

Form 3160-3
(June 2015)FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER 1b. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other 1c. Type of Completion: ☐ Hydraulic Fracturing ☒ Single Zone ☐ Multiple Zone		5. Lease Serial No. NMSF078763 6. If Indian, Allottee or Tribe Name 7. If Unit or CA Agreement, Name and No. NMNM078407E/ROSA UNIT 8. Lease Name and Well No. ROSA UNIT 690H 9. API Well No. 30-039-31494
2. Name of Operator LOGOS OPERATING LLC 3a. Address 2010 AFTON PLACE, FARMINGTON, NM 87401 3b. Phone No. (include area code) (505) 278-8720		10. Field and Pool, or Exploratory BASIN MANCOS/BASIN MANCOS 11. Sec., T. R. M. or Blk. and Survey or Area SEC 8/T31N/R5W/NMP
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface NWNE / 748 FNL / 1950 FEL / LAT 36.9192 / LONG -107.383422 At proposed prod. zone NESE / 2318 FSL / 116 FEL / LAT 36.927591 / LONG -107.341131		12. County or Parish RIO ARRIBA 13. State NM
14. Distance in miles and direction from nearest town or post office* 38 miles		15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 116 feet 16. No of acres in lease 17. Spacing Unit dedicated to this well 1104.64
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 20 feet		19. Proposed Depth 6982 feet / 20176 feet 20. BLM/BIA Bond No. in file FED:
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6347 feet		22. Approximate date work will start* 04/01/2025 23. Estimated duration 65 days
24. Attachments		

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

- | | |
|---|---|
| 1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office). | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM. |
|---|---|

25. Signature (Electronic Submission) Title REGULATORY SPECIALIST	Name (Printed/Typed) LACEY GRANILLO / Ph: (505) 324-4145	Date 11/21/2023
Approved by (Signature) (Electronic Submission) Title AFM-Minerals	Name (Printed/Typed) DAVE J MANKIEWICZ / Ph: (505) 564-7761 Office Farmington Field Office	Date 06/05/2025

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)



Approval Date: 06/05/2025

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM I: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM connects this information to a new evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

Additional Operator Remarks

Location of Well

0. SHL: NWNE / 748 FNL / 1950 FEL / TWSP: 31N / RANGE: 5W / SECTION: 8 / LAT: 36.9192 / LONG: -107.383422 (TVD: 0 feet, MD: 0 feet)
PPP: NWSW / 2317 FSL / 0 FWL / TWSP: 31N / RANGE: 5W / SECTION: 4 / LAT: 36.92761 / LONG: -107.376762 (TVD: 0 feet, MD: 0 feet)
PPP: NWSW / 2343 FSL / 0 FWL / TWSP: 31N / RANGE: 5W / SECTION: 3 / LAT: 36.927683 / LONG: -107.358737 (TVD: 0 feet, MD: 0 feet)
PPP: NESE / 2307 FSL / 367 FEL / TWSP: 31N / RANGE: 5W / SECTION: 5 / LAT: 36.927583 / LONG: -107.378016 (TVD: 0 feet, MD: 0 feet)
PPP: NWSE / 1886 FSL / 1343 FEL / TWSP: 31N / RANGE: 5W / SECTION: 5 / LAT: 36.926432 / LONG: -107.381353 (TVD: 0 feet, MD: 0 feet)
PPP: NESW / 2366 FSL / 1883 FWL / TWSP: 31N / RANGE: 5W / SECTION: 4 / LAT: 36.927744 / LONG: -107.369719 (TVD: 0 feet, MD: 0 feet)
PPP: NWSE / 1393 FSL / 1836 FEL / TWSP: 31N / RANGE: 5W / SECTION: 5 / LAT: 36.92508 / LONG: -107.383038 (TVD: 6991 feet, MD: 7610 feet)
BHL: NESE / 2318 FSL / 116 FEL / TWSP: 31N / RANGE: 5W / SECTION: 3 / LAT: 36.927591 / LONG: -107.341131 (TVD: 6982 feet, MD: 20176 feet)

BLM Point of Contact

Name: CHRISTOPHER P WENMAN
Title: Natural Resource Specialist
Phone: (505) 564-7727
Email: cwenman@blm.gov

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

CONFIDENTIAL

Conditions of Approval

Operator: LOGOS Resources, LLC (LOGOS)
Well Names: Rosa Unit Pad 34 Natural Gas Wells Project
Legal Location: Sec 8 T31N R5W, Rio Arriba County, NM
NEPA Log Number: DOI-BLM-NM-F010-2025-0013-EA
Onsite Date: July 18, 2023
Lease Number: NMSF078763

The following conditions of approval will apply to LOGOS Rosa Unit Pad 34 Natural Gas Wells Project, and other associated facilities, unless a particular Surface Managing Agency or private surface owner has supplied to Bureau of Land Management and the operator a contradictory environmental stipulation. The failure of the operator to comply with these requirements may result in an assessment or civil penalties pursuant to 43 CFR 3163.1 or 3163.2.

1. **Disclaimers:** BLM's approval of the APD does not relieve the lessee and operator from obtaining any other authorizations that may be required by the BIA, Navajo Tribe, State, or other jurisdictional entities.
2. **Copy of Plans:** A complete copy of the APD package, including Surface Use Plan of Operations, Bare Soil Reclamation Plan, Plan of Development (if required), Conditions of Approval, Cultural Resource Record of Review, Cultural Resources Compliance Form (if required), and Project Stipulations (if required) shall be at the project area at all times and available to all persons.
3. **Review of NEPA documents:** It is the responsibility of the operator to follow all the design features, best management practices, and mitigation measures as contained in the Environmental Assessment DOI-BLM-NM-F010-2025-0013-EA, which contains additional design features and best management practices that must be followed. Copies of the EA, Decision Record, and Finding of No Significant Impact may be obtained from the BLM FFO public room, or online at: [EplanningUi \(blm.gov\)](https://www.blm.gov/planning).
4. **Best Management Practices (BMPs):** Farmington Field Office established environmental Best Management Practices (BMP's) will be followed during construction and reclamation of well site pads, access roads, pipeline ties, facility placement or any other surface disturbing activity associated with this project. Bureau wide standard BMP's are found in the Gold Book, Fourth Edition-Revised 2007. Farmington Field Office BMP's are integrated into the Environmental Assessment, Surface Use Plan of Operations, Bare Soil Reclamation Plan, and COAs.

Construction, Production, Facilities, Reclamation & Maintenance

5. **Construction & Reclamation Notification:** The operator or their contractor will contact the Bureau of Land Management, Farmington Field Office Environmental Protection Staff at (505) 564-7600 or by email, at least 48 hours prior to any construction or reclamation on this project. The operator or their contractor will contact the grazing permittee to give notice at least 10 days prior to start of construction operations.

6. **Grazing Allotments, Permittee Notification, and Concerns:** The operator will notify the grazing lease operator of the Rosa Community allotment at least ten business days prior to beginning any construction activity to ensure there will be no conflicts between construction activities and livestock grazing operations. The operator is not obligated to cease or delay construction unless directed by the Authorized Officer (AO). Any range improvement (fences, pipelines, ponds, etc.) disturbed by construction activities will be repaired immediately following construction and will be repaired to the condition the improvement was in prior to disturbance. Cattle guards will be installed to replace any livestock fencing or gates removed for road construction. No cattle guards needed. If fencing has to be temporarily open to place layflat, ensure fencing secured.
7. **Livestock Grazing:** Cattle are in allotment between 5/1 and 10/31. Industry may need to coordinate with permittee if concerns of livestock in area during construction.
8. **Production Facilities:** As marked in the APD, design and layout of facilities will be deferred until an onsite with BLM-FFO surface protection staff is conducted to determine the best location. LOGOS or their contractor will contact the Bureau of Land Management, Farmington Field Office, Surface, and Environmental Protection Staff (505) 564-7600 to schedule a facility layout onsite.
9. **Open Trenches:** No more than ½ mile of trench or the amount of trench that can be worked in one day will be open at any given time.
10. **Staking:** The holder shall place slope stakes, culvert location and grade stakes, and other construction control stakes as deemed necessary by the authorized officer to ensure construction in accordance with the plan of development. If stakes are disturbed, they shall be replaced before proceeding with construction.
11. **Weather:** No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts more than 6 inches deep, the soil shall be deemed too wet.
12. **Stockpile of Soil:** The top 6 inches of soil material will be stripped and stockpiled in the construction zones around the pad [construction zones may be restricted or deleted to provide resource avoidance]. The stockpiled soil will be free of brush and tree limbs, trunks, and roots. The stockpiled soil material will be spread on the reclaimed portions of the pad [including the reserve pit, cut and fill slopes] prior to re-seeding. Spreading shall not be done when the ground or topsoil is frozen or wet.
13. **Painting of Equipment:** Within 90 days of installation, all above ground structures not subject to safety requirements shall be painted by the Holder to blend with the natural color of the landscape. A reflective material may be used to reduce hazards that may occur when such structures are near roads. Otherwise, the paint use shall be a non-glare, non-reflective, non-chalking color of: Federal 595a-34127 (Juniper Green)
14. **Storage Tanks:** All open top permanent production or storage tanks regardless of diameter made of fiberglass, steel, or other material used for the containment of oil,

condensate, produced water and or other production waste shall be screened, netted, or otherwise covered to protect migratory birds and other wildlife from access.

15. **Compressors:** Compressor units on this well location not equipped with a drip pan for containment of fluids shall be lined with an impervious material at least 8 mils thick and a 12-inch berm. The compressor will be painted to match the well facilities. Any variance to this will be approved by the Authorized Officer (AO). Noise mitigation may be required at the time of compressor installation.
16. **Acquisition of Water:** Water acquired to construct, produce, and maintain actions authorized by this permit to drill must be acquired from permitted water sources, or water authorized for use by the New Mexico Oil Conservation Division (OCD). Upon request the AO shall be provided with documentation of water sources.
17. **Culverts:** No culverts smaller than 18" will be installed. Silt Traps/Bell Holes will be built upstream of all culvert locations. Rip-rap will be placed at the downstream end of all culverts to prevent undercutting.
18. **Driving Surface Area:** All activities associated within the construction, operation, maintenance, and abandonment of the well location is limited to areas approved in the APD or ROW permit. During the production of the well, vehicular traffic is limited to the daily driving surface area established during interim reclamation construction operations. This area typically forms a keyhole or teardrop driving surface from which all production facilities may be serviced or inspected. A v-type ditch will be constructed on the outside of the driving surface to further define the driving surface and to deter vehicular traffic from entering onto the interim reclamation areas.
19. **Berms:** Berms or firewalls will be constructed around all storage facilities sufficient in size to contain the storage capacity of 110% of the largest tank, or 110% of the combined capacity of tanks if a rupture could drain more than one tank. Berm walls will be compacted with appropriate equipment to assure proper construction. Metal containment barriers, used for secondary containment, will be properly installed, per the manufacturer directions.
20. **Contouring of Cut and Fill Slopes:** The interim cut and fill slope grade shall be as close to the original contour as possible. To obtain this ratio, pits and slopes shall be back sloped into the pad during interim reclamation. Only subsurface soil and material shall be utilized in the contouring of the cut and fill slopes. Under no circumstances shall topsoil be utilized as substrate material for contouring of cut and fill slopes.
21. **Seed Mix:** The Pinyon/Juniper Seed Mix will be used for interim and final reclamation. The SUPO in the approved APD contains information on the specific seed mix and application rate. Seeding shall be accomplished within 120 days after final construction (time frame may be extended on a case-by-case basis with AO approval). Seeding shall be repeated if a satisfactory stand is not obtained as determined by the AO upon evaluation after the second growing season.
22. **Maintenance:** In order to perform subsequent well operations, right-of-way (ROW) operations, or install new/additional equipment, it may be necessary to drive, park, and

operate on restored, interim vegetation within the previously disturbed area. This is generally acceptable provided damage is promptly repaired and reclaimed following use. Where vehicular travel has occurred as a “convenience” and interim reclamation/vegetation has been compromised, immediate remediation of the affected areas is required. Additionally, where erosion has occurred and compromised the reclamation of the well location, the affected area must be promptly remediated so that future erosion is prevented, and the landform is stabilized.

23. **Non-Permitted Disturbance:** Construction maintenance or any other activity outside the areas permitted by the APO will require additional approval and may require a new cultural survey and clearance.
24. **Layflat Lines:** Layflat lines used for development of the wells may be on the ground for a maximum of 6 months and shall be retrieved within 30 days of ending completion operations. If the layflat lines are needed for longer than 6 months or cannot be retrieved within 30 days of ending completion operations, a Sundry NOI shall be submitted to the BLM FFO for review and decision that includes a rationale for the time extension.
25. **“Hotwork” and Construction Affecting Fire Safety:** The holder or its contractors will notify the BLM of any fires and comply with all rules and regulations administered by the BLM concerning the use, prevention and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The holder or its contractors may be held liable for the cost of fire suppression, stabilization and rehabilitation. In the event of a fire, personal safety will be the first priority of the holder or its contractors.
- The holder or its contractors shall:
- a. Operate all internal and external combustion engines (including off-highway vehicles, chainsaws, generators, heavy equipment, etc.) with a qualified spark arrester. Qualified spark arresters are maintained and not modified, and meet the Society of Automotive Engineers (SAE) Recommended Practices J335 or J350. Refer to 43 CFR §8343.1.
 - a. *Refueling of any combustible engine equipment must be minimum of 3 meters away from any ignition source (open flame, smoking, etc.).*
 - b. Maintain and clean all equipment regularly to remove flammable debris buildup and prevent fluid leaks that can lead to ignitions.
 - c. Carry at least one shovel or wildland fire hand tool (combi, Pulaski, McLeod) per person working, minimum 5 gallons of water, and a fire extinguisher rated at a minimum as ABC - 10 pound on each piece of equipment and each vehicle.
 - d. When conducting “hotwork” such as, but not limited to welding, grinding, cutting, spark-producing work with metal, work that creates hot material or slag; choose an area large enough to contain all hot material that is naturally free of all flammable vegetation or remove the flammable vegetation in a manner compliant with the permitted activity. If adequate clearance cannot be made, wet an area large enough to contain all hot material prior to the activity and periodically throughout the activity to reduce the risk of wildfire ignition. Regardless of clearance, maintain readiness to respond to an ignition at all times. In addition, keep one hand tool per person and at least one fire extinguisher ready, minimum, as specified earlier (#3) during this activity.

- e. Keep apprised of current and forecasted weather at <https://www.weather.gov/abq/forecasts-fireweather-links> and fire conditions at www.wfas.net and take additional fire precautions when fire danger is rated High or greater. Red Flag Warnings are issued by the National Weather Service when fire conditions are most dangerous, and ignitions escape control quickly. Extra precautions are required during these warnings such as additional water, designate a fire watch/patrol and tools. If work is being conducted in an area that is not clear of vegetation within 50 feet of work area; then, when fire danger is rated High or greater and 1. There is a predicted Red Flag warning for your area or 2. If winds are predicted to be greater than 10 mph, stop all hotwork activities for the day at 10 am.
- f. In the event of an ignition, initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If a fire spreads beyond the capability of workers with the stipulated tools, all will cease fire suppression action and leave the area immediately via pre-identified escape routes.
- g. Call **911** or the **Taos Interagency Fire Dispatch Center (575-758-6208)** immediately of the location and status of any fire.

AND

Notify the respective BLM field office for which the permit or contract was issued immediately of the incident.

Farmington Field Office at 505-564-7600

Taos Field Office at 575-758-8851

26. **Noxious Weeds:** Inventory the proposed site for the presence of noxious and invasive weeds. Noxious weeds are those listed on the New Mexico Noxious Weed List and USDA's Federal Noxious Weed List. The New Mexico Noxious Weed List or USDA's Noxious Weed List can be updated at any time and should be regularly check for any changes. Invasive species may or may not be listed as a noxious weed but have been identified to likely cause economic or environmental harm or harm to human health. The following noxious weeds have been identified as occurring on lands within the boundaries of the Farmington Field Office (FFO). There are numerous invasive species on the FFO such as Russian thistle (*Salsola spp.*) and field bindweed (*Convolvulus arvensis*).

Russian Knapweed (<i>Centaurea repens</i>)	Musk Thistle (<i>Carduus nutans</i>)
Bull Thistle (<i>Cirsium vulgare</i>)	Canada Thistle (<i>Cirsium arvense</i>)
Scotch Thistle (<i>Onopordum acanthium</i>)	Hoary Cress (<i>Cardaria draba</i>)
Perennial Pepperweed (<i>Lepidium latifolium</i>)	Halogeton (<i>Halogeton glomeratus</i>)
Spotted Knapweed (<i>Centaurea maculosa</i>)	Dalmation Toadflax (<i>Linaria genistifolia</i>)
Yellow Toadflax (<i>Linaria vulgaris</i>)	Camelthorn (<i>Alhagi pseudalhagi</i>)
African Rue (<i>Peganum harmala</i>)	Salt Cedar (<i>Tamarix spp.</i>)
Diffuse Knapweed (<i>Centaurea diffusa</i>)	Leafy Spurge (<i>Euphorbia esula</i>)

- a. Identified weeds will be treated prior to new surface disturbance if determined by the FFO Noxious Weed Coordinator. A Pesticide Use Proposal (PUP) must be

- submitted to and approved by the FFO Noxious Weed Coordinator prior to application of pesticide. The FFO Noxious Weeds Coordinator (505-564-7600) can provide assistance in the development of the PUP.
- b. Vehicles and equipment should be inspected and cleaned prior to coming onto the work site. This is especially important on vehicles from out of state or if coming from a weed-infested site.
 - c. Construction equipment should be inspected and cleaned prior to coming onto the work site. This is especially important on vehicles from out of state or if coming from a weed-infested site.
 - d. Fill dirt or gravel may be needed for excavation, road construction/repair, or for spill remediation. If fill dirt or gravel will be required, the source shall be noxious weed free and approved by the FFO Noxious Weed Coordinator.
 - e. The site shall be monitored for the life of the project for the presence of noxious weeds (includes maintenance and construction activities). If weeds are found the FFO Coordinator shall be notified at (505) 564-7600 and provided with a Weed Management Plan and if necessary, a Pesticide Use Proposal (PUP) . The FFO Coordinator can provide assistance developing the Weed Management Plan and/or the Pesticide Use Proposal.
 - f. Only pesticides authorized for use on BLM lands would be used and applied by a licensed pesticide applicator. The use of pesticides would comply with federal and state laws and used only in accordance with their registered use and limitations. (Company Name)'s weed-control contractor would contact the BLM-FFO prior to using these chemicals.
 - g. Noxious/invasive weed treatments must be reported to the FFO Noxious Weed Coordinator. A Pesticide Application Record (PAR) is required to report any mechanical, chemical, biological or cultural treatments used to eradicate, and/or control noxious or invasive species. Reporting will be required quarterly and annually or per request from the FFO Noxious Weed Coordinator.
27. **Bare ground vegetation trim-out:** If bare ground vegetation treatment (trim-out) is desired around facility structures, the operator will submit a bare ground/trim-out design included in their Surface Use Plan of Operations (SUPO). The design will address vegetation safety concerns of the operator and BLM while minimizing impacts to interim reclamation efforts. The design must include what structures to be treated and buffer distances of trim-out. Pesticide use for vegetation control around anchor structures is not approved. If pesticides are used for bare ground trim-out, the trim-out will not exceed three feet from the edge of any eligible permanent structure (i.e., well heads, fences, tanks). Additional distance/areas may be requested and must be approved by the FFO authorized officer. The additional information below must also be provided to the FFO:
- a. Pesticide use for trim out will require a Pesticide Use Proposal (PUP). A PUP is required **prior** to any treatment and must be approved by the FFO Noxious Weed Coordinator. Only pesticides authorized for use on BLM lands would be used and applied by a licensed pesticide applicator. The use of pesticides would comply with federal and state laws and used only in accordance with their registered use and limitations. LOGOS' weed-control contractor would contact the BLM-FFO prior to using these chemicals and provide Pesticide Use Reports (PURs) post treatment.

- b. A Pesticide Use Report (PUR) or a Biological Use Report (BUR) is required to report any chemical, or biological treatments used to eradicate, or control vegetation on site. Reporting will be required quarterly and annually or per request from the FFO Noxious Weed Coordinator.
28. **Paleontology:** Any paleontological resource discovered by the Operator, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant scientific values. The Holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the Authorized Officer after consulting with the Holder.
29. **Visual Resources:** Dark Sky COAs need to be applied to existing lighting, which is not dark sky friendly and to any additional lights added as part of pad expansion. All permanent lighting will use full cutoff luminaires, which are fully shielded (i.e., not emitting direct or indirect light above an imaginary horizontal plane passing through the lowest part of the light source). All permanent lighting will be pointed straight down at the ground in order to prevent light spill to the sides. All permanent lighting will be 4000° Kelvin or less with 3000° Kelvin preferred. Warmer light colors are less noticeable by humans and cause less impact to wildlife. All permanent lighting will be controlled by a switch and/or timer which allows the lights to be turned on when workers are on location during dark periods but will keep the lights off the majority of the time.
30. **Wildlife:** The proposed project is not anticipated to have significant impacts on small or big game species. However, the project is located within the BLM FFO-designated Rosa Mesa Wildlife Area, requiring a closure from December 1st through March 31st of each year. This stipulation applies only to construction, drilling, and completion activities. It does not apply to operation and maintenance of production facilities.
31. **Hazards:** Wildlife hazards associated with the proposed project would be fenced, covered, and/or contained in storage tanks, as necessary.
32. **Migratory Birds:** The BLM/FFO migratory bird policy requires a bird nest survey between May 15 - July 31 for any projects that would remove 4.0 or more acres or vegetation. The proposed project is estimated to disturb more than four acres of vegetation, a survey will be required if construction occurs within the specified timeframe. The operator would equip all open-top pits, tanks, ponds, and pipes containing hydrocarbons with nets, screens, or other avian exclusion devices to prevent injury or death to migratory birds (NTL-FFO/AUFO-2004-01, IM No. WO-2013-033, Onshore Order #7 III E-3). Exemptions to this stipulation would be made by the BLM/FFO Authorized Officer. Nest surveys will be conducted within 48 hours of scheduled construction by BLM/FFO personnel or approved biologist. Any active nests will require a disturbance buffer to eliminate impacts to nesting birds. Active nests will not be disturbed. Applicant will adhere to timing limitations and management measures if any new raptor nests are discovered within the project area. These timing limitations are species specific depending on the raptor that is discovered.

33. **Threatened, Endangered or Sensitive Species:** If, in operations the operator/holder discovers any Threatened, Endangered, or Sensitive species, work in the vicinity of the discovery will be suspended and the discovery promptly reported to the BLM-FFO T&E specialist at (505) 564-7600. The BLM-FFO will then specify what action is to be taken. Failure to notify the BLM-FFO about a discovery may result in civil or criminal penalties in accordance with The Endangered Species Act (as amended).

Cultural Resources

34. **Discovery of Cultural Resources in the Absence of Monitoring:** Discovery of Cultural Resources in the Absence of Monitoring: If, in its operations, operator/holder discovers any previously unidentified historic or prehistoric cultural resources, then work in the vicinity of the discovery will be suspended and the discovery promptly reported to BLM Field Manager. BLM will then specify what action is to be taken. If there is an approved "discovery plan" in place for the project, then the plan will be executed. In the absence of an approved plan, the BLM will evaluate the significance of the discovery in accordance with 36 CFR Section 800.13, in consultation with the appropriate State or Tribal Historic Preservation Officer(s) and Indian tribe(s) that might attach religious and cultural significance to the affected property, or in accordance with an approved program alternative. Minor recordation, stabilization, or data recovery may be performed by BLM or a third party acting on its behalf, such as a permitted cultural resources consultant. If warranted, more extensive archaeological or alternative mitigation, likely implemented by a permitted cultural resources consultant, may be required of the operator/holder prior to allowing the project to proceed. Further damage to significant cultural resources will not be allowed until any mitigations determined appropriate through the agency's Section 106 consultation are completed. Failure to notify the BLM about a discovery may result in civil or criminal penalties in accordance with the Archeological Resources Protection Act (ARPA) of 1979, as amended, the Native American Graves Protection and Repatriation Act (NAGRPA) of 1990, as amended, and other applicable laws.
35. **Discovery of Cultural Resources during Monitoring:** If monitoring confirms the presence of previously unidentified historic or prehistoric cultural resources, then work in the vicinity of the discovery will be suspended and the monitor will promptly report the discovery to the BLM Field Manager. BLM will then specify what action is to be taken. If there is an approved "discovery plan" in place for the project, then the plan will be executed. In the absence of an approved plan, the BLM will evaluate the significance of the discovery in accordance with 36 CFR Section 800.13, in consultation with the appropriate State or Tribal Historic Preservation Officer(s) and Indian tribe(s) that might attach religious and cultural significance to the affected property, or in accordance with an approved program alternative. Minor recordation, stabilization, or data recovery may be performed by BLM or a third party acting on its behalf, such as a permitted cultural resources consultant. If warranted, more extensive archaeological or alternative mitigation, likely implemented by a permitted cultural resources consultant, may be required of the operator/holder prior to allowing the project to proceed. Further damage to significant cultural resources will not be allowed until any mitigations determined appropriate through the agency's Section 106 consultation are completed.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Farmington District Office
6251 College Blvd, Suite A
Farmington, New Mexico 87402



In Reply Refer To:
3162.3-1(NMF0110)

* LOGOS OPERATING LLC
#690H ROSA UNIT
Lease: NMSF078763 Unit: NMNM78407E
SH: NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 8, T.31 N., R.5 W.
Rio Arriba County, New Mexico
BH: NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 3, T.31 N., R.5 W.
Rio Arriba County, New Mexico
***Above Data Required on Well Sign**

GENERAL REQUIREMENTS FOR OIL AND GAS OPERATIONS ON FEDERAL AND INDIAN LEASES

The following special requirements apply and are effective when **checked**:

- A. ☒ Note all surface/drilling conditions of approval attached.
- B. ☒ The required wait on cement (WOC) time will be a minimum of 500 psi compressive strength at 60 degrees. Blowout preventor (BOP) nipple-up operations may then be initiated
- C. ☒ Test all casing strings below the conductor casing to .22 psi/ft. of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield (burst) for a minimum of 30 minutes. If pressure declines more than 10 percent in 30 minutes, corrective action shall be taken.
- D. ☐ Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the Bureau of Land Management, New Mexico State Office, Reservoir Management Group, 301 Dinosaur Trail, Santa Fe, New Mexico 87508.
The effective date of the agreement must be **prior** to any sales.
- E. ☐ The use of co-flex hose is authorized contingent upon the following:
 1. From the BOP to the choke manifold: the co-flex hose must be hobbled on both ends and saddle to prevent whip.
 2. From the choke manifold to the discharge tank: the co-flex hoses must be as straight as practical, hobbled on both ends and anchored to prevent whip.
 3. The co-flex hose pressure rating must be at least commensurate with approved BOPE.

INTERIOR REGION 7 • UPPER COLORADO BASIN

COLORADO, NEW MEXICO, UTAH, WYOMING

I. GENERAL

- A. Full compliance with all applicable laws and regulations, with the approved Permit to drill, and with the approved Surface Use and Operations Plan is required. Lessees and/or operators are fully accountable for the actions of their contractors and subcontractors. Failure to comply with these requirements and the filing of required reports will result in strict enforcement pursuant to 43 CFR 3163.1 or 3163.2.
- B. Each well shall have a well sign in legible condition from spud date to final abandonment. The sign should show the operator's name, lease serial number, or unit name, well number, location of the well, and whether lease is Tribal or Allotted, (See 43 CFR 3162.6(b)).
- C. A complete copy of the approved Application for Permit to Drill, along with any conditions of approval, shall be available to authorized personnel at the drill site whenever active drilling operations are under way.
- D. For Wildcat wells only, a drilling operations progress report is to be submitted, to the BLM-Field Office, weekly from the spud date until the well is completed and the Well Completion Report is filed. The report should be on 8-1/2 x 11 inch paper, and each page should identify the well by; operator's name, well number, location and lease number.
- E. As soon as practical, notice is required of all blowouts, fires and accidents involving life-threatening injuries or loss of life. (See NTL-3A).
- F. BOP equipment (except the annular preventer) shall be tested utilizing a test plug to full working pressure for 10 minutes. No bleed-off of pressure is acceptable. (See 43 CFR 3172.6(b)(9)(ii)).
- G. The operator shall have sufficient weighting materials and lost circulation materials on location in the event of a pressure kick or in the event of lost circulation. (See 43 CFR 3172.8(a)).
- H. The flare line(s) discharge shall be located not less than 100 feet from the well head, having straight lines unless turns are targeted with running tees, and shall be positioned downwind of the prevailing wind direction and shall be anchored. The flare system shall have an effective method for ignition. Where noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and to maintain a continuous flare. (See 43 CFR 3172.8(b)(7)).
- I. Prior approval by the BLM-Authorized Office (Drilling and Production Section) is required for variance from the approved drilling program and before commencing plugging operations, plug back work, casing repair work, corrective cementing operations, or suspending drilling operations indefinitely. Emergency approval may be obtained orally, but such approval is contingent upon filing of a Notice of Intent sundry within three business days. **Any changes to the approved plan or any questions regarding drilling operations should be directed to BLM during regular business hours at 505-564-7600. Emergency program changes after hours should be directed to Virgil Lucero at 505-793-1836.**
- J. **The Inspection and Enforcement Section (I&E), phone number (505-564-7750) is to be notified at least 24 hours in advance of BOP test, spudding, cementing, or plugging operations so that a BLM representative may witness the operations.**
- K. Unless drilling operations are commenced within three years according to 43 CFR 3171.14, approval of the Application for Permit to Drill will expire. No extensions will be granted.

- L. From the time drilling operations are initiated and until drilling operations are completed, a member of the drilling crew or the tool pusher shall maintain rig surveillance at all times, unless the well is secured with blowout preventers or cement plugs.
- M. If for any reason, drilling operations are suspended for more than 90 days, a written notice must be provided to this office outlining your plans for this well.
- N. **Commingling:** No production (oil, gas, and water) from the subject well should start until Sundry Notices (if necessary) granting variances from applicable regulations as related to commingling and off-lease measurement are approved by this office. (See 43 CFR 3173.14)

II. REPORTING REQUIREMENTS

- A. For reporting purposes, all well Sundry notices, well completion and other well actions shall be referenced by the appropriate lease, communitization agreement and/or unit agreement numbers.
- B. The following reports shall be filed with the BLM-Authorized Officer online through AFMSS 2 within 30 days after the work is completed.
 - 1. Provide complete information concerning.
 - a. Setting of each string of casing. Show size and depth of hole, grade and weight of casing, depth set, depth of all cementing tools that are used, amount (in cubic feet) and types of cement used, whether cement circulated to surface and all cement tops in the casing annulus, casing test method and results, and the date work was done. Show spud date on first report submitted.
 - b. Intervals tested, perforated (include size, number and location of perforations), acidized, or fractured; and results obtained. Provide date work was done on well completion report and completion sundry notice.
 - c. Subsequent Report of Abandonment, show the way the well was plugged, including depths where casing was cut and pulled, intervals (by depths) where cement plugs were replaced, and dates of the operations.
 - 2. Well Completion Report will be submitted with 30 days after well has been completed.
 - a. Initial Bottom Hole Pressure (BHP) for the producing formations. Show the BHP on the completion report. The pressure may be: 1) measured with a bottom hole bomb, or; 2) calculated based on shut in surface pressures (minimum seven day buildup) and fluid level shot.
 - 3. Submit a cement evaluation log if cement is not circulated to surface.
- C. Production Startup Notification is required no later than the 5th business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site or resumes production in the case of a well which has been off production for more than 90 days. The operator shall notify the Authorized Officer by letter or Sundry Notice, Form 3160-5, or orally to be followed by a letter or Sundry Notice, of the date on which such production has begun or resumed. CFR 43 3162.4-1(c).

III. DRILLER'S LOG

The following shall be entered in the daily driller's log: 1) Blowout preventer pressures tests, including test pressures and results, 2) Blowout preventer tests for proper functioning, 3) Blowout prevention drills conducted, 4) Casing run, including size, grade, weight, and depth set, 5) How pipe was cemented, including amount of cement, type, whether cement circulated to surface, location of cementing tools, etc., 6) Waiting on cement time for each casing string, 7) Casing pressure tests after cementing, including test pressure and results, and 8) Estimated amounts of oil and gas recovered and/or produced during drill stem test.

IV. GAS FLARING

Gas produced from this well may not be vented or flared beyond an initial, authorized test period of * Days, 20 MMCF following its (completion)(recompletion), or flowback has been routed to the production separator, whichever first occurs, without the prior, written approval of the authorized officer in accordance with 43 CFR 3179.81. Should gas be vented or flared without approval beyond the test period authorized above, you may be directed to shut-in the well until the gas can be captured or approval to continue venting or flaring as uneconomic is granted. You shall be required to compensate the lessor for the portion of the gas vented or flared without approval which is determined to have been avoidably lost.

*30 days, unless a longer test period is specifically approved by the authorized officer. The 30-day period will commence upon the beginning of flowback following completion or recompletion.

V. SAFETY

- A. All rig heating stoves are to be of the explosion-proof type.
- B. Rig safety lines are to be installed.
- C. Hard hats and other Personal Protective Equipment (PPE) must be utilized.

VI. CHANGE OF PLANS OR ABANDONMENT

- A. Any changes of plans required to mitigate unanticipated conditions encountered during drilling operations, will require approval as set forth in Section 1.I.
- B. If the well is dry, it is to be plugged in accordance with 43 CFR 3162.3-4, approval of the proposed plugging program is required as set forth in Section 1.I. The report should show the total depth reached, the reason for plugging, and the proposed intervals, by depths, where cement plugs are to be placed, type of plugging mud, etc. A Subsequent Report of Abandonment is required as set forth in Section II.B.1c.
- C. Unless a well has been properly cased and cemented, or properly plugged, the drilling rig must not be moved from the drill site without prior approval from the BLM-Authorized Officer.

VII. PHONE NUMBERS

- A. For BOPE tests, cementing, and plugging operations the phone number is 505-564-7750 and must be called 24 hours in advance in order that a BLM representative may witness the operations.
- B. Emergency program changes after hours contact:

Virgil Lucero (505) 793-1836
Kenneth Rennick (505) 564-7742
Matthew Kade (505) 564-7736

C-102 Submit Electronically Via OCD Permitting	State of New Mexico Energy, Minerals & Natural Resources Department OIL CONSERVATION DIVISION	Revised July 9, 2024	
		Submittal Type	☒ Initial Submittal
			☐ Amended Report
		☐ As Drilled	

WELL LOCATION INFORMATION

API Number 30-039-31494	Pool Code 97232	Pool Name BASIN MANCOS
Property Code 320608	Property Name ROSA UNIT	Well Number 690H
OGRID No. 289408	Operator Name LOGOS OPERATING, LLC	Ground Level Elevation 6347'
Surface Owner: ☐ State ☐ Fee ☐ Tribal ☒ Federal		Mineral Owner: ☐ State ☐ Fee ☐ Tribal ☒ Federal

Surface Location

UL B	Section 8	Township 31N	Range 5W	Lot	Feet from N/S Line 748' NORTH	Feet from E/W Line 1950' EAST	Latitude 36.919200 °N	Longitude -107.383422 °W	County RIO ARRIBA
---------	--------------	-----------------	-------------	-----	----------------------------------	----------------------------------	--------------------------	-----------------------------	----------------------

Bottom Hole Location

UL I	Section 3	Township 31N	Range 5W	Lot	Feet from N/S Line 2318' SOUTH	Feet from E/W Line 116' EAST	Latitude 36.927591 °N	Longitude -107.341131 °W	County RIO ARRIBA
---------	--------------	-----------------	-------------	-----	-----------------------------------	---------------------------------	--------------------------	-----------------------------	----------------------

Dedicated Acres 1104.64	Penetrated Spacing Unit: Entire Sections 3, 4 & 5, T31N, R5W	Infill or Defining Well INFILL	Defining Well API	Overlapping Spacing Unit ☐ Yes ☒ No	Consolidation Code UNITIZATION
Order Numbers R-13457			Well setbacks are under Common Ownership: ☐ Yes ☒ No		

Kick Off Point (KOP)

UL O	Section 5	Township 31N	Range 5W	Lot	Feet from N/S Line 896' SOUTH	Feet from E/W Line 2238' EAST	Latitude 36.923717 °N	Longitude -107.384414 °W	County RIO ARRIBA
---------	--------------	-----------------	-------------	-----	----------------------------------	----------------------------------	--------------------------	-----------------------------	----------------------

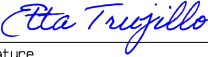
First Take Point (FTP)

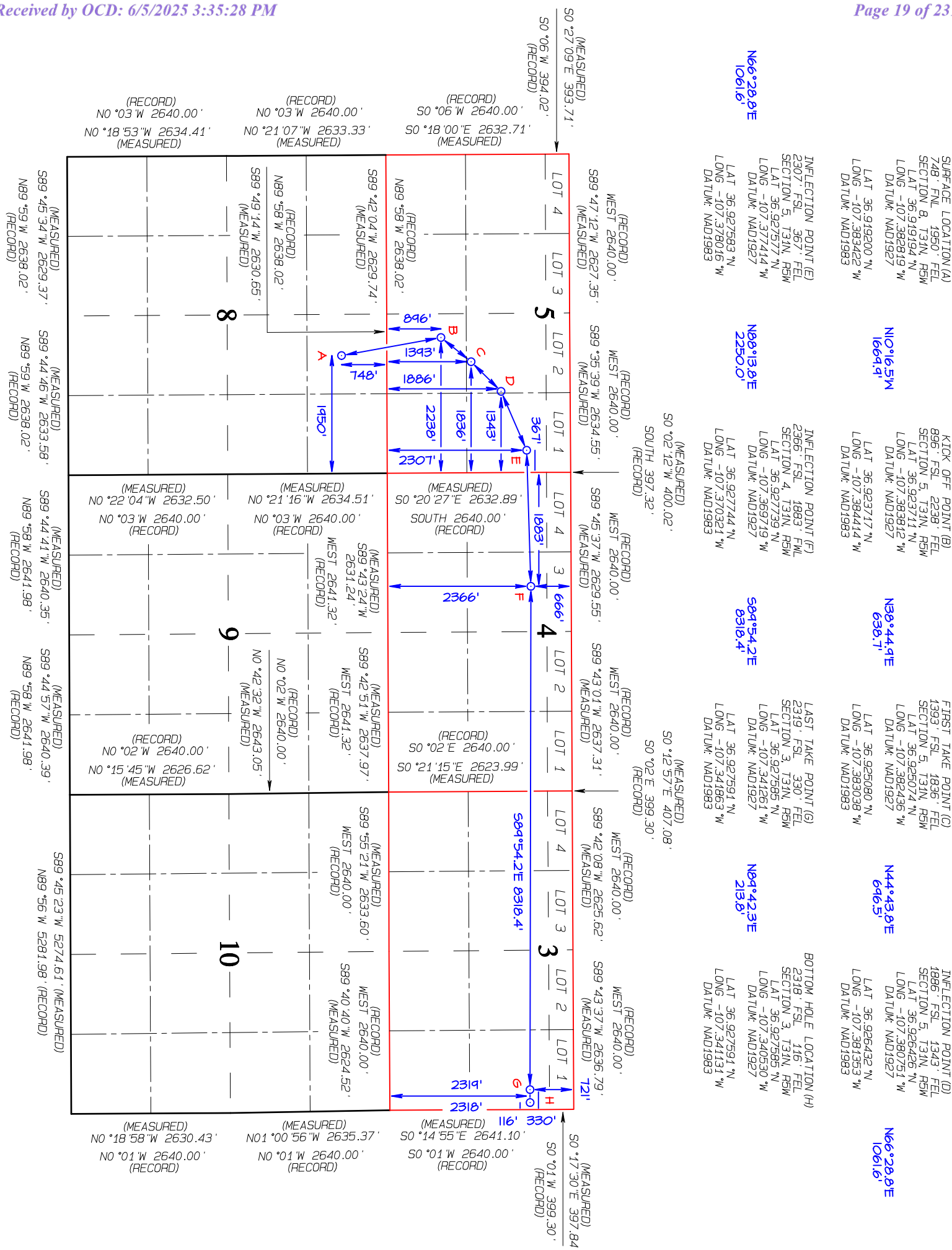
UL J	Section 5	Township 31N	Range 5W	Lot	Feet from N/S Line 1393' SOUTH	Feet from E/W Line 1836' EAST	Latitude 36.925080 °N	Longitude -107.383038 °W	County RIO ARRIBA
---------	--------------	-----------------	-------------	-----	-----------------------------------	----------------------------------	--------------------------	-----------------------------	----------------------

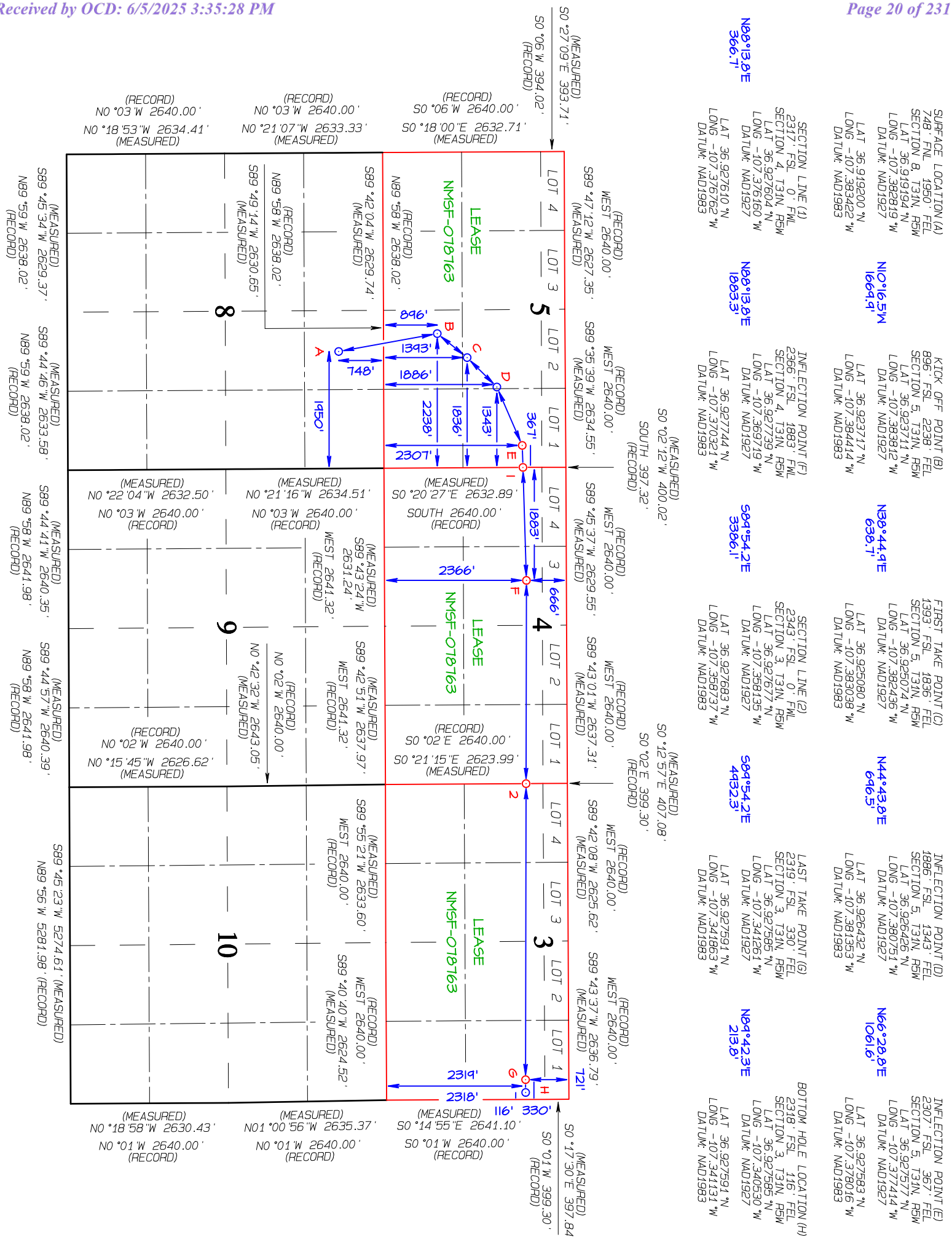
Last Take Point (LTP)

UL I	Section 3	Township 31N	Range 5W	Lot	Feet from N/S Line 2319' SOUTH	Feet from E/W Line 330' EAST	Latitude 36.927591 °N	Longitude -107.341863 °W	County RIO ARRIBA
---------	--------------	-----------------	-------------	-----	-----------------------------------	---------------------------------	--------------------------	-----------------------------	----------------------

Unitized Area or Area of Uniform Interest ROSA UNIT	Spacing Unit Type ☒ Horizontal ☐ Vertical ☐ Directional	Ground Floor Elevation 6317'
--	--	---------------------------------

OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and, if the well is a vertical or directional well, that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of a working interest or unleased mineral interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. If this well is a horizontal well, I further certify that this organization has received the consent of at least one lessee or owner of a working interest or unleased mineral interest in each tract (in the target pool or formation) in which any part of the well's completed interval will be located or obtained a compulsory pooling order from the division.  Signature 12/12/2024 Date Etta Trujillo Printed Name etrujillo@logosresourcesllc.com E-mail Address	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.  JASON C. EDWARDS Signature and Seal of Professional Surveyor Certificate Number 15269 Date of Survey DECEMBER 20, 2022
--	--





State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

Section 1 – Plan Description Effective May 25, 2021

I. Operator: LOGOS Operating, LLC **OGRID:** 289408 **Date:** 1 / 29 / 2025

II. Type: ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: _____

III. Well(s): Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Rosa Unit 672H	30-039-pending	B-8-31N-5W	713'FNL, 1931'FWL	N/A	23,527	771
Rosa Unit 674H	30-039-pending	B-8-31N-5W	713'FNL, 1941'FEL	N/A	22,790	746
Rosa Unit 690H	30-039-pending	B-8-31N-5W	748'FNL, 1950'FEL	N/A	17,013	609
Rosa Unit 692H	30-039-pending	B-8-31N-5W	766'FNL, 1960'FEL	N/A	18,265	597
Rosa Unit 694H	30-039-pending	B-8-31N-5W	783'FNL, 1970'FEL	N/A	22,790	746
Rosa Unit 696H	30-039-pending	B-8-31N-5W	801'FNL, 1980'FEL	N/A	16,661	597

IV. Central Delivery Point Name: Harvest Gathering System [See 19.15.27.9(D)(1) NMAC]

V. Anticipated Schedule: Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Rosa Unit 672H	30-039-pending	Pending	Pending	Pending	Pending	Pending
Rosa Unit 674H	30-039-pending	Pending	Pending	Pending	Pending	Pending
Rosa Unit 690H	30-039-pending	Pending	Pending	Pending	Pending	Pending
Rosa Unit 692H	30-039-pending	Pending	Pending	Pending	Pending	Pending
Rosa Unit 694H	30-039-pending	Pending	Pending	Pending	Pending	Pending
Rosa Unit 696H	30-039-pending	Pending	Pending	Pending	Pending	Pending

VI. Separation Equipment: ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

VII. Operational Practices: ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

VIII. Best Management Practices: ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

Section 2 – Enhanced Plan**EFFECTIVE APRIL 1, 2022**

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

☒ Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

IX. Anticipated Natural Gas Production:

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

X. Natural Gas Gathering System (NGGS):

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

XI. Map. ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

XII. Line Capacity. The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

XIII. Line Pressure. Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

XIV. Confidentiality: ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.

Section 3 - Certifications

Effective May 25, 2021

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system.

If Operator checks this box, Operator will select one of the following:

Well Shut-In. ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

Venting and Flaring Plan. ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

Section 4 - Notices

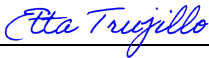
1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature:	
Printed Name:	Etta Trujillo
Title:	Regulatory Specialist II
E-mail Address:	etrujillo@logosresourcesllc.com
Date:	1/28/2025
Phone:	(505) 324-4154
OIL CONSERVATION DIVISION (Only applicable when submitted as a standalone form)	
Approved By:	
Title:	
Approval Date:	
Conditions of Approval:	

VI. Separation Equipment

The operator will select separation equipment for the maximum anticipated throughput and pressure to optimize gas capture. Separation equipment is sized according to manufacturer's design specifications. Separation vessels are built following the A.S.M.E. section VII division 1 codes for pressure vessel design, fabrication, inspection, testing and certification. Anticipated well pressures and production rates are evaluated to select separation equipment according to the equipment's designed operating pressure and throughput.

After completion, the operator utilizes flowback equipment, including separators, to manage wellbore fluids and solids during the initial separation period. After the initial flowback period is complete the operator utilizes iterative facility separation equipment to ensure that optimal separation is achieved.

VII. Operational Practices 19.15.27.8 NMAC A through F

- A. The operator will maximize the recovery of natural gas and minimize the amount of gas vented or flared when technically and safely feasible as further described and detailed within the following subsections (B-F of 19.15.27.8). In all cases where natural gas venting and flaring requires regulatory reporting, reporting will be submitted accurately and within the required time frames.
- B. Venting and flaring during drilling operations:
 - a. New Drill HZ Oil Wells: The operator drills wells in the area by utilizing a balanced mud to safely drill the wellbore. This technique prevents gas from coming to surface during the drilling process. If there is an emergency or malfunction and natural gas does come to surface the natural gas will be captured or combusted, with an appropriately sized and located flare stack, if technically and safely feasible.
 - b. New Drill HZ Gas Wells: The operator drills wells in the area by balancing the mud weight to safely drill the wellbore with as minimal flaring as possible. When gas kicks enter the wellbore, sometimes it is necessary to circulate it out of the wellbore to an appropriately sized and located flare stack. The operator will estimate the volume flared and appropriately report.
- C. Venting and flaring during completion or recompletion operations:
 - a. New Drill HZ Oil Wells: The operator's facilities are designed to handle the maximum throughput and pressures from the newly drilled and completed wellbores. The amount of gas vented and flared will be minimized when technically and safely feasible. During initial flowback and initial separation flowback the operator will utilize contracted flowback equipment, including separators, to manage wellbore fluids and solids. The initial flowback period will be minimized and flow will be sent to separation equipment as soon as possible to reduce the amount of gas that is vented to atmosphere. During the separation flowback period natural gas will be routed to a properly sized and located flare until the natural gas is of pipeline quality (less than 60 days). The natural gas will also be utilized on site as needed for fuel gas or injection gas.
 - b. New Drill HZ Gas Wells: The operator's facilities are designed to handle the maximum throughput and pressures from the newly drilled and completed wellbores. The amount of gas vented and flared will be minimized when technically and safely feasible. During

initial flowback and initial separation flowback the operator will utilize contracted flowback equipment, including separators, to manage wellbore fluids and solids. The initial flowback period will be minimized and flow will be sent to separation equipment as soon as possible to reduce the amount of gas that is vented to atmosphere. The natural gas will be utilized on site as needed for fuel gas and natural gas will be sold.

D. Venting and flaring during production operations:

- a. New Drill HZ Oil Wells: The operator's facilities are designed to handle the maximum throughput and pressures from producing wellbores. The amount of gas vented and flared will be minimized when technically and safely feasible. This facility will operate under a notice of intent (NOI) from the New Mexico Environment Department (NMED).

Operations will effectively manage the following scenarios to minimize the quantity of natural gas that is vented or flared:

- (a) If there is an emergency or malfunction, vented or flared natural gas will be reported, if required, and the emergency or malfunction will be resolved as soon as technically and safely feasible.
- (b) If the wellbore requires liquids to be unloaded to atmosphere, the operator will not vent the well after the well has achieved a stabilized rate and pressure. The operator will remain on site during unloading. Plunger lift systems will be optimized to reduce the amount of natural gas venting. Downhole maintenance, such as workovers, swabbing, etc. will only be conducted as needed and best management practices will be utilized to reduce venting of natural gas.
- (c) The operator will minimize the amount of time that natural gas is vented to atmosphere from gauging and sampling a storage tank or low-pressure vessel, automatic tank gauges will be the primary means of gauging with minor exceptions.
- (d) The operator will reduce the amount of time needed for loading out liquids from a storage tanks or other low-pressure vessels whenever feasible. Operations will utilize a LACT system when available to minimize gas vented during oil tank loading.
- (e) Equipment will be repaired and maintained routinely to minimize the venting or flaring of natural gas. Repairs and maintenance will be conducted in a manner that minimizes the amount of natural gas vented to atmosphere through the isolation of the equipment that is being repaired or maintained.
- (f) Electric controllers and pumps will be installed to replace pneumatic controllers whenever feasible. Pneumatic controllers and pumps will be inspected frequently to ensure that no excess gas is vented to atmosphere.
- (g) Storage tanks and other low-pressure vessel normal operational venting will be minimized during the early life of the well with the installation of

a vapor recovery unit to limit the flash and working and breathing emissions to atmosphere.

- (h) No dehydration or amine units are anticipated to be set on location.
 - (i) Compressors, compressor engines, turbines, flanges, connectors, valves, and flanges will be routinely inspected to ensure that no excess venting occurs outside of normal operation.
 - (j) Regulatory required testing, such as bradenhead and packer testing will be performed in a manner that minimizes the amount of natural gas vented to atmosphere.
 - (k) When natural gas does not meet gathering pipeline specifications, for example high nitrogen content after a nearby frac, gas samples will be collected twice per week to determine when pipeline specification gas content has been achieved. During this time frame gas will be flared and not vented to atmosphere. Natural gas that meets pipeline specifications will be sold via pipeline and natural gas that can be utilized for fuel gas will be used during this time.
 - (l) If pipeline, equipment, or facilities need purged of impurities gas losses will be minimized as much as technically and safely feasible.
- b. New Drill HZ Gas Wells: The operator's facilities are designed to handle the maximum throughput and pressures from producing wellbores. The amount of gas vented and flared will be minimized when technically and safely feasible.

Operations will effectively manage the following scenarios to minimize the quantity of natural gas that is vented or flared:

- (a) If there is an emergency or malfunction vented or flared natural gas will be reported, if required, and the emergency or malfunction will be resolved as soon as technically and safely feasible.
- (b) If the wellbore needs to be unloaded to atmosphere the operator will not vent the well after the well has achieved a stabilized rate and pressure. The operator will remain on site during unloading. Plunger lift systems will be optimized to reduce the amount of natural gas venting. Downhole maintenance, such as workovers, swabbing, etc. will only be conducted as needed and best management practices will be utilized to reduce venting of natural gas.
- (c) The operator will minimize the amount of time that natural gas is vented to atmosphere from gauging and sampling a storage tank or low-pressure vessel, automatic tank gauges will be the primary means of gauging. The formation is only anticipated to produce water and therefore tank emissions are anticipated to be negligible.
- (d) The operator will reduce the amount of time needed for loading out liquids from a storage tanks or other low-pressure vessels whenever feasible. Operations will always utilize the water transfer systems when available. Water loading emissions are anticipated to be negligible.

- (e) Equipment will be repaired and maintained routinely to minimize the venting or flaring of natural gas. Repairs and maintenance will be conducted in a manner that minimizes the amount of natural gas vented to atmosphere through the isolation of the equipment that is being repaired or maintained.
- (f) Electric controllers and pumps, or instrument air, will be installed to replace pneumatic controllers whenever feasible. Pneumatic controllers and pumps will be inspected frequently to ensure that no excess gas is vented to atmosphere.
- (g) No dehydration or amine units are anticipated to be set on location.
- (h) Compressors, compressor engines, turbines, flanges, connectors, valves, storage tanks, and other low-pressure vessels and flanges will be routinely inspected to ensure that no excess venting occurs outside of normal operations.
- (i) Regulatory required testing, such as bradenhead and packer testing will be performed in a manner that minimizes the amount of natural gas vented to atmosphere.
- (j) If natural gas does not meet gathering pipeline specifications gas samples will be collected twice per week to determine when pipeline specification gas content has been achieved. During this time frame gas will be flared and not vented to atmosphere. Natural gas that meets pipeline specifications will be sold via pipeline and natural gas that can be utilized for fuel gas will be used during this time.
- (k) If pipeline, equipment, or facilities need purged of impurities gas losses will be minimized as much as technically and safely feasible.

E. Performance standards:

- a. The production facilities are designed to handle the maximum throughput and pressures from producing wellbores and will be designed to minimize waste. The amount of gas vented and flared will be minimized when technically and safely feasible.
- b. All tanks that are routed to a control device that is installed after 5/25/2021 will have an automatic gauging system to minimize the amount of vented natural gas.
- c. If a flare stack is installed or replaced after 5/25/2021 it will be equipped with an automatic ignitor or continuous pilot. The flare stack will be properly sized and designed to ensure proper combustion efficiency. The flare stack will be located 100 feet away from the nearest wellhead or storage tank.
- d. AVO inspections will be conducted weekly for the year after completion and for all wells producing greater than 60,000 cubic feet of natural gas daily. The AVO inspection will include all components, including flare stacks, thief hatches, closed vent systems, pumps, compressors, pressure relief devices, valves, lines, flanges, connectors, and associated pipeline to identify any leaks and releases by comprehensive auditory, visual, and olfactory inspection. The AVO inspection records will be maintained for 5 years which will be available at the department's request. Identified leaks will be repaired as soon as feasible to minimize the amount of vented natural gas.

F. Measurement or estimation of vented and flared natural gas.

- a. The volume of natural gas that is vented, flared or consumed for beneficial use will be measured when possible, or estimated, during drilling, completions, or production operations.
- b. Equipment will be installed to measure the volume of natural gas flared for all APD's issued after 5/25/2021 on facilities that will have an average daily gas rate greater than 60,000 cubic feet of natural gas. Measurement equipment will conform to API MPMS Chapter 14.10 regulations. The measurement equipment will not have a manifold that allows the diversion of natural gas around the metering element except for the sole purpose of inspecting and servicing the measurement equipment. If metering is not practical then the volume of gas will be estimated.



LOGOS Operating, LLC Operations Plan

Note: This procedure will be adjusted onsite based upon actual conditions

Date:	December 11, 2024	Pool:	Basin Mancos
Well Name:	Rosa Unit 690H	GL Elevation:	6347
Surface Location:	Sec 8, T31N, R5W 748' FNL, 1950' FEL (36.919200° N, -107.383422° W – NAD83)	KB:	30'
Bottom Hole Location:	Sec 3, T31N, R5W 2318' FSL, 116' FEL (36.927591° N, -107.341131° W – NAD83)	Measured Depth:	20,176' (KB)
Lease Serial CA Serial	# NMSF078763 # NMNM78407E	County:	Rio Arriba

I. GEOLOGY

A. Formation Tops (Based on KB Elevation): Estimated top of important geological markers:
SURFACE FORMATION – NACIMIENTO

NAME	MD	TVD	NAME	MD	TVD
OJO ALAMO	2,505'	2,439'	*POINT LOOKOUT	5869'	5,635'
KIRTLAND	2,631'	2,559'	*MANCOS	6,488'	6,238'
*FRUITLAND	2,946'	2,858'	KICKOFF POINT	6,660'	6,408'
*PICTURED CLIFFS	3,483'	3,368'	LANDING POINT	7,610'	6,991'
LEWIS	3,592'	3,471'	TD	20,176'	6,982'
CHACRA	4,832'	4,649'			
*CLIFF HOUSE	5,651'	5,426'			
MENEFEE	5,687'	5,461'			

* indicates depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered.

B. MUD LOGGING PROGRAM: Mudlogger on location from KOP to TD.

C. LOGGING PROGRAM: LWD GR from conductor casing to TD.

D. NATURAL GAUGES: Gauge any noticeable increases in gas flow. Record all gauges in Tour book and on morning reports.

II. DRILLING

A. MUD PROGRAM: LSND mud (WBM) was used to drill the 26"/24" conductor hole. LSND (WBM) will be used to drill the 17-1/2" surface hole and 12-1/4" intermediate hole. A LSND (WBM) or (OBM) will be used to drill the 8-1/2" curve and lateral portion of the wellbore. Treat for lost circulation as necessary. Obtain 100% returns prior to cementing. Notify Engineering of any mud losses.

Above ground steel pits will be used for fluid and cuttings while drilling. In the unlikely event that a tank develops a leak, upon immediate visual discovery, the fluid would be transferred to another tank and contaminated soil would be removed and disposed. Any leaks, spills or other undesirable events will be reported in accordance with BLM NTL 3A. Rig crews will monitor the tanks at all times.



- B. BOP TESTING:** The BOPE will be tested to **250 psi (Low) for 5 minutes** and **3000 psi (High) for 10 minutes**. Pressure test surface casing to **600 psi for 30 minutes** and intermediate casing to **1500 psi for 30 minutes**. Utilize a BOPE Testing Unit with a recording chart and appropriate test plug for testing. The drum brakes will be inspected and tested each tour. BOP equipment will be tested every 30 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe and blind rams shall be activated each trip or but not more than once a day. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE. **All tests and inspections will be recorded and logged with time and results.** A full BOP test will be conducted when initially installed for the first well on the pad or if seals subject to test pressure are broken, following related repairs and at a minimum of 30 day intervals. A BOPE Shell Test only will be conducted for subsequent wells on the pad when seals subject to pressure have not been broken or repaired and fall within the 30 day interval of first full test.
- C. GeoHazards:** There are no Geohazards
- D. Maximum Anticipated Pressure:** $6991' \text{ TVD} \times 0.43 = 3,006 \text{ psi}$
- E. H2S Concerns:** There is no record of any naturally occurring H2S in any formation in the Rosa Unit. No H2S is anticipated in this formation or this well.

III. MATERIALS

A. CASING EQUIPMENT:

CASING TYPE	OH SIZE (IN)	DEPTH (MD)	CSG SIZE	WEIGHT	GRADE	CONN
CONDUCTOR (Pre-set)	26" or 24"	350' (GL) or Greater	20"	94 LBS	J-55 or equiv	LTC/BTC
SURFACE	17.5"	3,533'	13.375"	54.5 LBS	J-55 or equiv	LTC/BTC
INTERMEDIATE	12.25"	6,563'	9.625"	43.5 LBS	N-80 or equiv	LTC/BTC
PRODUCTION	8.5"	20,176'	5.5"	20 LBS	P-110 or equiv	LTC/BTC

NOTE: All casing depths are approximate, based on KB elevation and will be based on drilling conditions +/- 50'. Weights, grades and connections will be based on availability and may vary but will be equivalent or greater.

B. FLOAT EQUIPMENT:

- 1. CONDUCTOR CASING:** 20" cement nose guide shoe. Place float shoe 1 joint above shoe. Run (1) standard centralizer on each of the bottom (3) joints of Surface Casing.
- 2. SURFACE CASING:** 13-3/8" cement nose guide shoe with float. Place float collar one joint above the shoe. Install (1) centralizer on each of the bottom (3) joints and one standard centralizer every (3) joints to 2,500 ft. Run (1) centralizer at 2,500 ft., 2,000ft., 1,500 ft., 1,000 ft., and 500ft.
 - Casing will be kept fluid filled during drilling
- 3. INTERMEDIATE CASING:** 9-5/8" cement float shoe. Place float collar one joint above the shoe. Install (1) centralizer on each of the bottom (3) joints and one standard centralizer every (3) joints to 2,500 ft. Run (1) centralizer at 2,500 ft., 2,300ft., 2,000ft., 1,500 ft., and 1,000 ft. Optional use of DV Tools (2) will be strategically placed above loss circulation zones anticipated in the Mesaverde and Fruitland Coal. Optional use of cancellation plugs for DV tools may be used if losses while cementing are not encountered. Optional use of an ICP may be used in conjunction with DV Tools.
- 4. PRODUCTION CASING:** Run 5-1/2" casing with cement nose guide Float Shoe, 5-1/2" full or pup joints as necessary, Landing Collar, 5-1/2" full or pup joints as necessary, at least (1) one Toe Sleeve (Sliding Sleeve) positioned inside the applicable production area. Centralizer



program will be determined by wellbore conditions. Production casing to be pressure tested during completion operations with frac stack installed.

C. CEMENTING:

(Note: Cement type and volumes may be adjusted onsite due to actual conditions and availability)

1. CONDUCTOR: Casing shall be set at ~ 350' and cemented to surface. TOC at Surface.

Conductor - 20"	Top	Footage	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Type G	-	350	0.9599	1.3	487	87	1.10	442	15.8
Type III		350	0.9599	1.3	487	87	1.39	350	14.6
24" hole									
Set Depth	350								

2. SURFACE: Surface casing shall be kept fluid-filled while running into the hole to meet BLM minimum collapse requirements. The surface casing will be cemented in 1 stage. If cement does not circulate to the surface, a CBL will be run to determine TOC.

Surface - 13-3/8"	Top	Footage	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Stage 1 Tail	2,933	600	0.6947	1.3	575	102	1.10	523	15.8
Stage 1 Lead - OH	350	2,583	0.6947	1.3	2,333	415	1.90	1228	12.4
Stage 2 Lead - Cased	-	350	1.019	1	357	64	1.90	188	12.4
					3,265	581		1939	
Set Depth	3533								

3. INTERMEDIATE : Intermediate casing shall be kept fluid filled while running in to the hole to meet BLM minimum collapse requirements. The intermediate casing will be cemented in 2 or 3 stages using DV/STAGE tools in order to reduce cement losses and maximize cement coverage. Operator proposes optional DV tools and optional ICP's above anticipated loss circulation zones in the Mesaverde and in the Fruitland coal. If losses are not observed during the second stage a cancellation plug will be pumped and the remaining cement will be pumped during stage 2. If cement does not circulate to the DV tool(s) or to surface, a CBL will be run to determine

Intermediate - 9-5/8"	Top	Footage	Cement (ft3/ft) Annular Capacity	Excess (30%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Stage 1 Tail	6,063	500	0.3132	1.3	220	39	1.10	200	15.8
Stage 1 Lead	4,907	1,156	0.3132	1.3	471	84	1.90	248	12.4
					691	123		448	
Stage 2 Tail	4,307	600	0.3132	1.3	244	44	1.58	155	13.2
Stage 2 Lead	3,433	874	0.3132	1.3	356	63	1.90	187	12.4
Stage 2 Lead - Cased	3,333	100	0.3627	1	36	6	1.90	19	12.4
Stage 2 Totals					636	113		361	
Int 2 Totals					1,327	236		809	
Contingency									
Stage 3 Tail	3,533	75	0.3132	1.3	31	5	1.58	19	13.2
Stage 3 Tail - Cased	3,033	500	0.3490	1	175	31	1.58	110	13.2
Stage 3 Lead - Cased	-	3,033	0.3490	1	1,059	189	1.90	557	12.4
Contingency Stage 3 Totals					1,264	225		687	
Set Depth	6563								

TOC. Calculations based on 30% excess for open hole and cement to surface. Actual excess pumped will be determined by well conditions.



4. **PRODUCTION**: Production casing will be cemented in 1 stage with 100' of cement overlap above intermediate shoe. A CBL, or alternatively, a Temperature Survey will be used to determine TOC.

Production - 5-1/2"	Top	ft	Cement (ft3/ft) Annular Capacity	Excess (15%)	Total (ft3)	Total (bbl)	Slurry Yield (ft3/sk)	Sacks Cement	Density (PPG)
Cased Lead	6,463	100	0.2531	1	25	5	1.59	16	13.2
Open Hole Lead	6,563	13,613	0.2291	1.15	3,592	640	1.59	2,259	13.2
					3,617	644		2,275	

Set depth 20176

Calculations based on 15% excess for open hole and 100' overlap into intermediate casing. Actual volumes will vary.

Cement calculations are used for volume estimation. Well conditions will dictate final cement job design. Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected. All waiting on cement times shall be a minimum of 8 hours or adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

IV. **COMPLETION**

A. **CBL**

CBLs and/or Temperature Surveys will be performed as needed or required to determine cement top if cement is not circulated.

B. **PRESSURE TEST**

- C. Pressure test 5-1/2" casing to 0.22 psi/ft * 6991' TVD = 1538 psi for 30 minutes. Increase pressure to Open RSI sleeves.

D. **STIMULATION**

Stimulate with sand and water. Isolate stages with flow through or dissolvable frac plugs. Drill out frac plugs and flowback lateral.

E. **PRODUCTION TUBING**

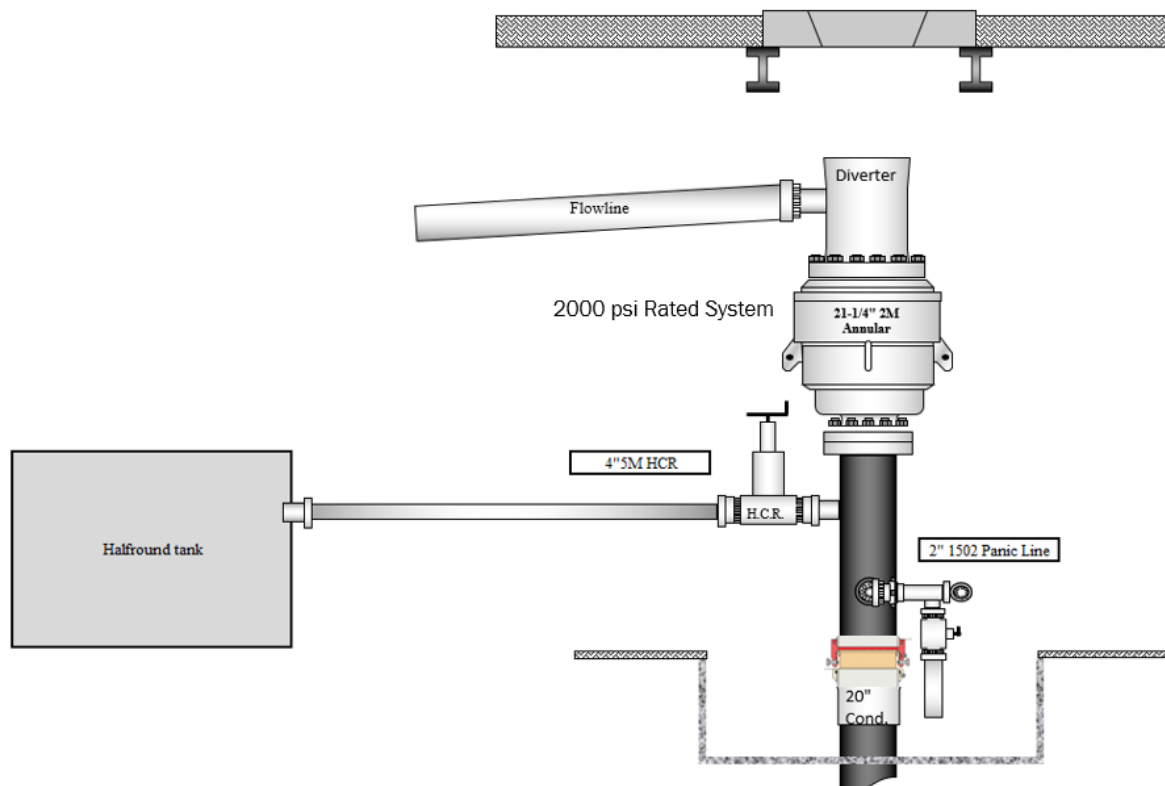
2-7/8", 6.5#, J-55 or L-80, EUE tubing will be run once volumes and pressures dictate. Due to the extremely high initial flow rates and pressures seen in offset wells, tubing will be installed once it is safe to do so, typically 12-36 months after completion.

*NOTE: Although this horizontal well may be drilled past the applicable setbacks, an unorthodox location application is not required because the completed interval in this well, as defined by 19.15.16.7 8(1) NMAC, will be entirely within the applicable setbacks. This approach complies with all applicable rules, including 19.15.16.14 A(3) NMAC, 19.15.16.14 8(2) NMAC, 19.15.16.15 8(2)NMAC, and 19.15.16.15. 8(4) NMAC.



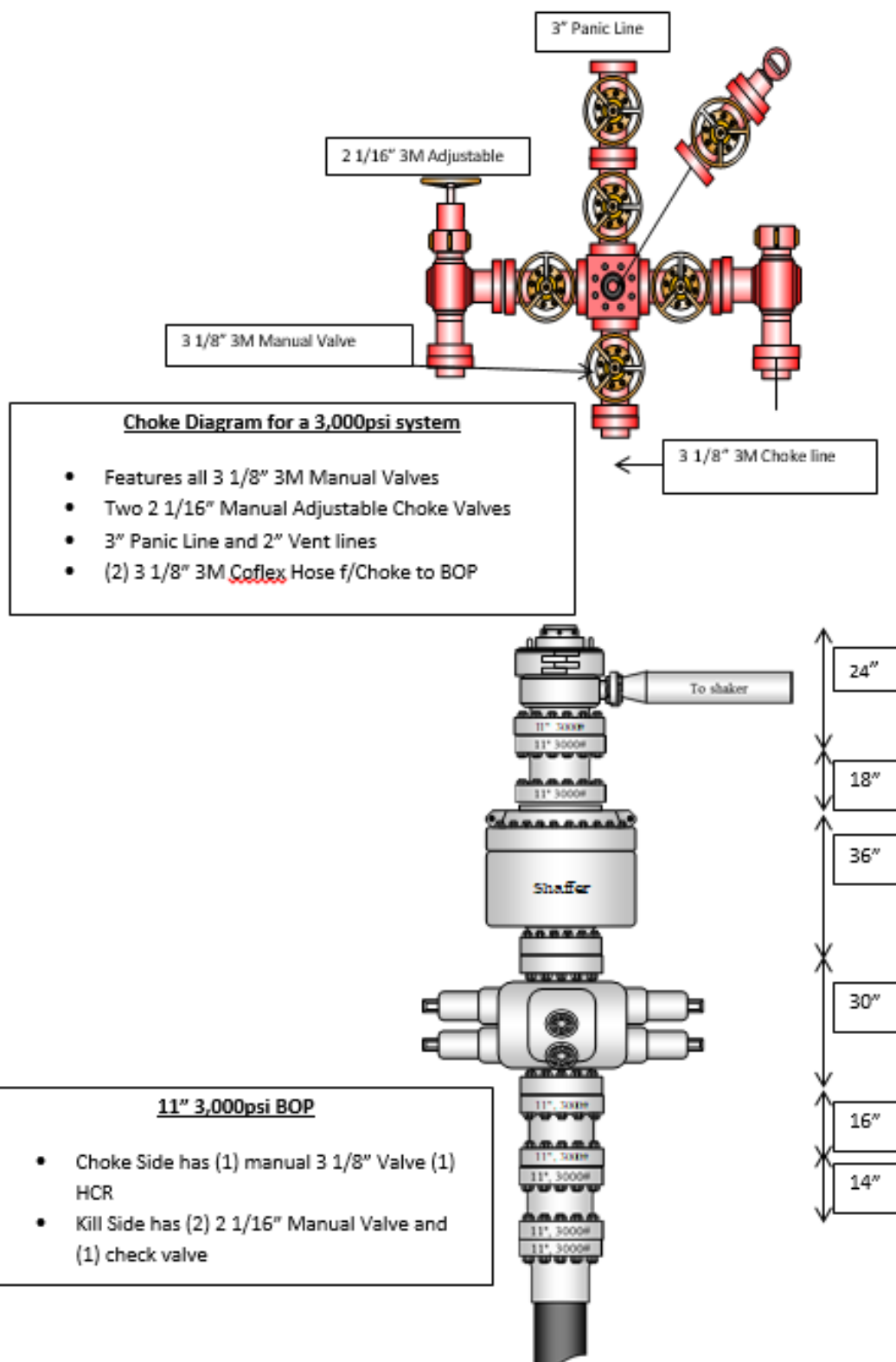
BOP Equipment

Surface Hole Diverter





3M 11" B.O.P.E Diagram



Logos Operating LLC

Rio Arriba, NM (NAD83)

Rosa Unit 34

Rosa Unit #690H

OH

Prelim 5

Anticollision Report

22 November, 2024

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Reference	Prelim 5		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCSWA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Max. Cent. Dist. of 99,999.00usft or Max. SF of 100	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	11/22/2024		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	20,175.56	Prelim 5 (OH)	MWD+HRGM+MS	MWD + HRGM + Multi-Station Correction	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Rosa Unit 34						
(O) Carson #1 - OH - OH-INC	16,377.52	7,127.93	2,954.23	2,651.62	9.763	CC, ES
(O) Carson #1 - OH - OH-INC	16,400.00	7,127.91	2,954.31	2,651.63	9.760	SF
(O) Rosa Unit #041B - OH - OH-SVY	6,067.81	6,196.50	2,808.90	2,741.95	41.953	CC
(O) Rosa Unit #041B - OH - OH-SVY	6,659.67	6,778.65	2,812.91	2,738.73	37.916	ES
(O) Rosa Unit #041B - OH - OH-SVY	6,950.00	7,062.28	2,869.65	2,791.11	36.536	SF
(O) Rosa Unit #041C - OH - OH-SVY	1,013.60	1,004.87	42.06	35.80	6.721	CC, ES, SF
(O) Rosa Unit #053 - OH - OH-INC	562.54	551.54	393.99	382.24	33.513	CC
(O) Rosa Unit #053 - OH - OH-INC	700.00	688.55	395.50	380.78	26.872	ES
(O) Rosa Unit #053 - OH - OH-INC	6,850.00	6,581.52	2,050.78	1,885.48	12.406	SF
(O) Rosa Unit #072C - OH - OH-SVY	6,688.25	6,630.96	5,855.54	5,804.87	115.560	CC, ES
(O) Rosa Unit #072C - OH - OH-SVY	7,550.00	7,168.41	6,228.72	6,171.69	109.230	SF
(O) Rosa Unit #080A - OH - OH-INC	629.97	535.99	1,985.18	1,972.51	156.700	CC
(O) Rosa Unit #080A - OH - OH-INC	800.00	703.19	1,987.41	1,970.95	120.790	ES
(O) Rosa Unit #080A - OH - OH-INC	5,100.00	4,786.00	2,667.24	2,541.31	21.182	SF
(O) Rosa Unit #107 - OH - OH-INC	11,600.00	6,803.34	235.85	28.10	1.135	Level 3, ES, SF
(O) Rosa Unit #107 - OH - OH-INC	11,632.00	6,803.32	233.67	29.32	1.143	Level 3, CC
(O) Rosa Unit #108 - OH - OH-SVY	268.00	166.00	5,148.99	5,147.00	2,584.035	CC
(O) Rosa Unit #108 - OH - OH-SVY	1,300.00	1,188.25	5,153.61	5,133.53	256.589	ES
(O) Rosa Unit #108 - OH - OH-SVY	7,350.00	6,837.22	5,844.35	5,674.30	34.367	SF
(O) Rosa Unit #149 - OH - OH-INC	3,060.43	2,870.66	7,957.47	7,878.06	100.213	CC
(O) Rosa Unit #149 - OH - OH-INC	6,300.00	5,949.00	8,015.45	7,801.51	37.466	ES
(O) Rosa Unit #149 - OH - OH-INC	6,700.00	5,949.00	8,035.43	7,820.20	37.334	SF
(O) Rosa Unit #149A - OH - OH-INC	2,714.00	2,541.92	9,378.62	9,317.79	154.180	CC
(O) Rosa Unit #149A - OH - OH-INC	5,100.00	4,810.70	9,408.11	9,288.98	78.978	ES
(O) Rosa Unit #149A - OH - OH-INC	6,800.00	6,000.00	9,474.70	9,323.39	62.618	SF
(O) Rosa Unit #149B - OH - OH-INC	5,268.98	5,102.59	11,202.68	11,057.25	77.035	CC
(O) Rosa Unit #149B - OH - OH-INC	6,700.00	6,493.39	11,209.49	11,019.08	58.873	ES
(O) Rosa Unit #149B - OH - OH-INC	7,400.00	7,002.21	11,536.06	11,326.94	55.164	SF
(O) Rosa Unit #149C - OH - OH-SVY	4,069.18	3,999.50	8,558.23	8,500.80	149.035	CC
(O) Rosa Unit #149C - OH - OH-SVY	6,750.00	6,509.90	8,606.41	8,214.02	21.934	ES
(O) Rosa Unit #149C - OH - OH-SVY	7,400.00	6,954.53	8,945.30	8,492.60	19.760	SF
(O) Rosa Unit #164 - OH - OH-SVY	2,140.40	918.16	8,682.84	8,658.61	358.358	CC
(O) Rosa Unit #164 - OH - OH-SVY	2,200.00	940.11	8,682.96	8,658.43	354.111	ES
(O) Rosa Unit #164 - OH - OH-SVY	8,800.00	1,752.80	11,046.75	10,990.61	196.784	SF
(O) Rosa Unit #164A - OH - OH-INC	6,654.66	6,060.00	8,064.18	7,876.71	43.016	CC
(O) Rosa Unit #164A - OH - OH-INC	6,659.67	6,060.00	8,064.18	7,876.69	43.012	ES
(O) Rosa Unit #164A - OH - OH-INC	6,800.00	6,060.00	8,075.54	7,887.55	42.957	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Rosa Unit 34						
(O) Rosa Unit #164B - OH - OH-SVY	2,218.97	1,023.00	8,613.53	8,593.79	436.289	CC
(O) Rosa Unit #164B - OH - OH-SVY	2,300.00	1,023.00	8,613.91	8,593.79	427.946	ES
(O) Rosa Unit #164B - OH - OH-SVY	8,700.00	1,809.45	10,888.49	10,834.57	201.954	SF
(O) Rosa Unit #164C - OH - OH-SVY	6,432.13	6,412.66	7,764.07	7,703.27	127.707	CC
(O) Rosa Unit #164C - OH - OH-SVY	6,659.67	6,641.71	7,764.56	7,702.58	125.270	ES
(O) Rosa Unit #164C - OH - OH-SVY	7,450.00	7,203.93	8,103.55	8,036.51	120.873	SF
(O) Rosa Unit #171 - OH - OH-INC	480.54	368.53	4,924.12	4,915.70	584.298	CC
(O) Rosa Unit #171 - OH - OH-INC	1,400.00	1,275.79	4,931.15	4,902.15	170.034	ES
(O) Rosa Unit #171 - OH - OH-INC	6,600.00	6,028.00	5,283.13	5,132.78	35.140	SF
(O) Rosa Unit #171A - OH - OH-SVY	111.00	0.00	4,999.03	4,998.73	10,000.000	CC, ES
(O) Rosa Unit #171A - OH - OH-SVY	5,300.00	3,337.00	6,493.37	6,430.18	102.757	SF
(O) Rosa Unit #171B - OH - OH-SVY	1,924.95	1,347.22	4,745.99	4,731.87	336.101	CC
(O) Rosa Unit #171B - OH - OH-SVY	2,000.00	1,393.00	4,746.34	4,731.66	323.307	ES
(O) Rosa Unit #171B - OH - OH-SVY	6,900.00	6,388.00	5,450.07	5,383.35	81.690	SF
(O) Rosa Unit #171C - OH - OH-SVY	210.00	249.00	4,789.91	4,784.22	842.123	CC
(O) Rosa Unit #171C - OH - OH-SVY	300.00	311.40	4,790.05	4,783.24	702.885	ES
(O) Rosa Unit #171C - OH - OH-SVY	7,100.00	6,990.00	7,079.81	6,987.22	76.458	SF
(O) Rosa Unit #226 - OH - OH-INC	2,545.31	2,348.06	8,870.93	8,814.87	158.235	CC
(O) Rosa Unit #226 - OH - OH-INC	3,400.00	3,135.00	8,874.99	8,797.36	114.322	ES
(O) Rosa Unit #226 - OH - OH-INC	5,800.00	3,135.00	9,221.87	9,134.47	105.520	SF
(O) Rosa Unit #226A - OH - OH-SVY	3,619.55	5,392.00	8,240.66	8,197.52	191.021	CC, ES
(O) Rosa Unit #226A - OH - OH-SVY	6,400.00	5,392.00	8,703.85	8,652.75	170.359	SF
(O) Rosa Unit #228A - OH - OH-SVY	496.99	383.00	5,318.83	5,312.96	906.852	CC
(O) Rosa Unit #228A - OH - OH-SVY	500.00	383.00	5,318.83	5,312.95	905.189	ES
(O) Rosa Unit #228A - OH - OH-SVY	5,700.00	3,253.00	6,514.53	6,468.29	140.862	SF
(O) Rosa Unit #336 - OH - OH-INC	635.99	607.99	158.55	145.00	11.706	CC
(O) Rosa Unit #336 - OH - OH-INC	700.00	671.82	159.90	144.91	10.669	ES
(O) Rosa Unit #336 - OH - OH-INC	1,200.00	1,167.50	214.48	187.85	8.054	SF
(O) Rosa Unit #336A - OH - OH-INC	669.48	591.48	2,542.48	2,528.81	185.994	CC
(O) Rosa Unit #336A - OH - OH-INC	1,000.00	920.77	2,547.51	2,525.71	116.841	ES
(O) Rosa Unit #336A - OH - OH-INC	3,100.00	2,809.00	2,731.22	2,659.78	38.230	SF
(O) Rosa Unit #350A - OH - OH-SVY	15,804.45	3,645.00	4,860.78	4,755.63	46.229	CC, ES
(O) Rosa Unit #350A - OH - OH-SVY	16,400.00	3,645.00	4,897.22	4,789.87	45.620	SF
(O) Rosa Unit #46 - OH - OH-INC	539.74	503.71	159.23	147.98	14.163	CC
(O) Rosa Unit #46 - OH - OH-INC	700.00	663.54	161.08	146.15	10.787	ES
(O) Rosa Unit #46 - OH - OH-INC	1,200.00	1,159.72	218.73	191.78	8.116	SF
(O) Rosa Unit #80B - OH - OH-SVY	3,326.52	3,395.13	2,523.50	2,493.28	83.512	CC
(O) Rosa Unit #80B - OH - OH-SVY	4,800.00	4,724.39	2,596.88	2,488.23	23.901	ES
(O) Rosa Unit #80B - OH - OH-SVY	7,000.00	6,838.50	2,856.80	2,585.65	10.536	SF
(O) Rosa Unit #95 - OH - OH-INC	13,984.62	5,990.00	3,791.95	3,565.65	16.756	CC
(O) Rosa Unit #95 - OH - OH-INC	14,000.00	5,990.00	3,791.98	3,565.60	16.750	ES
(O) Rosa Unit #95 - OH - OH-INC	14,300.00	5,990.00	3,805.04	3,577.25	16.704	SF
(O) Rosa Unit 072B - OH - OH-SVY	0.00	0.00	4,935.78			
(O) Rosa Unit 072B - OH - OH-SVY	1,876.71	694.00	4,910.82	4,902.67	602.270	CC
(O) Rosa Unit 072B - OH - OH-SVY	1,900.00	694.00	4,910.88	4,902.62	595.075	ES
(O) Rosa Unit 148 COM - OH - OH-INC	6,677.09	6,389.74	13,777.49	13,576.11	68.414	CC
(O) Rosa Unit 148 COM - OH - OH-INC	6,700.00	6,412.32	13,777.80	13,575.49	68.104	ES
(O) Rosa Unit 148 COM - OH - OH-INC	7,500.00	6,937.72	14,121.03	13,895.33	62.567	SF
Rosa Unit #672H - OH - Prelim 5	500.00	500.00	40.06	36.69	11.890	CC, ES
Rosa Unit #672H - OH - Prelim 5	7,400.00	7,250.00	135.36	81.71	2.523	SF
Rosa Unit #674H - OH - Prelim 5	510.00	510.00	20.10	16.66	5.842	CC
Rosa Unit #674H - OH - Prelim 5	600.00	599.70	20.47	16.39	5.011	ES
Rosa Unit #674H - OH - Prelim 5	1,515.00	1,509.53	31.05	19.97	2.803	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Rosa Unit 34						
Rosa Unit #692H - OH - Prelim 5	600.00	600.00	19.96	15.87	4.885	CC, ES
Rosa Unit #692H - OH - Prelim 5	20,176.02	19,463.23	1,385.11	987.96	3.488	SF
Rosa Unit #694H - OH - Prelim 5	600.00	600.00	39.92	35.84	9.769	CC, ES
Rosa Unit #694H - OH - Prelim 5	900.00	901.68	47.41	41.17	7.595	SF
Rosa Unit #696H - OH - Prelim 5	600.00	600.00	60.03	55.94	14.688	CC, ES
Rosa Unit #696H - OH - Prelim 5	20,176.02	19,213.94	2,666.48	2,267.79	6.688	SF

Offset Design: Rosa Unit 34 - (O) Carson #1 - OH - OH-INC												Offset Site Error:	0.00 usft	
Survey Program:		434-A027Ua_INC-ONLY				Semi Major Axis		Offset Wellbore Centre		Rule Assigned:			Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	141.00	141.00	0.00	2.50	89.14	128.00	8,543.80	8,544.76					
100.00	100.00	241.00	241.00	0.25	4.27	89.14	128.00	8,543.80	8,544.76	8,540.24	4.52	1,890.096		
200.00	200.00	341.00	341.00	0.61	6.04	89.14	128.00	8,543.80	8,544.76	8,538.11	6.65	1,284.747		
300.00	300.00	441.00	441.00	0.97	7.81	89.14	128.00	8,543.80	8,544.76	8,535.98	8.78	973.088		
400.00	400.00	541.00	541.00	1.33	9.58	89.14	128.00	8,543.80	8,544.76	8,533.85	10.91	783.115		
500.00	500.00	641.00	641.00	1.68	11.36	89.14	128.00	8,543.80	8,544.76	8,531.72	13.04	655.202		
600.00	600.00	741.11	741.11	2.04	13.13	89.14	128.21	8,543.80	8,544.76	8,529.59	15.17	563.138		
604.45	604.45	745.56	745.56	2.06	13.21	99.14	128.20	8,543.80	8,544.76	8,529.50	15.27	559.639		
700.00	699.98	841.21	841.21	2.40	14.90	99.15	128.07	8,543.80	8,545.04	8,527.73	17.30	493.797		
800.00	799.84	940.84	940.84	2.76	16.67	99.17	128.00	8,543.80	8,545.87	8,526.44	19.43	439.885		
900.00	899.45	1,040.46	1,040.45	3.13	18.43	99.20	128.00	8,543.80	8,547.27	8,525.72	21.55	396.588		
1,000.00	998.70	1,139.76	1,139.76	3.49	20.19	99.24	128.22	8,543.80	8,549.24	8,525.56	23.68	361.092		
1,100.00	1,097.47	1,238.60	1,238.60	3.86	21.94	99.29	128.11	8,543.80	8,551.78	8,525.98	25.80	331.462		
1,200.00	1,195.62	1,336.63	1,336.62	4.24	23.69	99.35	128.00	8,543.80	8,554.93	8,527.00	27.93	306.270		
1,300.00	1,293.06	1,434.06	1,434.06	4.64	25.45	99.42	128.00	8,543.80	8,558.69	8,528.61	30.09	284.483		
1,400.00	1,389.64	1,530.66	1,530.65	5.06	27.18	99.50	128.21	8,543.80	8,563.09	8,530.85	32.24	265.600		
1,500.00	1,485.27	1,626.26	1,626.25	5.50	28.90	99.58	128.11	8,543.80	8,568.16	8,533.76	34.40	249.082		
1,515.00	1,499.52	1,640.50	1,640.49	5.57	29.16	99.60	128.09	8,543.80	8,568.97	8,534.25	34.72	246.783		
1,600.00	1,580.22	1,721.24	1,721.22	5.96	30.61	99.76	128.00	8,543.80	8,573.69	8,537.13	36.56	234.478		
1,700.00	1,675.17	1,816.18	1,816.17	6.44	32.32	99.96	128.00	8,543.80	8,579.35	8,540.61	38.74	221.444		
1,800.00	1,770.11	1,910.86	1,910.84	6.92	34.03	100.16	128.21	8,543.80	8,585.11	8,544.19	40.92	209.782		
1,900.00	1,865.05	2,006.08	2,006.05	7.41	35.76	100.35	128.00	8,543.80	8,590.99	8,547.86	43.13	199.170		
2,000.00	1,959.99	2,101.02	2,100.99	7.90	37.50	100.55	128.00	8,543.80	8,596.98	8,551.62	45.36	189.510		
2,100.00	2,054.94	2,195.90	2,195.87	8.40	39.24	100.74	128.21	8,543.80	8,603.08	8,555.48	47.60	180.745		
2,200.00	2,149.88	2,290.59	2,290.57	8.90	40.98	100.94	128.14	8,543.80	8,609.29	8,559.46	49.83	172.767		
2,300.00	2,244.82	2,385.86	2,385.82	9.41	42.74	101.14	128.00	8,543.80	8,615.61	8,563.51	52.10	165.381		
2,400.00	2,339.76	2,480.80	2,480.76	9.92	44.56	101.33	128.00	8,543.80	8,622.04	8,567.62	54.41	158.452		
2,500.00	2,434.71	2,575.31	2,575.27	10.43	46.37	101.52	128.55	8,543.80	8,628.56	8,571.83	56.73	152.107		
2,600.00	2,529.65	2,668.98	2,668.93	10.94	48.16	101.71	128.25	8,543.80	8,635.21	8,576.19	59.02	146.298		
2,700.00	2,624.59	2,765.66	2,765.59	11.45	50.04	101.91	128.00	8,543.80	8,641.98	8,580.57	61.41	140.723		
2,800.00	2,719.53	2,860.37	2,860.29	11.97	51.90	102.10	128.44	8,543.80	8,648.82	8,585.04	63.78	135.595		
2,900.00	2,814.48	2,953.30	2,953.23	12.49	53.73	102.29	128.18	8,543.80	8,655.81	8,589.69	66.12	130.904		
3,000.00	2,909.42	3,050.52	3,050.42	13.01	55.69	102.49	128.00	8,543.80	8,662.90	8,594.31	68.59	126.301		
3,100.00	3,004.36	3,145.46	3,145.36	13.53	57.62	102.69	128.00	8,543.80	8,670.09	8,599.06	71.03	122.063		
3,200.00	3,099.30	3,237.94	3,237.82	14.05	59.50	102.87	128.52	8,543.80	8,677.36	8,603.94	73.42	118.189		
3,300.00	3,194.25	3,335.40	3,335.25	14.57	61.47	103.07	128.00	8,543.80	8,684.79	8,608.89	75.91	114.416		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Carson #1 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		434-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
3,400.00	3,289.19	3,430.34	3,430.19	15.09	63.37	103.26	128.00	8,543.80	8,692.30	8,613.99	78.32	110.989	
3,500.00	3,384.13	3,524.95	3,524.79	15.62	65.26	103.45	128.86	8,543.80	8,699.86	8,619.14	80.72	107.777	
3,600.00	3,479.07	3,617.19	3,617.03	16.14	67.11	103.64	128.62	8,543.80	8,707.60	8,624.52	83.08	104.812	
3,700.00	3,574.02	3,715.22	3,715.02	16.67	69.07	103.84	128.00	8,543.80	8,715.48	8,629.93	85.55	101.874	
3,800.00	3,668.96	3,810.16	3,809.96	17.19	70.98	104.03	128.00	8,543.80	8,723.42	8,635.44	87.97	99.160	
3,900.00	3,763.90	3,905.10	3,904.90	17.72	72.89	104.22	128.00	8,543.80	8,731.46	8,641.07	90.39	96.594	
4,000.00	3,858.84	3,999.13	3,998.93	18.24	74.78	104.40	128.78	8,543.80	8,739.54	8,646.74	92.80	94.180	
4,100.00	3,953.79	4,092.03	4,091.82	18.77	76.65	104.59	128.56	8,543.80	8,747.81	8,652.63	95.18	91.912	
4,200.00	4,048.73	4,184.78	4,184.57	19.30	78.51	104.78	128.11	8,543.80	8,756.21	8,658.66	97.55	89.759	
4,300.00	4,143.67	4,284.93	4,284.67	19.82	80.63	104.98	128.00	8,543.80	8,764.68	8,664.50	100.19	87.485	
4,400.00	4,238.61	4,379.87	4,379.61	20.35	82.66	105.16	128.00	8,543.80	8,773.25	8,670.53	102.73	85.404	
4,500.00	4,333.56	4,473.72	4,473.45	20.88	84.67	105.34	129.03	8,543.80	8,781.81	8,676.57	105.24	83.443	
4,600.00	4,428.50	4,565.41	4,565.14	21.41	86.63	105.53	128.77	8,543.80	8,790.61	8,682.90	107.71	81.610	
4,700.00	4,523.44	4,656.92	4,656.64	21.93	88.58	105.71	128.21	8,543.80	8,799.56	8,689.37	110.18	79.865	
4,800.00	4,618.38	4,759.73	4,759.38	22.46	90.99	105.92	128.00	8,543.80	8,808.56	8,695.45	113.10	77.882	
4,900.00	4,713.33	4,853.48	4,853.12	22.99	93.25	106.10	128.84	8,543.80	8,817.54	8,701.67	115.87	76.097	
5,000.00	4,808.27	4,941.65	4,941.28	23.52	95.38	106.27	128.47	8,543.80	8,826.77	8,708.27	118.51	74.484	
5,100.00	4,903.21	5,044.69	5,044.21	24.05	97.99	106.48	128.00	8,543.80	8,836.11	8,714.48	121.63	72.645	
5,200.00	4,998.16	5,139.63	5,139.16	24.58	100.53	106.66	128.00	8,543.80	8,845.50	8,720.82	124.68	70.946	
5,300.00	5,093.10	5,234.12	5,233.60	25.11	103.05	106.83	130.06	8,543.80	8,854.72	8,727.01	127.71	69.333	
5,400.00	5,188.04	5,321.26	5,320.73	25.64	105.38	107.01	129.75	8,543.80	8,864.35	8,733.81	130.55	67.902	
5,500.00	5,282.98	5,408.07	5,407.51	26.17	107.70	107.18	128.87	8,543.80	8,874.17	8,740.80	133.37	66.537	
5,600.00	5,377.93	5,519.69	5,518.93	26.70	110.76	107.40	128.00	8,543.80	8,884.07	8,747.13	136.95	64.873	
5,623.25	5,400.00	5,541.76	5,541.00	26.82	111.39	107.45	128.00	8,543.80	8,886.37	8,748.68	137.69	64.541	
5,700.00	5,473.03	5,614.79	5,614.03	27.22	113.45	107.66	128.00	8,543.80	8,893.81	8,753.68	140.13	63.467	
5,800.00	5,568.64	5,708.53	5,707.73	27.73	116.09	107.90	129.96	8,543.80	8,902.84	8,759.57	143.27	62.141	
5,900.00	5,664.75	5,795.48	5,794.66	28.23	118.54	108.14	129.54	8,543.80	8,911.77	8,765.57	146.20	60.957	
6,000.00	5,761.33	5,882.56	5,881.72	28.71	121.00	108.36	128.54	8,543.80	8,920.33	8,771.21	149.12	59.821	
6,100.00	5,858.34	6,000.42	5,999.34	29.18	124.66	108.62	128.00	8,543.80	8,928.30	8,775.07	153.23	58.267	
6,200.00	5,955.76	6,096.94	6,095.83	29.64	127.77	108.81	129.72	8,543.80	8,935.43	8,778.65	156.78	56.995	
6,300.00	6,053.57	6,181.08	6,179.95	30.07	130.48	108.99	129.27	8,543.80	8,942.41	8,782.50	159.91	55.923	
6,400.00	6,151.72	6,294.16	6,292.72	30.50	134.22	109.19	128.00	8,543.80	8,948.97	8,784.91	164.06	54.548	
6,500.00	6,250.19	6,392.63	6,391.19	30.91	137.74	109.34	128.00	8,543.80	8,954.79	8,786.82	167.98	53.309	
6,600.00	6,348.94	6,491.39	6,489.94	31.30	141.28	109.49	128.00	8,543.80	8,960.07	8,788.17	171.90	52.125	
6,659.67	6,408.00	6,541.87	6,540.33	31.53	143.08	109.54	130.82	8,543.80	8,962.48	8,788.56	173.93	51.531	
6,700.00	6,447.82	6,575.73	6,574.17	31.68	144.29	93.01	130.56	8,543.80	8,963.67	8,788.38	175.29	51.136	
6,750.00	6,496.66	6,617.20	6,615.62	31.90	145.78	81.84	130.06	8,543.80	8,963.12	8,786.13	176.99	50.643	
6,800.00	6,544.65	6,657.82	6,656.22	32.13	147.23	75.76	129.38	8,543.80	8,960.33	8,781.66	178.67	50.150	
6,850.00	6,591.49	6,734.56	6,732.49	32.37	149.96	72.35	128.00	8,543.80	8,955.37	8,773.71	181.66	49.298	
6,900.00	6,636.89	6,779.96	6,777.89	32.62	151.53	70.35	128.00	8,543.80	8,948.03	8,764.53	183.50	48.763	
6,950.00	6,680.57	6,823.64	6,821.57	32.89	153.05	69.30	128.00	8,543.80	8,938.57	8,753.27	185.30	48.238	
7,000.00	6,722.26	6,864.41	6,862.30	33.17	154.46	68.92	129.87	8,543.80	8,926.72	8,739.70	187.01	47.733	
7,050.00	6,761.71	6,894.71	6,892.58	33.45	155.51	69.03	129.76	8,543.80	8,913.28	8,724.90	188.38	47.316	
7,100.00	6,798.67	6,922.89	6,920.75	33.75	156.49	69.56	129.52	8,543.80	8,898.03	8,708.35	189.68	46.911	
7,150.00	6,832.91	6,948.77	6,946.62	34.06	157.38	70.44	129.16	8,543.80	8,881.08	8,690.16	190.92	46.518	
7,200.00	6,864.22	7,007.62	7,005.22	34.37	159.42	71.82	128.00	8,543.80	8,862.63	8,669.32	193.31	45.847	
7,250.00	6,892.42	7,035.81	7,033.42	34.69	160.38	73.34	128.00	8,543.80	8,842.53	8,647.89	194.64	45.431	
7,300.00	6,917.32	7,060.71	7,058.32	35.03	161.23	75.11	128.00	8,543.80	8,821.12	8,625.26	195.86	45.038	
7,350.00	6,938.77	7,082.17	7,079.77	35.37	161.97	77.10	128.00	8,543.80	8,798.53	8,601.56	196.97	44.669	
7,400.00	6,956.64	7,100.04	7,097.64	35.72	162.58	79.29	128.00	8,543.80	8,774.94	8,576.97	197.97	44.324	
7,450.00	6,970.83	7,114.22	7,111.83	36.07	163.06	81.65	128.00	8,543.80	8,750.50	8,551.65	198.85	44.005	
7,500.00	6,981.23	7,124.63	7,122.23	36.44	163.42	84.16	128.00	8,543.80	8,725.37	8,525.76	199.61	43.712	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Carson #1 - OH - OH-INC											Offset Site Error: 0.00 usft		
Survey Program: 434-A027Ua_INC-ONLY				Rule Assigned:								Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
7,550.00	6,987.80	7,131.19	7,128.80	36.81	163.64	86.78	128.00	8,543.80	8,699.71	8,499.47	200.24	43.446	
7,600.00	6,990.48	7,133.88	7,131.48	37.19	163.73	89.48	128.00	8,543.80	8,673.70	8,472.95	200.74	43.208	
7,609.87	6,990.55	7,133.94	7,131.55	37.26	163.73	90.02	128.00	8,543.80	8,668.53	8,467.71	200.82	43.165	
7,700.00	6,990.49	7,133.88	7,131.49	37.97	163.73	90.02	128.00	8,543.80	8,621.68	8,420.11	201.57	42.772	
7,800.00	6,990.42	7,133.81	7,131.42	38.78	163.73	90.02	128.00	8,543.80	8,570.51	8,368.08	202.43	42.339	
7,900.00	6,990.35	7,133.74	7,131.35	39.64	163.73	90.02	128.00	8,543.80	8,520.20	8,316.89	203.31	41.907	
8,000.00	6,990.28	7,133.67	7,131.28	40.53	163.73	90.02	128.00	8,543.80	8,470.78	8,266.56	204.22	41.479	
8,100.00	6,990.21	7,133.60	7,131.21	41.45	163.72	90.02	128.00	8,543.80	8,422.25	8,217.10	205.16	41.053	
8,200.00	6,990.14	7,133.53	7,131.14	42.40	163.72	90.02	128.00	8,543.80	8,374.64	8,168.52	206.12	40.631	
8,306.37	6,990.06	7,133.46	7,131.06	43.45	163.72	90.02	128.00	8,543.80	8,325.01	8,117.85	207.16	40.186	
8,400.00	6,990.00	7,133.39	7,131.00	44.38	163.72	90.02	128.00	8,543.80	8,279.51	8,071.42	208.09	39.788	
8,500.00	6,989.93	7,133.32	7,130.93	45.36	163.71	90.03	128.00	8,543.80	8,225.98	8,016.91	209.07	39.345	
8,600.00	6,989.85	7,133.25	7,130.85	46.33	163.71	90.03	128.00	8,543.80	8,167.49	7,957.46	210.03	38.887	
8,700.00	6,989.78	7,133.17	7,130.78	47.28	163.71	90.04	128.00	8,543.80	8,104.25	7,893.28	210.96	38.415	
8,800.00	6,989.70	7,133.10	7,130.70	48.21	163.71	90.04	128.00	8,543.80	8,036.43	7,824.56	211.87	37.931	
8,900.00	6,989.63	7,133.02	7,130.63	49.11	163.70	90.05	128.00	8,543.80	7,964.27	7,751.53	212.74	37.437	
9,000.00	6,989.55	7,132.95	7,130.55	49.99	163.70	90.05	128.00	8,543.80	7,888.00	7,674.44	213.56	36.936	
9,100.00	6,989.48	7,132.87	7,130.48	50.84	163.70	90.06	128.00	8,543.80	7,807.87	7,593.53	214.34	36.428	
9,200.00	6,989.40	7,132.80	7,130.40	51.66	163.70	90.07	128.00	8,543.80	7,724.16	7,509.10	215.06	35.917	
9,300.00	6,989.33	7,132.73	7,130.33	52.45	163.69	90.08	128.00	8,543.80	7,637.18	7,421.46	215.72	35.403	
9,393.87	6,989.27	7,132.66	7,130.27	53.15	163.69	90.09	128.00	8,543.80	7,552.83	7,336.55	216.28	34.921	
9,400.00	6,989.26	7,132.66	7,130.26	53.20	163.69	90.09	128.00	8,543.80	7,547.24	7,330.92	216.32	34.890	
9,500.00	6,989.19	7,132.59	7,130.19	53.95	163.69	90.09	128.00	8,543.80	7,456.21	7,239.32	216.89	34.378	
9,600.00	6,989.12	7,132.52	7,130.12	54.73	163.69	90.09	128.00	8,543.80	7,365.41	7,147.93	217.48	33.868	
9,700.00	6,989.05	7,132.45	7,130.05	55.55	163.68	90.08	128.00	8,543.80	7,274.86	7,056.77	218.08	33.359	
9,800.00	6,988.98	7,132.38	7,129.98	56.40	163.68	90.08	128.00	8,543.80	7,184.55	6,965.85	218.70	32.851	
9,900.00	6,988.91	7,132.31	7,129.91	57.28	163.68	90.08	128.00	8,543.80	7,094.51	6,875.16	219.34	32.344	
10,000.00	6,988.84	7,132.24	7,129.84	58.20	163.68	90.08	128.00	8,543.80	7,004.73	6,784.73	220.00	31.839	
10,100.00	6,988.77	7,132.17	7,129.77	59.14	163.67	90.08	128.00	8,543.80	6,915.24	6,694.56	220.68	31.336	
10,200.00	6,988.70	7,132.10	7,129.70	60.11	163.67	90.08	128.00	8,543.80	6,826.04	6,604.66	221.38	30.834	
10,300.00	6,988.63	7,132.03	7,129.63	61.11	163.67	90.08	128.00	8,543.80	6,737.14	6,515.04	222.10	30.334	
10,400.00	6,988.56	7,131.96	7,129.56	62.14	163.67	90.08	128.00	8,543.80	6,648.56	6,425.72	222.84	29.836	
10,500.00	6,988.49	7,131.89	7,129.49	63.19	163.66	90.07	128.00	8,543.80	6,560.30	6,336.70	223.60	29.340	
10,600.00	6,988.42	7,131.82	7,129.42	64.26	163.66	90.07	128.00	8,543.80	6,472.39	6,248.00	224.38	28.845	
10,700.00	6,988.35	7,131.75	7,129.35	65.36	163.66	90.07	128.00	8,543.80	6,384.83	6,159.64	225.19	28.353	
10,800.00	6,988.28	7,131.68	7,129.28	66.48	163.66	90.07	128.00	8,543.80	6,297.64	6,071.62	226.02	27.863	
10,900.00	6,988.21	7,131.61	7,129.21	67.61	163.65	90.07	128.00	8,543.80	6,210.84	5,983.97	226.87	27.376	
11,000.00	6,988.14	7,131.54	7,129.14	68.77	163.65	90.07	128.00	8,543.80	6,124.44	5,896.69	227.75	26.891	
11,100.00	6,988.07	7,131.47	7,129.07	69.95	163.65	90.07	128.00	8,543.80	6,038.47	5,809.81	228.66	26.408	
11,200.00	6,988.01	7,131.40	7,129.01	71.14	163.65	90.07	128.00	8,543.80	5,952.93	5,723.34	229.59	25.929	
11,300.00	6,987.94	7,131.33	7,128.94	72.35	163.65	90.06	128.00	8,543.80	5,867.84	5,637.29	230.55	25.452	
11,400.00	6,987.87	7,131.26	7,128.87	73.57	163.64	90.06	128.00	8,543.80	5,783.24	5,551.70	231.53	24.978	
11,500.00	6,987.80	7,131.19	7,128.80	74.81	163.64	90.06	128.00	8,543.80	5,699.13	5,466.58	232.55	24.507	
11,600.00	6,987.73	7,131.12	7,128.73	76.07	163.64	90.06	128.00	8,543.80	5,615.54	5,381.95	233.59	24.040	
11,643.87	6,987.70	7,131.09	7,128.70	76.62	163.64	90.06	128.00	8,543.80	5,579.05	5,344.99	234.06	23.836	
11,700.00	6,987.66	7,131.05	7,128.66	77.33	163.64	90.06	128.00	8,543.80	5,532.20	5,297.54	234.66	23.576	
11,737.27	6,987.63	7,131.03	7,128.63	77.80	163.63	90.06	128.00	8,543.80	5,500.85	5,265.80	235.05	23.403	
11,800.00	6,987.59	7,130.98	7,128.59	78.59	163.63	90.06	128.00	8,543.80	5,448.04	5,212.33	235.71	23.113	
11,900.00	6,987.52	7,130.92	7,128.52	79.86	163.63	90.06	128.00	8,543.80	5,364.29	5,127.50	236.80	22.654	
12,000.00	6,987.46	7,130.85	7,128.46	81.14	163.63	90.06	128.00	8,543.80	5,281.11	5,043.20	237.91	22.198	
12,100.00	6,987.39	7,130.78	7,128.39	82.43	163.63	90.06	128.00	8,543.80	5,198.52	4,959.47	239.06	21.746	
12,200.00	6,987.32	7,130.72	7,128.32	83.73	163.62	90.05	128.00	8,543.80	5,116.55	4,876.32	240.23	21.298	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Carson #1 - OH - OH-INC												Offset Site Error:	0.00 usft		
Survey Program:		434-A027Ua_INC-ONLY				Rule Assigned:								Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)		
12,300.00	6,987.26	7,130.65	7,128.26	85.05	163.62	90.05	128.00	8,543.80	5,035.24	4,793.79	241.45	20.854			
12,400.00	6,987.19	7,130.58	7,128.19	86.38	163.62	90.05	128.00	8,543.80	4,954.61	4,711.91	242.69	20.415			
12,500.00	6,987.12	7,130.52	7,128.12	87.71	163.62	90.05	128.00	8,543.80	4,874.69	4,630.71	243.98	19.980			
12,600.00	6,987.06	7,130.45	7,128.06	89.06	163.62	90.05	128.00	8,543.80	4,795.53	4,550.24	245.29	19.550			
12,700.00	6,986.99	7,130.38	7,127.99	90.41	163.61	90.05	128.00	8,543.80	4,717.16	4,470.51	246.65	19.125			
12,800.00	6,986.92	7,130.32	7,127.92	91.77	163.61	90.05	128.00	8,543.80	4,639.62	4,391.58	248.04	18.705			
12,900.00	6,986.86	7,130.25	7,127.86	93.14	163.61	90.05	128.00	8,543.80	4,562.96	4,313.49	249.47	18.291			
13,000.00	6,986.79	7,130.18	7,127.79	94.52	163.61	90.04	128.00	8,543.80	4,487.22	4,236.28	250.93	17.882			
13,100.00	6,986.72	7,130.12	7,127.72	95.90	163.60	90.04	128.00	8,543.80	4,412.44	4,160.00	252.43	17.480			
13,200.00	6,986.66	7,130.05	7,127.66	97.30	163.60	90.04	128.00	8,543.80	4,338.67	4,084.70	253.97	17.083			
13,300.00	6,986.59	7,129.98	7,127.59	98.69	163.60	90.04	128.00	8,543.80	4,265.98	4,010.43	255.55	16.694			
13,400.00	6,986.52	7,129.92	7,127.52	100.10	163.60	90.04	128.00	8,543.80	4,194.41	3,937.25	257.16	16.311			
13,500.00	6,986.46	7,129.85	7,127.46	101.51	163.59	90.04	128.00	8,543.80	4,124.02	3,865.22	258.80	15.935			
13,600.00	6,986.39	7,129.78	7,127.39	102.93	163.59	90.04	128.00	8,543.80	4,054.88	3,794.40	260.48	15.567			
13,700.00	6,986.32	7,129.72	7,127.32	104.35	163.59	90.03	128.00	8,543.80	3,987.05	3,724.85	262.20	15.206			
13,800.00	6,986.25	7,129.65	7,127.25	105.78	163.59	90.03	128.00	8,543.80	3,920.60	3,656.65	263.94	14.854			
13,900.00	6,986.19	7,129.58	7,127.19	107.21	163.59	90.03	128.00	8,543.80	3,855.59	3,589.87	265.72	14.510			
14,000.00	6,986.12	7,129.52	7,127.12	108.65	163.58	90.03	128.00	8,543.80	3,792.11	3,524.59	267.52	14.175			
14,100.00	6,986.05	7,129.45	7,127.05	110.09	163.58	90.03	128.00	8,543.80	3,730.22	3,460.88	269.34	13.849			
14,200.00	6,985.99	7,129.38	7,126.99	111.54	163.58	90.03	128.00	8,543.80	3,670.02	3,398.84	271.19	13.533			
14,300.00	6,985.92	7,129.32	7,126.92	112.99	163.58	90.03	128.00	8,543.80	3,611.59	3,338.54	273.05	13.227			
14,400.00	6,985.85	7,129.25	7,126.85	114.45	163.57	90.03	128.00	8,543.80	3,555.00	3,280.09	274.92	12.931			
14,500.00	6,985.79	7,129.18	7,126.79	115.91	163.57	90.02	128.00	8,543.80	3,500.36	3,223.57	276.79	12.646			
14,600.00	6,985.72	7,129.12	7,126.72	117.38	163.57	90.02	128.00	8,543.80	3,447.76	3,169.09	278.67	12.372			
14,700.00	6,985.65	7,129.05	7,126.65	118.84	163.57	90.02	128.00	8,543.80	3,397.28	3,116.75	280.54	12.110			
14,800.00	6,985.59	7,128.98	7,126.59	120.32	163.57	90.02	128.00	8,543.80	3,349.03	3,066.64	282.39	11.859			
14,900.00	6,985.52	7,128.92	7,126.52	121.79	163.56	90.02	128.00	8,543.80	3,303.11	3,018.88	284.23	11.621			
15,000.00	6,985.45	7,128.85	7,126.45	123.27	163.56	90.02	128.00	8,543.80	3,259.61	2,973.58	286.03	11.396			
15,100.00	6,985.39	7,128.78	7,126.39	124.75	163.56	90.02	128.00	8,543.80	3,218.62	2,930.83	287.79	11.184			
15,200.00	6,985.32	7,128.72	7,126.32	126.24	163.56	90.02	128.00	8,543.80	3,180.25	2,890.75	289.51	10.985			
15,300.00	6,985.25	7,128.65	7,126.25	127.72	163.55	90.01	128.00	8,543.80	3,144.60	2,853.44	291.16	10.800			
15,400.00	6,985.19	7,128.58	7,126.19	129.21	163.55	90.01	128.00	8,543.80	3,111.75	2,819.01	292.75	10.630			
15,500.00	6,985.12	7,128.52	7,126.12	130.71	163.55	90.01	128.00	8,543.80	3,081.80	2,787.55	294.25	10.473			
15,600.00	6,985.05	7,128.45	7,126.05	132.20	163.55	90.01	128.00	8,543.80	3,054.83	2,759.17	295.67	10.332			
15,700.00	6,984.99	7,128.38	7,125.99	133.70	163.54	90.01	128.00	8,543.80	3,030.92	2,733.94	296.98	10.206			
15,800.00	6,984.92	7,128.32	7,125.92	135.20	163.54	90.01	128.00	8,543.80	3,010.15	2,711.96	298.19	10.095			
15,900.00	6,984.85	7,128.25	7,125.85	136.71	163.54	90.01	128.00	8,543.80	2,992.57	2,693.30	299.28	9.999			
16,000.00	6,984.79	7,128.18	7,125.79	138.21	163.54	90.00	128.00	8,543.80	2,978.25	2,678.02	300.24	9.920			
16,100.00	6,984.72	7,128.11	7,125.72	139.72	163.54	90.00	128.00	8,543.80	2,967.24	2,666.17	301.06	9.856			
16,200.00	6,984.65	7,128.05	7,125.65	141.23	163.53	90.00	128.00	8,543.80	2,959.56	2,657.81	301.75	9.808			
16,300.00	6,984.59	7,127.98	7,125.59	142.75	163.53	90.00	128.00	8,543.80	2,955.25	2,652.96	302.29	9.776			
16,377.52	6,984.53	7,127.93	7,125.53	143.92	163.53	90.00	128.00	8,543.80	2,954.23	2,651.62	302.61	9.763 CC, ES			
16,400.00	6,984.52	7,127.91	7,125.52	144.26	163.53	90.00	128.00	8,543.80	2,954.31	2,651.63	302.68	9.760 SF			
16,500.00	6,984.45	7,127.85	7,125.45	145.78	163.53	90.00	128.00	8,543.80	2,956.77	2,653.84	302.93	9.761			
16,600.00	6,984.39	7,127.78	7,125.39	147.29	163.52	90.00	128.00	8,543.80	2,962.59	2,659.57	303.02	9.777			
16,700.00	6,984.32	7,127.71	7,125.32	148.82	163.52	90.00	128.00	8,543.80	2,971.78	2,668.81	302.97	9.809			
16,800.00	6,984.25	7,127.65	7,125.25	150.34	163.52	89.99	128.00	8,543.80	2,984.29	2,681.52	302.77	9.857			
16,900.00	6,984.19	7,127.58	7,125.19	151.86	163.52	89.99	128.00	8,543.80	3,000.08	2,697.65	302.43	9.920			
17,000.00	6,984.12	7,127.51	7,125.12	153.39	163.51	89.99	128.00	8,543.80	3,019.10	2,717.14	301.96	9.998			
17,100.00	6,984.05	7,127.45	7,125.05	154.91	163.51	89.99	128.00	8,543.80	3,041.29	2,739.94	301.35	10.092			
17,200.00	6,983.99	7,127.38	7,124.99	156.44	163.51	89.99	128.00	8,543.80	3,066.59	2,765.95	300.63	10.200			
17,300.00	6,983.92	7,127.31	7,124.92	157.97	163.51	89.99	128.00	8,543.80	3,094.91	2,795.11	299.80	10.323			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Carson #1 - OH - OH-INC											Offset Site Error: 0.00 usft
Survey Program: 434-A027Ua_INC-ONLY											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
17,400.00	6,983.85	7,127.25	7,124.85	159.50	163.51	89.99	128.00	8,543.80	3,126.17	2,827.31	
17,500.00	6,983.79	7,127.18	7,124.79	161.04	163.50	89.99	128.00	8,543.80	3,160.29	2,862.46	
17,600.00	6,983.72	7,127.11	7,124.72	162.57	163.50	89.98	128.00	8,543.80	3,197.18	2,900.46	
17,700.00	6,983.65	7,127.05	7,124.65	164.11	163.50	89.98	128.00	8,543.80	3,236.73	2,941.20	
17,800.00	6,983.59	7,126.98	7,124.59	165.65	163.50	89.98	128.00	8,543.80	3,278.86	2,984.59	
17,900.00	6,983.52	7,126.91	7,124.52	167.18	163.49	89.98	128.00	8,543.80	3,323.46	3,030.50	
18,000.00	6,983.45	7,126.85	7,124.45	168.72	163.49	89.98	128.00	8,543.80	3,370.45	3,078.84	
18,100.00	6,983.39	7,126.78	7,124.39	170.27	163.49	89.98	128.00	8,543.80	3,419.71	3,129.49	
18,200.00	6,983.32	7,126.71	7,124.32	171.81	163.49	89.98	128.00	8,543.80	3,471.15	3,182.36	
18,300.00	6,983.25	7,126.65	7,124.25	173.35	163.49	89.98	128.00	8,543.80	3,524.68	3,237.34	
18,400.00	6,983.19	7,126.58	7,124.19	174.90	163.48	89.97	128.00	8,543.80	3,580.21	3,294.33	
18,500.00	6,983.12	7,126.51	7,124.12	176.44	163.48	89.97	128.00	8,543.80	3,637.64	3,353.23	
18,600.00	6,983.05	7,126.45	7,124.05	177.99	163.48	89.97	128.00	8,543.80	3,696.88	3,413.95	
18,700.00	6,982.99	7,126.38	7,123.99	179.54	163.48	89.97	128.00	8,543.80	3,757.84	3,476.40	
18,800.00	6,982.92	7,126.31	7,123.92	181.09	163.47	89.97	128.00	8,543.80	3,820.46	3,540.48	
18,900.00	6,982.85	7,126.25	7,123.85	182.64	163.47	89.97	128.00	8,543.80	3,884.63	3,606.12	
19,000.00	6,982.78	7,126.18	7,123.78	184.19	163.47	89.97	128.00	8,543.80	3,950.30	3,673.24	
19,100.00	6,982.72	7,126.11	7,123.72	185.74	163.47	89.96	128.00	8,543.80	4,017.38	3,741.76	
19,200.00	6,982.65	7,126.05	7,123.65	187.29	163.46	89.96	128.00	8,543.80	4,085.81	3,811.61	
19,300.00	6,982.58	7,125.98	7,123.58	188.84	163.46	89.96	128.00	8,543.80	4,155.52	3,882.71	
19,400.00	6,982.52	7,125.91	7,123.52	190.40	163.46	89.96	128.00	8,543.80	4,226.45	3,955.01	
19,500.00	6,982.45	7,125.85	7,123.45	191.95	163.46	89.96	128.00	8,543.80	4,298.53	4,028.44	
19,600.00	6,982.38	7,125.78	7,123.38	193.51	163.46	89.96	128.00	8,543.80	4,371.71	4,102.95	
19,700.00	6,982.32	7,125.71	7,123.32	195.07	163.45	89.96	128.00	8,543.80	4,445.94	4,178.47	
19,800.00	6,982.25	7,125.65	7,123.25	196.62	163.45	89.96	128.00	8,543.80	4,521.15	4,254.97	
19,900.00	6,982.18	7,125.58	7,123.18	198.18	163.45	89.95	128.00	8,543.80	4,597.32	4,332.37	
20,000.00	6,982.12	7,125.51	7,123.12	199.74	163.45	89.95	128.00	8,543.80	4,674.38	4,410.65	
20,100.00	6,982.05	7,125.45	7,123.05	201.30	163.44	89.95	128.00	8,543.80	4,752.30	4,489.76	
20,176.02	6,982.00	7,125.39	7,123.00	202.36	163.44	89.95	128.00	8,543.80	4,812.07	4,549.72	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 323-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	2,508.42	2,360.14	0.00	14.85	-71.19	1,312.41	-3,853.75	4,686.31				
100.00	100.00	2,555.27	2,400.85	0.25	15.29	-71.14	1,308.36	-3,830.91	4,637.20	4,621.06	16.14	287.314	
200.00	200.00	2,657.09	2,489.46	0.61	16.24	-71.04	1,298.90	-3,781.67	4,588.33	4,571.54	16.78	273.372	
300.00	300.00	2,844.56	2,651.60	0.97	17.99	-70.86	1,280.55	-3,689.39	4,538.68	4,520.76	17.92	253.331	
400.00	400.00	2,943.41	2,736.54	1.33	18.96	-70.78	1,269.06	-3,640.15	4,487.75	4,469.10	18.66	240.549	
500.00	500.00	3,153.07	2,914.82	1.68	21.10	-70.59	1,244.76	-3,532.56	4,435.42	4,415.41	20.02	221.593	
600.00	600.00	3,246.58	2,993.47	2.04	22.07	-70.48	1,234.89	-3,482.95	4,381.71	4,360.92	20.80	210.678	
700.00	699.98	3,324.87	3,059.35	2.40	22.89	-61.55	1,226.02	-3,441.59	4,327.30	4,305.78	21.52	201.092	
800.00	799.84	3,389.00	3,113.39	2.76	23.56	-62.72	1,218.66	-3,407.86	4,271.69	4,249.50	22.18	192.552	
900.00	899.45	3,462.12	3,175.17	3.13	24.32	-63.98	1,209.89	-3,369.74	4,215.02	4,192.12	22.90	184.072	
1,000.00	998.70	3,483.00	3,192.85	3.49	24.54	-65.26	1,207.23	-3,358.96	4,157.72	4,134.36	23.36	177.961	
1,100.00	1,097.47	3,537.66	3,239.44	3.86	25.09	-66.66	1,200.29	-3,331.23	4,099.87	4,075.86	24.02	170.718	
1,200.00	1,195.62	3,574.00	3,270.73	4.24	25.45	-68.07	1,195.76	-3,313.31	4,042.03	4,017.45	24.58	164.431	
1,300.00	1,293.06	3,574.00	3,270.73	4.64	25.45	-69.39	1,195.76	-3,313.31	3,984.37	3,959.40	24.97	159.544	
1,400.00	1,389.64	3,629.04	3,318.62	5.06	25.96	-70.95	1,189.13	-3,287.01	3,926.35	3,900.64	25.70	152.747	
1,500.00	1,485.27	3,667.00	3,352.02	5.50	26.31	-72.48	1,184.75	-3,269.51	3,868.76	3,842.41	26.35	146.815	
1,515.00	1,499.52	3,667.00	3,352.02	5.57	26.31	-72.68	1,184.75	-3,269.51	3,860.12	3,833.70	26.42	146.115	
1,600.00	1,580.22	3,667.00	3,352.02	5.96	26.31	-72.68	1,184.75	-3,269.51	3,811.85	3,785.06	26.79	142.287	
1,700.00	1,675.17	3,708.24	3,388.70	6.44	26.66	-72.91	1,180.30	-3,251.19	3,756.00	3,728.49	27.51	136.524	
1,800.00	1,770.11	3,760.00	3,435.35	6.92	27.09	-73.21	1,175.32	-3,229.34	3,701.91	3,673.60	28.32	130.734	
1,900.00	1,865.05	3,760.00	3,435.35	7.41	27.09	-73.21	1,175.32	-3,229.34	3,648.59	3,619.79	28.80	126.707	
2,000.00	1,959.99	3,798.33	3,470.23	7.90	27.38	-73.42	1,171.96	-3,213.81	3,596.84	3,567.33	29.51	121.895	
2,100.00	2,054.94	3,853.00	3,520.27	8.40	27.79	-73.74	1,167.37	-3,192.28	3,546.27	3,515.95	30.33	116.940	
2,200.00	2,149.88	3,853.00	3,520.27	8.90	27.79	-73.74	1,167.37	-3,192.28	3,496.98	3,466.14	30.83	113.420	
2,300.00	2,244.82	3,903.71	3,567.10	9.41	28.14	-74.04	1,163.14	-3,173.28	3,448.86	3,417.24	31.62	109.071	
2,400.00	2,339.76	3,944.00	3,604.64	9.92	28.42	-74.28	1,159.65	-3,159.09	3,402.45	3,370.09	32.36	105.145	
2,500.00	2,434.71	3,944.00	3,604.64	10.43	28.42	-74.28	1,159.65	-3,159.09	3,357.72	3,324.84	32.88	102.119	
2,600.00	2,529.65	3,987.65	3,645.70	10.94	28.67	-74.56	1,155.89	-3,144.76	3,314.46	3,280.75	33.71	98.329	
2,700.00	2,624.59	4,038.00	3,693.58	11.45	28.96	-74.88	1,151.75	-3,129.77	3,273.45	3,238.86	34.59	94.642	
2,800.00	2,719.53	4,038.00	3,693.58	11.97	28.96	-74.88	1,151.75	-3,129.77	3,233.73	3,198.62	35.11	92.102	
2,900.00	2,814.48	4,038.00	3,693.58	12.49	28.96	-74.88	1,151.75	-3,129.77	3,196.64	3,161.02	35.62	89.734	
3,000.00	2,909.42	4,088.59	3,742.26	13.01	29.20	-75.21	1,148.25	-3,116.47	3,160.83	3,124.26	36.57	86.427	
3,100.00	3,004.36	4,130.00	3,782.51	13.53	29.38	-75.46	1,146.23	-3,106.96	3,127.66	3,090.22	37.44	83.535	
3,200.00	3,099.30	4,130.00	3,782.51	14.05	29.38	-75.46	1,146.23	-3,106.96	3,096.37	3,058.43	37.94	81.623	
3,300.00	3,194.25	4,166.09	3,817.84	14.57	29.50	-75.68	1,144.93	-3,099.70	3,067.30	3,028.55	38.74	79.169	
3,400.00	3,289.19	4,222.00	3,872.94	15.09	29.69	-76.02	1,143.46	-3,090.35	3,040.94	3,001.20	39.73	76.536	
3,500.00	3,384.13	4,222.00	3,872.94	15.62	29.69	-76.02	1,143.46	-3,090.35	3,015.91	2,975.72	40.19	75.039	
3,600.00	3,479.07	4,255.37	3,905.99	16.14	29.76	-76.23	1,142.81	-3,085.77	2,993.52	2,952.66	40.85	73.273	
3,700.00	3,574.02	4,295.00	3,945.34	16.67	29.85	-76.47	1,142.10	-3,081.11	2,973.24	2,931.69	41.55	71.554	
3,800.00	3,668.96	4,295.00	3,945.34	17.19	29.85	-76.47	1,142.10	-3,081.11	2,955.51	2,913.56	41.95	70.452	
3,900.00	3,763.90	4,404.47	4,054.28	17.72	30.16	-77.15	1,140.01	-3,070.68	2,937.81	2,894.46	43.34	67.777	
4,000.00	3,858.84	4,463.03	4,112.65	18.24	30.33	-77.52	1,138.72	-3,066.11	2,922.27	2,878.00	44.27	66.015	
4,100.00	3,953.79	4,521.69	4,171.16	18.77	30.50	-77.90	1,137.30	-3,062.25	2,908.20	2,863.01	45.18	64.364	
4,200.00	4,048.73	4,580.43	4,229.80	19.30	30.68	-78.29	1,135.76	-3,059.10	2,895.61	2,849.52	46.09	62.820	
4,300.00	4,143.67	4,696.00	4,345.25	19.82	31.03	-79.06	1,132.37	-3,054.98	2,885.42	2,837.89	47.53	60.706	
4,400.00	4,238.61	4,696.00	4,345.25	20.35	31.03	-79.06	1,132.37	-3,054.98	2,874.97	2,827.10	47.87	60.052	
4,500.00	4,333.56	4,784.99	4,434.18	20.88	31.58	-79.66	1,129.78	-3,053.00	2,866.47	2,817.43	49.03	58.458	
4,600.00	4,428.50	4,871.23	4,520.37	21.41	32.12	-80.23	1,127.64	-3,051.31	2,858.60	2,808.43	50.17	56.978	
4,700.00	4,523.44	4,957.76	4,606.87	21.93	32.65	-80.81	1,125.86	-3,049.85	2,851.38	2,800.07	51.31	55.572	
4,800.00	4,618.38	5,044.59	4,693.68	22.46	33.19	-81.38	1,124.45	-3,048.61	2,844.77	2,792.32	52.45	54.234	
4,900.00	4,713.33	5,131.70	4,780.78	22.99	33.73	-81.94	1,123.41	-3,047.60	2,838.79	2,785.19	53.60	52.962	
5,000.00	4,808.27	5,219.10	4,868.17	23.52	34.27	-82.51	1,122.75	-3,046.82	2,833.40	2,778.65	54.75	51.751	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		323-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,100.00	4,903.21	5,306.78	4,955.85	24.05	34.81	-83.07	1,122.46	-3,046.28	2,828.61	2,772.71	55.90	50.598		
5,200.00	4,998.16	5,394.74	5,043.81	24.58	35.36	-83.62	1,122.56	-3,045.97	2,824.41	2,767.35	57.06	49.499		
5,300.00	5,093.10	5,482.98	5,132.05	25.11	35.90	-84.17	1,123.04	-3,045.89	2,820.77	2,762.55	58.22	48.452		
5,400.00	5,188.04	5,571.49	5,220.56	25.64	36.45	-84.72	1,123.91	-3,046.06	2,817.69	2,758.32	59.38	47.453		
5,500.00	5,282.98	5,660.00	5,309.05	26.17	37.00	-85.26	1,125.16	-3,046.47	2,815.16	2,754.63	60.54	46.502		
5,600.00	5,377.93	5,754.32	5,403.37	26.70	37.61	-85.83	1,126.55	-3,047.04	2,813.08	2,751.39	61.70	45.596		
5,623.25	5,400.00	5,776.16	5,425.20	26.82	37.75	-85.96	1,126.82	-3,047.17	2,812.65	2,750.69	61.96	45.392		
5,700.00	5,473.03	5,848.31	5,497.35	27.22	38.21	-86.39	1,127.61	-3,047.63	2,811.40	2,748.56	62.85	44.735		
5,800.00	5,568.64	5,942.59	5,591.62	27.73	38.82	-86.92	1,128.35	-3,048.23	2,810.18	2,746.20	63.98	43.921		
5,900.00	5,664.75	6,037.17	5,686.20	28.23	39.42	-87.43	1,128.78	-3,048.85	2,809.39	2,744.29	65.10	43.152		
6,000.00	5,761.33	6,132.03	5,781.05	28.71	40.03	-87.93	1,128.88	-3,049.49	2,808.98	2,742.77	66.21	42.424		
6,067.81	5,827.07	6,196.50	5,845.53	29.03	40.44	-88.25	1,128.76	-3,049.94	2,808.90	2,741.95	66.95	41.953 CC		
6,100.00	5,858.34	6,227.15	5,876.17	29.18	40.64	-88.40	1,128.65	-3,050.15	2,808.92	2,741.62	67.30	41.734		
6,200.00	5,955.76	6,322.51	5,971.53	29.64	41.25	-88.85	1,128.09	-3,050.83	2,809.17	2,740.79	68.38	41.080		
6,300.00	6,053.57	6,418.11	6,067.12	30.07	41.87	-89.28	1,127.20	-3,051.52	2,809.71	2,740.27	69.45	40.459		
6,400.00	6,151.72	6,513.93	6,162.93	30.50	42.48	-89.68	1,125.98	-3,052.23	2,810.50	2,740.00	70.49	39.869		
6,500.00	6,250.19	6,614.19	6,263.18	30.91	43.38	-90.07	1,124.44	-3,052.96	2,811.46	2,739.63	71.83	39.143		
6,600.00	6,348.94	6,717.10	6,366.07	31.30	44.44	-90.44	1,122.89	-3,053.57	2,812.39	2,739.08	73.31	38.363		
6,659.67	6,408.00	6,778.65	6,427.62	31.53	45.07	-90.64	1,121.98	-3,053.86	2,812.91	2,738.73	74.19	37.916 ES		
6,700.00	6,447.82	6,820.14	6,469.10	31.68	45.50	-107.19	1,121.38	-3,054.03	2,814.31	2,739.52	74.79	37.632		
6,750.00	6,496.66	6,871.00	6,519.95	31.90	46.02	-118.45	1,120.66	-3,054.19	2,818.97	2,743.43	75.54	37.319		
6,800.00	6,544.65	6,920.93	6,569.88	32.13	46.54	-124.65	1,119.97	-3,054.32	2,826.86	2,750.56	76.30	37.051		
6,850.00	6,591.49	6,969.63	6,618.57	32.37	47.04	-128.33	1,119.30	-3,054.41	2,837.96	2,760.91	77.05	36.831		
6,900.00	6,636.89	7,016.81	6,665.75	32.62	47.53	-130.57	1,118.66	-3,054.47	2,852.25	2,774.44	77.81	36.657		
6,950.00	6,680.57	7,062.28	6,711.22	32.89	47.99	-131.87	1,118.06	-3,054.49	2,869.65	2,791.11	78.54	36.536 SF		
7,000.00	6,722.26	7,109.30	6,758.23	33.17	48.07	-132.52	1,117.51	-3,054.46	2,890.07	2,811.15	78.91	36.623		
7,050.00	6,761.71	7,153.92	6,802.85	33.45	48.14	-132.63	1,117.08	-3,054.37	2,913.39	2,834.11	79.29	36.746		
7,100.00	6,798.67	7,195.88	6,844.81	33.75	48.20	-132.26	1,116.76	-3,054.23	2,939.51	2,859.86	79.65	36.904		
7,150.00	6,832.91	7,234.93	6,883.86	34.06	48.26	-131.43	1,116.55	-3,054.05	2,968.30	2,888.29	80.01	37.098		
7,200.00	6,864.22	7,270.82	6,919.75	34.37	48.31	-130.12	1,116.42	-3,053.84	2,999.62	2,919.26	80.36	37.326		
7,250.00	6,892.42	7,303.33	6,952.26	34.69	48.36	-128.28	1,116.35	-3,053.61	3,033.30	2,952.60	80.70	37.586		
7,300.00	6,917.32	7,332.24	6,981.16	35.03	48.41	-125.86	1,116.34	-3,053.38	3,069.16	2,988.13	81.03	37.878		
7,350.00	6,938.77	7,357.34	7,006.27	35.37	48.45	-122.76	1,116.36	-3,053.17	3,107.00	3,025.66	81.34	38.199		
7,400.00	6,956.64	7,378.46	7,027.39	35.72	48.48	-118.87	1,116.40	-3,052.97	3,146.60	3,064.97	81.63	38.547		
7,450.00	6,970.83	7,395.44	7,044.36	36.07	48.51	-114.05	1,116.45	-3,052.80	3,187.72	3,105.82	81.90	38.922		
7,500.00	6,981.23	7,408.13	7,057.05	36.44	48.53	-108.18	1,116.50	-3,052.66	3,230.12	3,147.97	82.15	39.319		
7,550.00	6,987.80	7,416.42	7,065.34	36.81	48.54	-101.19	1,116.53	-3,052.57	3,273.54	3,191.16	82.38	39.736		
7,600.00	6,990.48	7,420.21	7,069.13	37.19	48.54	-93.13	1,116.55	-3,052.53	3,317.70	3,235.11	82.59	40.172		
7,609.87	6,990.55	7,420.42	7,069.34	37.26	48.55	-91.43	1,116.55	-3,052.53	3,326.47	3,243.85	82.63	40.259		
7,700.00	6,990.49	7,421.52	7,070.44	37.97	48.55	-91.47	1,116.56	-3,052.52	3,406.98	3,324.01	82.96	41.066		
7,800.00	6,990.42	7,422.77	7,071.69	38.78	48.55	-91.52	1,116.56	-3,052.50	3,496.84	3,413.52	83.32	41.968		
7,900.00	6,990.35	7,424.03	7,072.95	39.64	48.55	-91.56	1,116.57	-3,052.49	3,587.24	3,503.58	83.66	42.877		
8,000.00	6,990.28	7,425.30	7,074.23	40.53	48.55	-91.61	1,116.57	-3,052.47	3,678.14	3,594.14	83.99	43.791		
8,100.00	6,990.21	7,426.60	7,075.52	41.45	48.55	-91.66	1,116.58	-3,052.46	3,769.49	3,685.19	84.31	44.712		
8,200.00	6,990.14	7,427.91	7,076.84	42.40	48.56	-91.71	1,116.59	-3,052.44	3,861.28	3,776.67	84.61	45.638		
8,306.37	6,990.06	7,429.33	7,078.25	43.45	48.56	-91.76	1,116.59	-3,052.43	3,959.34	3,874.43	84.91	46.628		
8,400.00	6,990.00	7,430.61	7,079.53	44.38	48.56	-92.16	1,116.60	-3,052.41	4,047.10	3,961.95	85.15	47.526		
8,500.00	6,989.93	7,432.03	7,080.95	45.36	48.56	-92.83	1,116.61	-3,052.40	4,143.17	4,057.81	85.36	48.537		
8,600.00	6,989.85	7,433.48	7,082.41	46.33	48.57	-94.08	1,116.61	-3,052.38	4,241.05	4,155.54	85.51	49.595		
8,700.00	6,989.78	7,434.98	7,083.90	47.28	48.57	-97.21	1,116.62	-3,052.36	4,340.16	4,254.55	85.62	50.694		
8,800.00	6,989.70	7,436.50	7,085.42	48.21	48.57	-117.07	1,116.63	-3,052.35	4,439.96	4,354.29	85.67	51.826		
8,900.00	6,989.63	7,438.04	7,086.96	49.11	48.57	104.73	1,116.64	-3,052.33	4,539.93	4,454.24	85.68	52.986		

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		323-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:		0.00 usft	
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,000.00	6,989.55	7,439.60	7,088.52	49.99	48.57	96.11	1,116.65	-3,052.31	4,639.58	4,553.93	85.65	54.168		
9,100.00	6,989.48	7,441.15	7,090.07	50.84	48.58	93.90	1,116.66	-3,052.29	4,738.47	4,652.88	85.58	55.366		
9,200.00	6,989.40	7,442.70	7,091.62	51.66	48.58	92.90	1,116.66	-3,052.27	4,836.17	4,750.69	85.48	56.576		
9,300.00	6,989.33	7,444.23	7,093.15	52.45	48.58	92.34	1,116.67	-3,052.26	4,932.30	4,846.95	85.35	57.791		
9,393.87	6,989.27	7,445.65	7,094.57	53.15	48.58	91.99	1,116.68	-3,052.24	5,020.77	4,935.57	85.19	58.933		
9,400.00	6,989.26	7,445.74	7,094.66	53.20	48.58	91.99	1,116.68	-3,052.24	5,026.49	4,941.31	85.18	59.008		
9,500.00	6,989.19	7,447.24	7,096.16	53.95	48.59	92.04	1,116.69	-3,052.22	5,119.87	5,034.86	85.02	60.223		
9,600.00	6,989.12	7,448.75	7,097.67	54.73	48.59	92.09	1,116.70	-3,052.20	5,213.50	5,128.64	84.86	61.438		
9,700.00	6,989.05	7,450.28	7,099.20	55.55	48.59	92.14	1,116.71	-3,052.18	5,307.36	5,222.65	84.71	62.656		
9,800.00	6,988.98	7,451.82	7,100.74	56.40	48.59	92.19	1,116.72	-3,052.16	5,401.44	5,316.88	84.56	63.874		
9,900.00	6,988.91	7,453.37	7,102.29	57.28	48.60	92.23	1,116.73	-3,052.15	5,495.73	5,411.30	84.43	65.094		
10,000.00	6,988.84	7,454.93	7,103.85	58.20	48.60	92.28	1,116.74	-3,052.13	5,590.22	5,505.92	84.30	66.314		
10,100.00	6,988.77	7,456.51	7,105.43	59.14	48.60	92.33	1,116.75	-3,052.11	5,684.89	5,600.71	84.18	67.535		
10,200.00	6,988.70	7,458.11	7,107.03	60.11	48.60	92.38	1,116.76	-3,052.09	5,779.75	5,695.69	84.06	68.757		
10,300.00	6,988.63	7,459.72	7,108.64	61.11	48.61	92.43	1,116.77	-3,052.07	5,874.77	5,790.82	83.95	69.979		
10,400.00	6,988.56	7,461.34	7,110.26	62.14	48.61	92.49	1,116.78	-3,052.05	5,969.96	5,886.11	83.85	71.201		
10,500.00	6,988.49	7,462.98	7,111.90	63.19	48.61	92.54	1,116.79	-3,052.03	6,065.30	5,981.55	83.75	72.423		
10,600.00	6,988.42	7,464.63	7,113.55	64.26	48.61	92.59	1,116.80	-3,052.01	6,160.79	6,077.13	83.65	73.645		
10,700.00	6,988.35	7,466.30	7,115.22	65.36	48.62	92.64	1,116.81	-3,051.99	6,256.42	6,172.85	83.57	74.868		
10,800.00	6,988.28	7,467.98	7,116.90	66.48	48.62	92.70	1,116.82	-3,051.97	6,352.18	6,268.70	83.48	76.090		
10,900.00	6,988.21	7,469.68	7,118.60	67.61	48.62	92.75	1,116.84	-3,051.94	6,448.07	6,364.67	83.40	77.311		
11,000.00	6,988.14	7,471.39	7,120.31	68.77	48.62	92.80	1,116.85	-3,051.92	6,544.09	6,460.76	83.33	78.532		
11,100.00	6,988.07	7,473.12	7,122.04	69.95	48.63	92.86	1,116.86	-3,051.90	6,640.22	6,556.96	83.26	79.753		
11,200.00	6,988.01	7,474.87	7,123.78	71.14	48.63	92.91	1,116.87	-3,051.88	6,736.47	6,653.27	83.19	80.973		
11,300.00	6,987.94	7,476.63	7,125.55	72.35	48.63	92.97	1,116.89	-3,051.86	6,832.82	6,749.69	83.13	82.193		
11,400.00	6,987.87	7,478.41	7,127.33	73.57	48.63	93.02	1,116.90	-3,051.83	6,929.27	6,846.20	83.07	83.411		
11,500.00	6,987.80	7,480.20	7,129.12	74.81	48.64	93.08	1,116.91	-3,051.81	7,025.83	6,942.81	83.02	84.629		
11,600.00	6,987.73	7,482.02	7,130.93	76.07	48.64	93.14	1,116.93	-3,051.79	7,122.48	7,039.51	82.97	85.846		
11,643.87	6,987.70	7,482.82	7,131.73	76.62	48.64	93.16	1,116.93	-3,051.78	7,164.90	7,081.95	82.95	86.379		
11,700.00	6,987.66	7,483.84	7,132.76	77.33	48.64	92.98	1,116.94	-3,051.76	7,219.07	7,136.16	82.92	87.062		
11,737.27	6,987.63	7,484.52	7,133.43	77.80	48.64	92.87	1,116.94	-3,051.75	7,254.89	7,172.00	82.90	87.516		
11,800.00	6,987.59	7,485.66	7,134.58	78.59	48.65	92.90	1,116.95	-3,051.74	7,315.11	7,232.25	82.86	88.278		
11,900.00	6,987.52	7,487.49	7,136.41	79.86	48.65	92.95	1,116.97	-3,051.71	7,411.19	7,328.37	82.81	89.492		
12,000.00	6,987.46	7,489.34	7,138.26	81.14	48.65	93.00	1,116.98	-3,051.69	7,507.36	7,424.60	82.77	90.704		
12,100.00	6,987.39	7,491.21	7,140.12	82.43	48.65	93.05	1,117.00	-3,051.66	7,603.64	7,520.92	82.72	91.916		
12,200.00	6,987.32	7,493.09	7,142.00	83.73	48.66	93.11	1,117.01	-3,051.64	7,700.01	7,617.33	82.68	93.126		
12,300.00	6,987.26	7,494.99	7,143.90	85.05	48.66	93.16	1,117.03	-3,051.61	7,796.47	7,713.83	82.65	94.335		
12,400.00	6,987.19	7,496.91	7,145.82	86.38	48.66	93.21	1,117.04	-3,051.59	7,893.02	7,810.41	82.61	95.542		
12,500.00	6,987.12	7,498.85	7,147.76	87.71	48.67	93.27	1,117.06	-3,051.56	7,989.66	7,907.08	82.58	96.749		
12,600.00	6,987.06	7,500.80	7,149.71	89.06	48.67	93.32	1,117.08	-3,051.54	8,086.37	8,003.82	82.55	97.953		
12,700.00	6,986.99	7,502.77	7,151.69	90.41	48.67	93.38	1,117.09	-3,051.51	8,183.17	8,100.64	82.53	99.157		
12,800.00	6,986.92	7,504.77	7,153.68	91.77	48.68	93.43	1,117.11	-3,051.48	8,280.04	8,197.53	82.50	100.358		
12,900.00	6,986.86	7,506.78	7,155.69	93.14	48.68	93.49	1,117.13	-3,051.45	8,376.98	8,294.50	82.48	101.559		
13,000.00	6,986.79	7,508.81	7,157.72	94.52	48.68	93.55	1,117.15	-3,051.43	8,474.00	8,391.53	82.47	102.757		
13,100.00	6,986.72	7,510.86	7,159.77	95.90	48.68	93.60	1,117.17	-3,051.40	8,571.08	8,488.63	82.45	103.954		
13,200.00	6,986.66	7,512.93	7,161.84	97.30	48.69	93.66	1,117.18	-3,051.37	8,668.23	8,585.79	82.44	105.149		
13,300.00	6,986.59	7,515.02	7,163.93	98.69	48.69	93.72	1,117.20	-3,051.34	8,765.44	8,683.01	82.43	106.342		
13,400.00	6,986.52	7,517.13	7,166.04	100.10	48.69	93.78	1,117.22	-3,051.31	8,862.71	8,780.29	82.42	107.533		
13,500.00	6,986.46	7,519.27	7,168.18	101.51	48.70	93.84	1,117.24	-3,051.28	8,960.05	8,877.63	82.41	108.723		
13,600.00	6,986.39	7,521.42	7,170.33	102.93	48.70	93.90	1,117.26	-3,051.25	9,057.44	8,975.03	82.41	109.910		
13,700.00	6,986.32	7,523.59	7,172.51	104.35	48.70	93.96	1,117.28	-3,051.22	9,154.89	9,072.48	82.41	111.096		
13,800.00	6,986.25	7,525.79	7,174.70	105.78	48.71	94.02	1,117.31	-3,051.19	9,252.39	9,169.98	82.41	112.279		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		323-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,900.00	6,986.19	7,528.01	7,176.92	107.21	48.71	94.08	1,117.33	-3,051.15	9,349.94	9,267.53	82.41	113.461		
14,000.00	6,986.12	7,530.25	7,179.16	108.65	48.71	94.15	1,117.35	-3,051.12	9,447.55	9,365.14	82.41	114.640		
14,100.00	6,986.05	7,532.52	7,181.43	110.09	48.72	94.21	1,117.37	-3,051.09	9,545.20	9,462.78	82.42	115.817		
14,200.00	6,985.99	7,534.80	7,183.71	111.54	48.72	94.27	1,117.40	-3,051.05	9,642.90	9,560.48	82.42	116.992		
14,300.00	6,985.92	7,537.11	7,186.02	112.99	48.73	94.34	1,117.42	-3,051.02	9,740.65	9,658.22	82.43	118.165		
14,400.00	6,985.85	7,539.45	7,188.36	114.45	48.73	94.40	1,117.44	-3,050.99	9,838.48	9,756.00	82.44	119.335		
14,500.00	6,985.79	7,541.81	7,190.72	115.91	48.73	94.47	1,117.47	-3,050.95	9,936.28	9,853.82	82.46	120.503		
14,600.00	6,985.72	7,544.19	7,193.10	117.38	48.74	94.54	1,117.49	-3,050.92	10,034.16	9,951.69	82.47	121.669		
14,700.00	6,985.65	7,546.60	7,195.51	118.84	48.74	94.60	1,117.52	-3,050.88	10,132.08	10,049.59	82.49	122.832		
14,800.00	6,985.59	7,549.04	7,197.94	120.32	48.74	94.67	1,117.55	-3,050.84	10,230.04	10,147.54	82.50	123.993		
14,900.00	6,985.52	7,551.50	7,200.40	121.79	48.75	94.74	1,117.57	-3,050.81	10,328.04	10,245.51	82.52	125.152		
15,000.00	6,985.45	7,553.98	7,202.89	123.27	48.75	94.81	1,117.60	-3,050.77	10,426.08	10,343.53	82.54	126.308		
15,100.00	6,985.39	7,556.50	7,205.40	124.75	48.76	94.88	1,117.63	-3,050.73	10,524.15	10,441.58	82.57	127.462		
15,200.00	6,985.32	7,559.04	7,207.94	126.24	48.76	94.95	1,117.66	-3,050.69	10,622.26	10,539.67	82.59	128.613		
15,300.00	6,985.25	7,561.60	7,210.51	127.72	48.76	95.02	1,117.69	-3,050.65	10,720.40	10,637.78	82.62	129.762		
15,400.00	6,985.19	7,564.20	7,213.10	129.21	48.77	95.10	1,117.72	-3,050.61	10,818.58	10,735.93	82.64	130.908		
15,500.00	6,985.12	7,566.82	7,215.73	130.71	48.77	95.17	1,117.75	-3,050.57	10,916.79	10,834.12	82.67	132.051		
15,600.00	6,985.05	7,569.48	7,218.38	132.20	48.78	95.24	1,117.78	-3,050.53	11,015.03	10,932.33	82.70	133.192		
15,700.00	6,984.99	7,572.16	7,221.06	133.70	48.78	95.32	1,117.81	-3,050.48	11,113.30	11,030.57	82.73	134.330		
15,800.00	6,984.92	7,574.87	7,223.77	135.20	48.78	95.39	1,117.84	-3,050.44	11,211.60	11,128.84	82.76	135.466		
15,900.00	6,984.85	7,577.62	7,226.52	136.71	48.79	95.47	1,117.88	-3,050.40	11,309.94	11,227.14	82.80	136.598		
16,000.00	6,984.79	7,580.39	7,229.29	138.21	48.79	95.55	1,117.91	-3,050.35	11,408.30	11,325.46	82.83	137.728		
16,100.00	6,984.72	7,583.19	7,232.10	139.72	48.80	95.63	1,117.95	-3,050.31	11,506.69	11,423.82	82.87	138.856		
16,200.00	6,984.65	7,586.03	7,234.93	141.23	48.80	95.70	1,117.98	-3,050.26	11,605.10	11,522.20	82.91	139.980		
16,300.00	6,984.59	7,588.90	7,237.80	142.75	48.81	95.78	1,118.02	-3,050.21	11,703.54	11,620.60	82.94	141.102		
16,400.00	6,984.52	7,591.80	7,240.70	144.26	48.81	95.87	1,118.06	-3,050.17	11,802.01	11,719.03	82.98	142.221		
16,500.00	6,984.45	7,594.74	7,243.64	145.78	48.81	95.95	1,118.09	-3,050.12	11,900.50	11,817.48	83.02	143.337		
16,600.00	6,984.39	7,597.71	7,246.61	147.29	48.82	96.03	1,118.13	-3,050.07	11,999.02	11,915.96	83.07	144.450		
16,700.00	6,984.32	7,600.72	7,249.62	148.82	48.82	96.11	1,118.17	-3,050.02	12,097.56	12,014.45	83.11	145.560		
16,800.00	6,984.25	7,603.76	7,252.66	150.34	48.83	96.20	1,118.21	-3,049.97	12,196.13	12,112.97	83.15	146.667		
16,900.00	6,984.19	7,606.84	7,255.73	151.86	48.83	96.28	1,118.26	-3,049.92	12,294.72	12,211.52	83.20	147.772		
17,000.00	6,984.12	7,609.95	7,258.85	153.39	48.84	96.37	1,118.30	-3,049.86	12,393.33	12,310.08	83.25	148.873		
17,100.00	6,984.05	7,613.10	7,262.00	154.91	48.84	96.46	1,118.34	-3,049.81	12,491.96	12,408.66	83.30	149.972		
17,200.00	6,983.99	7,616.29	7,265.19	156.44	48.85	96.55	1,118.39	-3,049.75	12,590.61	12,507.27	83.34	151.067		
17,300.00	6,983.92	7,619.52	7,268.41	157.97	48.85	96.64	1,118.43	-3,049.70	12,689.29	12,605.89	83.39	152.159		
17,400.00	6,983.85	7,622.79	7,271.68	159.50	48.86	96.73	1,118.48	-3,049.64	12,787.98	12,704.53	83.45	153.249		
17,500.00	6,983.79	7,461.43	7,110.34	161.04	48.61	92.22	1,117.42	-3,051.64	12,886.72	12,803.61	83.11	155.055		
17,600.00	6,983.72	7,462.08	7,110.99	162.57	48.61	92.24	1,117.42	-3,051.63	12,985.47	12,902.31	83.16	156.154		
17,700.00	6,983.65	7,608.32	7,257.22	164.11	49.15	96.32	1,118.12	-3,049.90	13,084.23	13,000.31	83.92	155.913		
17,800.00	6,983.59	7,610.79	7,259.68	165.65	49.16	96.39	1,118.14	-3,049.86	13,183.00	13,099.01	83.98	156.969		
17,900.00	6,983.52	7,613.27	7,262.17	167.18	49.17	96.46	1,118.16	-3,049.82	13,281.79	13,197.74	84.05	158.022		
18,000.00	6,983.45	7,615.78	7,264.68	168.72	49.19	96.53	1,118.19	-3,049.78	13,380.60	13,296.48	84.12	159.072		
18,100.00	6,983.39	7,618.31	7,267.20	170.27	49.20	96.60	1,118.21	-3,049.74	13,479.42	13,395.24	84.18	160.119		
18,200.00	6,983.32	7,620.86	7,269.75	171.81	49.21	96.67	1,118.24	-3,049.69	13,578.27	13,494.01	84.25	161.162		
18,300.00	6,983.25	7,623.43	7,272.33	173.35	49.23	96.74	1,118.26	-3,049.65	13,677.13	13,592.80	84.32	162.201		
18,400.00	6,983.19	7,626.03	7,274.92	174.90	49.24	96.82	1,118.29	-3,049.61	13,776.00	13,691.61	84.39	163.237		
18,500.00	6,983.12	7,628.64	7,277.54	176.44	49.25	96.89	1,118.32	-3,049.56	13,874.89	13,790.43	84.46	164.270		
18,600.00	6,983.05	7,631.28	7,280.18	177.99	49.27	96.96	1,118.34	-3,049.52	13,973.80	13,889.26	84.54	165.299		
18,700.00	6,982.99	7,633.95	7,282.84	179.54	49.28	97.04	1,118.37	-3,049.47	14,072.72	13,988.11	84.61	166.325		
18,800.00	6,982.92	7,636.63	7,285.52	181.09	49.30	97.11	1,118.39	-3,049.42	14,171.66	14,086.97	84.68	167.347		
18,900.00	6,982.85	7,639.34	7,288.23	182.64	49.31	97.19	1,118.42	-3,049.38	14,270.61	14,185.85	84.76	168.365		
19,000.00	6,982.78	7,642.08	7,290.97	184.19	49.33	97.26	1,118.45	-3,049.33	14,369.57	14,284.74	84.84	169.380		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program: 323-MWD OWSG Rev5													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,100.00	6,982.72	7,644.83	7,293.72	185.74	49.34	97.34	1,118.48	-3,049.28	14,468.55	14,383.64	84.91	170.392		
19,200.00	6,982.65	7,647.62	7,296.51	187.29	49.36	97.41	1,118.50	-3,049.23	14,567.55	14,482.56	84.99	171.400		
19,300.00	6,982.58	7,650.42	7,299.31	188.84	49.37	97.49	1,118.53	-3,049.18	14,666.55	14,581.48	85.07	172.404		
19,400.00	6,982.52	7,653.26	7,302.14	190.40	49.39	97.57	1,118.56	-3,049.13	14,765.57	14,680.42	85.15	173.405		
19,500.00	6,982.45	7,656.12	7,305.00	191.95	49.40	97.65	1,118.59	-3,049.08	14,864.60	14,779.37	85.23	174.402		
19,600.00	6,982.38	7,659.00	7,307.89	193.51	49.42	97.73	1,118.62	-3,049.03	14,963.65	14,878.34	85.31	175.395		
19,700.00	6,982.32	7,661.91	7,310.80	195.07	49.43	97.81	1,118.64	-3,048.97	15,062.71	14,977.31	85.40	176.385		
19,800.00	6,982.25	7,664.85	7,313.73	196.62	49.45	97.89	1,118.67	-3,048.92	15,161.78	15,076.29	85.48	177.371		
19,900.00	6,982.18	7,667.81	7,316.70	198.18	49.46	97.97	1,118.70	-3,048.87	15,260.86	15,175.29	85.57	178.354		
20,000.00	6,982.12	7,670.81	7,319.69	199.74	49.48	98.06	1,118.73	-3,048.81	15,359.95	15,274.30	85.65	179.332		
20,100.00	6,982.05	7,673.83	7,322.71	201.30	49.50	98.14	1,118.76	-3,048.76	15,459.05	15,373.32	85.74	180.308		
20,176.02	6,982.00	7,676.14	7,325.02	202.36	49.51	98.20	1,118.78	-3,048.71	15,534.39	15,443.97	90.42	171.794		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		388-APC_ISCWSA REV 2 MWD						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)	
0.00	0.00	0.00	0.00	0.00	0.00	-164.32	-104.12	-29.23	111.97					
100.00	100.00	71.11	71.11	0.25	0.08	-164.33	-104.09	-29.21	108.11	107.78	0.33	326.576		
200.00	200.00	171.27	171.27	0.61	0.19	-164.36	-103.94	-29.10	107.94	107.14	0.80	134.575		
300.00	300.00	271.42	271.42	0.97	0.31	-164.42	-103.67	-28.90	107.62	106.35	1.27	84.535		
400.00	400.00	371.57	371.57	1.33	0.42	-164.51	-103.27	-28.61	107.16	105.42	1.74	61.440		
500.00	500.00	474.48	474.47	1.68	0.63	-164.66	-101.87	-27.94	105.69	103.37	2.32	45.642		
600.00	600.00	579.43	579.23	2.04	0.89	-165.40	-96.57	-25.16	100.13	97.22	2.91	34.354		
700.00	699.98	687.17	686.08	2.40	1.18	-157.93	-84.50	-18.93	89.49	85.97	3.52	25.421		
800.00	799.84	793.30	789.35	2.76	1.57	-164.96	-63.10	-7.67	72.66	68.53	4.13	17.590		
900.00	899.45	893.91	885.26	3.13	2.08	-179.97	-36.19	6.35	54.49	49.63	4.86	11.205		
1,000.00	998.70	991.89	976.12	3.49	2.71	148.41	-3.61	23.12	42.29	36.22	6.07	6.971		
1,013.60	1,012.16	1,004.87	988.00	3.54	2.80	142.98	1.02	25.53	42.06	35.80	6.26	6.721	CC, ES, SF	
1,100.00	1,097.47	1,086.15	1,061.57	3.86	3.41	111.38	31.52	41.73	51.04	43.88	7.16	7.127		
1,200.00	1,195.62	1,177.42	1,142.00	4.24	4.18	90.27	69.01	63.03	78.25	70.51	7.74	10.111		
1,300.00	1,293.06	1,265.82	1,217.59	4.64	5.02	80.04	108.78	85.79	113.56	105.23	8.33	13.629		
1,400.00	1,389.64	1,347.98	1,284.33	5.06	5.90	73.77	150.68	108.89	154.79	145.87	8.92	17.355		
1,500.00	1,485.27	1,427.84	1,345.21	5.50	6.85	68.96	196.67	132.44	200.87	191.30	9.56	21.008		
1,515.00	1,499.52	1,439.34	1,353.75	5.57	6.99	68.41	203.53	135.98	208.09	198.44	9.66	21.551		
1,600.00	1,580.22	1,508.28	1,404.12	5.96	7.86	66.40	245.18	157.86	250.33	240.01	10.31	24.276		
1,700.00	1,675.17	1,592.63	1,465.04	6.44	8.92	64.50	296.96	184.76	301.05	289.88	11.17	26.951		
1,800.00	1,770.11	1,678.25	1,526.53	6.92	9.96	62.98	350.12	211.65	352.08	340.03	12.06	29.202		
1,900.00	1,865.05	1,758.63	1,583.88	7.41	10.97	61.95	400.05	237.69	404.09	391.20	12.89	31.342		
2,000.00	1,959.99	1,844.13	1,644.64	7.90	12.04	61.16	453.11	266.05	456.78	442.95	13.83	33.019		
2,100.00	2,054.94	1,938.03	1,712.22	8.40	13.17	60.66	510.18	297.58	508.92	494.01	14.91	34.130		
2,200.00	2,149.88	2,021.03	1,772.82	8.90	14.18	60.46	559.38	325.75	560.23	544.39	15.85	35.354		
2,300.00	2,244.82	2,102.61	1,831.88	9.41	15.22	60.19	608.57	353.12	611.97	595.20	16.77	36.486		
2,400.00	2,339.76	2,190.66	1,895.01	9.92	16.35	59.79	662.80	381.81	663.94	646.15	17.79	37.319		
2,500.00	2,434.71	2,278.28	1,957.96	10.43	17.42	59.39	717.07	409.58	715.44	696.65	18.79	38.084		
2,600.00	2,529.65	2,369.69	2,024.20	10.94	18.55	59.10	772.88	438.78	766.47	746.63	19.85	38.623		
2,700.00	2,624.59	2,456.55	2,087.18	11.45	19.61	58.87	825.86	466.55	817.50	796.66	20.84	39.227		
2,800.00	2,719.53	2,551.06	2,156.60	11.97	20.73	58.73	882.39	496.84	867.66	845.72	21.94	39.549		
2,900.00	2,814.48	2,635.17	2,218.58	12.49	21.76	58.65	932.36	523.95	917.68	894.77	22.91	40.050		
3,000.00	2,909.42	2,723.04	2,283.07	13.01	22.86	58.60	984.52	552.95	968.31	944.36	23.95	40.429		
3,100.00	3,004.36	2,914.52	2,432.46	13.53	24.97	58.94	1,088.38	612.35	1,013.10	986.87	26.23	38.624		
3,200.00	3,099.30	3,055.25	2,547.77	14.05	26.40	59.22	1,159.62	650.16	1,052.40	1,024.61	27.78	37.881		
3,300.00	3,194.25	3,204.67	2,674.62	14.57	27.80	59.59	1,230.17	685.52	1,086.44	1,057.10	29.34	37.026		
3,400.00	3,289.19	3,337.53	2,790.43	15.09	28.95	59.99	1,288.77	713.74	1,116.37	1,085.67	30.71	36.354		
3,500.00	3,384.13	3,647.76	3,077.90	15.62	31.03	62.02	1,389.70	768.84	1,136.58	1,103.68	32.90	34.547		
3,600.00	3,479.07	3,837.11	3,262.04	16.14	31.85	63.78	1,428.22	789.70	1,143.75	1,109.61	34.14	33.500		
3,700.00	3,574.02	4,067.70	3,490.89	16.67	32.40	66.51	1,451.82	802.65	1,140.59	1,105.47	35.12	32.479		
3,800.00	3,668.96	4,176.99	3,600.01	17.19	32.54	67.90	1,457.72	803.94	1,131.96	1,095.76	36.20	31.271		
3,900.00	3,763.90	4,273.39	3,696.27	17.72	32.68	69.15	1,462.78	804.74	1,123.57	1,086.22	37.35	30.085		
4,000.00	3,858.84	4,369.79	3,792.54	18.24	32.82	70.41	1,467.85	805.54	1,115.74	1,077.23	38.51	28.973		
4,100.00	3,953.79	4,466.19	3,888.80	18.77	32.96	71.69	1,472.91	806.34	1,108.50	1,068.82	39.68	27.936		
4,200.00	4,048.73	4,562.59	3,985.06	19.30	33.10	72.99	1,477.97	807.14	1,101.86	1,061.01	40.85	26.970		
4,300.00	4,143.67	4,658.99	4,081.33	19.82	33.24	74.30	1,483.03	807.94	1,095.82	1,053.79	42.03	26.071		
4,400.00	4,238.61	4,755.38	4,177.59	20.35	33.38	75.62	1,488.09	808.73	1,090.40	1,047.19	43.21	25.235		
4,500.00	4,333.56	4,851.78	4,273.85	20.88	33.53	76.95	1,493.14	809.53	1,085.61	1,041.22	44.39	24.458		
4,600.00	4,428.50	4,948.18	4,370.11	21.41	33.67	78.30	1,498.20	810.33	1,081.44	1,035.88	45.56	23.736		
4,700.00	4,523.44	5,044.57	4,466.37	21.93	33.81	79.65	1,503.25	811.13	1,077.93	1,031.19	46.73	23.066		
4,800.00	4,618.38	5,140.96	4,562.62	22.46	33.95	81.01	1,508.30	811.92	1,075.05	1,027.16	47.90	22.445		
4,900.00	4,713.33	5,237.36	4,658.88	22.99	34.09	82.38	1,513.34	812.72	1,072.84	1,023.78	49.05	21.871		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041C - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 388-APC_ISCWSA REV 2 MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,000.00	4,808.27	5,333.75	4,755.14	23.52	34.24	83.75	1,518.39	813.52	1,071.28	1,021.08	50.20	21.340	
5,100.00	4,903.21	5,430.14	4,851.39	24.05	34.38	85.12	1,523.43	814.31	1,070.38	1,019.05	51.33	20.851	
5,185.54	4,984.43	5,512.59	4,933.73	24.50	34.50	86.30	1,527.75	814.99	1,070.14	1,017.84	52.30	20.463	
5,200.00	4,998.16	5,526.53	4,947.65	24.58	34.52	86.50	1,528.48	815.11	1,070.14	1,017.69	52.46	20.401	
5,300.00	5,093.10	5,622.92	5,043.90	25.11	34.66	87.87	1,533.52	815.91	1,070.57	1,017.01	53.56	19.987	
5,400.00	5,188.04	5,719.31	5,140.15	25.64	34.80	89.25	1,538.55	816.70	1,071.66	1,017.01	54.65	19.608	
5,500.00	5,282.98	5,815.69	5,236.41	26.17	34.95	90.62	1,543.59	817.50	1,073.41	1,017.68	55.73	19.262	
5,600.00	5,377.93	5,912.08	5,332.66	26.70	35.09	91.98	1,548.63	818.29	1,075.82	1,019.04	56.78	18.946	
5,623.25	5,400.00	5,934.49	5,355.04	26.82	35.12	92.30	1,549.80	818.48	1,076.47	1,019.45	57.03	18.877	
5,700.00	5,473.03	6,008.60	5,429.04	27.22	35.23	93.34	1,553.67	819.09	1,078.85	1,021.05	57.81	18.663	
5,800.00	5,568.64	6,105.55	5,525.85	27.73	35.38	94.63	1,558.73	819.88	1,082.37	1,023.59	58.78	18.415	
5,900.00	5,664.75	6,202.91	5,623.08	28.23	35.52	95.82	1,563.81	820.69	1,086.25	1,026.56	59.70	18.196	
6,000.00	5,761.33	6,300.65	5,720.68	28.71	35.66	96.93	1,568.90	821.49	1,090.39	1,029.82	60.57	18.003	
6,100.00	5,858.34	6,398.74	5,818.64	29.18	35.81	97.95	1,574.02	822.30	1,094.68	1,033.29	61.39	17.831	
6,200.00	5,955.76	6,497.16	5,916.92	29.64	35.96	98.88	1,579.15	823.11	1,099.03	1,036.85	62.17	17.677	
6,300.00	6,053.57	6,595.87	6,015.49	30.07	36.10	99.72	1,584.29	823.92	1,103.35	1,040.43	62.92	17.537	
6,400.00	6,151.72	6,694.84	6,114.32	30.50	36.25	100.46	1,589.45	824.73	1,107.57	1,043.95	63.62	17.410	
6,500.00	6,250.19	6,794.04	6,213.39	30.91	36.40	101.12	1,594.61	825.55	1,111.62	1,047.33	64.29	17.292	
6,600.00	6,348.94	6,893.45	6,312.66	31.30	36.55	101.68	1,599.79	826.37	1,115.44	1,050.52	64.92	17.182	
6,659.67	6,408.00	6,952.85	6,371.98	31.53	36.63	101.97	1,602.88	826.85	1,117.60	1,052.31	65.28	17.119	
6,700.00	6,447.82	6,992.94	6,412.01	31.68	36.69	85.67	1,604.96	827.18	1,118.15	1,052.61	65.54	17.061	
6,750.00	6,496.66	7,042.28	6,461.28	31.90	36.77	74.91	1,607.53	827.59	1,116.45	1,050.55	65.89	16.943	
6,800.00	6,544.65	7,090.92	6,509.86	32.13	36.84	69.38	1,610.06	827.99	1,112.18	1,045.89	66.29	16.777	
6,850.00	6,591.49	7,138.57	6,557.44	32.37	36.91	66.55	1,612.54	828.38	1,105.44	1,038.72	66.72	16.568	
6,900.00	6,636.89	7,184.93	6,603.74	32.62	36.98	65.34	1,614.95	828.76	1,096.39	1,029.21	67.18	16.319	
6,950.00	6,680.57	7,229.72	6,648.46	32.89	37.05	65.20	1,617.27	829.13	1,085.20	1,017.52	67.67	16.035	
7,000.00	6,722.26	7,272.65	6,691.34	33.17	37.11	65.86	1,619.50	829.48	1,072.09	1,003.90	68.19	15.723	
7,050.00	6,761.71	7,313.48	6,732.11	33.45	37.17	67.13	1,621.63	829.81	1,057.30	988.59	68.72	15.387	
7,100.00	6,798.67	7,351.94	6,770.51	33.75	37.23	68.89	1,623.62	830.13	1,041.14	971.89	69.25	15.034	
7,150.00	6,832.91	7,387.79	6,806.32	34.06	37.28	71.04	1,625.49	830.42	1,023.91	954.12	69.79	14.671	
7,200.00	6,864.22	7,420.82	6,839.30	34.37	37.33	73.48	1,627.20	830.69	1,005.95	935.63	70.32	14.305	
7,250.00	6,892.42	7,450.83	6,869.26	34.69	37.38	76.10	1,628.76	830.94	987.64	916.81	70.83	13.943	
7,300.00	6,917.32	7,477.62	6,896.02	35.03	37.42	78.80	1,630.15	831.16	969.36	898.04	71.31	13.593	
7,350.00	6,938.77	7,501.03	6,919.40	35.37	37.45	81.46	1,631.37	831.35	951.50	879.75	71.74	13.263	
7,400.00	6,956.64	7,520.93	6,939.27	35.72	37.48	84.00	1,632.40	831.51	934.46	862.35	72.11	12.959	
7,450.00	6,970.83	7,537.17	6,955.49	36.07	37.50	86.31	1,633.24	831.65	918.62	846.23	72.39	12.690	
7,500.00	6,981.23	7,549.68	6,967.98	36.44	37.52	88.31	1,633.89	831.75	904.35	831.78	72.57	12.462	
7,550.00	6,987.80	7,558.36	6,976.65	36.81	37.54	89.94	1,634.34	831.82	891.98	819.35	72.63	12.281	
7,600.00	6,990.48	7,563.17	6,981.46	37.19	37.54	91.17	1,634.59	831.86	881.77	809.20	72.56	12.152	
7,609.87	6,990.55	7,563.66	6,981.95	37.26	37.54	91.36	1,634.62	831.86	880.03	807.49	72.53	12.133	
7,700.00	6,990.49	7,567.43	6,985.71	37.97	37.55	91.60	1,634.81	831.90	869.09	797.07	72.02	12.068	
7,761.25	6,990.44	7,569.99	6,988.26	38.46	37.55	91.77	1,634.95	831.92	866.93	795.51	71.42	12.139	
7,800.00	6,990.42	7,571.61	6,989.88	38.78	37.56	91.88	1,635.03	831.93	867.79	796.85	70.95	12.231	
7,900.00	6,990.35	7,575.79	6,994.05	39.64	37.56	92.16	1,635.25	831.96	877.94	808.54	69.41	12.649	
8,000.00	6,990.28	7,579.97	6,998.23	40.53	37.57	92.43	1,635.46	832.00	899.15	831.64	67.51	13.318	
8,100.00	6,990.21	7,584.15	7,002.40	41.45	37.57	92.71	1,635.68	832.03	930.66	865.25	65.40	14.229	
8,200.00	6,990.14	7,588.33	7,006.57	42.40	37.58	92.98	1,635.90	832.07	971.46	908.23	63.23	15.365	
8,306.37	6,990.06	7,592.77	7,011.01	43.45	37.59	93.28	1,636.13	832.10	1,023.82	962.84	60.98	16.790	
8,400.00	6,990.00	7,596.59	7,014.82	44.38	37.59	93.39	1,636.33	832.13	1,074.01	1,014.92	59.09	18.177	
8,500.00	6,989.93	7,600.43	7,018.66	45.36	37.60	93.47	1,636.53	832.17	1,128.30	1,071.13	57.16	19.738	
8,600.00	6,989.85	7,604.02	7,022.25	46.33	37.60	93.53	1,636.71	832.19	1,182.96	1,127.59	55.38	21.363	
8,700.00	6,989.78	7,607.34	7,025.56	47.28	37.61	93.56	1,636.88	832.22	1,237.71	1,183.97	53.75	23.029	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program:		388-APC_ISCWSA REV 2 MWD						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
8,800.00	6,989.70	7,610.37	7,028.58	48.21	37.61	93.56	1,637.04	832.25	1,292.28	1,239.98	52.30	24.709	
8,900.00	6,989.63	7,613.09	7,031.31	49.11	37.62	93.55	1,637.18	832.27	1,346.45	1,295.40	51.06	26.372	
9,000.00	6,989.55	7,615.50	7,033.71	49.99	37.62	93.51	1,637.31	832.29	1,400.02	1,349.99	50.03	27.984	
9,100.00	6,989.48	7,617.58	7,035.79	50.84	37.62	93.46	1,637.42	832.31	1,452.81	1,403.58	49.23	29.512	
9,200.00	6,989.40	7,619.32	7,037.53	51.66	37.63	93.40	1,637.51	832.32	1,504.65	1,455.99	48.66	30.922	
9,300.00	6,989.33	7,620.72	7,038.92	52.45	37.63	93.32	1,637.58	832.33	1,555.41	1,507.08	48.32	32.187	
9,393.87	6,989.27	7,621.70	7,039.91	53.15	37.63	93.25	1,637.63	832.34	1,601.94	1,553.73	48.21	33.228	
9,400.00	6,989.26	7,621.76	7,039.96	53.20	37.63	93.25	1,637.63	832.34	1,604.96	1,556.75	48.21	33.292	
9,500.00	6,989.19	7,622.64	7,040.85	53.95	37.63	93.28	1,637.68	832.35	1,656.51	1,608.20	48.31	34.290	
9,600.00	6,989.12	7,623.53	7,041.73	54.73	37.63	93.32	1,637.72	832.35	1,712.35	1,663.77	48.58	35.248	
9,700.00	6,989.05	7,624.41	7,042.61	55.55	37.63	93.36	1,637.77	832.36	1,772.08	1,723.10	48.98	36.179	
9,800.00	6,988.98	7,625.30	7,043.50	56.40	37.64	93.39	1,637.82	832.37	1,835.31	1,785.84	49.48	37.095	
9,900.00	6,988.91	7,626.18	7,044.38	57.28	37.64	93.43	1,637.86	832.38	1,901.71	1,851.67	50.03	38.008	
10,000.00	6,988.84	7,627.07	7,045.26	58.20	37.64	93.47	1,637.91	832.38	1,970.94	1,920.31	50.63	38.927	
10,100.00	6,988.77	7,627.95	7,046.15	59.14	37.64	93.50	1,637.95	832.39	2,042.72	1,991.48	51.25	39.860	
10,200.00	6,988.70	7,628.84	7,047.03	60.11	37.64	93.54	1,638.00	832.40	2,116.80	2,064.93	51.87	40.810	
10,300.00	6,988.63	7,629.72	7,047.91	61.11	37.64	93.58	1,638.05	832.41	2,192.93	2,140.44	52.49	41.781	
10,400.00	6,988.56	7,630.61	7,048.80	62.14	37.64	93.61	1,638.09	832.41	2,270.92	2,217.82	53.09	42.774	
10,500.00	6,988.49	7,631.49	7,049.68	63.19	37.64	93.65	1,638.14	832.42	2,350.57	2,296.89	53.68	43.790	
10,600.00	6,988.42	7,632.38	7,050.56	64.26	37.65	93.68	1,638.18	832.43	2,431.72	2,377.48	54.24	44.829	
10,700.00	6,988.35	7,633.26	7,051.45	65.36	37.65	93.72	1,638.23	832.43	2,514.23	2,459.45	54.79	45.889	
10,800.00	6,988.28	7,634.15	7,052.33	66.48	37.65	93.76	1,638.28	832.44	2,597.98	2,542.66	55.31	46.970	
10,900.00	6,988.21	7,635.03	7,053.21	67.61	37.65	93.79	1,638.32	832.45	2,682.83	2,627.02	55.81	48.071	
11,000.00	6,988.14	7,635.91	7,054.10	68.77	37.65	93.83	1,638.37	832.46	2,768.70	2,712.41	56.29	49.190	
11,100.00	6,988.07	7,636.80	7,054.98	69.95	37.65	93.87	1,638.41	832.46	2,855.48	2,798.74	56.74	50.326	
11,200.00	6,988.01	7,637.68	7,055.86	71.14	37.65	93.90	1,638.46	832.47	2,943.11	2,885.93	57.17	51.478	
11,300.00	6,987.94	7,638.57	7,056.75	72.35	37.66	93.94	1,638.51	832.48	3,031.50	2,973.91	57.58	52.644	
11,400.00	6,987.87	7,639.45	7,057.63	73.57	37.66	93.97	1,638.55	832.49	3,120.59	3,062.61	57.98	53.824	
11,500.00	6,987.80	7,640.34	7,058.51	74.81	37.66	94.01	1,638.60	832.49	3,210.32	3,151.97	58.35	55.017	
11,600.00	6,987.73	7,641.22	7,059.40	76.07	37.66	94.05	1,638.64	832.50	3,300.64	3,241.94	58.71	56.221	
11,643.87	6,987.70	7,641.61	7,059.79	76.62	37.66	94.06	1,638.66	832.50	3,340.44	3,281.58	58.86	56.752	
11,700.00	6,987.66	7,642.08	7,060.25	77.33	37.66	93.92	1,638.69	832.51	3,391.28	3,332.23	59.05	57.429	
11,737.27	6,987.63	7,642.36	7,060.53	77.80	37.66	93.83	1,638.70	832.51	3,424.87	3,365.69	59.18	57.872	
11,800.00	6,987.59	7,642.81	7,060.98	78.59	37.66	93.84	1,638.73	832.51	3,481.40	3,422.01	59.40	58.614	
11,900.00	6,987.52	7,643.53	7,061.70	79.86	37.66	93.87	1,638.76	832.52	3,571.95	3,512.23	59.73	59.805	
12,000.00	6,987.46	7,644.25	7,062.42	81.14	37.66	93.90	1,638.80	832.52	3,662.99	3,602.95	60.04	61.005	
12,100.00	6,987.39	7,644.97	7,063.14	82.43	37.66	93.93	1,638.84	832.53	3,754.49	3,694.14	60.35	62.214	
12,200.00	6,987.32	7,645.69	7,063.85	83.73	37.67	93.95	1,638.87	832.54	3,846.41	3,785.77	60.64	63.430	
12,300.00	6,987.26	7,646.40	7,064.57	85.05	37.67	93.98	1,638.91	832.54	3,938.72	3,877.80	60.92	64.654	
12,400.00	6,987.19	7,647.12	7,065.29	86.38	37.67	94.01	1,638.95	832.55	4,031.40	3,970.22	61.19	65.885	
12,500.00	6,987.12	7,647.84	7,066.01	87.71	37.67	94.04	1,638.99	832.55	4,124.43	4,062.98	61.45	67.121	
12,600.00	6,987.06	7,648.56	7,066.73	89.06	37.67	94.06	1,639.02	832.56	4,217.77	4,156.07	61.70	68.364	
12,700.00	6,986.99	7,649.28	7,067.44	90.41	37.67	94.09	1,639.06	832.57	4,311.41	4,249.47	61.94	69.611	
12,800.00	6,986.92	7,650.00	7,068.16	91.77	37.67	94.12	1,639.10	832.57	4,405.33	4,343.16	62.17	70.863	
12,900.00	6,986.86	7,650.72	7,068.88	93.14	37.67	94.15	1,639.14	832.58	4,499.51	4,437.12	62.39	72.118	
13,000.00	6,986.79	7,651.44	7,069.60	94.52	37.67	94.17	1,639.17	832.58	4,593.93	4,531.33	62.61	73.378	
13,100.00	6,986.72	7,652.15	7,070.31	95.90	37.68	94.20	1,639.21	832.59	4,688.59	4,625.78	62.82	74.641	
13,200.00	6,986.66	7,652.87	7,071.03	97.30	37.68	94.23	1,639.25	832.60	4,783.47	4,720.45	63.02	75.906	
13,300.00	6,986.59	7,653.59	7,071.75	98.69	37.68	94.26	1,639.28	832.60	4,878.55	4,815.33	63.21	77.175	
13,400.00	6,986.52	7,654.31	7,072.47	100.10	37.68	94.28	1,639.32	832.61	4,973.82	4,910.41	63.40	78.445	
13,500.00	6,986.46	7,655.03	7,073.19	101.51	37.68	94.31	1,639.36	832.61	5,069.27	5,005.68	63.59	79.718	
13,600.00	6,986.39	7,655.75	7,073.90	102.93	37.68	94.34	1,639.40	832.62	5,164.90	5,101.13	63.77	80.992	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 388-APC_ISCWSA REV 2 MWD												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
13,700.00	6,986.32	7,656.47	7,074.62	104.35	37.68	94.37	1,639.43	832.62	5,260.69	5,196.74	63.95	82.268	
13,800.00	6,986.25	7,657.19	7,075.34	105.78	37.68	94.39	1,639.47	832.63	5,356.63	5,292.52	64.12	83.546	
13,900.00	6,986.19	7,657.90	7,076.06	107.21	37.68	94.42	1,639.51	832.64	5,452.72	5,388.44	64.28	84.824	
14,000.00	6,986.12	7,658.62	7,076.77	108.65	37.69	94.45	1,639.55	832.64	5,548.95	5,484.50	64.45	86.103	
14,100.00	6,986.05	7,659.34	7,077.49	110.09	37.69	94.48	1,639.58	832.65	5,645.31	5,580.70	64.60	87.383	
14,200.00	6,985.99	7,660.06	7,078.21	111.54	37.69	94.50	1,639.62	832.65	5,741.79	5,677.03	64.76	88.663	
14,300.00	6,985.92	7,660.78	7,078.93	112.99	37.69	94.53	1,639.66	832.66	5,838.39	5,773.48	64.91	89.944	
14,400.00	6,985.85	7,661.50	7,079.65	114.45	37.69	94.56	1,639.69	832.67	5,935.10	5,870.04	65.06	91.225	
14,500.00	6,985.79	7,662.22	7,080.36	115.91	37.69	94.59	1,639.73	832.67	6,031.92	5,966.72	65.21	92.505	
14,600.00	6,985.72	7,662.94	7,081.08	117.38	37.69	94.61	1,639.77	832.68	6,128.84	6,063.49	65.35	93.786	
14,700.00	6,985.65	7,663.65	7,081.80	118.84	37.69	94.64	1,639.81	832.68	6,225.86	6,160.37	65.49	95.066	
14,800.00	6,985.59	7,664.37	7,082.52	120.32	37.69	94.67	1,639.84	832.69	6,322.98	6,257.35	65.63	96.346	
14,900.00	6,985.52	7,665.09	7,083.23	121.79	37.69	94.70	1,639.88	832.70	6,420.18	6,354.41	65.76	97.625	
15,000.00	6,985.45	7,665.81	7,083.95	123.27	37.70	94.72	1,639.92	832.70	6,517.46	6,451.56	65.90	98.903	
15,100.00	6,985.39	7,666.53	7,084.67	124.75	37.70	94.75	1,639.96	832.71	6,614.83	6,548.80	66.03	100.181	
15,200.00	6,985.32	7,667.25	7,085.39	126.24	37.70	94.78	1,639.99	832.71	6,712.27	6,646.11	66.16	101.458	
15,300.00	6,985.25	7,667.97	7,086.11	127.72	37.70	94.81	1,640.03	832.72	6,809.79	6,743.50	66.29	102.734	
15,400.00	6,985.19	7,668.69	7,086.82	129.21	37.70	94.83	1,640.07	832.72	6,907.38	6,840.97	66.41	104.008	
15,500.00	6,985.12	7,669.40	7,087.54	130.71	37.70	94.86	1,640.11	832.73	7,005.03	6,938.50	66.54	105.282	
15,600.00	6,985.05	7,670.12	7,088.26	132.20	37.70	94.89	1,640.14	832.74	7,102.76	7,036.10	66.66	106.554	
15,700.00	6,984.99	7,670.84	7,088.98	133.70	37.70	94.92	1,640.18	832.74	7,200.54	7,133.76	66.78	107.824	
15,800.00	6,984.92	7,671.56	7,089.69	135.20	37.70	94.94	1,640.22	832.75	7,298.38	7,231.48	66.90	109.094	
15,900.00	6,984.85	7,672.28	7,090.41	136.71	37.71	94.97	1,640.25	832.75	7,396.29	7,329.27	67.02	110.361	
16,000.00	6,984.79	7,673.00	7,091.13	138.21	37.71	95.00	1,640.29	832.76	7,494.24	7,427.11	67.14	111.628	
16,100.00	6,984.72	7,673.72	7,091.85	139.72	37.71	95.03	1,640.33	832.77	7,592.25	7,525.00	67.25	112.892	
16,200.00	6,984.65	7,674.43	7,092.56	141.23	37.71	95.05	1,640.37	832.77	7,690.32	7,622.95	67.37	114.155	
16,300.00	6,984.59	7,675.15	7,093.28	142.75	37.71	95.08	1,640.40	832.78	7,788.43	7,720.94	67.48	115.415	
16,400.00	6,984.52	7,675.87	7,094.00	144.26	37.71	95.11	1,640.44	832.78	7,886.58	7,818.99	67.59	116.674	
16,500.00	6,984.45	7,676.59	7,094.72	145.78	37.71	95.14	1,640.48	832.79	7,984.79	7,917.08	67.71	117.931	
16,600.00	6,984.39	7,677.31	7,095.43	147.29	37.71	95.16	1,640.52	832.80	8,083.04	8,015.22	67.82	119.186	
16,700.00	6,984.32	7,678.03	7,096.15	148.82	37.71	95.19	1,640.55	832.80	8,181.33	8,113.40	67.93	120.439	
16,800.00	6,984.25	7,678.75	7,096.87	150.34	37.72	95.22	1,640.59	832.81	8,279.66	8,211.62	68.04	121.690	
16,900.00	6,984.19	7,679.46	7,097.59	151.86	37.72	95.25	1,640.63	832.81	8,378.03	8,309.88	68.15	122.939	
17,000.00	6,984.12	7,680.18	7,098.31	153.39	37.72	95.27	1,640.66	832.82	8,476.44	8,408.18	68.26	124.185	
17,100.00	6,984.05	7,680.90	7,099.02	154.91	37.72	95.30	1,640.70	832.82	8,574.88	8,506.52	68.36	125.429	
17,200.00	6,983.99	7,681.62	7,099.74	156.44	37.72	95.33	1,640.74	832.83	8,673.36	8,604.89	68.47	126.671	
17,300.00	6,983.92	7,682.34	7,100.46	157.97	37.72	95.36	1,640.78	832.84	8,771.88	8,703.30	68.58	127.911	
17,400.00	6,983.85	7,683.06	7,101.18	159.50	37.72	95.38	1,640.81	832.84	8,870.43	8,801.74	68.68	129.148	
17,500.00	6,983.79	7,683.78	7,101.89	161.04	37.72	95.41	1,640.85	832.85	8,969.01	8,900.22	68.79	130.382	
17,600.00	6,983.72	7,684.50	7,102.61	162.57	37.72	95.44	1,640.89	832.85	9,067.62	8,998.72	68.90	131.615	
17,700.00	6,983.65	7,685.21	7,103.33	164.11	37.72	95.47	1,640.93	832.86	9,166.26	9,097.26	69.00	132.844	
17,800.00	6,983.59	7,685.93	7,104.05	165.65	37.73	95.49	1,640.96	832.87	9,264.93	9,195.83	69.10	134.071	
17,900.00	6,983.52	7,686.65	7,104.76	167.18	37.73	95.52	1,641.00	832.87	9,363.63	9,294.42	69.21	135.296	
18,000.00	6,983.45	7,687.37	7,105.48	168.72	37.73	95.55	1,641.04	832.88	9,462.35	9,393.04	69.31	136.518	
18,100.00	6,983.39	7,688.09	7,106.20	170.27	37.73	95.58	1,641.07	832.88	9,561.11	9,491.69	69.42	137.737	
18,200.00	6,983.32	7,688.81	7,106.92	171.81	37.73	95.60	1,641.11	832.89	9,659.88	9,590.37	69.52	138.954	
18,300.00	6,983.25	7,689.53	7,107.63	173.35	37.73	95.63	1,641.15	832.90	9,758.69	9,689.07	69.62	140.168	
18,400.00	6,983.19	7,690.24	7,108.35	174.90	37.73	95.66	1,641.19	832.90	9,857.51	9,787.79	69.72	141.379	
18,500.00	6,983.12	7,690.96	7,109.07	176.44	37.73	95.68	1,641.22	832.91	9,956.37	9,886.54	69.83	142.587	
18,600.00	6,983.05	7,691.68	7,109.79	177.99	37.73	95.71	1,641.26	832.91	10,055.24	9,985.31	69.93	143.793	
18,700.00	6,982.99	7,692.40	7,110.50	179.54	37.74	95.74	1,641.30	832.92	10,154.13	10,084.10	70.03	144.996	
18,800.00	6,982.92	7,693.12	7,111.22	181.09	37.74	95.77	1,641.34	832.92	10,253.05	10,182.92	70.13	146.196	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #041C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 388-APC_ISCWSA REV 2 MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
18,900.00	6,982.85	7,693.84	7,111.94	182.64	37.74	95.79	1,641.37	832.93	10,351.99	10,281.75		70.23	147.393
19,000.00	6,982.78	7,694.55	7,112.66	184.19	37.74	95.82	1,641.41	832.94	10,450.94	10,380.61		70.34	148.587
19,100.00	6,982.72	7,695.27	7,113.37	185.74	37.74	95.85	1,641.45	832.94	10,549.92	10,479.48		70.44	149.778
19,200.00	6,982.65	7,695.99	7,114.09	187.29	37.74	95.88	1,641.48	832.95	10,648.92	10,578.38		70.54	150.966
19,300.00	6,982.58	7,696.71	7,114.81	188.84	37.74	95.90	1,641.52	832.95	10,747.93	10,677.29		70.64	152.152
19,400.00	6,982.52	7,697.43	7,115.53	190.40	37.74	95.93	1,641.56	832.96	10,846.96	10,776.22		70.74	153.334
19,500.00	6,982.45	7,698.15	7,116.24	191.95	37.74	95.96	1,641.60	832.97	10,946.01	10,875.17		70.84	154.514
19,600.00	6,982.38	7,698.87	7,116.96	193.51	37.75	95.99	1,641.63	832.97	11,045.08	10,974.14		70.94	155.690
19,700.00	6,982.32	7,699.58	7,117.68	195.07	37.75	96.01	1,641.67	832.98	11,144.17	11,073.12		71.04	156.863
19,800.00	6,982.25	7,700.30	7,118.40	196.62	37.75	96.04	1,641.71	832.98	11,243.27	11,172.12		71.14	158.034
19,900.00	6,982.18	7,701.02	7,119.11	198.18	37.75	96.07	1,641.75	832.99	11,342.38	11,271.14		71.25	159.201
20,000.00	6,982.12	7,701.74	7,119.83	199.74	37.75	96.10	1,641.78	833.00	11,441.51	11,370.17		71.35	160.365
20,100.00	6,982.05	7,702.46	7,120.55	201.30	37.75	96.12	1,641.82	833.00	11,540.66	11,469.21		71.45	161.526
20,176.02	6,982.00	7,703.00	7,121.09	202.36	37.75	96.14	1,641.85	833.01	11,616.03	11,539.92		76.12	152.605

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #053 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 300-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-155.33	-358.25	-164.58	394.39				
100.00	100.00	89.00	89.00	0.25	1.58	-155.33	-358.25	-164.58	394.24	392.41	1.83	215.682	
200.00	200.00	189.00	189.00	0.61	3.35	-155.33	-358.25	-164.58	394.24	390.28	3.96	99.607	
300.00	300.00	289.00	289.00	0.97	5.12	-155.33	-358.25	-164.58	394.24	388.15	6.09	64.756	
400.00	400.00	389.00	389.00	1.33	6.92	-155.33	-358.25	-164.58	394.24	386.00	8.25	47.816	
500.00	500.00	489.00	489.00	1.68	8.72	-155.33	-358.25	-164.58	394.24	383.84	10.41	37.888	
562.54	562.54	551.54	551.54	1.91	9.85	-155.31	-357.97	-164.58	393.99	382.24	11.76	33.513 CC	
600.00	600.00	588.89	588.88	2.04	10.52	-155.31	-357.98	-164.58	394.00	381.43	12.56	31.360	
700.00	699.98	688.55	688.55	2.40	12.32	-145.44	-358.05	-164.58	395.50	380.78	14.72	26.872 ES	
800.00	799.84	788.09	788.09	2.76	14.11	-145.82	-358.21	-164.58	399.97	383.10	16.87	23.706	
900.00	899.45	888.46	888.45	3.13	16.07	-146.44	-358.25	-164.58	407.25	388.05	19.19	21.219	
1,000.00	998.70	987.71	987.70	3.49	18.03	-147.25	-358.25	-164.58	417.47	395.95	21.52	19.399	
1,100.00	1,097.47	1,085.83	1,085.82	3.86	19.97	-148.20	-357.86	-164.58	430.38	406.56	23.83	18.061	
1,200.00	1,195.62	1,183.11	1,183.09	4.24	21.90	-149.31	-358.11	-164.58	447.03	420.90	26.12	17.111	
1,300.00	1,293.06	1,282.12	1,282.06	4.64	24.03	-150.55	-358.25	-164.58	466.74	438.11	28.64	16.299	
1,400.00	1,389.64	1,376.42	1,376.34	5.06	26.15	-151.75	-357.77	-164.58	489.14	458.01	31.14	15.710	
1,500.00	1,485.27	1,474.40	1,474.27	5.50	28.43	-153.08	-358.25	-164.58	515.76	481.95	33.80	15.258	
1,515.00	1,499.52	1,488.65	1,488.52	5.57	28.79	-153.27	-358.25	-164.58	519.97	485.75	34.22	15.197	
1,600.00	1,580.22	1,569.35	1,569.22	5.96	30.77	-154.52	-358.25	-164.58	544.17	507.64	36.53	14.898	
1,700.00	1,675.17	1,662.54	1,662.39	6.44	33.07	-155.81	-357.13	-164.58	571.84	532.63	39.20	14.586	
1,800.00	1,770.11	1,753.56	1,753.41	6.92	35.31	-157.00	-357.72	-164.58	601.45	559.63	41.83	14.380	
1,900.00	1,865.05	1,854.32	1,854.05	7.41	37.79	-158.18	-358.25	-164.58	631.19	586.49	44.70	14.121	
2,000.00	1,959.99	1,949.27	1,948.99	7.90	40.12	-159.18	-358.25	-164.58	660.63	613.22	47.42	13.932	
2,100.00	2,054.94	2,044.21	2,043.94	8.40	42.46	-160.11	-358.25	-164.58	690.25	640.11	50.14	13.766	
2,200.00	2,149.88	2,136.58	2,136.26	8.90	44.72	-160.91	-356.29	-164.58	718.09	665.29	52.80	13.601	
2,300.00	2,244.82	2,227.66	2,227.33	9.41	46.96	-161.66	-356.86	-164.58	748.57	693.16	55.42	13.508	
2,400.00	2,339.76	2,318.46	2,318.11	9.92	49.19	-162.37	-357.89	-164.58	779.66	721.63	58.03	13.436	
2,500.00	2,434.71	2,424.17	2,423.71	10.43	51.74	-163.12	-358.25	-164.58	810.06	749.07	60.99	13.282	
2,600.00	2,529.65	2,519.11	2,518.65	10.94	54.01	-163.74	-358.25	-164.58	840.28	776.62	63.65	13.201	
2,700.00	2,624.59	2,611.41	2,610.93	11.45	56.22	-164.29	-357.19	-164.58	869.53	803.28	66.25	13.125	
2,800.00	2,719.53	2,702.05	2,701.56	11.97	58.39	-164.81	-357.69	-164.58	900.42	831.62	68.81	13.086	
2,900.00	2,814.48	2,804.06	2,803.48	12.49	60.84	-165.35	-358.25	-164.58	931.40	859.74	71.66	12.997	
3,000.00	2,909.42	2,899.00	2,898.42	13.01	63.12	-165.83	-358.25	-164.58	961.90	887.57	74.34	12.940	
3,100.00	3,004.36	2,993.94	2,993.36	13.53	65.40	-166.27	-358.25	-164.58	992.46	915.45	77.01	12.887	
3,200.00	3,099.30	3,087.37	3,086.76	14.05	67.64	-166.67	-356.36	-164.58	1,021.19	941.54	79.65	12.821	
3,300.00	3,194.25	3,178.03	3,177.41	14.57	69.82	-167.05	-356.68	-164.58	1,052.18	969.97	82.21	12.799	
3,400.00	3,289.19	3,268.46	3,267.83	15.09	71.99	-167.41	-357.37	-164.58	1,083.60	998.84	84.77	12.784	
3,500.00	3,384.13	3,373.88	3,373.13	15.62	74.42	-167.80	-358.25	-164.58	1,115.17	1,027.55	87.62	12.727	
3,600.00	3,479.07	3,468.83	3,468.07	16.14	76.35	-168.13	-358.25	-164.58	1,145.95	1,056.00	89.95	12.740	
3,700.00	3,574.02	3,563.77	3,563.02	16.67	78.28	-168.44	-358.25	-164.58	1,176.75	1,084.48	92.28	12.753	
3,800.00	3,668.96	3,655.24	3,654.47	17.19	80.14	-168.73	-357.01	-164.58	1,206.36	1,111.83	94.52	12.762	
3,900.00	3,763.90	3,745.16	3,744.38	17.72	81.97	-169.00	-357.45	-164.58	1,237.69	1,140.95	96.74	12.794	
4,000.00	3,858.84	3,848.66	3,847.84	18.24	84.05	-169.29	-358.25	-164.58	1,269.35	1,170.11	99.24	12.791	
4,100.00	3,953.79	3,943.60	3,942.79	18.77	85.82	-169.55	-358.25	-164.58	1,300.27	1,198.87	101.40	12.823	
4,200.00	4,048.73	4,038.54	4,037.73	19.30	87.58	-169.79	-358.25	-164.58	1,331.21	1,227.65	103.56	12.854	
4,300.00	4,143.67	4,132.15	4,131.33	19.82	89.32	-170.02	-357.74	-164.58	1,361.67	1,255.97	105.70	12.883	
4,400.00	4,238.61	4,224.74	4,223.93	20.35	91.04	-170.24	-357.91	-164.58	1,392.82	1,285.01	107.81	12.920	
4,500.00	4,333.56	4,323.40	4,322.56	20.88	92.87	-170.46	-358.25	-164.58	1,424.15	1,314.11	110.04	12.942	
4,600.00	4,428.50	4,418.34	4,417.50	21.41	94.47	-170.67	-358.25	-164.58	1,455.16	1,343.11	112.05	12.987	
4,700.00	4,523.44	4,513.28	4,512.44	21.93	96.08	-170.87	-358.25	-164.58	1,486.20	1,372.14	114.06	13.030	
4,800.00	4,618.38	4,606.98	4,606.14	22.46	97.67	-171.05	-357.42	-164.58	1,516.42	1,400.38	116.04	13.068	
4,900.00	4,713.33	4,698.29	4,697.44	22.99	99.22	-171.23	-357.61	-164.58	1,547.67	1,429.69	117.98	13.118	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #053 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 300-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,000.00	4,808.27	4,789.45	4,788.60	23.52	100.76	-171.39	-358.00	-164.58	1,579.16	1,459.25	119.91	13.169	
5,100.00	4,903.21	4,893.07	4,892.21	24.05	102.79	-171.57	-358.25	-164.58	1,610.47	1,488.10	122.37	13.161	
5,200.00	4,998.16	4,988.01	4,987.16	24.58	104.81	-171.73	-358.25	-164.58	1,641.57	1,516.78	124.79	13.155	
5,300.00	5,093.10	5,082.95	5,082.10	25.11	106.83	-171.89	-358.25	-164.58	1,672.68	1,545.46	127.21	13.149	
5,400.00	5,188.04	5,177.90	5,177.04	25.64	108.85	-172.04	-358.25	-164.58	1,703.80	1,574.16	129.63	13.143	
5,500.00	5,282.98	5,272.84	5,271.98	26.17	110.87	-172.18	-358.25	-164.58	1,734.93	1,602.87	132.05	13.138	
5,600.00	5,377.93	5,367.81	5,366.93	26.70	112.90	-172.32	-358.25	-164.58	1,766.07	1,631.59	134.48	13.133	
5,623.25	5,400.00	5,389.88	5,389.00	26.82	113.37	-172.35	-358.25	-164.58	1,773.31	1,638.27	135.04	13.132	
5,700.00	5,473.03	5,462.91	5,462.03	27.22	114.92	-172.48	-358.25	-164.58	1,796.73	1,659.83	136.90	13.124	
5,800.00	5,568.64	5,558.52	5,557.64	27.73	116.95	-172.64	-358.25	-164.58	1,825.80	1,686.47	139.33	13.104	
5,900.00	5,664.75	5,649.81	5,648.92	28.23	118.90	-172.78	-357.34	-164.58	1,852.31	1,710.66	141.65	13.076	
6,000.00	5,761.33	5,739.89	5,738.99	28.71	120.81	-172.91	-357.73	-164.58	1,878.48	1,734.53	143.94	13.050	
6,100.00	5,858.34	5,848.29	5,847.34	29.18	123.12	-173.04	-358.25	-164.58	1,903.03	1,756.36	146.67	12.975	
6,200.00	5,955.76	5,945.71	5,944.76	29.64	125.19	-173.15	-358.25	-164.58	1,925.43	1,776.30	149.13	12.911	
6,300.00	6,053.57	6,043.52	6,042.57	30.07	127.28	-173.25	-358.25	-164.58	1,946.14	1,794.55	151.59	12.839	
6,400.00	6,151.72	6,136.85	6,135.89	30.50	129.26	-173.33	-357.22	-164.58	1,964.13	1,810.20	153.93	12.760	
6,500.00	6,250.19	6,229.06	6,228.09	30.91	131.22	-173.41	-357.59	-164.58	1,981.83	1,825.59	156.24	12.684	
6,600.00	6,348.94	6,338.97	6,337.94	31.30	133.58	-173.48	-358.25	-164.58	1,998.05	1,839.06	159.00	12.567	
6,659.67	6,408.00	6,398.03	6,397.00	31.53	134.89	-173.52	-358.25	-164.58	2,006.54	1,846.03	160.52	12.500	
6,700.00	6,447.82	6,437.84	6,436.82	31.68	135.77	169.57	-358.25	-164.58	2,012.91	1,851.36	161.55	12.460	
6,750.00	6,496.66	6,486.69	6,485.66	31.90	136.85	157.68	-358.25	-164.58	2,023.07	1,860.26	162.82	12.425	
6,800.00	6,544.65	6,534.68	6,533.65	32.13	137.91	150.59	-358.25	-164.58	2,035.72	1,871.64	164.07	12.407	
6,850.00	6,591.49	6,581.52	6,580.49	32.37	138.95	145.78	-358.25	-164.58	2,050.78	1,885.48	165.30	12.406 SF	
6,900.00	6,636.89	6,624.96	6,623.92	32.62	139.91	142.11	-357.06	-164.58	2,067.03	1,900.58	166.46	12.418	
6,950.00	6,680.57	6,665.91	6,664.87	32.89	140.82	139.04	-357.13	-164.58	2,086.84	1,919.29	167.55	12.455	
7,000.00	6,722.26	6,704.95	6,703.91	33.17	141.68	136.28	-357.24	-164.58	2,108.93	1,940.33	168.60	12.509	
7,050.00	6,761.71	6,741.82	6,740.78	33.45	142.50	133.64	-357.39	-164.58	2,133.22	1,963.63	169.59	12.579	
7,100.00	6,798.67	6,776.30	6,775.26	33.75	143.26	130.99	-357.57	-164.58	2,159.60	1,989.08	170.52	12.665	
7,150.00	6,832.91	6,808.18	6,807.13	34.06	143.97	128.23	-357.77	-164.58	2,187.98	2,016.59	171.39	12.766	
7,200.00	6,864.22	6,837.25	6,836.20	34.37	144.61	125.29	-357.98	-164.58	2,218.21	2,046.03	172.18	12.883	
7,250.00	6,892.42	6,882.55	6,881.42	34.69	145.62	122.55	-358.25	-164.58	2,250.15	2,076.76	173.39	12.977	
7,300.00	6,917.32	6,907.45	6,906.32	35.03	146.20	119.15	-358.25	-164.58	2,283.46	2,109.37	174.09	13.116	
7,350.00	6,938.77	6,928.91	6,927.77	35.37	146.69	115.40	-358.25	-164.58	2,318.19	2,143.49	174.70	13.270	
7,400.00	6,956.64	6,946.78	6,945.64	35.72	147.10	111.25	-358.25	-164.58	2,354.16	2,178.96	175.21	13.437	
7,450.00	6,970.83	6,960.96	6,959.83	36.07	147.43	106.71	-358.25	-164.58	2,391.19	2,215.58	175.61	13.617	
7,500.00	6,981.23	6,971.37	6,970.23	36.44	147.67	101.79	-358.25	-164.58	2,429.05	2,253.15	175.90	13.809	
7,550.00	6,987.80	6,977.93	6,976.80	36.81	147.82	96.54	-358.25	-164.58	2,467.54	2,291.45	176.09	14.013	
7,600.00	6,990.48	6,980.62	6,979.48	37.19	147.88	91.05	-358.25	-164.58	2,506.43	2,330.26	176.18	14.227	
7,609.87	6,990.55	6,980.69	6,979.55	37.26	147.88	89.95	-358.25	-164.58	2,514.13	2,337.95	176.18	14.270	
7,700.00	6,990.49	6,980.62	6,979.49	37.97	147.88	89.95	-358.25	-164.58	2,585.11	2,408.91	176.19	14.672	
7,800.00	6,990.42	6,980.55	6,979.42	38.78	147.88	89.95	-358.25	-164.58	2,665.21	2,489.00	176.21	15.125	
7,900.00	6,990.35	6,980.48	6,979.35	39.64	147.88	89.94	-358.25	-164.58	2,746.61	2,570.38	176.23	15.586	
8,000.00	6,990.28	6,980.41	6,979.28	40.53	147.88	89.94	-358.25	-164.58	2,829.21	2,652.96	176.25	16.052	
8,100.00	6,990.21	6,980.34	6,979.21	41.45	147.87	89.94	-358.25	-164.58	2,912.90	2,736.63	176.27	16.525	
8,200.00	6,990.14	6,980.27	6,979.14	42.40	147.87	89.94	-358.25	-164.58	2,997.59	2,821.30	176.29	17.004	
8,306.37	6,990.06	6,980.20	6,979.06	43.45	147.87	89.93	-358.25	-164.58	3,088.67	2,912.36	176.32	17.518	
8,400.00	6,990.00	6,980.13	6,979.00	44.38	147.87	89.94	-358.25	-164.58	3,168.07	2,991.73	176.34	17.966	
8,500.00	6,989.93	6,980.06	6,978.93	45.36	147.87	89.94	-358.25	-164.58	3,250.07	3,073.70	176.37	18.428	
8,600.00	6,989.85	6,979.99	6,978.85	46.33	147.87	89.95	-358.25	-164.58	3,329.01	3,152.60	176.40	18.872	
8,700.00	6,989.78	6,979.91	6,978.78	47.28	147.86	89.95	-358.25	-164.58	3,404.73	3,228.29	176.44	19.297	
8,800.00	6,989.70	6,979.84	6,978.70	48.21	147.86	89.96	-358.25	-164.58	3,477.09	3,300.59	176.49	19.701	
8,900.00	6,989.63	6,979.76	6,978.63	49.11	147.86	89.96	-358.25	-164.58	3,545.94	3,369.39	176.55	20.084	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #053 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		300-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface Toolface (°)	Offset Wellbore Centre		Distance			Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		
9,000.00	6,989.55	6,979.69	6,978.55	49.99	147.86	89.96	-358.25	-164.58	3,611.18	3,434.55	176.62	20.446	
9,100.00	6,989.48	6,979.61	6,978.48	50.84	147.86	89.97	-358.25	-164.58	3,672.66	3,495.96	176.70	20.784	
9,200.00	6,989.40	6,979.54	6,978.40	51.66	147.86	89.97	-358.25	-164.58	3,730.30	3,553.51	176.80	21.100	
9,300.00	6,989.33	6,979.47	6,978.33	52.45	147.85	89.98	-358.25	-164.58	3,783.99	3,607.10	176.90	21.391	
9,393.87	6,989.27	6,979.40	6,978.27	53.15	147.85	89.98	-358.25	-164.58	3,830.72	3,653.71	177.01	21.641	
9,400.00	6,989.26	6,979.40	6,978.26	53.20	147.85	89.98	-358.25	-164.58	3,833.66	3,656.64	177.01	21.657	
9,500.00	6,989.19	6,979.33	6,978.19	53.95	147.85	89.98	-358.25	-164.58	3,882.63	3,705.49	177.14	21.918	
9,600.00	6,989.12	6,979.26	6,978.12	54.73	147.85	89.98	-358.25	-164.58	3,933.53	3,756.25	177.28	22.188	
9,700.00	6,989.05	6,979.19	6,978.05	55.55	147.85	89.97	-358.25	-164.58	3,986.30	3,808.88	177.42	22.468	
9,800.00	6,988.98	6,979.12	6,977.98	56.40	147.85	89.97	-358.25	-164.58	4,040.85	3,863.28	177.57	22.757	
9,900.00	6,988.91	6,979.05	6,977.91	57.28	147.84	89.97	-358.25	-164.58	4,097.11	3,919.40	177.71	23.055	
10,000.00	6,988.84	6,978.98	6,977.84	58.20	147.84	89.97	-358.25	-164.58	4,155.02	3,977.16	177.86	23.361	
10,100.00	6,988.77	6,978.91	6,977.77	59.14	147.84	89.97	-358.25	-164.58	4,214.51	4,036.49	178.01	23.675	
10,200.00	6,988.70	6,978.84	6,977.70	60.11	147.84	89.97	-358.25	-164.58	4,275.51	4,097.34	178.17	23.997	
10,300.00	6,988.63	6,978.77	6,977.63	61.11	147.84	89.97	-358.25	-164.58	4,337.95	4,159.63	178.32	24.327	
10,400.00	6,988.56	6,978.70	6,977.56	62.14	147.84	89.97	-358.25	-164.58	4,401.79	4,223.31	178.47	24.664	
10,500.00	6,988.49	6,978.63	6,977.49	63.19	147.84	89.97	-358.25	-164.58	4,466.94	4,288.32	178.62	25.007	
10,600.00	6,988.42	6,978.56	6,977.42	64.26	147.83	89.96	-358.25	-164.58	4,533.37	4,354.60	178.78	25.358	
10,700.00	6,988.35	6,978.49	6,977.35	65.36	147.83	89.96	-358.25	-164.58	4,601.02	4,422.09	178.93	25.714	
10,800.00	6,988.28	6,978.42	6,977.28	66.48	147.83	89.96	-358.25	-164.58	4,669.82	4,490.74	179.08	26.077	
10,900.00	6,988.21	6,978.35	6,977.21	67.61	147.83	89.96	-358.25	-164.58	4,739.74	4,560.51	179.23	26.446	
11,000.00	6,988.14	6,978.28	6,977.14	68.77	147.83	89.96	-358.25	-164.58	4,810.72	4,631.34	179.37	26.820	
11,100.00	6,988.07	6,978.21	6,977.07	69.95	147.83	89.96	-358.25	-164.58	4,882.71	4,703.19	179.52	27.199	
11,200.00	6,988.01	6,978.14	6,977.01	71.14	147.82	89.96	-358.25	-164.58	4,955.68	4,776.02	179.66	27.584	
11,300.00	6,987.94	6,978.07	6,976.94	72.35	147.82	89.96	-358.25	-164.58	5,029.57	4,849.77	179.80	27.973	
11,400.00	6,987.87	6,978.00	6,976.87	73.57	147.82	89.95	-358.25	-164.58	5,104.36	4,924.42	179.94	28.367	
11,500.00	6,987.80	6,977.93	6,976.80	74.81	147.82	89.95	-358.25	-164.58	5,180.00	4,999.92	180.08	28.766	
11,600.00	6,987.73	6,977.86	6,976.73	76.07	147.82	89.95	-358.25	-164.58	5,256.45	5,076.24	180.21	29.168	
11,643.87	6,987.70	6,977.83	6,976.70	76.62	147.82	89.95	-358.25	-164.58	5,290.23	5,109.96	180.27	29.346	
11,700.00	6,987.66	6,977.79	6,976.66	77.33	147.82	89.95	-358.25	-164.58	5,333.33	5,152.99	180.34	29.573	
11,737.27	6,987.63	6,977.77	6,976.63	77.80	147.82	89.96	-358.25	-164.58	5,361.69	5,181.29	180.39	29.723	
11,800.00	6,987.59	6,977.72	6,976.59	78.59	147.81	89.95	-358.25	-164.58	5,409.40	5,228.92	180.48	29.973	
11,900.00	6,987.52	6,977.66	6,976.52	79.86	147.81	89.95	-358.25	-164.58	5,486.08	5,305.47	180.61	30.376	
12,000.00	6,987.46	6,977.59	6,976.46	81.14	147.81	89.95	-358.25	-164.58	5,563.51	5,382.77	180.74	30.782	
12,100.00	6,987.39	6,977.52	6,976.39	82.43	147.81	89.95	-358.25	-164.58	5,641.64	5,460.77	180.87	31.192	
12,200.00	6,987.32	6,977.46	6,976.32	83.73	147.81	89.95	-358.25	-164.58	5,720.46	5,539.46	181.00	31.605	
12,300.00	6,987.26	6,977.39	6,976.26	85.05	147.81	89.95	-358.25	-164.58	5,799.93	5,618.80	181.12	32.022	
12,400.00	6,987.19	6,977.32	6,976.19	86.38	147.81	89.95	-358.25	-164.58	5,880.02	5,698.78	181.25	32.442	
12,500.00	6,987.12	6,977.26	6,976.12	87.71	147.80	89.95	-358.25	-164.58	5,960.72	5,779.35	181.37	32.865	
12,600.00	6,987.06	6,977.19	6,976.06	89.06	147.80	89.95	-358.25	-164.58	6,041.99	5,860.51	181.49	33.291	
12,700.00	6,986.99	6,977.12	6,975.99	90.41	147.80	89.95	-358.25	-164.58	6,123.82	5,942.22	181.61	33.720	
12,800.00	6,986.92	6,977.06	6,975.92	91.77	147.80	89.94	-358.25	-164.58	6,206.18	6,024.46	181.72	34.152	
12,900.00	6,986.86	6,976.99	6,975.86	93.14	147.80	89.94	-358.25	-164.58	6,289.06	6,107.22	181.84	34.586	
13,000.00	6,986.79	6,976.92	6,975.79	94.52	147.80	89.94	-358.25	-164.58	6,372.42	6,190.47	181.95	35.023	
13,100.00	6,986.72	6,976.86	6,975.72	95.90	147.79	89.94	-358.25	-164.58	6,456.26	6,274.20	182.06	35.462	
13,200.00	6,986.66	6,976.79	6,975.66	97.30	147.79	89.94	-358.25	-164.58	6,540.55	6,358.38	182.17	35.904	
13,300.00	6,986.59	6,976.72	6,975.59	98.69	147.79	89.94	-358.25	-164.58	6,625.28	6,443.00	182.28	36.347	
13,400.00	6,986.52	6,976.66	6,975.52	100.10	147.79	89.94	-358.25	-164.58	6,710.42	6,528.04	182.38	36.793	
13,500.00	6,986.46	6,976.59	6,975.46	101.51	147.79	89.94	-358.25	-164.58	6,795.98	6,613.49	182.49	37.241	
13,600.00	6,986.39	6,976.52	6,975.39	102.93	147.79	89.94	-358.25	-164.58	6,881.92	6,699.33	182.59	37.690	
13,700.00	6,986.32	6,976.46	6,975.32	104.35	147.79	89.93	-358.25	-164.58	6,968.24	6,785.54	182.69	38.142	
13,800.00	6,986.25	6,976.39	6,975.25	105.78	147.78	89.93	-358.25	-164.58	7,054.92	6,872.12	182.79	38.595	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #053 - OH - OH-INC											Offset Site Error: 0.00 usft										
Survey Program: 300-A027Ua_INC-ONLY				Reference		Offset		Semi Major Axis		Highside		Offset Wellbore Centre		Rule Assigned:		Distance		Warning		Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor									
13,900.00	6,986.19	6,976.32	6,975.19	107.21	147.78	89.93	-358.25	-164.58	7,141.94	6,959.05	182.89	39.050									
14,000.00	6,986.12	6,976.26	6,975.12	108.65	147.78	89.93	-358.25	-164.58	7,229.31	7,046.31	182.99	39.506									
14,100.00	6,986.05	6,976.19	6,975.05	110.09	147.78	89.93	-358.25	-164.58	7,316.99	7,133.90	183.09	39.964									
14,200.00	6,985.99	6,976.12	6,974.99	111.54	147.78	89.93	-358.25	-164.58	7,404.99	7,221.80	183.19	40.423									
14,300.00	6,985.92	6,976.06	6,974.92	112.99	147.78	89.93	-358.25	-164.58	7,493.29	7,310.01	183.28	40.884									
14,400.00	6,985.85	6,975.99	6,974.85	114.45	147.77	89.93	-358.25	-164.58	7,581.88	7,398.50	183.38	41.346									
14,500.00	6,985.79	6,975.92	6,974.79	115.91	147.77	89.93	-358.25	-164.58	7,670.75	7,487.28	183.47	41.809									
14,600.00	6,985.72	6,975.86	6,974.72	117.38	147.77	89.92	-358.25	-164.58	7,759.89	7,576.33	183.56	42.274									
14,700.00	6,985.65	6,975.79	6,974.65	118.84	147.77	89.92	-358.25	-164.58	7,849.30	7,665.64	183.66	42.739									
14,800.00	6,985.59	6,975.72	6,974.59	120.32	147.77	89.92	-358.25	-164.58	7,938.95	7,755.21	183.75	43.206									
14,900.00	6,985.52	6,975.66	6,974.52	121.79	147.77	89.92	-358.25	-164.58	8,028.85	7,845.01	183.84	43.674									
15,000.00	6,985.45	6,975.59	6,974.45	123.27	147.77	89.92	-358.25	-164.58	8,118.99	7,935.06	183.93	44.142									
15,100.00	6,985.39	6,975.52	6,974.39	124.75	147.76	89.92	-358.25	-164.58	8,209.35	8,025.34	184.02	44.612									
15,200.00	6,985.32	6,975.46	6,974.32	126.24	147.76	89.92	-358.25	-164.58	8,299.94	8,115.83	184.11	45.083									
15,300.00	6,985.25	6,975.39	6,974.25	127.72	147.76	89.92	-358.25	-164.58	8,390.74	8,206.55	184.19	45.554									
15,400.00	6,985.19	6,975.32	6,974.19	129.21	147.76	89.92	-358.25	-164.58	8,481.75	8,297.47	184.28	46.026									
15,500.00	6,985.12	6,975.26	6,974.12	130.71	147.76	89.91	-358.25	-164.58	8,572.95	8,388.59	184.37	46.499									
15,600.00	6,985.05	6,975.19	6,974.05	132.20	147.76	89.91	-358.25	-164.58	8,664.36	8,479.90	184.45	46.973									
15,700.00	6,984.99	6,975.12	6,973.99	133.70	147.75	89.91	-358.25	-164.58	8,755.94	8,571.40	184.54	47.447									
15,800.00	6,984.92	6,975.06	6,973.92	135.20	147.75	89.91	-358.25	-164.58	8,847.72	8,663.09	184.63	47.922									
15,900.00	6,984.85	6,974.99	6,973.85	136.71	147.75	89.91	-358.25	-164.58	8,939.66	8,754.95	184.71	48.398									
16,000.00	6,984.79	6,974.92	6,973.79	138.21	147.75	89.91	-358.25	-164.58	9,031.78	8,846.99	184.80	48.874									
16,100.00	6,984.72	6,974.86	6,973.72	139.72	147.75	89.91	-358.25	-164.58	9,124.07	8,939.19	184.88	49.351									
16,200.00	6,984.65	6,974.79	6,973.65	141.23	147.75	89.91	-358.25	-164.58	9,216.51	9,031.55	184.97	49.828									
16,300.00	6,984.59	6,974.72	6,973.59	142.75	147.75	89.91	-358.25	-164.58	9,309.12	9,124.07	185.05	50.306									
16,400.00	6,984.52	6,974.66	6,973.52	144.26	147.74	89.90	-358.25	-164.58	9,401.87	9,216.74	185.13	50.784									
16,500.00	6,984.45	6,974.59	6,973.45	145.78	147.74	89.90	-358.25	-164.58	9,494.77	9,309.55	185.22	51.263									
16,600.00	6,984.39	6,974.52	6,973.39	147.29	147.74	89.90	-358.25	-164.58	9,587.81	9,402.51	185.30	51.742									
16,700.00	6,984.32	6,974.46	6,973.32	148.82	147.74	89.90	-358.25	-164.58	9,681.00	9,495.61	185.38	52.221									
16,800.00	6,984.25	6,974.39	6,973.25	150.34	147.74	89.90	-358.25	-164.58	9,774.31	9,588.85	185.47	52.701									
16,900.00	6,984.19	6,974.32	6,973.19	151.86	147.74	89.90	-358.25	-164.58	9,867.76	9,682.21	185.55	53.181									
17,000.00	6,984.12	6,974.25	6,973.12	153.39	147.73	89.90	-358.25	-164.58	9,961.34	9,775.70	185.63	53.662									
17,100.00	6,984.05	6,974.19	6,973.05	154.91	147.73	89.90	-358.25	-164.58	10,055.03	9,869.32	185.71	54.142									
17,200.00	6,983.99	6,974.12	6,972.99	156.44	147.73	89.90	-358.25	-164.58	10,148.85	9,963.06	185.80	54.623									
17,300.00	6,983.92	6,974.05	6,972.92	157.97	147.73	89.89	-358.25	-164.58	10,242.79	10,056.91	185.88	55.104									
17,400.00	6,983.85	6,973.99	6,972.85	159.50	147.73	89.89	-358.25	-164.58	10,336.84	10,150.88	185.96	55.586									
17,500.00	6,983.79	6,973.92	6,972.79	161.04	147.73	89.89	-358.25	-164.58	10,431.00	10,244.96	186.04	56.067									
17,600.00	6,983.72	6,973.85	6,972.72	162.57	147.73	89.89	-358.25	-164.58	10,525.27	10,339.14	186.13	56.549									
17,700.00	6,983.65	6,973.79	6,972.65	164.11	147.72	89.89	-358.25	-164.58	10,619.64	10,433.43	186.21	57.031									
17,800.00	6,983.59	6,973.72	6,972.59	165.65	147.72	89.89	-358.25	-164.58	10,714.12	10,527.83	186.29	57.513									
17,900.00	6,983.52	6,973.65	6,972.52	167.18	147.72	89.89	-358.25	-164.58	10,808.69	10,622.32	186.37	57.995									
18,000.00	6,983.45	6,973.59	6,972.45	168.72	147.72	89.89	-358.25	-164.58	10,903.36	10,716.91	186.45	58.477									
18,100.00	6,983.39	6,973.52	6,972.39	170.27	147.72	89.89	-358.25	-164.58	10,998.13	10,811.59	186.54	58.960									
18,200.00	6,983.32	6,973.45	6,972.32	171.81	147.72	89.88	-358.25	-164.58	11,092.99	10,906.37	186.62	59.442									
18,300.00	6,983.25	6,973.39	6,972.25	173.35	147.71	89.88	-358.25	-164.58	11,187.93	11,001.23	186.70	59.924									
18,400.00	6,983.19	6,973.32	6,972.19	174.90	147.71	89.88	-358.25	-164.58	11,282.97	11,096.19	186.78	60.407									
18,500.00	6,983.12	6,973.25	6,972.12	176.44	147.71	89.88	-358.25	-164.58	11,378.09	11,191.22	186.87	60.889									
18,600.00	6,983.05	6,973.19	6,972.05	177.99	147.71	89.88	-358.25	-164.58	11,473.29	11,286.34	186.95	61.372									
18,700.00	6,982.99	6,973.12	6,971.99	179.54	147.71	89.88	-358.25	-164.58	11,568.57	11,381.54	187.03	61.854									
18,800.00	6,982.92	6,973.05	6,971.92	181.09	147.71	89.88	-358.25	-164.58	11,663.94	11,476.82	187.11	62.336									
18,900.00	6,982.85	6,972.99	6,971.85	182.64	147.71	89.88	-358.25	-164.58	11,759.38	11,572.18	187.20	62.819									
19,000.00	6,982.78	6,972.92	6,971.78	184.19	147.70	89.88	-358.25	-164.58	11,854.89	11,667.61	187.28	63.301									

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #053 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 300-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	6,972.85	6,971.72	185.74	147.70	89.88	-358.25	-164.58	11,950.48	11,763.12	187.36	63.783	
19,200.00	6,982.65	6,972.79	6,971.65	187.29	147.70	89.87	-358.25	-164.58	12,046.14	11,858.70	187.44	64.265	
19,300.00	6,982.58	6,972.72	6,971.58	188.84	147.70	89.87	-358.25	-164.58	12,141.87	11,954.34	187.53	64.747	
19,400.00	6,982.52	6,972.65	6,971.52	190.40	147.70	89.87	-358.25	-164.58	12,237.67	12,050.06	187.61	65.229	
19,500.00	6,982.45	6,972.59	6,971.45	191.95	147.70	89.87	-358.25	-164.58	12,333.53	12,145.84	187.69	65.711	
19,600.00	6,982.38	6,972.52	6,971.38	193.51	147.69	89.87	-358.25	-164.58	12,429.46	12,241.69	187.78	66.193	
19,700.00	6,982.32	6,972.45	6,971.32	195.07	147.69	89.87	-358.25	-164.58	12,525.46	12,337.60	187.86	66.674	
19,800.00	6,982.25	6,972.39	6,971.25	196.62	147.69	89.87	-358.25	-164.58	12,621.51	12,433.57	187.94	67.156	
19,900.00	6,982.18	6,972.32	6,971.18	198.18	147.69	89.87	-358.25	-164.58	12,717.63	12,529.60	188.03	67.637	
20,000.00	6,982.12	6,972.25	6,971.12	199.74	147.69	89.87	-358.25	-164.58	12,813.80	12,625.69	188.11	68.118	
20,100.00	6,982.05	6,972.19	6,971.05	201.30	147.69	89.86	-358.25	-164.58	12,910.04	12,721.84	188.20	68.599	
20,176.02	6,982.00	6,972.14	6,971.00	202.36	147.69	89.86	-358.25	-164.58	12,983.23	12,791.18	192.05	67.604	

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #072C - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 320-APC_ISCWSA REV 2 MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	48.87	48.87	0.00	0.06	-69.12	2,433.77	-6,378.58	6,827.13				
100.00	100.00	1,247.78	1,231.15	0.25	3.53	-70.13	2,289.63	-6,336.80	6,821.75	6,818.11	3.65	1,870.192	
200.00	200.00	1,308.43	1,289.94	0.61	3.81	-70.23	2,275.42	-6,332.29	6,806.46	6,802.32	4.15	1,641.979	
300.00	300.00	1,426.83	1,404.57	0.97	4.38	-70.44	2,247.06	-6,323.75	6,791.31	6,786.33	4.97	1,365.781	
400.00	400.00	1,531.00	1,505.30	1.33	4.91	-70.62	2,221.61	-6,316.12	6,775.93	6,770.16	5.77	1,174.012	
500.00	500.00	1,594.00	1,566.21	1.68	5.21	-70.73	2,206.16	-6,311.57	6,760.73	6,754.35	6.38	1,059.830	
600.00	600.00	1,638.25	1,609.12	2.04	5.40	-70.81	2,195.84	-6,308.50	6,746.27	6,739.37	6.89	978.611	
700.00	699.98	1,693.38	1,662.81	2.40	5.63	-61.16	2,183.85	-6,304.87	6,731.81	6,724.35	7.45	903.231	
800.00	799.84	1,787.40	1,754.44	2.76	6.03	-61.63	2,163.61	-6,298.90	6,716.07	6,707.89	8.17	821.711	
900.00	899.45	1,929.96	1,893.17	3.13	6.70	-62.27	2,132.18	-6,289.53	6,698.41	6,689.30	9.12	734.661	
1,000.00	998.70	2,067.63	2,026.64	3.49	7.37	-63.00	2,099.68	-6,280.55	6,678.91	6,668.84	10.08	662.858	
1,100.00	1,097.47	2,206.85	2,161.36	3.86	8.05	-63.82	2,066.18	-6,270.05	6,656.75	6,645.71	11.05	602.641	
1,200.00	1,195.62	2,298.40	2,249.82	4.24	8.51	-64.56	2,043.56	-6,263.25	6,633.30	6,621.46	11.84	560.376	
1,300.00	1,293.06	2,373.44	2,322.43	4.64	8.86	-65.29	2,025.52	-6,257.54	6,608.65	6,596.10	12.55	526.703	
1,400.00	1,389.64	2,442.19	2,389.03	5.06	9.18	-66.04	2,009.28	-6,252.39	6,583.06	6,569.82	13.24	497.187	
1,500.00	1,485.27	2,525.22	2,469.45	5.50	9.58	-66.89	1,989.52	-6,246.41	6,556.57	6,542.54	14.03	467.204	
1,515.00	1,499.52	2,539.62	2,483.39	5.57	9.65	-67.03	1,986.07	-6,245.37	6,552.51	6,538.34	14.17	462.571	
1,600.00	1,580.22	2,576.04	2,518.70	5.96	9.82	-67.19	1,977.53	-6,242.79	6,529.70	6,514.99	14.71	444.041	
1,700.00	1,675.17	2,630.87	2,572.01	6.44	10.06	-67.43	1,965.24	-6,239.04	6,503.63	6,488.23	15.39	422.477	
1,800.00	1,770.11	2,728.05	2,666.53	6.92	10.49	-67.85	1,943.62	-6,232.50	6,478.04	6,461.79	16.25	398.552	
1,900.00	1,865.05	2,790.00	2,726.80	7.41	10.77	-68.12	1,929.90	-6,228.35	6,452.81	6,435.82	16.99	379.848	
2,000.00	1,959.99	2,901.51	2,835.23	7.90	11.28	-68.61	1,905.04	-6,220.70	6,427.72	6,409.79	17.94	358.365	
2,100.00	2,054.94	3,024.05	2,954.21	8.40	11.86	-69.16	1,876.99	-6,212.01	6,402.67	6,383.71	18.96	337.690	
2,200.00	2,149.88	3,104.00	3,031.75	8.90	12.24	-69.52	1,858.44	-6,206.16	6,377.71	6,357.90	19.81	321.972	
2,300.00	2,244.82	3,166.00	3,091.96	9.41	12.51	-69.80	1,844.34	-6,201.73	6,353.34	6,332.77	20.57	308.834	
2,400.00	2,339.76	3,201.16	3,126.17	9.92	12.66	-69.96	1,836.59	-6,199.37	6,329.80	6,308.56	21.24	298.059	
2,500.00	2,434.71	3,229.00	3,153.32	10.43	12.78	-70.08	1,830.67	-6,197.62	6,307.26	6,285.38	21.88	288.288	
2,600.00	2,529.65	3,291.00	3,214.03	10.94	13.02	-70.35	1,818.58	-6,194.10	6,285.77	6,263.14	22.63	277.731	
2,700.00	2,624.59	3,323.76	3,246.22	11.45	13.14	-70.48	1,812.76	-6,192.38	6,265.16	6,241.88	23.28	269.117	
2,800.00	2,719.53	3,382.67	3,304.21	11.97	13.35	-70.73	1,802.85	-6,189.30	6,245.29	6,221.28	24.01	260.113	
2,900.00	2,814.48	3,417.00	3,338.06	12.49	13.47	-70.87	1,797.36	-6,187.62	6,226.25	6,201.59	24.66	252.453	
3,000.00	2,909.42	3,453.89	3,374.48	13.01	13.59	-71.01	1,791.78	-6,186.06	6,208.25	6,182.93	25.32	245.193	
3,100.00	3,004.36	3,487.07	3,407.33	13.53	13.70	-71.14	1,787.12	-6,185.00	6,191.43	6,165.46	25.97	238.437	
3,200.00	3,099.30	3,582.74	3,502.07	14.05	13.99	-71.52	1,774.17	-6,182.13	6,175.21	6,148.42	26.79	230.522	
3,300.00	3,194.25	3,670.00	3,588.67	14.57	14.23	-71.85	1,763.91	-6,179.18	6,159.22	6,131.66	27.56	223.464	
3,400.00	3,289.19	3,712.28	3,630.72	15.09	14.34	-72.00	1,759.67	-6,177.81	6,143.88	6,115.67	28.21	217.773	
3,500.00	3,384.13	3,753.29	3,671.55	15.62	14.44	-72.15	1,756.08	-6,176.71	6,129.51	6,100.65	28.85	212.437	
3,600.00	3,479.07	3,794.00	3,712.15	16.14	14.52	-72.29	1,753.28	-6,175.86	6,116.13	6,086.64	29.49	207.416	
3,700.00	3,574.02	3,847.00	3,765.07	16.67	14.62	-72.46	1,750.56	-6,174.99	6,103.64	6,073.51	30.13	202.584	
3,800.00	3,668.96	3,908.00	3,826.01	17.19	14.73	-72.66	1,747.87	-6,174.19	6,091.80	6,061.02	30.78	197.903	
3,900.00	3,763.90	4,024.76	3,942.65	17.72	14.93	-73.03	1,742.78	-6,172.67	6,080.07	6,048.54	31.53	192.818	
4,000.00	3,858.84	4,116.69	4,034.49	18.24	15.10	-73.33	1,738.83	-6,171.50	6,068.60	6,036.36	32.24	188.218	
4,100.00	3,953.79	4,208.65	4,126.36	18.77	15.26	-73.62	1,734.93	-6,170.34	6,057.34	6,024.39	32.95	183.819	
4,200.00	4,048.73	4,300.66	4,218.29	19.30	15.42	-73.92	1,731.08	-6,169.20	6,046.29	6,012.63	33.66	179.607	
4,300.00	4,143.67	4,392.71	4,310.25	19.82	15.59	-74.22	1,727.29	-6,168.07	6,035.45	6,001.08	34.38	175.572	
4,400.00	4,238.61	4,484.81	4,402.26	20.35	15.75	-74.52	1,723.54	-6,166.96	6,024.83	5,989.74	35.09	171.703	
4,500.00	4,333.56	4,576.94	4,494.32	20.88	15.91	-74.82	1,719.85	-6,165.86	6,014.41	5,978.61	35.80	167.991	
4,600.00	4,428.50	4,669.12	4,586.41	21.41	16.08	-75.12	1,716.21	-6,164.78	6,004.21	5,967.69	36.52	164.427	
4,700.00	4,523.44	4,761.34	4,678.56	21.93	16.24	-75.42	1,712.62	-6,163.72	5,994.21	5,956.98	37.23	161.003	
4,800.00	4,618.38	4,853.60	4,770.74	22.46	16.41	-75.72	1,709.09	-6,162.66	5,984.43	5,946.49	37.95	157.711	
4,900.00	4,713.33	4,945.90	4,862.97	22.99	16.57	-76.02	1,705.60	-6,161.63	5,974.86	5,936.20	38.66	154.545	
5,000.00	4,808.27	5,038.24	4,955.25	23.52	16.73	-76.32	1,702.17	-6,160.61	5,965.50	5,926.13	39.38	151.497	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #072C - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 320-APC_ISCWSA REV 2 MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,100.00	4,903.21	5,130.63	5,047.57	24.05	16.90	-76.62	1,698.79	-6,159.61	5,956.36	5,916.26	40.09	148.562	
5,200.00	4,998.16	5,223.06	5,139.93	24.58	17.06	-76.93	1,695.46	-6,158.62	5,947.42	5,906.61	40.81	145.733	
5,300.00	5,093.10	5,315.52	5,232.33	25.11	17.23	-77.23	1,692.19	-6,157.64	5,938.70	5,897.17	41.53	143.006	
5,400.00	5,188.04	5,408.03	5,324.78	25.64	17.39	-77.53	1,688.96	-6,156.69	5,930.19	5,887.94	42.25	140.376	
5,500.00	5,282.98	5,500.59	5,417.27	26.17	17.56	-77.84	1,685.79	-6,155.74	5,921.89	5,878.92	42.96	137.837	
5,600.00	5,377.93	5,593.18	5,509.81	26.70	17.72	-78.14	1,682.67	-6,154.82	5,913.80	5,870.12	43.68	135.386	
5,623.25	5,400.00	5,614.71	5,531.33	26.82	17.76	-78.21	1,681.95	-6,154.60	5,911.95	5,868.10	43.85	134.829	
5,700.00	5,473.03	5,685.99	5,602.56	27.22	17.89	-78.38	1,679.60	-6,153.90	5,906.02	5,861.63	44.39	133.034	
5,800.00	5,568.64	5,779.39	5,695.91	27.73	18.05	-78.60	1,676.56	-6,153.00	5,898.79	5,853.69	45.10	130.807	
5,900.00	5,664.75	5,873.38	5,789.85	28.23	18.22	-78.81	1,673.56	-6,152.11	5,892.07	5,846.29	45.78	128.700	
6,000.00	5,761.33	5,967.93	5,884.35	28.71	18.39	-79.01	1,670.60	-6,151.23	5,885.86	5,839.41	46.45	126.705	
6,100.00	5,858.34	6,062.99	5,979.36	29.18	18.56	-79.20	1,667.68	-6,150.36	5,880.13	5,833.02	47.11	124.817	
6,200.00	5,955.76	6,158.54	6,074.86	29.64	18.73	-79.39	1,664.80	-6,149.51	5,874.86	5,827.11	47.75	123.029	
6,300.00	6,053.57	6,254.55	6,170.83	30.07	18.90	-79.56	1,661.96	-6,148.66	5,870.03	5,821.65	48.38	121.336	
6,400.00	6,151.72	6,350.98	6,267.22	30.50	19.07	-79.72	1,659.17	-6,147.84	5,865.61	5,816.62	48.99	119.732	
6,500.00	6,250.19	6,447.81	6,364.00	30.91	19.25	-79.87	1,656.43	-6,147.02	5,861.60	5,812.02	49.59	118.213	
6,600.00	6,348.94	6,544.99	6,461.15	31.30	19.42	-80.01	1,653.74	-6,146.22	5,857.98	5,807.82	50.17	116.773	
6,659.67	6,408.00	6,603.14	6,519.27	31.53	19.53	-80.08	1,652.16	-6,145.75	5,856.00	5,805.49	50.50	115.950	
6,688.25	6,436.25	6,630.96	6,547.07	31.64	19.58	-92.74	1,651.41	-6,145.53	5,855.54	5,804.87	50.67	115.560 CC, ES	
6,700.00	6,447.82	6,642.34	6,558.45	31.68	19.60	-96.65	1,651.10	-6,145.44	5,855.62	5,804.88	50.74	115.406	
6,750.00	6,496.66	6,690.39	6,606.48	31.90	19.68	-107.91	1,649.82	-6,145.06	5,857.69	5,806.64	51.05	114.744	
6,800.00	6,544.65	6,737.55	6,653.62	32.13	19.77	-114.08	1,648.58	-6,144.69	5,862.58	5,811.20	51.38	114.103	
6,850.00	6,591.49	6,783.53	6,699.59	32.37	19.85	-117.70	1,647.38	-6,144.33	5,870.28	5,818.56	51.73	113.487	
6,900.00	6,636.89	6,828.06	6,744.10	32.62	19.93	-119.86	1,646.23	-6,143.99	5,880.77	5,828.68	52.09	112.901	
6,950.00	6,680.57	6,870.85	6,786.88	32.89	20.00	-121.06	1,645.14	-6,143.67	5,893.99	5,841.53	52.46	112.351	
7,000.00	6,722.26	6,911.65	6,827.67	33.17	20.08	-121.57	1,644.11	-6,143.36	5,909.89	5,857.05	52.84	111.839	
7,050.00	6,761.71	6,950.21	6,866.21	33.45	20.15	-121.53	1,643.15	-6,143.07	5,928.40	5,875.17	53.23	111.368	
7,100.00	6,798.67	6,986.28	6,902.27	33.75	20.21	-121.02	1,642.26	-6,142.81	5,949.42	5,895.80	53.63	110.942	
7,150.00	6,832.91	7,019.65	6,935.62	34.06	20.27	-120.08	1,641.44	-6,142.57	5,972.85	5,918.83	54.02	110.561	
7,200.00	6,864.22	7,050.10	6,966.07	34.37	20.33	-118.71	1,640.70	-6,142.35	5,998.56	5,944.14	54.42	110.228	
7,250.00	6,892.42	7,077.45	6,993.41	34.69	20.37	-116.91	1,640.04	-6,142.15	6,026.41	5,971.60	54.81	109.943	
7,300.00	6,917.32	7,101.54	7,017.49	35.03	20.42	-114.68	1,639.46	-6,141.98	6,056.25	6,001.05	55.20	109.706	
7,350.00	6,938.77	7,122.20	7,038.15	35.37	20.45	-111.99	1,638.97	-6,141.83	6,087.90	6,032.31	55.59	109.517	
7,400.00	6,956.64	7,139.32	7,055.25	35.72	20.49	-108.83	1,638.56	-6,141.71	6,121.18	6,065.21	55.96	109.377	
7,450.00	6,970.83	7,152.77	7,068.71	36.07	20.51	-105.18	1,638.24	-6,141.62	6,155.88	6,099.55	56.33	109.283	
7,500.00	6,981.23	7,162.49	7,078.42	36.44	20.53	-101.05	1,638.02	-6,141.55	6,191.80	6,135.12	56.68	109.235	
7,550.00	6,987.80	7,168.41	7,084.34	36.81	20.54	-96.45	1,637.88	-6,141.51	6,228.72	6,171.69	57.02	109.230 SF	
7,600.00	6,990.48	7,170.48	7,086.41	37.19	20.54	-91.43	1,637.83	-6,141.49	6,266.39	6,209.04	57.35	109.267	
7,609.87	6,990.55	7,170.44	7,086.37	37.26	20.54	-90.40	1,637.83	-6,141.49	6,273.89	6,216.48	57.41	109.278	
7,700.00	6,990.49	7,169.33	7,085.26	37.97	20.54	-90.39	1,637.85	-6,141.50	6,342.80	6,284.82	57.98	109.404	
7,800.00	6,990.42	7,168.10	7,084.04	38.78	20.54	-90.37	1,637.88	-6,141.51	6,419.86	6,361.27	58.60	109.563	
7,900.00	6,990.35	7,166.88	7,082.81	39.64	20.53	-90.35	1,637.91	-6,141.52	6,497.55	6,438.34	59.21	109.742	
8,000.00	6,990.28	7,165.65	7,081.58	40.53	20.53	-90.33	1,637.94	-6,141.53	6,575.84	6,516.03	59.81	109.943	
8,100.00	6,990.21	7,164.42	7,080.35	41.45	20.53	-90.32	1,637.97	-6,141.54	6,654.71	6,594.31	60.41	110.165	
8,200.00	6,990.14	7,163.19	7,079.12	42.40	20.53	-90.30	1,638.00	-6,141.54	6,734.15	6,673.15	60.99	110.408	
8,306.37	6,990.06	7,161.88	7,077.81	43.45	20.53	-90.28	1,638.03	-6,141.55	6,819.23	6,757.62	61.61	110.689	
8,400.00	6,990.00	7,160.79	7,076.73	44.38	20.52	-90.29	1,638.06	-6,141.56	6,896.37	6,834.25	62.12	111.023	
8,500.00	6,989.93	7,159.78	7,075.71	45.36	20.52	-90.30	1,638.08	-6,141.57	6,982.77	6,920.17	62.60	111.545	
8,600.00	6,989.85	7,158.92	7,074.86	46.33	20.52	-90.33	1,638.10	-6,141.57	7,072.76	7,009.74	63.02	112.233	
8,700.00	6,989.78	7,158.23	7,074.16	47.28	20.52	-90.37	1,638.12	-6,141.58	7,165.78	7,102.41	63.37	113.080	
8,800.00	6,989.70	7,157.70	7,073.63	48.21	20.52	-90.44	1,638.13	-6,141.58	7,261.27	7,197.62	63.65	114.077	
8,900.00	6,989.63	7,157.34	7,073.27	49.11	20.52	-90.58	1,638.14	-6,141.59	7,358.67	7,294.81	63.87	115.216	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #072C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		320-APC_ISCWSA REV 2 MWD					Rule Assigned:				Offset Well Error:	0.00 usft		
Reference	Offset	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre		Distance				Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,000.00	6,989.55	7,157.15	7,073.08	49.99	20.52	-90.90	1,638.14	-6,141.59	7,457.45	7,393.43	64.02	116.489		
9,100.00	6,989.48	7,157.13	7,073.07	50.84	20.52	-92.20	1,638.14	-6,141.59	7,557.08	7,492.98	64.10	117.887		
9,200.00	6,989.40	7,157.28	7,073.22	51.66	20.52	94.87	1,638.14	-6,141.59	7,657.05	7,592.93	64.13	119.404		
9,300.00	6,989.33	7,157.61	7,073.54	52.45	20.52	91.20	1,638.13	-6,141.58	7,756.88	7,692.79	64.09	121.030		
9,393.87	6,989.27	7,158.06	7,074.00	53.15	20.52	90.72	1,638.12	-6,141.58	7,850.02	7,786.01	64.00	122.649		
9,400.00	6,989.26	7,158.10	7,074.03	53.20	20.52	90.73	1,638.12	-6,141.58	7,856.08	7,792.08	64.00	122.759		
9,500.00	6,989.19	7,158.66	7,074.60	53.95	20.52	90.75	1,638.11	-6,141.58	7,954.90	7,891.01	63.88	124.527		
9,600.00	6,989.12	7,159.23	7,075.16	54.73	20.52	90.78	1,638.09	-6,141.57	8,053.74	7,989.97	63.77	126.293		
9,700.00	6,989.05	7,159.79	7,075.72	55.55	20.52	90.81	1,638.08	-6,141.57	8,152.62	8,088.96	63.66	128.059		
9,800.00	6,988.98	7,160.36	7,076.29	56.40	20.52	90.83	1,638.07	-6,141.56	8,251.52	8,187.96	63.56	129.823		
9,900.00	6,988.91	7,160.92	7,076.85	57.28	20.52	90.86	1,638.05	-6,141.56	8,350.45	8,286.99	63.46	131.586		
10,000.00	6,988.84	7,161.48	7,077.42	58.20	20.53	90.89	1,638.04	-6,141.56	8,449.41	8,386.04	63.36	133.347		
10,100.00	6,988.77	7,162.05	7,077.98	59.14	20.53	90.91	1,638.03	-6,141.55	8,548.38	8,485.11	63.27	135.107		
10,200.00	6,988.70	7,162.61	7,078.54	60.11	20.53	90.94	1,638.01	-6,141.55	8,647.39	8,584.20	63.18	136.865		
10,300.00	6,988.63	7,163.17	7,079.11	61.11	20.53	90.97	1,638.00	-6,141.54	8,746.41	8,683.31	63.10	138.622		
10,400.00	6,988.56	7,163.74	7,079.67	62.14	20.53	90.99	1,637.99	-6,141.54	8,845.46	8,782.44	63.01	140.376		
10,500.00	6,988.49	7,164.30	7,080.23	63.19	20.53	91.02	1,637.97	-6,141.54	8,944.52	8,881.59	62.93	142.129		
10,600.00	6,988.42	7,164.86	7,080.79	64.26	20.53	91.05	1,637.96	-6,141.53	9,043.61	8,980.76	62.86	143.880		
10,700.00	6,988.35	7,165.42	7,081.36	65.36	20.53	91.07	1,637.95	-6,141.53	9,142.72	9,079.94	62.78	145.629		
10,800.00	6,988.28	7,165.99	7,081.92	66.48	20.53	91.10	1,637.93	-6,141.52	9,241.85	9,179.14	62.71	147.376		
10,900.00	6,988.21	7,166.55	7,082.48	67.61	20.53	91.13	1,637.92	-6,141.52	9,340.99	9,278.35	62.64	149.120		
11,000.00	6,988.14	7,167.11	7,083.04	68.77	20.54	91.15	1,637.91	-6,141.52	9,440.16	9,377.58	62.57	150.862		
11,100.00	6,988.07	7,167.67	7,083.60	69.95	20.54	91.18	1,637.89	-6,141.51	9,539.34	9,476.83	62.51	152.602		
11,200.00	6,988.01	7,168.23	7,084.16	71.14	20.54	91.20	1,637.88	-6,141.51	9,638.54	9,576.09	62.45	154.340		
11,300.00	6,987.94	7,168.79	7,084.73	72.35	20.54	91.23	1,637.87	-6,141.51	9,737.75	9,675.36	62.39	156.075		
11,400.00	6,987.87	7,169.36	7,085.29	73.57	20.54	91.26	1,637.85	-6,141.50	9,836.98	9,774.65	62.34	157.807		
11,500.00	6,987.80	7,169.92	7,085.85	74.81	20.54	91.28	1,637.84	-6,141.50	9,936.23	9,873.95	62.28	159.537		
11,600.00	6,987.73	7,170.48	7,086.41	76.07	20.54	91.31	1,637.83	-6,141.49	10,035.49	9,973.26	62.23	161.264		
11,643.87	6,987.70	7,170.72	7,086.65	76.62	20.54	91.32	1,637.82	-6,141.49	10,079.03	10,016.83	62.21	162.020		
11,700.00	6,987.66	7,171.05	7,086.98	77.33	20.54	91.16	1,637.81	-6,141.49	10,134.69	10,072.52	62.18	162.996		
11,737.27	6,987.63	7,171.28	7,087.21	77.80	20.54	91.07	1,637.81	-6,141.49	10,171.57	10,109.41	62.15	163.652		
11,800.00	6,987.59	7,171.69	7,087.61	78.59	20.54	91.09	1,637.80	-6,141.48	10,233.58	10,171.47	62.11	164.760		
11,900.00	6,987.52	7,172.32	7,088.25	79.86	20.54	91.11	1,637.78	-6,141.48	10,332.45	10,270.41	62.05	166.523		
12,000.00	6,987.46	7,172.96	7,088.89	81.14	20.55	91.14	1,637.77	-6,141.48	10,431.35	10,369.36	61.99	168.283		
12,100.00	6,987.39	7,173.60	7,089.53	82.43	20.55	91.16	1,637.75	-6,141.47	10,530.27	10,468.34	61.93	170.039		
12,200.00	6,987.32	7,174.24	7,090.17	83.73	20.55	91.18	1,637.74	-6,141.47	10,629.20	10,567.33	61.87	171.793		
12,300.00	6,987.26	7,174.88	7,090.81	85.05	20.55	91.21	1,637.72	-6,141.46	10,728.16	10,666.34	61.82	173.544		
12,400.00	6,987.19	7,175.52	7,091.44	86.38	20.55	91.23	1,637.71	-6,141.46	10,827.13	10,765.37	61.77	175.291		
12,500.00	6,987.12	7,176.15	7,092.08	87.71	20.55	91.26	1,637.69	-6,141.45	10,926.13	10,864.41	61.72	177.036		
12,600.00	6,987.06	7,176.79	7,092.72	89.06	20.55	91.28	1,637.68	-6,141.45	11,025.14	10,963.47	61.67	178.776		
12,700.00	6,986.99	7,177.43	7,093.36	90.41	20.55	91.30	1,637.66	-6,141.44	11,124.17	11,062.54	61.63	180.513		
12,800.00	6,986.92	7,178.07	7,093.99	91.77	20.55	91.33	1,637.65	-6,141.44	11,223.21	11,161.63	61.58	182.247		
12,900.00	6,986.86	7,178.70	7,094.63	93.14	20.56	91.35	1,637.63	-6,141.44	11,322.28	11,260.73	61.54	183.977		
13,000.00	6,986.79	7,179.34	7,095.27	94.52	20.56	91.37	1,637.62	-6,141.43	11,421.36	11,359.85	61.50	185.704		
13,100.00	6,986.72	7,179.98	7,095.90	95.90	20.56	91.40	1,637.61	-6,141.43	11,520.45	11,458.98	61.47	187.426		
13,200.00	6,986.66	7,180.61	7,096.54	97.30	20.56	91.42	1,637.59	-6,141.42	11,619.56	11,558.13	61.43	189.145		
13,300.00	6,986.59	7,181.25	7,097.17	98.69	20.56	91.45	1,637.58	-6,141.42	11,718.69	11,657.29	61.40	190.860		
13,400.00	6,986.52	7,181.88	7,097.81	100.10	20.56	91.47	1,637.56	-6,141.41	11,817.83	11,756.46	61.37	192.571		
13,500.00	6,986.46	7,182.52	7,098.44	101.51	20.56	91.49	1,637.55	-6,141.41	11,916.98	11,855.64	61.34	194.278		
13,600.00	6,986.39	7,183.15	7,099.08	102.93	20.56	91.52	1,637.53	-6,141.41	12,016.15	11,954.84	61.31	195.982		
13,700.00	6,986.32	7,183.79	7,099.71	104.35	20.57	91.54	1,637.52	-6,141.40	12,115.33	12,054.05	61.29	197.681		
13,800.00	6,986.25	7,184.42	7,100.35	105.78	20.57	91.56	1,637.50	-6,141.40	12,214.53	12,153.27	61.26	199.375		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #072C - OH - OH-SVY												Offset Site Error: 0.00 usft	
Survey Program: 320-APC_ISCWSA REV 2 MWD				Rule Assigned:								Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
13,900.00	6,986.19	7,185.06	7,100.98	107.21	20.57	91.59	1,637.49	-6,141.39	12,313.74	12,252.50	61.24	201.066	
14,000.00	6,986.12	7,185.69	7,101.62	108.65	20.57	91.61	1,637.47	-6,141.39	12,412.96	12,351.74	61.22	202.752	
14,100.00	6,986.05	7,186.32	7,102.25	110.09	20.57	91.63	1,637.46	-6,141.38	12,512.19	12,450.99	61.20	204.434	
14,200.00	6,985.99	7,186.96	7,102.88	111.54	20.57	91.66	1,637.44	-6,141.38	12,611.44	12,550.25	61.19	206.112	
14,300.00	6,985.92	7,187.59	7,103.52	112.99	20.57	91.68	1,637.43	-6,141.37	12,710.70	12,649.53	61.17	207.785	
14,400.00	6,985.85	7,188.22	7,104.15	114.45	20.57	91.70	1,637.41	-6,141.37	12,809.97	12,748.81	61.16	209.454	
14,500.00	6,985.79	7,188.86	7,104.78	115.91	20.57	91.73	1,637.40	-6,141.37	12,909.25	12,848.10	61.15	211.118	
14,600.00	6,985.72	7,189.49	7,105.41	117.38	20.58	91.75	1,637.38	-6,141.36	13,008.54	12,947.40	61.14	212.778	
14,700.00	6,985.65	7,190.12	7,106.05	118.84	20.58	91.78	1,637.37	-6,141.36	13,107.84	13,046.71	61.13	214.433	
14,800.00	6,985.59	7,190.75	7,106.68	120.32	20.58	91.80	1,637.35	-6,141.35	13,207.15	13,146.03	61.12	216.083	
14,900.00	6,985.52	7,191.39	7,107.31	121.79	20.58	91.82	1,637.34	-6,141.35	13,306.48	13,245.36	61.11	217.729	
15,000.00	6,985.45	7,192.02	7,107.94	123.27	20.58	91.85	1,637.32	-6,141.34	13,405.81	13,344.70	61.11	219.370	
15,100.00	6,985.39	7,192.65	7,108.57	124.75	20.58	91.87	1,637.31	-6,141.34	13,505.15	13,444.05	61.11	221.006	
15,200.00	6,985.32	7,193.28	7,109.20	126.24	20.58	91.89	1,637.29	-6,141.33	13,604.51	13,543.40	61.11	222.638	
15,300.00	6,985.25	7,193.91	7,109.84	127.72	20.58	91.92	1,637.28	-6,141.33	13,703.87	13,642.76	61.11	224.264	
15,400.00	6,985.19	7,194.54	7,110.47	129.21	20.58	91.94	1,637.26	-6,141.33	13,803.24	13,742.13	61.11	225.886	
15,500.00	6,985.12	7,195.17	7,111.10	130.71	20.59	91.96	1,637.25	-6,141.32	13,902.62	13,841.51	61.11	227.502	
15,600.00	6,985.05	7,195.80	7,111.73	132.20	20.59	91.99	1,637.24	-6,141.32	14,002.01	13,940.89	61.11	229.114	
15,700.00	6,984.99	7,196.43	7,112.36	133.70	20.59	92.01	1,637.22	-6,141.31	14,101.40	14,040.29	61.12	230.721	
15,800.00	6,984.92	7,197.06	7,112.99	135.20	20.59	92.03	1,637.21	-6,141.31	14,200.81	14,139.68	61.13	232.322	
15,900.00	6,984.85	7,197.69	7,113.62	136.71	20.59	92.06	1,637.19	-6,141.30	14,300.22	14,239.09	61.13	233.919	
16,000.00	6,984.79	7,198.32	7,114.24	138.21	20.59	92.08	1,637.18	-6,141.30	14,399.65	14,338.50	61.14	235.510	
16,100.00	6,984.72	7,198.95	7,114.87	139.72	20.59	92.10	1,637.16	-6,141.30	14,499.08	14,437.92	61.15	237.096	
16,200.00	6,984.65	7,199.58	7,115.50	141.23	20.59	92.13	1,637.15	-6,141.29	14,598.51	14,537.35	61.16	238.677	
16,300.00	6,984.59	7,200.21	7,116.13	142.75	20.59	92.15	1,637.13	-6,141.29	14,697.96	14,636.78	61.18	240.253	
16,400.00	6,984.52	7,200.84	7,116.76	144.26	20.60	92.17	1,637.12	-6,141.28	14,797.41	14,736.22	61.19	241.824	
16,500.00	6,984.45	7,201.47	7,117.39	145.78	20.60	92.20	1,637.10	-6,141.28	14,896.87	14,835.67	61.21	243.389	
16,600.00	6,984.39	7,202.09	7,118.01	147.29	20.60	92.22	1,637.09	-6,141.27	14,996.34	14,935.12	61.22	244.949	
16,700.00	6,984.32	7,202.72	7,118.64	148.82	20.60	92.24	1,637.07	-6,141.27	15,095.81	15,034.58	61.24	246.504	
16,800.00	6,984.25	7,203.35	7,119.27	150.34	20.60	92.27	1,637.06	-6,141.27	15,195.30	15,134.04	61.26	248.053	
16,900.00	6,984.19	7,203.98	7,119.90	151.86	20.60	92.29	1,637.05	-6,141.26	15,294.78	15,233.51	61.28	249.597	
17,000.00	6,984.12	7,204.60	7,120.52	153.39	20.60	92.31	1,637.03	-6,141.26	15,394.28	15,332.98	61.30	251.135	
17,100.00	6,984.05	7,205.23	7,121.15	154.91	20.60	92.34	1,637.02	-6,141.25	15,493.78	15,432.46	61.32	252.668	
17,200.00	6,983.99	7,205.86	7,121.78	156.44	20.60	92.36	1,637.00	-6,141.25	15,593.29	15,531.94	61.34	254.196	
17,300.00	6,983.92	7,206.48	7,122.40	157.97	20.61	92.38	1,636.99	-6,141.24	15,692.80	15,631.43	61.37	255.718	
17,400.00	6,983.85	7,207.11	7,123.03	159.50	20.61	92.41	1,636.97	-6,141.24	15,792.32	15,730.93	61.39	257.234	
17,500.00	6,983.79	7,207.73	7,123.65	161.04	20.61	92.43	1,636.96	-6,141.23	15,891.85	15,830.43	61.42	258.745	
17,600.00	6,983.72	7,208.36	7,124.28	162.57	20.61	92.45	1,636.94	-6,141.23	15,991.38	15,929.93	61.45	260.251	
17,700.00	6,983.65	7,208.99	7,124.90	164.11	20.61	92.48	1,636.93	-6,141.23	16,090.92	16,029.44	61.47	261.751	
17,800.00	6,983.59	7,209.61	7,125.53	165.65	20.61	92.50	1,636.91	-6,141.22	16,190.46	16,128.96	61.50	263.245	
17,900.00	6,983.52	7,210.24	7,126.15	167.18	20.61	92.52	1,636.90	-6,141.22	16,290.01	16,228.47	61.53	264.734	
18,000.00	6,983.45	7,210.86	7,126.78	168.72	20.61	92.55	1,636.89	-6,141.21	16,389.56	16,328.00	61.56	266.217	
18,100.00	6,983.39	7,211.48	7,127.40	170.27	20.61	92.57	1,636.87	-6,141.21	16,489.12	16,427.52	61.60	267.695	
18,200.00	6,983.32	7,212.11	7,128.03	171.81	20.62	92.59	1,636.86	-6,141.20	16,588.69	16,527.06	61.63	269.166	
18,300.00	6,983.25	7,212.73	7,128.65	173.35	20.62	92.61	1,636.84	-6,141.20	16,688.26	16,626.59	61.66	270.633	
18,400.00	6,983.19	7,213.36	7,129.27	174.90	20.62	92.64	1,636.83	-6,141.20	16,787.83	16,726.13	61.70	272.093	
18,500.00	6,983.12	7,213.98	7,129.90	176.44	20.62	92.66	1,636.81	-6,141.19	16,887.41	16,825.68	61.73	273.548	
18,600.00	6,983.05	7,214.60	7,130.52	177.99	20.62	92.68	1,636.80	-6,141.19	16,987.00	16,925.22	61.77	274.997	
18,700.00	6,982.99	7,215.23	7,131.14	179.54	20.62	92.71	1,636.78	-6,141.18	17,086.59	17,024.78	61.81	276.441	
18,800.00	6,982.92	7,215.85	7,131.77	181.09	20.62	92.73	1,636.77	-6,141.18	17,186.18	17,124.33	61.85	277.878	
18,900.00	6,982.85	7,216.47	7,132.39	182.64	20.62	92.75	1,636.75	-6,141.17	17,285.78	17,223.89	61.89	279.310	
19,000.00	6,982.78	7,217.09	7,133.01	184.19	20.62	92.78	1,636.74	-6,141.17	17,385.38	17,323.46	61.93	280.737	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #072C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 320-APC_ISCWSA REV 2 MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	7,217.72	7,133.63	185.74	20.63	92.80	1,636.73	-6,141.17	17,484.99	17,423.02	61.97	282.157	
19,200.00	6,982.65	7,218.34	7,134.25	187.29	20.63	92.82	1,636.71	-6,141.16	17,584.60	17,522.59	62.01	283.572	
19,300.00	6,982.58	7,218.96	7,134.87	188.84	20.63	92.85	1,636.70	-6,141.16	17,684.22	17,622.17	62.05	284.981	
19,400.00	6,982.52	7,219.58	7,135.50	190.40	20.63	92.87	1,636.68	-6,141.15	17,783.84	17,721.74	62.10	286.384	
19,500.00	6,982.45	7,220.20	7,136.12	191.95	20.63	92.89	1,636.67	-6,141.15	17,883.47	17,821.33	62.14	287.782	
19,600.00	6,982.38	7,220.82	7,136.74	193.51	20.63	92.91	1,636.65	-6,141.14	17,983.10	17,920.91	62.19	289.173	
19,700.00	6,982.32	7,221.44	7,137.36	195.07	20.63	92.94	1,636.64	-6,141.14	18,082.73	18,020.50	62.23	290.559	
19,800.00	6,982.25	7,222.06	7,137.98	196.62	20.63	92.96	1,636.63	-6,141.14	18,182.37	18,120.09	62.28	291.939	
19,900.00	6,982.18	7,222.68	7,138.60	198.18	20.63	92.98	1,636.61	-6,141.13	18,282.01	18,219.68	62.33	293.313	
20,000.00	6,982.12	7,223.30	7,139.22	199.74	20.64	93.01	1,636.60	-6,141.13	18,381.66	18,319.28	62.38	294.682	
20,100.00	6,982.05	7,223.92	7,139.84	201.30	20.64	93.03	1,636.58	-6,141.12	18,481.31	18,418.88	62.43	296.045	
20,176.02	6,982.00	7,224.39	7,140.31	202.36	20.64	93.05	1,636.57	-6,141.12	18,557.06	18,490.26	66.80	277.819	

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #080A - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 95-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-117.98	-931.53	-1,753.29	1,987.62				
100.00	100.00	6.00	6.00	0.25	0.13	-117.98	-931.53	-1,753.29	1,985.39	1,985.01	0.38	5,241.028	
200.00	200.00	106.00	106.00	0.61	2.24	-117.98	-931.53	-1,753.29	1,985.39	1,982.54	2.85	697.247	
281.74	281.74	187.72	187.71	0.90	3.84	-117.97	-931.13	-1,753.29	1,985.20	1,980.46	4.75	418.321	
300.00	300.00	204.51	204.50	0.97	4.17	-117.97	-931.14	-1,753.29	1,985.21	1,980.07	5.14	386.161	
400.00	400.00	306.02	306.00	1.33	6.15	-117.98	-931.53	-1,753.29	1,985.39	1,977.92	7.48	265.555	
500.00	500.00	406.02	406.00	1.68	8.05	-117.98	-931.53	-1,753.29	1,985.39	1,975.66	9.73	203.959	
600.00	600.00	506.02	506.00	2.04	9.95	-117.98	-931.53	-1,753.29	1,985.39	1,973.40	11.99	165.558	
629.97	629.97	535.99	535.97	2.15	10.52	-107.97	-930.97	-1,753.29	1,985.18	1,972.51	12.67	156.700 CC	
700.00	699.98	604.91	604.88	2.40	11.83	-108.01	-931.01	-1,753.29	1,985.69	1,971.46	14.23	139.558	
800.00	799.84	703.19	703.17	2.76	13.69	-108.12	-931.21	-1,753.29	1,987.41	1,970.95	16.45	120.790 ES	
900.00	899.45	805.50	805.45	3.13	15.67	-108.32	-931.53	-1,753.29	1,990.29	1,971.51	18.79	105.945	
1,000.00	998.70	904.75	904.70	3.49	17.76	-108.57	-931.53	-1,753.29	1,994.18	1,972.93	21.25	93.847	
1,100.00	1,097.47	1,003.52	1,003.47	3.86	19.85	-108.90	-931.53	-1,753.29	1,999.26	1,975.55	23.71	84.321	
1,200.00	1,195.62	1,100.72	1,100.66	4.24	21.91	-109.26	-930.67	-1,753.29	2,005.18	1,979.03	26.15	76.684	
1,300.00	1,293.06	1,195.79	1,195.73	4.64	23.92	-109.69	-930.87	-1,753.29	2,012.96	1,984.40	28.56	70.493	
1,400.00	1,389.64	1,289.93	1,289.86	5.06	25.90	-110.18	-931.29	-1,753.29	2,022.29	1,991.33	30.96	65.322	
1,500.00	1,485.27	1,391.40	1,391.27	5.50	28.15	-110.77	-931.53	-1,753.29	2,033.06	1,999.42	33.64	60.433	
1,515.00	1,499.52	1,405.66	1,405.52	5.57	28.48	-110.86	-931.53	-1,753.29	2,034.79	2,000.76	34.03	59.787	
1,600.00	1,580.22	1,486.36	1,486.22	5.96	30.32	-111.53	-931.53	-1,753.29	2,044.88	2,008.62	36.26	56.398	
1,700.00	1,675.17	1,581.17	1,581.02	6.44	32.49	-112.27	-930.17	-1,753.29	2,056.39	2,017.51	38.88	52.891	
1,800.00	1,770.11	1,671.52	1,671.37	6.92	34.55	-113.01	-930.36	-1,753.29	2,069.14	2,027.73	41.41	49.973	
1,900.00	1,865.05	1,761.66	1,761.49	7.41	36.61	-113.74	-930.91	-1,753.29	2,082.50	2,038.58	43.93	47.406	
2,000.00	1,959.99	1,866.25	1,866.99	7.90	39.01	-114.59	-931.53	-1,753.29	2,096.28	2,049.48	46.80	44.797	
2,100.00	2,054.94	1,961.19	1,960.94	8.40	41.19	-115.33	-931.53	-1,753.29	2,110.10	2,060.65	49.45	42.672	
2,200.00	2,149.88	2,056.13	2,055.88	8.90	43.37	-116.06	-931.53	-1,753.29	2,124.29	2,072.19	52.11	40.769	
2,300.00	2,244.82	2,146.46	2,146.18	9.41	45.45	-116.73	-930.35	-1,753.29	2,138.14	2,083.48	54.65	39.121	
2,400.00	2,339.76	2,235.88	2,235.60	9.92	47.51	-117.42	-930.84	-1,753.29	2,153.37	2,096.19	57.18	37.659	
2,500.00	2,434.71	2,341.08	2,340.71	10.43	49.96	-118.21	-931.53	-1,753.29	2,169.05	2,108.95	60.11	36.087	
2,600.00	2,529.65	2,436.02	2,435.65	10.94	52.23	-118.91	-931.53	-1,753.29	2,184.67	2,121.82	62.85	34.758	
2,700.00	2,624.59	2,530.96	2,530.59	11.45	54.50	-119.60	-931.53	-1,753.29	2,200.63	2,135.03	65.60	33.546	
2,800.00	2,719.53	2,621.90	2,621.51	11.97	56.68	-120.23	-930.25	-1,753.29	2,216.07	2,147.82	68.25	32.471	
2,900.00	2,814.48	2,710.94	2,710.55	12.49	58.82	-120.86	-930.67	-1,753.29	2,232.96	2,162.12	70.85	31.518	
3,000.00	2,909.42	2,815.93	2,815.42	13.01	61.34	-121.61	-931.53	-1,753.29	2,250.44	2,176.60	73.84	30.476	
3,100.00	3,004.36	2,910.87	2,910.36	13.53	63.71	-122.26	-931.53	-1,753.29	2,267.67	2,190.99	76.68	29.573	
3,200.00	3,099.30	3,005.82	3,005.30	14.05	66.08	-122.90	-931.53	-1,753.29	2,285.21	2,205.69	79.52	28.738	
3,300.00	3,194.25	3,100.18	3,099.64	14.57	68.44	-123.50	-929.68	-1,753.29	2,301.73	2,219.39	82.34	27.954	
3,400.00	3,289.19	3,188.40	3,187.85	15.09	70.64	-124.08	-929.89	-1,753.29	2,319.99	2,234.99	85.00	27.294	
3,500.00	3,384.13	3,276.40	3,275.84	15.62	72.84	-124.66	-930.46	-1,753.29	2,338.82	2,251.17	87.65	26.683	
3,600.00	3,479.07	3,365.78	3,365.07	16.14	75.53	-125.38	-931.53	-1,753.29	2,358.22	2,267.41	90.81	25.970	
3,700.00	3,574.02	3,460.72	3,460.02	16.67	77.46	-125.98	-931.53	-1,753.29	2,377.16	2,283.97	93.19	25.508	
3,800.00	3,668.96	3,555.67	3,554.96	17.19	79.39	-126.56	-931.53	-1,753.29	2,396.36	2,300.78	95.58	25.072	
3,900.00	3,763.90	3,650.61	3,649.90	17.72	81.32	-127.14	-931.53	-1,753.29	2,415.82	2,317.86	97.96	24.660	
4,000.00	3,858.84	3,745.55	3,744.84	18.24	83.25	-127.71	-931.53	-1,753.29	2,435.53	2,335.18	100.35	24.271	
4,100.00	3,953.79	3,840.49	3,839.79	18.77	85.18	-128.28	-931.53	-1,753.29	2,455.48	2,352.75	102.73	23.903	
4,200.00	4,048.73	3,935.44	3,934.73	19.30	87.11	-128.83	-931.53	-1,753.29	2,475.66	2,370.56	105.10	23.554	
4,300.00	4,143.67	4,030.38	4,029.67	19.82	89.04	-129.37	-931.53	-1,753.29	2,496.08	2,388.60	107.48	23.223	
4,400.00	4,238.61	4,125.32	4,124.61	20.35	90.97	-129.91	-931.53	-1,753.29	2,516.73	2,406.87	109.86	22.909	
4,500.00	4,333.56	4,220.26	4,219.56	20.88	92.90	-130.44	-931.53	-1,753.29	2,537.59	2,425.36	112.23	22.611	
4,600.00	4,428.50	4,315.21	4,314.50	21.41	94.83	-130.96	-931.53	-1,753.29	2,558.67	2,444.07	114.60	22.327	
4,700.00	4,523.44	4,410.15	4,409.44	21.93	96.76	-131.47	-931.53	-1,753.29	2,579.97	2,462.99	116.97	22.056	
4,800.00	4,618.38	4,505.09	4,504.38	22.46	98.70	-131.97	-931.53	-1,753.29	2,601.46	2,482.12	119.34	21.799	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #080A - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		95-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
4,900.00	4,713.33	4,620.03	4,619.33	22.99	100.63	-132.47	-931.53	-1,753.29	2,623.16	2,501.45	121.71	21.553	
5,000.00	4,808.27	4,714.98	4,714.27	23.52	102.56	-132.96	-931.53	-1,753.29	2,645.05	2,520.97	124.07	21.318	
5,100.00	4,903.21	4,786.00	4,785.10	24.05	104.00	-133.32	-931.53	-1,753.29	2,667.24	2,541.31	125.92	21.182 SF	
5,200.00	4,998.16	4,786.00	4,785.10	24.58	104.00	-133.32	-931.53	-1,753.29	2,692.03	2,565.89	126.13	21.342	
5,300.00	5,093.10	4,786.00	4,785.10	25.11	104.00	-133.32	-931.53	-1,753.29	2,720.27	2,594.07	126.20	21.556	
5,400.00	5,188.04	4,786.00	4,785.10	25.64	104.00	-133.32	-931.53	-1,753.29	2,751.86	2,625.74	126.12	21.819	
5,500.00	5,282.98	4,786.00	4,785.10	26.17	104.00	-133.32	-931.53	-1,753.29	2,786.68	2,660.77	125.91	22.132	
5,600.00	5,377.93	4,786.00	4,785.10	26.70	104.00	-133.32	-931.53	-1,753.29	2,824.61	2,699.03	125.58	22.492	
5,623.25	5,400.00	4,786.00	4,785.10	26.82	104.00	-133.32	-931.53	-1,753.29	2,833.86	2,708.37	125.49	22.582	
5,700.00	5,473.03	4,786.00	4,785.10	27.22	104.00	-133.57	-931.53	-1,753.29	2,865.21	2,740.07	125.14	22.895	
5,800.00	5,568.64	4,786.00	4,785.10	27.73	104.00	-133.91	-931.53	-1,753.29	2,907.64	2,783.05	124.59	23.337	
5,900.00	5,664.75	4,786.00	4,785.10	28.23	104.00	-134.26	-931.53	-1,753.29	2,951.77	2,827.83	123.94	23.817	
6,000.00	5,761.33	4,786.00	4,785.10	28.71	104.00	-134.63	-931.53	-1,753.29	2,997.52	2,874.33	123.19	24.333	
6,100.00	5,858.34	4,786.00	4,785.10	29.18	104.00	-135.01	-931.53	-1,753.29	3,044.79	2,922.44	122.35	24.886	
6,200.00	5,955.76	4,786.00	4,785.10	29.64	104.00	-135.40	-931.53	-1,753.29	3,093.51	2,972.07	121.44	25.475	
6,300.00	6,053.57	4,786.00	4,785.10	30.07	104.00	-135.80	-931.53	-1,753.29	3,143.59	3,023.14	120.45	26.099	
6,400.00	6,151.72	4,786.00	4,785.10	30.50	104.00	-136.22	-931.53	-1,753.29	3,194.96	3,075.56	119.40	26.759	
6,500.00	6,250.19	4,786.00	4,785.10	30.91	104.00	-136.65	-931.53	-1,753.29	3,247.53	3,129.24	118.29	27.454	
6,600.00	6,348.94	4,786.00	4,785.10	31.30	104.00	-137.08	-931.53	-1,753.29	3,301.24	3,184.11	117.13	28.184	
6,659.67	6,408.00	4,786.00	4,785.10	31.53	104.00	-137.35	-931.53	-1,753.29	3,333.80	3,217.38	116.42	28.636	
6,700.00	6,447.82	4,786.00	4,785.10	31.68	104.00	-154.40	-931.53	-1,753.29	3,357.12	3,241.17	115.95	28.954	
6,750.00	6,496.66	4,786.00	4,785.10	31.90	104.00	-166.56	-931.53	-1,753.29	3,389.18	3,273.79	115.39	29.370	
6,800.00	6,544.65	4,786.00	4,785.10	32.13	104.00	-174.05	-931.53	-1,753.29	3,424.45	3,309.57	114.88	29.808	
6,850.00	6,591.49	4,786.00	4,785.10	32.37	104.00	-179.47	-931.53	-1,753.29	3,462.63	3,348.21	114.42	30.263	
6,900.00	6,636.89	4,786.00	4,785.10	32.62	104.00	175.94	-931.53	-1,753.29	3,503.38	3,389.38	114.00	30.731	
6,950.00	6,680.57	4,786.00	4,785.10	32.89	104.00	171.47	-931.53	-1,753.29	3,546.37	3,432.73	113.64	31.208	
7,000.00	6,722.26	4,786.00	4,785.10	33.17	104.00	166.48	-931.53	-1,753.29	3,591.26	3,477.93	113.33	31.689	
7,050.00	6,761.71	4,786.00	4,785.10	33.45	104.00	160.22	-931.53	-1,753.29	3,637.70	3,524.63	113.07	32.171	
7,100.00	6,798.67	4,786.00	4,785.10	33.75	104.00	151.45	-931.53	-1,753.29	3,685.37	3,572.49	112.88	32.650	
7,150.00	6,832.91	4,786.00	4,785.10	34.06	104.00	138.05	-931.53	-1,753.29	3,733.91	3,621.18	112.74	33.121	
7,200.00	6,864.22	4,786.00	4,785.10	34.37	104.00	117.14	-931.53	-1,753.29	3,783.01	3,670.36	112.65	33.582	
7,250.00	6,892.42	4,786.00	4,785.10	34.69	104.00	89.70	-931.53	-1,753.29	3,832.35	3,719.73	112.62	34.029	
7,300.00	6,917.32	4,786.00	4,785.10	35.03	104.00	65.09	-931.53	-1,753.29	3,881.62	3,768.98	112.64	34.459	
7,350.00	6,938.77	4,786.00	4,785.10	35.37	104.00	48.73	-931.53	-1,753.29	3,930.52	3,817.80	112.72	34.870	
7,400.00	6,956.64	4,786.00	4,785.10	35.72	104.00	38.60	-931.53	-1,753.29	3,978.78	3,865.93	112.85	35.258	
7,450.00	6,970.83	4,786.00	4,785.10	36.07	104.00	32.11	-931.53	-1,753.29	4,026.12	3,913.10	113.02	35.622	
7,500.00	6,981.23	4,786.00	4,785.10	36.44	104.00	27.72	-931.53	-1,753.29	4,072.29	3,959.05	113.24	35.961	
7,550.00	6,987.80	4,786.00	4,785.10	36.81	104.00	24.62	-931.53	-1,753.29	4,117.05	4,003.54	113.51	36.271	
7,600.00	6,990.48	4,786.00	4,785.10	37.19	104.00	22.35	-931.53	-1,753.29	4,160.17	4,046.35	113.82	36.551	
7,609.87	6,990.55	4,786.00	4,785.10	37.26	104.00	21.98	-931.53	-1,753.29	4,168.46	4,054.58	113.88	36.604	
7,700.00	6,990.49	4,786.00	4,785.10	37.97	104.00	21.98	-931.53	-1,753.29	4,244.21	4,129.73	114.49	37.072	
7,800.00	6,990.42	4,786.00	4,785.10	38.78	104.00	21.98	-931.53	-1,753.29	4,328.90	4,213.77	115.13	37.600	
7,900.00	6,990.35	4,786.00	4,785.10	39.64	104.00	21.98	-931.53	-1,753.29	4,414.22	4,298.48	115.74	38.139	
8,000.00	6,990.28	4,786.00	4,785.10	40.53	104.00	21.98	-931.53	-1,753.29	4,500.15	4,383.83	116.33	38.686	
8,100.00	6,990.21	4,786.00	4,785.10	41.45	104.00	21.98	-931.53	-1,753.29	4,586.65	4,469.77	116.88	39.242	
8,200.00	6,990.14	4,786.00	4,785.10	42.40	104.00	21.98	-931.53	-1,753.29	4,673.69	4,556.28	117.41	39.805	
8,306.37	6,990.06	4,786.00	4,785.10	43.45	104.00	21.98	-931.53	-1,753.29	4,766.83	4,648.88	117.95	40.413	
8,400.00	6,990.00	4,786.00	4,785.10	44.38	104.00	28.09	-931.53	-1,753.29	4,848.67	4,730.27	118.40	40.952	
8,500.00	6,989.93	4,786.00	4,785.10	45.36	104.00	33.95	-931.53	-1,753.29	4,934.99	4,816.15	118.83	41.528	
8,600.00	6,989.85	4,786.00	4,785.10	46.33	104.00	39.10	-931.53	-1,753.29	5,019.83	4,900.60	119.23	42.101	
8,700.00	6,989.78	4,786.00	4,785.10	47.28	104.00	43.58	-931.53	-1,753.29	5,102.88	4,983.28	119.60	42.666	
8,800.00	6,989.70	4,786.00	4,785.10	48.21	104.00	47.44	-931.53	-1,753.29	5,183.81	5,063.87	119.94	43.220	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #080A - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		95-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
8,900.00	6,989.63	4,786.00	4,785.10	49.11	104.00	50.77	-931.53	-1,753.29	5,262.35	5,142.10	120.25	43.761	
9,000.00	6,989.55	4,786.00	4,785.10	49.99	104.00	53.63	-931.53	-1,753.29	5,338.22	5,217.67	120.55	44.284	
9,100.00	6,989.48	4,786.00	4,785.10	50.84	104.00	56.09	-931.53	-1,753.29	5,411.17	5,290.35	120.82	44.787	
9,200.00	6,989.40	4,786.00	4,785.10	51.66	104.00	58.21	-931.53	-1,753.29	5,480.98	5,359.90	121.08	45.266	
9,300.00	6,989.33	4,786.00	4,785.10	52.45	104.00	60.04	-931.53	-1,753.29	5,547.42	5,426.09	121.34	45.720	
9,393.87	6,989.27	4,786.00	4,785.10	53.15	104.00	61.53	-931.53	-1,753.29	5,606.55	5,484.98	121.57	46.119	
9,400.00	6,989.26	4,786.00	4,785.10	53.20	104.00	61.53	-931.53	-1,753.29	5,610.31	5,488.73	121.58	46.146	
9,500.00	6,989.19	4,786.00	4,785.10	53.95	104.00	61.53	-931.53	-1,753.29	5,672.19	5,550.36	121.84	46.556	
9,600.00	6,989.12	4,786.00	4,785.10	54.73	104.00	61.53	-931.53	-1,753.29	5,735.16	5,613.05	122.11	46.968	
9,700.00	6,989.05	4,786.00	4,785.10	55.55	104.00	61.53	-931.53	-1,753.29	5,799.16	5,676.77	122.39	47.383	
9,800.00	6,988.98	4,786.00	4,785.10	56.40	104.00	61.53	-931.53	-1,753.29	5,864.17	5,741.49	122.68	47.801	
9,900.00	6,988.91	4,786.00	4,785.10	57.28	104.00	61.53	-931.53	-1,753.29	5,930.15	5,807.17	122.98	48.222	
10,000.00	6,988.84	4,786.00	4,785.10	58.20	104.00	61.53	-931.53	-1,753.29	5,997.07	5,873.79	123.28	48.645	
10,100.00	6,988.77	4,786.00	4,785.10	59.14	104.00	61.53	-931.53	-1,753.29	6,064.91	5,941.31	123.60	49.071	
10,200.00	6,988.70	4,786.00	4,785.10	60.11	104.00	61.53	-931.53	-1,753.29	6,133.62	6,009.71	123.91	49.500	
10,300.00	6,988.63	4,786.00	4,785.10	61.11	104.00	61.53	-931.53	-1,753.29	6,203.19	6,078.96	124.23	49.932	
10,400.00	6,988.56	4,786.00	4,785.10	62.14	104.00	61.53	-931.53	-1,753.29	6,273.58	6,149.02	124.56	50.367	
10,500.00	6,988.49	4,786.00	4,785.10	63.19	104.00	61.53	-931.53	-1,753.29	6,344.76	6,219.88	124.88	50.805	
10,600.00	6,988.42	4,786.00	4,785.10	64.26	104.00	61.53	-931.53	-1,753.29	6,416.71	6,291.50	125.21	51.247	
10,700.00	6,988.35	4,786.00	4,785.10	65.36	104.00	61.53	-931.53	-1,753.29	6,489.41	6,363.87	125.54	51.692	
10,800.00	6,988.28	4,786.00	4,785.10	66.48	104.00	61.53	-931.53	-1,753.29	6,562.82	6,436.95	125.87	52.140	
10,900.00	6,988.21	4,786.00	4,785.10	67.61	104.00	61.53	-931.53	-1,753.29	6,636.93	6,510.73	126.20	52.591	
11,000.00	6,988.14	4,786.00	4,785.10	68.77	104.00	61.53	-931.53	-1,753.29	6,711.71	6,585.18	126.53	53.045	
11,100.00	6,988.07	4,786.00	4,785.10	69.95	104.00	61.53	-931.53	-1,753.29	6,787.14	6,660.29	126.86	53.503	
11,200.00	6,988.01	4,786.00	4,785.10	71.14	104.00	61.53	-931.53	-1,753.29	6,863.20	6,736.02	127.18	53.964	
11,300.00	6,987.94	4,786.00	4,785.10	72.35	104.00	61.53	-931.53	-1,753.29	6,939.87	6,812.36	127.51	54.428	
11,400.00	6,987.87	4,786.00	4,785.10	73.57	104.00	61.53	-931.53	-1,753.29	7,017.12	6,889.29	127.83	54.895	
11,500.00	6,987.80	4,786.00	4,785.10	74.81	104.00	61.53	-931.53	-1,753.29	7,094.94	6,966.79	128.15	55.365	
11,600.00	6,987.73	4,786.00	4,785.10	76.07	104.00	61.53	-931.53	-1,753.29	7,173.31	7,044.85	128.46	55.839	
11,643.87	6,987.70	4,786.00	4,785.10	76.62	104.00	61.53	-931.53	-1,753.29	7,207.86	7,079.26	128.60	56.048	
11,700.00	6,987.66	4,786.00	4,785.10	77.33	104.00	62.20	-931.53	-1,753.29	7,251.92	7,123.14	128.78	56.314	
11,737.27	6,987.63	4,786.00	4,785.10	77.80	104.00	62.63	-931.53	-1,753.29	7,280.92	7,152.03	128.89	56.488	
11,800.00	6,987.59	4,786.00	4,785.10	78.59	104.00	62.63	-931.53	-1,753.29	7,329.70	7,200.61	129.09	56.779	
11,900.00	6,987.52	4,786.00	4,785.10	79.86	104.00	62.63	-931.53	-1,753.29	7,407.88	7,278.48	129.40	57.246	
12,000.00	6,987.46	4,786.00	4,785.10	81.14	104.00	62.63	-931.53	-1,753.29	7,486.58	7,356.87	129.71	57.716	
12,100.00	6,987.39	4,786.00	4,785.10	82.43	104.00	62.63	-931.53	-1,753.29	7,565.79	7,435.77	130.02	58.189	
12,200.00	6,987.32	4,786.00	4,785.10	83.73	104.00	62.63	-931.53	-1,753.29	7,645.48	7,515.16	130.33	58.664	
12,300.00	6,987.26	4,786.00	4,785.10	85.05	104.00	62.63	-931.53	-1,753.29	7,725.65	7,595.02	130.63	59.143	
12,400.00	6,987.19	4,786.00	4,785.10	86.38	104.00	62.63	-931.53	-1,753.29	7,806.27	7,675.35	130.92	59.624	
12,500.00	6,987.12	4,786.00	4,785.10	87.71	104.00	62.63	-931.53	-1,753.29	7,887.34	7,756.12	131.22	60.108	
12,600.00	6,987.06	4,786.00	4,785.10	89.06	104.00	62.63	-931.53	-1,753.29	7,968.83	7,837.32	131.51	60.595	
12,700.00	6,986.99	4,786.00	4,785.10	90.41	104.00	62.63	-931.53	-1,753.29	8,050.75	7,918.95	131.80	61.085	
12,800.00	6,986.92	4,786.00	4,785.10	91.77	104.00	62.63	-931.53	-1,753.29	8,133.07	8,000.99	132.08	61.577	
12,900.00	6,986.86	4,786.00	4,785.10	93.14	104.00	62.63	-931.53	-1,753.29	8,215.78	8,083.42	132.36	62.071	
13,000.00	6,986.79	4,786.00	4,785.10	94.52	104.00	62.63	-931.53	-1,753.29	8,298.87	8,166.23	132.64	62.569	
13,100.00	6,986.72	4,786.00	4,785.10	95.90	104.00	62.63	-931.53	-1,753.29	8,382.33	8,249.42	132.91	63.068	
13,200.00	6,986.66	4,786.00	4,785.10	97.30	104.00	62.63	-931.53	-1,753.29	8,466.15	8,332.97	133.18	63.570	
13,300.00	6,986.59	4,786.00	4,785.10	98.69	104.00	62.63	-931.53	-1,753.29	8,550.32	8,416.87	133.44	64.074	
13,400.00	6,986.52	4,786.00	4,785.10	100.10	104.00	62.63	-931.53	-1,753.29	8,634.82	8,501.12	133.71	64.580	
13,500.00	6,986.46	4,786.00	4,785.10	101.51	104.00	62.63	-931.53	-1,753.29	8,719.66	8,585.69	133.97	65.089	
13,600.00	6,986.39	4,786.00	4,785.10	102.93	104.00	62.63	-931.53	-1,753.29	8,804.81	8,670.59	134.22	65.599	
13,700.00	6,986.32	4,786.00	4,785.10	104.35	104.00	62.63	-931.53	-1,753.29	8,890.27	8,755.79	134.47	66.112	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #080A - OH - OH-INC												Offset Site Error: 0.00 usft			
Survey Program: Reference		95-A027Ua_INC-ONLY Offset				Semi Major Axis		Offset Wellbore Centre		Rule Assigned: Distance				Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
13,800.00	6,986.25	4,786.00	4,785.10	105.78	104.00	62.63	-931.53	-1,753.29	8,976.03	8,841.31	134.72	66.626			
13,900.00	6,986.19	4,786.00	4,785.10	107.21	104.00	62.63	-931.53	-1,753.29	9,062.08	8,927.11	134.97	67.143			
14,000.00	6,986.12	4,786.00	4,785.10	108.65	104.00	62.63	-931.53	-1,753.29	9,148.42	9,013.21	135.21	67.661			
14,100.00	6,986.05	4,786.00	4,785.10	110.09	104.00	62.63	-931.53	-1,753.29	9,235.03	9,099.58	135.45	68.181			
14,200.00	6,985.99	4,786.00	4,785.10	111.54	104.00	62.63	-931.53	-1,753.29	9,321.91	9,186.23	135.68	68.703			
14,300.00	6,985.92	4,786.00	4,785.10	112.99	104.00	62.63	-931.53	-1,753.29	9,409.05	9,273.13	135.92	69.227			
14,400.00	6,985.85	4,786.00	4,785.10	114.45	104.00	62.63	-931.53	-1,753.29	9,496.44	9,360.30	136.15	69.752			
14,500.00	6,985.79	4,786.00	4,785.10	115.91	104.00	62.63	-931.53	-1,753.29	9,584.09	9,447.71	136.37	70.278			
14,600.00	6,985.72	4,786.00	4,785.10	117.38	104.00	62.63	-931.53	-1,753.29	9,671.97	9,535.37	136.60	70.807			
14,700.00	6,985.65	4,786.00	4,785.10	118.84	104.00	62.63	-931.53	-1,753.29	9,760.08	9,623.26	136.82	71.336			
14,800.00	6,985.59	4,786.00	4,785.10	120.32	104.00	62.63	-931.53	-1,753.29	9,848.42	9,711.38	137.04	71.868			
14,900.00	6,985.52	4,786.00	4,785.10	121.79	104.00	62.63	-931.53	-1,753.29	9,936.98	9,799.73	137.25	72.400			
15,000.00	6,985.45	4,786.00	4,785.10	123.27	104.00	62.63	-931.53	-1,753.29	10,025.76	9,888.30	137.46	72.934			
15,100.00	6,985.39	4,786.00	4,785.10	124.75	104.00	62.63	-931.53	-1,753.29	10,114.75	9,977.07	137.67	73.469			
15,200.00	6,985.32	4,786.00	4,785.10	126.24	104.00	62.63	-931.53	-1,753.29	10,203.94	10,066.05	137.88	74.005			
15,300.00	6,985.25	4,786.00	4,785.10	127.72	104.00	62.63	-931.53	-1,753.29	10,293.32	10,155.24	138.09	74.543			
15,400.00	6,985.19	4,786.00	4,785.10	129.21	104.00	62.63	-931.53	-1,753.29	10,382.91	10,244.62	138.29	75.082			
15,500.00	6,985.12	4,786.00	4,785.10	130.71	104.00	62.63	-931.53	-1,753.29	10,472.68	10,334.19	138.49	75.621			
15,600.00	6,985.05	4,786.00	4,785.10	132.20	104.00	62.63	-931.53	-1,753.29	10,562.63	10,423.95	138.69	76.162			
15,700.00	6,984.99	4,786.00	4,785.10	133.70	104.00	62.63	-931.53	-1,753.29	10,652.77	10,513.89	138.88	76.704			
15,800.00	6,984.92	4,786.00	4,785.10	135.20	104.00	62.63	-931.53	-1,753.29	10,743.08	10,604.00	139.07	77.247			
15,900.00	6,984.85	4,786.00	4,785.10	136.71	104.00	62.63	-931.53	-1,753.29	10,833.55	10,694.29	139.27	77.791			
16,000.00	6,984.79	4,786.00	4,785.10	138.21	104.00	62.63	-931.53	-1,753.29	10,924.20	10,784.75	139.45	78.335			
16,100.00	6,984.72	4,786.00	4,785.10	139.72	104.00	62.63	-931.53	-1,753.29	11,015.01	10,875.37	139.64	78.881			
16,200.00	6,984.65	4,786.00	4,785.10	141.23	104.00	62.63	-931.53	-1,753.29	11,105.97	10,966.15	139.83	79.427			
16,300.00	6,984.59	4,786.00	4,785.10	142.75	104.00	62.63	-931.53	-1,753.29	11,197.09	11,057.08	140.01	79.974			
16,400.00	6,984.52	4,786.00	4,785.10	144.26	104.00	62.63	-931.53	-1,753.29	11,288.36	11,148.17	140.19	80.522			
16,500.00	6,984.45	4,786.00	4,785.10	145.78	104.00	62.63	-931.53	-1,753.29	11,379.78	11,239.41	140.37	81.071			
16,600.00	6,984.39	4,786.00	4,785.10	147.29	104.00	62.63	-931.53	-1,753.29	11,471.33	11,330.79	140.55	81.620			
16,700.00	6,984.32	4,786.00	4,785.10	148.82	104.00	62.63	-931.53	-1,753.29	11,563.03	11,422.31	140.72	82.170			
16,800.00	6,984.25	4,786.00	4,785.10	150.34	104.00	62.63	-931.53	-1,753.29	11,654.87	11,513.97	140.90	82.720			
16,900.00	6,984.19	4,786.00	4,785.10	151.86	104.00	62.63	-931.53	-1,753.29	11,746.84	11,605.77	141.07	83.271			
17,000.00	6,984.12	4,786.00	4,785.10	153.39	104.00	62.63	-931.53	-1,753.29	11,838.94	11,697.70	141.24	83.823			
17,100.00	6,984.05	4,786.00	4,785.10	154.91	104.00	62.63	-931.53	-1,753.29	11,931.16	11,789.76	141.41	84.375			
17,200.00	6,983.99	4,786.00	4,785.10	156.44	104.00	62.63	-931.53	-1,753.29	12,023.51	11,881.94	141.57	84.928			
17,300.00	6,983.92	4,786.00	4,785.10	157.97	104.00	62.63	-931.53	-1,753.29	12,115.99	11,974.25	141.74	85.481			
17,400.00	6,983.85	4,786.00	4,785.10	159.50	104.00	62.63	-931.53	-1,753.29	12,208.58	12,066.67	141.90	86.035			
17,500.00	6,983.79	4,786.00	4,785.10	161.04	104.00	62.63	-931.53	-1,753.29	12,301.28	12,159.22	142.07	86.589			
17,600.00	6,983.72	4,786.00	4,785.10	162.57	104.00	62.63	-931.53	-1,753.29	12,394.10	12,251.88	142.23	87.143			
17,700.00	6,983.65	4,786.00	4,785.10	164.11	104.00	62.63	-931.53	-1,753.29	12,487.04	12,344.65	142.39	87.698			
17,800.00	6,983.59	4,786.00	4,785.10	165.65	104.00	62.63	-931.53	-1,753.29	12,580.07	12,437.53	142.55	88.253			
17,900.00	6,983.52	4,786.00	4,785.10	167.18	104.00	62.63	-931.53	-1,753.29	12,673.22	12,530.52	142.70	88.809			
18,000.00	6,983.45	4,786.00	4,785.10	168.72	104.00	62.63	-931.53	-1,753.29	12,766.47	12,623.61	142.86	89.364			
18,100.00	6,983.39	4,786.00	4,785.10	170.27	104.00	62.63	-931.53	-1,753.29	12,859.82	12,716.81	143.01	89.920			
18,200.00	6,983.32	4,786.00	4,785.10	171.81	104.00	62.63	-931.53	-1,753.29	12,953.27	12,810.10	143.17	90.477			
18,300.00	6,983.25	4,786.00	4,785.10	173.35	104.00	62.63	-931.53	-1,753.29	13,046.82	12,903.50	143.32	91.033			
18,400.00	6,983.19	4,786.00	4,785.10	174.90	104.00	62.63	-931.53	-1,753.29	13,140.46	12,996.99	143.47	91.590			
18,500.00	6,983.12	4,786.00	4,785.10	176.44	104.00	62.63	-931.53	-1,753.29	13,234.19	13,090.57	143.62	92.147			
18,600.00	6,983.05	4,786.00	4,785.10	177.99	104.00	62.63	-931.53	-1,753.29	13,328.02	13,184.25	143.77	92.704			
18,700.00	6,982.99	4,786.00	4,785.10	179.54	104.00	62.63	-931.53	-1,753.29	13,421.94	13,278.02	143.92	93.261			
18,800.00	6,982.92	4,786.00	4,785.10	181.09	104.00	62.63	-931.53	-1,753.29	13,515.94	13,371.87	144.07	93.818			
18,900.00	6,982.85	4,786.00	4,785.10	182.64	104.00	62.63	-931.53	-1,753.29	13,610.03	13,465.82	144.21	94.376			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #080A - OH - OH-INC											Offset Site Error:	0.00 usft
Survey Program: 95-A027Ua_INC-ONLY											Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor
19,000.00	6,982.78	4,786.00	4,785.10	184.19	104.00	62.63	-931.53	-1,753.29	13,704.20	13,559.84	144.36	94.933
19,100.00	6,982.72	4,786.00	4,785.10	185.74	104.00	62.63	-931.53	-1,753.29	13,798.45	13,653.95	144.50	95.491
19,200.00	6,982.65	4,786.00	4,785.10	187.29	104.00	62.63	-931.53	-1,753.29	13,892.79	13,748.14	144.64	96.048
19,300.00	6,982.58	4,786.00	4,785.10	188.84	104.00	62.63	-931.53	-1,753.29	13,987.20	13,842.41	144.79	96.606
19,400.00	6,982.52	4,786.00	4,785.10	190.40	104.00	62.63	-931.53	-1,753.29	14,081.69	13,936.76	144.93	97.164
19,500.00	6,982.45	4,786.00	4,785.10	191.95	104.00	62.63	-931.53	-1,753.29	14,176.25	14,031.19	145.07	97.721
19,600.00	6,982.38	4,786.00	4,785.10	193.51	104.00	62.63	-931.53	-1,753.29	14,270.89	14,125.69	145.21	98.279
19,700.00	6,982.32	4,786.00	4,785.10	195.07	104.00	62.63	-931.53	-1,753.29	14,365.61	14,220.26	145.35	98.837
19,800.00	6,982.25	4,786.00	4,785.10	196.62	104.00	62.63	-931.53	-1,753.29	14,460.39	14,314.90	145.49	99.394
19,900.00	6,982.18	4,786.00	4,785.10	198.18	104.00	62.63	-931.53	-1,753.29	14,555.24	14,409.62	145.62	99.952
20,000.00	6,982.12	4,786.00	4,785.10	199.74	104.00	62.63	-931.53	-1,753.29	14,650.17	14,504.41	145.76	100.509
20,100.00	6,982.05	4,786.00	4,785.10	201.30	104.00	62.63	-931.53	-1,753.29	14,745.15	14,599.26	145.90	101.066
20,176.02	6,982.00	4,786.00	4,785.10	202.36	104.00	62.63	-931.53	-1,753.29	14,817.41	14,668.45	148.95	99.476

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #107 - OH - OH-INC													Offset Site Error:	0.00 usft	
Survey Program:		165-A027Ua_INC-ONLY					Rule Assigned:							Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	53.04	2,877.16	3,823.48	4,788.66						
100.00	100.00	0.00	0.00	0.25	0.00	53.04	2,877.16	3,823.48	4,785.84	4,785.58	0.25	N/A			
200.00	200.00	15.00	15.00	0.61	0.28	53.04	2,877.16	3,823.48	4,785.08	4,784.20	0.89	5,395.504			
300.00	300.00	115.00	115.00	0.97	2.13	53.04	2,877.16	3,823.48	4,785.08	4,781.99	3.09	1,546.691			
400.00	400.00	215.00	215.00	1.33	4.10	53.04	2,877.16	3,823.48	4,785.08	4,779.66	5.43	881.918			
500.00	500.00	318.44	318.43	1.68	6.27	53.04	2,877.40	3,823.48	4,785.23	4,777.28	7.95	601.545			
600.00	600.00	415.04	415.00	2.04	8.31	53.04	2,877.16	3,823.48	4,785.08	4,774.73	10.35	462.291			
700.00	699.98	515.02	514.98	2.40	10.52	63.07	2,877.16	3,823.48	4,784.29	4,771.37	12.92	370.340			
800.00	799.84	614.88	614.84	2.76	12.72	63.17	2,877.16	3,823.48	4,781.92	4,766.44	15.48	308.823			
900.00	899.45	714.49	714.45	3.13	14.93	63.33	2,877.16	3,823.48	4,777.99	4,759.94	18.05	264.755			
1,000.00	998.70	814.82	814.74	3.49	17.14	63.54	2,879.75	3,823.48	4,774.06	4,753.43	20.63	231.419			
1,100.00	1,097.47	923.79	923.70	3.86	19.55	63.85	2,879.52	3,823.48	4,766.93	4,743.52	23.41	203.623			
1,200.00	1,195.62	1,031.96	1,031.86	4.24	21.94	64.24	2,878.90	3,823.48	4,758.10	4,731.92	26.18	181.720			
1,300.00	1,293.06	1,139.15	1,139.03	4.64	24.31	64.70	2,877.90	3,823.48	4,747.65	4,718.70	28.95	164.006			
1,400.00	1,389.64	1,204.84	1,204.64	5.06	25.75	65.11	2,877.16	3,823.48	4,735.80	4,705.00	30.80	153.747			
1,500.00	1,485.27	1,300.47	1,300.27	5.50	27.63	65.65	2,877.16	3,823.48	4,723.17	4,690.06	33.10	142.673			
1,515.00	1,499.52	1,314.72	1,314.52	5.57	27.90	65.74	2,877.16	3,823.48	4,721.16	4,687.71	33.45	141.138			
1,600.00	1,580.22	1,395.42	1,395.22	5.96	29.48	66.02	2,877.16	3,823.48	4,709.78	4,674.37	35.41	133.005			
1,700.00	1,675.17	1,491.98	1,491.77	6.44	31.37	66.36	2,878.02	3,823.48	4,697.04	4,659.28	37.76	124.399			
1,800.00	1,770.11	1,593.51	1,593.30	6.92	33.36	66.72	2,877.83	3,823.48	4,683.87	4,643.66	40.21	116.481			
1,900.00	1,865.05	1,694.89	1,694.67	7.41	35.35	67.08	2,877.39	3,823.48	4,670.75	4,628.08	42.67	109.464			
2,000.00	1,959.99	1,775.24	1,774.99	7.90	36.99	67.37	2,877.16	3,823.48	4,657.89	4,613.09	44.79	103.986			
2,100.00	2,054.94	1,870.18	1,869.94	8.40	39.01	67.72	2,877.16	3,823.48	4,645.35	4,598.05	47.30	98.212			
2,200.00	2,149.88	1,965.13	1,964.88	8.90	41.03	68.06	2,877.16	3,823.48	4,633.00	4,583.19	49.81	93.015			
2,300.00	2,244.82	2,060.82	2,060.57	9.41	43.06	68.40	2,878.18	3,823.48	4,621.38	4,569.04	52.34	88.296			
2,400.00	2,339.76	2,160.92	2,160.67	9.92	45.19	68.76	2,878.04	3,823.48	4,609.31	4,554.34	54.97	83.856			
2,500.00	2,434.71	2,260.89	2,260.63	10.43	47.32	69.14	2,877.70	3,823.48	4,597.32	4,539.73	57.59	79.823			
2,600.00	2,529.65	2,360.73	2,360.46	10.94	49.45	69.51	2,877.14	3,823.48	4,585.42	4,525.20	60.22	76.142			
2,700.00	2,624.59	2,439.93	2,439.59	11.45	51.06	69.80	2,877.16	3,823.48	4,573.96	4,511.62	62.35	73.362			
2,800.00	2,719.53	2,534.88	2,534.53	11.97	53.00	70.16	2,877.16	3,823.48	4,562.71	4,497.92	64.80	70.415			
2,900.00	2,814.48	2,629.82	2,629.48	12.49	54.94	70.51	2,877.16	3,823.48	4,551.65	4,484.40	67.25	67.683			
3,000.00	2,909.42	2,730.33	2,729.96	13.01	57.00	70.87	2,878.73	3,823.48	4,541.57	4,471.76	69.82	65.050			
3,100.00	3,004.36	2,833.56	2,833.18	13.53	59.11	71.27	2,878.28	3,823.48	4,530.68	4,458.24	72.44	62.544			
3,200.00	3,099.30	2,936.55	2,936.16	14.05	61.21	71.67	2,877.46	3,823.48	4,519.82	4,444.76	75.06	60.216			
3,300.00	3,194.25	3,009.67	3,009.25	14.57	62.64	71.95	2,877.16	3,823.48	4,509.32	4,432.31	77.01	58.556			
3,400.00	3,289.19	3,104.61	3,104.19	15.09	64.43	72.31	2,877.16	3,823.48	4,499.22	4,419.90	79.32	56.722			
3,500.00	3,384.13	3,199.55	3,199.13	15.62	66.22	72.67	2,877.16	3,823.48	4,489.32	4,407.69	81.63	54.994			
3,600.00	3,479.07	3,294.49	3,294.07	16.14	68.01	73.04	2,877.16	3,823.48	4,479.62	4,395.67	83.95	53.362			
3,700.00	3,574.02	3,389.44	3,389.02	16.67	69.80	73.41	2,877.16	3,823.48	4,470.12	4,383.86	86.26	51.819			
3,800.00	3,668.96	3,484.38	3,483.96	17.19	71.59	73.78	2,877.16	3,823.48	4,460.82	4,372.24	88.58	50.359			
3,900.00	3,763.90	3,579.32	3,578.90	17.72	73.39	74.15	2,877.16	3,823.48	4,451.72	4,360.82	90.90	48.975			
4,000.00	3,858.84	3,674.26	3,673.84	18.24	75.18	74.52	2,877.16	3,823.48	4,442.82	4,349.61	93.22	47.661			
4,100.00	3,953.79	3,769.21	3,768.79	18.77	76.97	74.89	2,877.16	3,823.48	4,434.13	4,338.59	95.54	46.413			
4,200.00	4,048.73	3,864.84	3,864.41	19.30	78.77	75.25	2,878.96	3,823.48	4,426.42	4,328.55	97.87	45.228			
4,300.00	4,143.67	3,960.71	3,960.29	19.82	80.58	75.63	2,878.90	3,823.48	4,418.10	4,317.89	100.21	44.089			
4,400.00	4,238.61	4,056.56	4,056.13	20.35	82.39	76.01	2,878.79	3,823.48	4,409.98	4,307.43	102.55	43.004			
4,500.00	4,333.56	4,152.38	4,151.95	20.88	84.20	76.39	2,878.63	3,823.48	4,402.04	4,297.15	104.89	41.969			
4,600.00	4,428.50	4,248.17	4,247.73	21.41	86.00	76.77	2,878.43	3,823.48	4,394.30	4,287.07	107.23	40.981			
4,700.00	4,523.44	4,343.92	4,343.49	21.93	87.81	77.16	2,878.18	3,823.48	4,386.75	4,277.18	109.57	40.037			
4,800.00	4,618.38	4,439.65	4,439.21	22.46	89.62	77.55	2,877.88	3,823.48	4,379.40	4,267.49	111.91	39.134			
4,900.00	4,713.33	4,535.34	4,534.90	22.99	91.42	77.94	2,877.53	3,823.48	4,372.25	4,258.00	114.25	38.270			
5,000.00	4,808.27	4,631.00	4,630.56	23.52	93.23	78.33	2,877.14	3,823.48	4,365.30	4,248.71	116.59	37.442			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #107 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		165-A027Ua_INC-ONLY						Rule Assigned:		Offset Well Error:		0.00 usft		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Semi Major Axis (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Distance Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,100.00	4,903.21	4,718.73	4,718.21	24.05	94.96	78.68	2,877.16	3,823.48	4,358.71	4,239.86	118.85	36.673		
5,200.00	4,998.16	4,813.67	4,813.16	24.58	96.83	79.07	2,877.16	3,823.48	4,352.35	4,231.09	121.26	35.893		
5,300.00	5,093.10	4,908.62	4,908.10	25.11	98.70	79.46	2,877.16	3,823.48	4,346.20	4,222.53	123.67	35.145		
5,400.00	5,188.04	5,003.56	5,003.04	25.64	100.56	79.84	2,877.16	3,823.48	4,340.27	4,214.19	126.07	34.427		
5,500.00	5,282.98	5,098.50	5,097.98	26.17	102.43	80.23	2,877.16	3,823.48	4,334.55	4,206.08	128.48	33.738		
5,600.00	5,377.93	5,193.86	5,193.33	26.70	104.31	80.60	2,878.93	3,823.48	4,329.66	4,198.77	130.89	33.078		
5,623.25	5,400.00	5,216.33	5,215.80	26.82	104.75	80.69	2,878.92	3,823.48	4,328.41	4,196.96	131.46	32.926		
5,700.00	5,473.03	5,290.64	5,290.11	27.22	106.22	80.96	2,878.85	3,823.48	4,324.44	4,191.11	133.33	32.434		
5,800.00	5,568.64	5,387.88	5,387.34	27.73	108.13	81.28	2,878.65	3,823.48	4,319.64	4,183.88	135.76	31.818		
5,900.00	5,664.75	5,485.56	5,485.02	28.23	110.05	81.60	2,878.34	3,823.48	4,315.26	4,177.07	138.19	31.227		
6,000.00	5,761.33	5,583.66	5,583.12	28.71	111.98	81.90	2,877.91	3,823.48	4,311.26	4,170.65	140.61	30.661		
6,100.00	5,858.34	5,682.16	5,681.61	29.18	113.92	82.18	2,877.36	3,823.48	4,307.63	4,164.60	143.02	30.118		
6,200.00	5,955.76	5,771.38	5,770.76	29.64	115.72	82.42	2,877.16	3,823.48	4,304.45	4,159.17	145.28	29.628		
6,300.00	6,053.57	5,869.18	5,868.57	30.07	117.72	82.66	2,877.16	3,823.48	4,301.69	4,153.96	147.73	29.119		
6,400.00	6,151.72	5,967.33	5,966.72	30.50	119.73	82.89	2,877.16	3,823.48	4,299.23	4,149.07	150.16	28.631		
6,500.00	6,250.19	6,065.80	6,065.19	30.91	121.74	83.09	2,877.16	3,823.48	4,297.07	4,144.49	152.59	28.162		
6,600.00	6,348.94	6,164.56	6,163.94	31.30	123.76	83.28	2,877.16	3,823.48	4,295.19	4,140.19	155.00	27.710		
6,659.67	6,408.00	6,223.61	6,223.00	31.53	124.97	83.38	2,877.16	3,823.48	4,294.19	4,137.75	156.44	27.449		
6,700.00	6,447.82	6,263.43	6,262.82	31.68	125.78	83.66	2,877.16	3,823.48	4,292.42	4,135.00	157.41	27.269		
6,750.00	6,496.66	6,312.27	6,311.66	31.90	126.78	83.90	2,877.16	3,823.48	4,287.13	4,128.50	158.62	27.027		
6,800.00	6,544.65	6,360.26	6,359.65	32.13	127.76	84.13	2,877.16	3,823.48	4,278.45	4,118.62	159.83	26.769		
6,850.00	6,591.49	6,407.10	6,406.49	32.37	128.72	84.38	2,877.16	3,823.48	4,266.45	4,105.43	161.03	26.495		
6,900.00	6,636.89	6,452.50	6,451.89	32.62	129.65	84.53	2,877.16	3,823.48	4,251.23	4,089.02	162.20	26.209		
6,950.00	6,680.57	6,496.18	6,495.57	32.89	130.54	84.56	2,877.16	3,823.48	4,232.88	4,069.52	163.36	25.912		
7,000.00	6,722.26	6,537.87	6,537.26	33.17	131.39	84.54	2,877.16	3,823.48	4,211.54	4,047.07	164.47	25.606		
7,050.00	6,761.71	6,577.32	6,576.71	33.45	132.20	84.53	2,877.16	3,823.48	4,187.36	4,021.81	165.55	25.293		
7,100.00	6,798.67	6,614.28	6,613.67	33.75	132.95	84.27	2,877.16	3,823.48	4,160.52	3,993.93	166.59	24.975		
7,150.00	6,832.91	6,648.52	6,647.91	34.06	133.65	84.13	2,877.16	3,823.48	4,131.18	3,963.61	167.57	24.653		
7,200.00	6,864.22	6,679.83	6,679.22	34.37	134.29	84.93	2,877.16	3,823.48	4,099.56	3,931.06	168.50	24.330		
7,250.00	6,892.42	6,708.03	6,707.42	34.69	134.87	85.88	2,877.16	3,823.48	4,065.86	3,896.49	169.37	24.006		
7,300.00	6,917.32	6,732.93	6,732.32	35.03	135.38	86.23	2,877.16	3,823.48	4,030.32	3,860.15	170.17	23.684		
7,350.00	6,938.77	6,754.38	6,753.77	35.37	135.82	86.19	2,877.16	3,823.48	3,993.16	3,822.26	170.90	23.365		
7,400.00	6,956.64	6,772.26	6,771.64	35.72	136.18	86.80	2,877.16	3,823.48	3,954.64	3,783.07	171.57	23.050		
7,450.00	6,970.83	6,786.44	6,785.83	36.07	136.47	87.04	2,877.16	3,823.48	3,915.00	3,742.84	172.16	22.741		
7,500.00	6,981.23	6,796.85	6,796.23	36.44	136.69	87.86	2,877.16	3,823.48	3,874.49	3,701.82	172.67	22.439		
7,550.00	6,987.80	6,803.41	6,802.80	36.81	136.82	88.15	2,877.16	3,823.48	3,833.38	3,660.27	173.11	22.145		
7,600.00	6,990.48	6,806.09	6,805.48	37.19	136.87	88.74	2,877.16	3,823.48	3,791.92	3,618.45	173.46	21.860		
7,609.87	6,990.55	6,806.16	6,805.55	37.26	136.88	90.06	2,877.16	3,823.48	3,783.72	3,610.19	173.52	21.805		
7,700.00	6,990.49	6,806.10	6,805.49	37.97	136.87	90.06	2,877.16	3,823.48	3,709.14	3,535.05	174.08	21.307		
7,800.00	6,990.42	6,806.03	6,805.42	38.78	136.87	90.06	2,877.16	3,823.48	3,627.21	3,452.48	174.74	20.758		
7,900.00	6,990.35	6,805.96	6,805.35	39.64	136.87	90.05	2,877.16	3,823.48	3,546.22	3,370.79	175.43	20.214		
8,000.00	6,990.28	6,805.89	6,805.28	40.53	136.87	90.05	2,877.16	3,823.48	3,466.22	3,290.05	176.17	19.676		
8,100.00	6,990.21	6,805.82	6,805.21	41.45	136.87	90.05	2,877.16	3,823.48	3,387.28	3,210.34	176.94	19.143		
8,200.00	6,990.14	6,805.75	6,805.14	42.40	136.87	90.05	2,877.16	3,823.48	3,309.48	3,131.72	177.77	18.617		
8,306.37	6,990.06	6,805.68	6,805.06	43.45	136.87	90.05	2,877.16	3,823.48	3,228.08	3,049.39	178.69	18.065		
8,400.00	6,990.00	6,805.61	6,805.00	44.38	136.86	90.05	2,877.16	3,823.48	3,155.65	2,976.14	179.52	17.579		
8,500.00	6,989.93	6,805.54	6,804.93	45.36	136.86	90.06	2,877.16	3,823.48	3,075.31	2,894.94	180.37	17.050		
8,600.00	6,989.85	6,805.46	6,804.85	46.33	136.86	90.07	2,877.16	3,823.48	2,992.03	2,810.84	181.19	16.513		
8,700.00	6,989.78	6,805.39	6,804.78	47.28	136.86	90.08	2,877.16	3,823.48	2,905.99	2,724.02	181.97	15.969		
8,800.00	6,989.70	6,805.31	6,804.70	48.21	136.86	90.09	2,877.16	3,823.48	2,817.37	2,634.66	182.70	15.420		
8,900.00	6,989.63	6,805.24	6,804.63	49.11	136.86	90.10	2,877.16	3,823.48	2,726.36	2,542.98	183.38	14.867		
9,000.00	6,989.55	6,805.16	6,804.55	49.99	136.86	90.12	2,877.16	3,823.48	2,633.20	2,449.20	184.00	14.311		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #107 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 165-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
9,100.00	6,989.48	6,805.09	6,804.48	50.84	136.85	90.14	2,877.16	3,823.48	2,538.12	2,353.58	184.54	13.754	
9,200.00	6,989.40	6,805.02	6,804.40	51.66	136.85	90.18	2,877.16	3,823.48	2,441.39	2,256.39	185.00	13.197	
9,300.00	6,989.33	6,804.94	6,804.33	52.45	136.85	90.25	2,877.16	3,823.48	2,343.30	2,157.93	185.37	12.641	
9,393.87	6,989.27	6,804.88	6,804.27	53.15	136.85	90.38	2,877.16	3,823.48	2,250.29	2,064.67	185.62	12.123	
9,400.00	6,989.26	6,804.87	6,804.26	53.20	136.85	90.38	2,877.16	3,823.48	2,244.19	2,058.56	185.63	12.089	
9,500.00	6,989.19	6,804.80	6,804.19	53.95	136.85	90.36	2,877.16	3,823.48	2,144.76	1,958.91	185.86	11.540	
9,600.00	6,989.12	6,804.73	6,804.12	54.73	136.85	90.35	2,877.16	3,823.48	2,045.38	1,859.29	186.10	10.991	
9,700.00	6,989.05	6,804.66	6,804.05	55.55	136.85	90.33	2,877.16	3,823.48	1,946.07	1,759.71	186.37	10.442	
9,800.00	6,988.98	6,804.59	6,803.98	56.40	136.84	90.31	2,877.16	3,823.48	1,846.84	1,660.17	186.66	9.894	
9,900.00	6,988.91	6,804.52	6,803.91	57.28	136.84	90.30	2,877.16	3,823.48	1,747.69	1,560.70	186.99	9.346	
10,000.00	6,988.84	6,804.45	6,803.84	58.20	136.84	90.28	2,877.16	3,823.48	1,648.64	1,461.28	187.35	8.800	
10,100.00	6,988.77	6,804.39	6,803.77	59.14	136.84	90.26	2,877.16	3,823.48	1,549.71	1,361.95	187.77	8.253	
10,200.00	6,988.70	6,804.32	6,803.70	60.11	136.84	90.25	2,877.16	3,823.48	1,450.93	1,262.70	188.23	7.708	
10,300.00	6,988.63	6,804.25	6,803.63	61.11	136.84	90.23	2,877.16	3,823.48	1,352.33	1,163.58	188.76	7.164	
10,400.00	6,988.56	6,804.18	6,803.56	62.14	136.84	90.21	2,877.16	3,823.48	1,253.96	1,064.59	189.37	6.622	
10,500.00	6,988.49	6,804.11	6,803.49	63.19	136.83	90.19	2,877.16	3,823.48	1,155.86	965.79	190.07	6.081	
10,600.00	6,988.42	6,804.04	6,803.42	64.26	136.83	90.18	2,877.16	3,823.48	1,058.12	867.22	190.90	5.543	
10,700.00	6,988.35	6,803.97	6,803.35	65.36	136.83	90.16	2,877.16	3,823.48	960.84	768.96	191.88	5.007	
10,800.00	6,988.28	6,803.90	6,803.28	66.48	136.83	90.14	2,877.16	3,823.48	864.18	671.12	193.07	4.476	
10,900.00	6,988.21	6,803.83	6,803.21	67.61	136.83	90.13	2,877.16	3,823.48	768.39	573.87	194.51	3.950	
11,000.00	6,988.14	6,803.76	6,803.14	68.77	136.83	90.11	2,877.16	3,823.48	673.81	477.50	196.31	3.432	
11,100.00	6,988.07	6,803.69	6,803.07	69.95	136.83	90.09	2,877.16	3,823.48	581.05	382.48	198.57	2.926	
11,200.00	6,988.01	6,803.62	6,803.01	71.14	136.82	90.07	2,877.16	3,823.48	491.14	289.70	201.44	2.438	
11,300.00	6,987.94	6,803.55	6,802.94	72.35	136.82	90.06	2,877.16	3,823.48	405.98	200.97	205.01	1.980	
11,400.00	6,987.87	6,803.48	6,802.87	73.57	136.82	90.04	2,877.16	3,823.48	329.28	120.28	208.99	1.576	
11,500.00	6,987.80	6,803.41	6,802.80	74.81	136.82	90.02	2,877.16	3,823.48	268.37	56.79	211.58	1.268	Level 3
11,600.00	6,987.73	6,803.34	6,802.73	76.07	136.82	90.01	2,877.16	3,823.48	235.85	28.10	207.75	1.135	Level 3, ES, SF
11,632.00	6,987.70	6,803.32	6,802.70	76.47	136.82	90.00	2,877.16	3,823.48	233.67	29.32	204.35	1.143	Level 3, CC
11,643.87	6,987.70	6,803.31	6,802.70	76.62	136.82	90.00	2,877.16	3,823.48	233.97	31.14	202.83	1.154	Level 3
11,700.00	6,987.66	6,803.27	6,802.66	77.33	136.82	89.99	2,877.16	3,823.48	242.83	48.40	194.44	1.249	Level 3
11,737.27	6,987.63	6,803.24	6,802.63	77.80	136.82	89.98	2,877.16	3,823.48	254.89	66.42	188.48	1.352	Level 3
11,800.00	6,987.59	6,803.20	6,802.59	78.59	136.82	89.97	2,877.16	3,823.48	284.88	105.32	179.55	1.587	
11,900.00	6,987.52	6,803.13	6,802.52	79.86	136.81	89.96	2,877.16	3,823.48	351.04	180.20	170.84	2.055	
12,000.00	6,987.46	6,803.07	6,802.46	81.14	136.81	89.94	2,877.16	3,823.48	430.47	262.52	167.95	2.563	
12,100.00	6,987.39	6,803.00	6,802.39	82.43	136.81	89.93	2,877.16	3,823.48	517.08	349.13	167.95	3.079	
12,200.00	6,987.32	6,802.93	6,802.32	83.73	136.81	89.91	2,877.16	3,823.48	607.82	438.87	168.95	3.598	
12,300.00	6,987.26	6,802.87	6,802.26	85.05	136.81	89.89	2,877.16	3,823.48	701.09	530.91	170.17	4.120	
12,400.00	6,987.19	6,802.80	6,802.19	86.38	136.81	89.88	2,877.16	3,823.48	795.99	624.65	171.34	4.646	
12,500.00	6,987.12	6,802.73	6,802.12	87.71	136.81	89.86	2,877.16	3,823.48	892.00	719.62	172.39	5.174	
12,600.00	6,987.06	6,802.67	6,802.06	89.06	136.80	89.84	2,877.16	3,823.48	988.81	815.51	173.30	5.706	
12,700.00	6,986.99	6,802.60	6,801.99	90.41	136.80	89.83	2,877.16	3,823.48	1,086.19	912.09	174.10	6.239	
12,800.00	6,986.92	6,802.53	6,801.92	91.77	136.80	89.81	2,877.16	3,823.48	1,184.01	1,009.22	174.79	6.774	
12,900.00	6,986.86	6,802.47	6,801.86	93.14	136.80	89.80	2,877.16	3,823.48	1,282.17	1,106.77	175.40	7.310	
13,000.00	6,986.79	6,802.40	6,801.79	94.52	136.80	89.78	2,877.16	3,823.48	1,380.59	1,204.65	175.94	7.847	
13,100.00	6,986.72	6,802.33	6,801.72	95.90	136.80	89.76	2,877.16	3,823.48	1,479.22	1,302.81	176.42	8.385	
13,200.00	6,986.66	6,802.27	6,801.66	97.30	136.80	89.75	2,877.16	3,823.48	1,578.03	1,401.18	176.85	8.923	
13,300.00	6,986.59	6,802.20	6,801.59	98.69	136.80	89.73	2,877.16	3,823.48	1,676.98	1,499.75	177.23	9.462	
13,400.00	6,986.52	6,802.13	6,801.52	100.10	136.79	89.71	2,877.16	3,823.48	1,776.04	1,598.46	177.58	10.002	
13,500.00	6,986.46	6,802.07	6,801.46	101.51	136.79	89.70	2,877.16	3,823.48	1,875.21	1,697.31	177.89	10.541	
13,600.00	6,986.39	6,802.00	6,801.39	102.93	136.79	89.68	2,877.16	3,823.48	1,974.45	1,796.27	178.18	11.081	
13,700.00	6,986.32	6,801.93	6,801.32	104.35	136.79	89.67	2,877.16	3,823.48	2,073.78	1,895.33	178.45	11.621	
13,800.00	6,986.25	6,801.87	6,801.25	105.78	136.79	89.65	2,877.16	3,823.48	2,173.16	1,994.46	178.70	12.161	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #107 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		165-A027Ua_INC-ONLY							Rule Assigned:				Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
13,900.00	6,986.19	6,801.80	6,801.19	107.21	136.79	89.63	2,877.16	3,823.48	2,272.60	2,093.67	178.93	12.701		
14,000.00	6,986.12	6,801.73	6,801.12	108.65	136.79	89.62	2,877.16	3,823.48	2,372.08	2,192.94	179.14	13.242		
14,100.00	6,986.05	6,801.67	6,801.05	110.09	136.78	89.60	2,877.16	3,823.48	2,471.61	2,292.27	179.34	13.782		
14,200.00	6,985.99	6,801.60	6,800.99	111.54	136.78	89.58	2,877.16	3,823.48	2,571.17	2,391.64	179.53	14.322		
14,300.00	6,985.92	6,801.53	6,800.92	112.99	136.78	89.57	2,877.16	3,823.48	2,670.76	2,491.06	179.70	14.862		
14,400.00	6,985.85	6,801.47	6,800.85	114.45	136.78	89.55	2,877.16	3,823.48	2,770.39	2,590.52	179.87	15.402		
14,500.00	6,985.79	6,801.40	6,800.79	115.91	136.78	89.54	2,877.16	3,823.48	2,870.04	2,690.01	180.03	15.942		
14,600.00	6,985.72	6,801.33	6,800.72	117.38	136.78	89.52	2,877.16	3,823.48	2,969.71	2,789.54	180.18	16.482		
14,700.00	6,985.65	6,801.27	6,800.65	118.84	136.78	89.50	2,877.16	3,823.48	3,069.41	2,889.09	180.32	17.022		
14,800.00	6,985.59	6,801.20	6,800.59	120.32	136.77	89.49	2,877.16	3,823.48	3,169.12	2,988.66	180.46	17.561		
14,900.00	6,985.52	6,801.13	6,800.52	121.79	136.77	89.47	2,877.16	3,823.48	3,268.86	3,088.26	180.59	18.101		
15,000.00	6,985.45	6,801.07	6,800.45	123.27	136.77	89.45	2,877.16	3,823.48	3,368.60	3,187.89	180.72	18.640		
15,100.00	6,985.39	6,801.00	6,800.39	124.75	136.77	89.44	2,877.16	3,823.48	3,468.37	3,287.53	180.84	19.179		
15,200.00	6,985.32	6,800.93	6,800.32	126.24	136.77	89.42	2,877.16	3,823.48	3,568.14	3,387.18	180.96	19.718		
15,300.00	6,985.25	6,800.87	6,800.25	127.72	136.77	89.41	2,877.16	3,823.48	3,667.93	3,486.86	181.07	20.257		
15,400.00	6,985.19	6,800.80	6,800.19	129.21	136.77	89.39	2,877.16	3,823.48	3,767.73	3,586.55	181.18	20.795		
15,500.00	6,985.12	6,800.73	6,800.12	130.71	136.77	89.37	2,877.16	3,823.48	3,867.54	3,686.25	181.29	21.333		
15,600.00	6,985.05	6,800.67	6,800.05	132.20	136.76	89.36	2,877.16	3,823.48	3,967.36	3,785.96	181.40	21.871		
15,700.00	6,984.99	6,800.60	6,799.99	133.70	136.76	89.34	2,877.16	3,823.48	4,067.19	3,885.69	181.50	22.409		
15,800.00	6,984.92	6,800.53	6,799.92	135.20	136.76	89.32	2,877.16	3,823.48	4,167.02	3,985.43	181.60	22.947		
15,900.00	6,984.85	6,800.47	6,799.85	136.71	136.76	89.31	2,877.16	3,823.48	4,266.87	4,085.17	181.69	23.484		
16,000.00	6,984.79	6,800.40	6,799.79	138.21	136.76	89.29	2,877.16	3,823.48	4,366.72	4,184.93	181.79	24.021		
16,100.00	6,984.72	6,800.33	6,799.72	139.72	136.76	89.28	2,877.16	3,823.48	4,466.58	4,284.69	181.88	24.558		
16,200.00	6,984.65	6,800.27	6,799.65	141.23	136.76	89.26	2,877.16	3,823.48	4,566.44	4,384.47	181.97	25.094		
16,300.00	6,984.59	6,800.20	6,799.59	142.75	136.75	89.24	2,877.16	3,823.48	4,666.31	4,484.25	182.06	25.630		
16,400.00	6,984.52	6,800.13	6,799.52	144.26	136.75	89.23	2,877.16	3,823.48	4,766.18	4,584.04	182.15	26.166		
16,500.00	6,984.45	6,800.07	6,799.45	145.78	136.75	89.21	2,877.16	3,823.48	4,866.06	4,683.83	182.24	26.702		
16,600.00	6,984.39	6,800.00	6,799.39	147.29	136.75	89.19	2,877.16	3,823.48	4,965.95	4,783.63	182.32	27.237		
16,700.00	6,984.32	6,799.93	6,799.32	148.82	136.75	89.18	2,877.16	3,823.48	5,065.84	4,883.43	182.40	27.773		
16,800.00	6,984.25	6,799.86	6,799.25	150.34	136.75	89.16	2,877.16	3,823.48	5,165.73	4,983.25	182.49	28.307		
16,900.00	6,984.19	6,799.80	6,799.19	151.86	136.75	89.15	2,877.16	3,823.48	5,265.63	5,083.06	182.57	28.842		
17,000.00	6,984.12	6,799.73	6,799.12	153.39	136.74	89.13	2,877.16	3,823.48	5,365.53	5,182.88	182.65	29.376		
17,100.00	6,984.05	6,799.66	6,799.05	154.91	136.74	89.11	2,877.16	3,823.48	5,465.44	5,282.71	182.73	29.910		
17,200.00	6,983.99	6,799.60	6,798.99	156.44	136.74	89.10	2,877.16	3,823.48	5,565.35	5,382.54	182.81	30.443		
17,300.00	6,983.92	6,799.53	6,798.92	157.97	136.74	89.08	2,877.16	3,823.48	5,665.26	5,482.37	182.89	30.976		
17,400.00	6,983.85	6,799.46	6,798.85	159.50	136.74	89.06	2,877.16	3,823.48	5,765.17	5,582.21	182.97	31.509		
17,500.00	6,983.79	6,799.40	6,798.79	161.04	136.74	89.05	2,877.16	3,823.48	5,865.09	5,682.05	183.04	32.042		
17,600.00	6,983.72	6,799.33	6,798.72	162.57	136.74	89.03	2,877.16	3,823.48	5,965.01	5,781.89	183.12	32.574		
17,700.00	6,983.65	6,799.26	6,798.65	164.11	136.74	89.02	2,877.16	3,823.48	6,064.94	5,881.74	183.20	33.106		
17,800.00	6,983.59	6,799.20	6,798.59	165.65	136.73	89.00	2,877.16	3,823.48	6,164.86	5,981.59	183.27	33.638		
17,900.00	6,983.52	6,799.13	6,798.52	167.18	136.73	88.98	2,877.16	3,823.48	6,264.79	6,081.44	183.35	34.169		
18,000.00	6,983.45	6,799.06	6,798.45	168.72	136.73	88.97	2,877.16	3,823.48	6,364.72	6,181.30	183.42	34.700		
18,100.00	6,983.39	6,799.00	6,798.39	170.27	136.73	88.95	2,877.16	3,823.48	6,464.65	6,281.16	183.50	35.230		
18,200.00	6,983.32	6,798.93	6,798.32	171.81	136.73	88.93	2,877.16	3,823.48	6,564.59	6,381.02	183.57	35.760		
18,300.00	6,983.25	6,798.86	6,798.25	173.35	136.73	88.92	2,877.16	3,823.48	6,664.53	6,480.88	183.65	36.290		
18,400.00	6,983.19	6,798.80	6,798.19	174.90	136.73	88.90	2,877.16	3,823.48	6,764.46	6,580.74	183.72	36.819		
18,500.00	6,983.12	6,798.73	6,798.12	176.44	136.72	88.89	2,877.16	3,823.48	6,864.40	6,680.61	183.79	37.348		
18,600.00	6,983.05	6,798.66	6,798.05	177.99	136.72	88.87	2,877.16	3,823.48	6,964.35	6,780.48	183.87	37.877		
18,700.00	6,982.99	6,798.60	6,797.99	179.54	136.72	88.85	2,877.16	3,823.48	7,064.29	6,880.35	183.94	38.405		
18,800.00	6,982.92	6,798.53	6,797.92	181.09	136.72	88.84	2,877.16	3,823.48	7,164.23	6,980.22	184.01	38.933		
18,900.00	6,982.85	6,798.46	6,797.85	182.64	136.72	88.82	2,877.16	3,823.48	7,264.18	7,080.09	184.09	39.460		
19,000.00	6,982.78	6,798.40	6,797.78	184.19	136.72	88.80	2,877.16	3,823.48	7,364.13	7,179.97	184.16	39.988		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #107 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 165-A027Ua_INC-ONLY							Rule Assigned:						Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
19,100.00	6,982.72	6,798.33	6,797.72	185.74	136.72	88.79	2,877.16	3,823.48	7,464.08	7,279.85	184.23	40.514		
19,200.00	6,982.65	6,798.26	6,797.65	187.29	136.71	88.77	2,877.16	3,823.48	7,564.03	7,379.72	184.31	41.041		
19,300.00	6,982.58	6,798.20	6,797.58	188.84	136.71	88.76	2,877.16	3,823.48	7,663.98	7,479.60	184.38	41.566		
19,400.00	6,982.52	6,798.13	6,797.52	190.40	136.71	88.74	2,877.16	3,823.48	7,763.94	7,579.48	184.45	42.092		
19,500.00	6,982.45	6,798.06	6,797.45	191.95	136.71	88.72	2,877.16	3,823.48	7,863.89	7,679.37	184.52	42.617		
19,600.00	6,982.38	6,798.00	6,797.38	193.51	136.71	88.71	2,877.16	3,823.48	7,963.85	7,779.25	184.60	43.142		
19,700.00	6,982.32	6,797.93	6,797.32	195.07	136.71	88.69	2,877.16	3,823.48	8,063.80	7,879.13	184.67	43.666		
19,800.00	6,982.25	6,797.86	6,797.25	196.62	136.71	88.68	2,877.16	3,823.48	8,163.76	7,979.02	184.74	44.190		
19,900.00	6,982.18	6,797.80	6,797.18	198.18	136.71	88.66	2,877.16	3,823.48	8,263.72	8,078.90	184.82	44.713		
20,000.00	6,982.12	6,797.73	6,797.12	199.74	136.70	88.64	2,877.16	3,823.48	8,363.68	8,178.79	184.89	45.237		
20,100.00	6,982.05	6,797.66	6,797.05	201.30	136.70	88.63	2,877.16	3,823.48	8,463.64	8,278.68	184.96	45.759		
20,176.02	6,982.00	6,797.61	6,797.00	202.36	136.70	88.61	2,877.16	3,823.48	8,539.63	8,350.71	188.92	45.203		

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #108 - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 107-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-102.71	-1,132.50	-5,022.95	5,150.04				
100.00	100.00	0.00	0.00	0.25	0.00	-102.71	-1,132.50	-5,022.95	5,149.03	5,148.78	0.25	N/A	
134.01	134.01	32.01	32.01	0.37	0.20	-102.71	-1,132.50	-5,022.95	5,149.03	5,148.46	0.57	9,028.114	
200.00	200.00	98.00	98.00	0.61	0.61	-102.71	-1,132.50	-5,022.95	5,149.03	5,147.82	1.21	4,243.140	
268.00	268.00	166.00	166.00	0.85	1.17	-102.70	-1,132.30	-5,022.95	5,148.99	5,147.00	1.99	2,584.035 CC	
300.00	300.00	194.43	194.43	0.97	1.40	-102.70	-1,132.35	-5,022.95	5,149.00	5,146.66	2.34	2,201.735	
400.00	400.00	298.01	298.00	1.33	2.23	-102.71	-1,132.50	-5,022.95	5,149.03	5,145.53	3.50	1,471.618	
417.55	417.55	315.55	315.54	1.39	2.37	-102.70	-1,132.40	-5,022.95	5,149.01	5,145.32	3.69	1,393.611	
500.00	500.00	395.81	395.81	1.68	3.00	-102.71	-1,132.48	-5,022.95	5,149.03	5,144.43	4.60	1,119.738	
600.00	600.00	498.02	498.00	2.04	4.74	-102.71	-1,132.50	-5,022.95	5,149.03	5,142.35	6.69	770.012	
700.00	699.98	598.00	597.98	2.40	6.55	-92.72	-1,132.50	-5,022.95	5,149.12	5,140.27	8.84	582.431	
800.00	799.84	696.71	696.69	2.76	8.33	-92.77	-1,131.69	-5,022.95	5,149.19	5,138.22	10.97	469.318	
900.00	899.45	793.44	793.42	3.13	10.08	-92.85	-1,131.91	-5,022.95	5,149.67	5,136.60	13.07	394.029	
1,000.00	998.70	889.76	889.73	3.49	11.82	-92.97	-1,132.37	-5,022.95	5,150.40	5,135.24	15.16	339.631	
1,100.00	1,097.47	995.52	995.47	3.86	13.25	-93.14	-1,132.50	-5,022.95	5,151.27	5,134.32	16.95	303.983	
1,200.00	1,195.62	1,093.68	1,093.62	4.24	14.47	-93.33	-1,132.50	-5,022.95	5,152.37	5,133.84	18.53	278.060	
1,300.00	1,293.06	1,188.25	1,188.18	4.64	15.64	-93.53	-1,131.91	-5,022.95	5,153.61	5,133.53	20.09	256.589 ES	
1,400.00	1,389.64	1,281.10	1,281.03	5.06	16.79	-93.76	-1,132.27	-5,022.95	5,155.41	5,133.78	21.64	238.254	
1,500.00	1,485.27	1,383.35	1,383.27	5.50	17.61	-94.05	-1,132.50	-5,022.95	5,157.55	5,134.68	22.87	225.483	
1,515.00	1,499.52	1,397.61	1,397.52	5.57	17.68	-94.10	-1,132.50	-5,022.95	5,157.90	5,134.89	23.01	224.115	
1,600.00	1,580.22	1,478.19	1,478.11	5.96	18.12	-94.37	-1,132.16	-5,022.95	5,159.89	5,136.07	23.82	216.606	
1,700.00	1,675.17	1,569.72	1,569.64	6.44	18.61	-94.69	-1,132.28	-5,022.95	5,162.54	5,137.78	24.76	208.465	
1,800.00	1,770.11	1,668.20	1,668.11	6.92	19.21	-95.04	-1,132.50	-5,022.95	5,165.40	5,139.59	25.82	200.092	
1,900.00	1,865.05	1,763.14	1,763.05	7.41	19.88	-95.37	-1,132.50	-5,022.95	5,168.40	5,141.45	26.95	191.761	
2,000.00	1,959.99	1,857.98	1,857.89	7.90	20.55	-95.69	-1,132.26	-5,022.95	5,171.52	5,143.43	28.09	184.076	
2,100.00	2,054.94	1,951.56	1,951.47	8.40	21.21	-96.02	-1,132.31	-5,022.95	5,174.91	5,145.68	29.23	177.025	
2,200.00	2,149.88	2,045.09	2,045.00	8.90	21.88	-96.34	-1,132.45	-5,022.95	5,178.51	5,148.14	30.37	170.490	
2,300.00	2,244.82	2,142.93	2,142.82	9.41	22.31	-96.68	-1,132.50	-5,022.95	5,182.27	5,150.99	31.28	165.664	
2,400.00	2,339.76	2,234.71	2,234.59	9.92	22.64	-96.99	-1,132.13	-5,022.95	5,186.10	5,154.02	32.08	161.653	
2,500.00	2,434.71	2,332.84	2,332.71	10.43	23.00	-97.33	-1,132.50	-5,022.95	5,190.34	5,157.43	32.91	157.730	
2,600.00	2,529.65	2,427.79	2,427.65	10.94	23.36	-97.66	-1,132.50	-5,022.95	5,194.65	5,160.91	33.74	153.969	
2,700.00	2,624.59	2,520.53	2,520.39	11.45	23.71	-97.97	-1,131.76	-5,022.95	5,198.91	5,164.35	34.56	150.413	
2,800.00	2,719.53	2,608.07	2,607.92	11.97	24.05	-98.27	-1,132.07	-5,022.95	5,203.70	5,168.33	35.37	147.106	
2,900.00	2,814.48	2,712.67	2,712.48	12.49	24.84	-98.64	-1,132.50	-5,022.95	5,208.70	5,172.04	36.65	142.111	
3,000.00	2,909.42	2,807.61	2,807.42	13.01	26.03	-98.96	-1,132.50	-5,022.95	5,213.75	5,175.41	38.34	135.988	
3,100.00	3,004.36	2,902.55	2,902.36	13.53	27.22	-99.28	-1,132.50	-5,022.95	5,218.98	5,178.96	40.03	130.384	
3,200.00	3,099.30	2,997.47	2,997.27	14.05	28.41	-99.59	-1,131.06	-5,022.95	5,223.91	5,182.19	41.72	125.224	
3,300.00	3,194.25	3,088.05	3,087.84	14.57	29.54	-99.90	-1,131.17	-5,022.95	5,229.54	5,186.19	43.35	120.632	
3,400.00	3,289.19	3,178.50	3,178.28	15.09	30.67	-100.21	-1,131.49	-5,022.95	5,235.44	5,190.46	44.98	116.382	
3,500.00	3,384.13	3,268.80	3,268.58	15.62	31.80	-100.52	-1,132.03	-5,022.95	5,241.61	5,194.99	46.62	112.440	
3,600.00	3,479.07	3,377.32	3,377.07	16.14	34.15	-100.89	-1,132.50	-5,022.95	5,247.91	5,198.42	49.48	106.053	
3,700.00	3,574.02	3,472.27	3,472.02	16.67	37.22	-101.21	-1,132.50	-5,022.95	5,254.24	5,201.16	53.07	98.996	
3,800.00	3,668.96	3,567.21	3,566.96	17.19	40.28	-101.53	-1,132.50	-5,022.95	5,260.74	5,204.08	56.67	92.838	
3,900.00	3,763.90	3,662.15	3,661.90	17.72	43.35	-101.85	-1,132.50	-5,022.95	5,267.43	5,207.17	60.26	87.416	
4,000.00	3,858.84	3,757.09	3,756.84	18.24	46.41	-102.17	-1,132.50	-5,022.95	5,274.30	5,210.45	63.85	82.608	
4,100.00	3,953.79	3,852.04	3,851.79	18.77	49.47	-102.49	-1,132.50	-5,022.95	5,281.34	5,213.90	67.44	78.315	
4,200.00	4,048.73	3,945.83	3,945.58	19.30	52.50	-102.79	-1,131.32	-5,022.95	5,288.09	5,217.10	70.99	74.491	
4,300.00	4,143.67	4,039.18	4,038.92	19.82	55.51	-103.10	-1,131.40	-5,022.95	5,295.52	5,220.99	74.53	71.055	
4,400.00	4,238.61	4,132.48	4,132.22	20.35	58.52	-103.41	-1,131.56	-5,022.95	5,303.15	5,225.08	78.06	67.935	
4,500.00	4,333.56	4,225.74	4,225.48	20.88	61.53	-103.72	-1,131.78	-5,022.95	5,310.98	5,229.39	81.60	65.089	
4,600.00	4,428.50	4,318.96	4,318.69	21.41	64.54	-104.03	-1,132.07	-5,022.95	5,319.03	5,233.90	85.13	62.484	
4,700.00	4,523.44	4,412.13	4,411.86	21.93	67.54	-104.34	-1,132.43	-5,022.95	5,327.27	5,238.62	88.66	60.090	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #108 - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		107-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:		0.00 usft	
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
4,800.00	4,618.38	4,516.73	4,516.38	22.46	68.60	-104.68	-1,132.50	-5,022.95	5,335.56	5,245.35	90.21	59.146		
4,900.00	4,713.33	4,611.67	4,611.33	22.99	69.21	-104.99	-1,132.50	-5,022.95	5,344.00	5,252.68	91.31	58.523		
5,000.00	4,808.27	4,698.83	4,698.47	23.52	69.77	-105.27	-1,131.76	-5,022.95	5,352.29	5,259.92	92.37	57.946		
5,100.00	4,903.21	4,784.63	4,784.27	24.05	70.33	-105.55	-1,132.21	-5,022.95	5,361.29	5,267.88	93.41	57.396		
5,200.00	4,998.16	4,896.54	4,896.16	24.58	71.80	-105.92	-1,132.50	-5,022.95	5,370.34	5,274.95	95.39	56.301		
5,300.00	5,093.10	4,991.48	4,991.10	25.11	73.37	-106.22	-1,132.50	-5,022.95	5,379.45	5,282.01	97.45	55.203		
5,400.00	5,188.04	5,086.42	5,086.04	25.64	74.93	-106.53	-1,132.50	-5,022.95	5,388.74	5,289.23	99.51	54.152		
5,500.00	5,282.98	5,181.36	5,180.98	26.17	76.49	-106.84	-1,132.50	-5,022.95	5,398.19	5,296.62	101.57	53.146		
5,600.00	5,377.93	5,276.31	5,275.93	26.70	78.05	-107.14	-1,132.50	-5,022.95	5,407.81	5,304.18	103.63	52.182		
5,623.25	5,400.00	5,298.38	5,298.00	26.82	78.42	-107.21	-1,132.50	-5,022.95	5,410.07	5,305.96	104.11	51.964		
5,700.00	5,473.03	5,371.41	5,371.03	27.22	79.62	-107.51	-1,132.50	-5,022.95	5,417.44	5,311.75	105.69	51.257		
5,800.00	5,568.64	5,465.59	5,465.20	27.73	81.17	-107.86	-1,131.27	-5,022.95	5,426.12	5,318.40	107.72	50.372		
5,900.00	5,664.75	5,559.80	5,559.41	28.23	82.72	-108.21	-1,131.36	-5,022.95	5,435.03	5,325.29	109.74	49.527		
6,000.00	5,761.33	5,654.43	5,654.04	28.71	84.28	-108.54	-1,131.51	-5,022.95	5,443.55	5,331.80	111.75	48.712		
6,100.00	5,858.34	5,749.47	5,749.08	29.18	85.84	-108.85	-1,131.73	-5,022.95	5,451.65	5,337.90	113.75	47.926		
6,200.00	5,955.76	5,844.87	5,844.48	29.64	87.41	-109.14	-1,132.03	-5,022.95	5,459.32	5,343.57	115.75	47.166		
6,300.00	6,053.57	5,940.63	5,940.23	30.07	88.99	-109.41	-1,132.39	-5,022.95	5,466.53	5,348.80	117.74	46.431		
6,400.00	6,151.72	6,050.17	6,049.72	30.50	94.05	-109.68	-1,132.50	-5,022.95	5,473.08	5,349.87	123.21	44.419		
6,500.00	6,250.19	6,148.64	6,148.19	30.91	99.43	-109.91	-1,132.50	-5,022.95	5,479.06	5,350.06	129.01	42.472		
6,600.00	6,348.94	6,247.39	6,246.94	31.30	104.83	-110.11	-1,132.50	-5,022.95	5,484.50	5,349.70	134.80	40.687		
6,659.67	6,408.00	6,306.45	6,306.00	31.53	108.06	-110.22	-1,132.50	-5,022.95	5,487.47	5,349.21	138.26	39.691		
6,700.00	6,447.82	6,346.27	6,345.82	31.68	110.24	-126.68	-1,132.50	-5,022.95	5,490.64	5,350.06	140.59	39.055		
6,750.00	6,496.66	6,395.11	6,394.66	31.90	112.91	-137.87	-1,132.50	-5,022.95	5,498.00	5,354.54	143.46	38.323		
6,800.00	6,544.65	6,443.10	6,442.65	32.13	115.54	-144.05	-1,132.50	-5,022.95	5,509.10	5,362.80	146.30	37.657		
6,850.00	6,591.49	6,489.94	6,489.49	32.37	118.10	-147.76	-1,132.50	-5,022.95	5,523.88	5,374.80	149.07	37.055		
6,900.00	6,636.89	6,535.34	6,534.89	32.62	120.58	-150.07	-1,132.50	-5,022.95	5,542.25	5,390.47	151.78	36.516		
6,950.00	6,680.57	6,579.02	6,578.57	32.89	122.97	-151.49	-1,132.50	-5,022.95	5,564.10	5,409.72	154.38	36.041		
7,000.00	6,722.26	6,620.71	6,620.26	33.17	125.25	-152.29	-1,132.50	-5,022.95	5,589.30	5,432.42	156.88	35.628		
7,050.00	6,761.71	6,660.16	6,659.71	33.45	127.41	-152.60	-1,132.50	-5,022.95	5,617.70	5,458.45	159.25	35.275		
7,100.00	6,798.67	6,697.12	6,696.67	33.75	129.43	-152.48	-1,132.50	-5,022.95	5,649.13	5,487.65	161.48	34.983		
7,150.00	6,832.91	6,731.36	6,730.91	34.06	131.31	-151.93	-1,132.50	-5,022.95	5,683.39	5,519.83	163.56	34.748		
7,200.00	6,864.22	6,762.67	6,762.22	34.37	133.02	-150.94	-1,132.50	-5,022.95	5,720.28	5,554.82	165.46	34.571		
7,250.00	6,892.42	6,790.87	6,790.42	34.69	134.56	-149.41	-1,132.50	-5,022.95	5,759.57	5,592.38	167.19	34.449		
7,300.00	6,917.32	6,815.77	6,815.32	35.03	135.92	-147.22	-1,132.50	-5,022.95	5,801.01	5,632.28	168.72	34.382		
7,350.00	6,938.77	6,837.22	6,836.77	35.37	137.10	-144.13	-1,132.50	-5,022.95	5,844.35	5,674.30	170.06	34.367 SF		
7,400.00	6,956.64	6,855.09	6,854.64	35.72	138.08	-139.79	-1,132.50	-5,022.95	5,889.33	5,718.15	171.18	34.404		
7,450.00	6,970.83	6,869.28	6,868.83	36.07	138.85	-133.58	-1,132.50	-5,022.95	5,935.67	5,763.58	172.09	34.492		
7,500.00	6,981.23	6,879.68	6,879.23	36.44	139.42	-124.56	-1,132.50	-5,022.95	5,983.07	5,810.29	172.78	34.629		
7,550.00	6,987.80	6,886.25	6,885.80	36.81	139.78	-111.50	-1,132.50	-5,022.95	6,031.25	5,858.00	173.24	34.814		
7,600.00	6,990.48	6,888.93	6,888.48	37.19	139.93	-93.76	-1,132.50	-5,022.95	6,079.90	5,906.42	173.48	35.046		
7,609.87	6,990.55	6,889.00	6,888.55	37.26	139.93	-89.82	-1,132.50	-5,022.95	6,089.53	5,916.02	173.50	35.097		
7,700.00	6,990.49	6,888.94	6,888.49	37.97	139.93	-89.82	-1,132.50	-5,022.95	6,177.56	6,003.91	173.65	35.575		
7,800.00	6,990.42	6,888.87	6,888.42	38.78	139.92	-89.81	-1,132.50	-5,022.95	6,275.30	6,101.49	173.81	36.105		
7,900.00	6,990.35	6,888.80	6,888.35	39.64	139.92	-89.81	-1,132.50	-5,022.95	6,373.11	6,199.14	173.96	36.635		
8,000.00	6,990.28	6,888.73	6,888.28	40.53	139.91	-89.81	-1,132.50	-5,022.95	6,470.98	6,296.87	174.12	37.165		
8,100.00	6,990.21	6,888.66	6,888.21	41.45	139.91	-89.80	-1,132.50	-5,022.95	6,568.92	6,394.66	174.27	37.695		
8,200.00	6,990.14	6,888.59	6,888.14	42.40	139.91	-89.80	-1,132.50	-5,022.95	6,666.92	6,492.51	174.41	38.225		
8,306.37	6,990.06	6,888.51	6,888.06	43.45	139.90	-89.80	-1,132.50	-5,022.95	6,771.23	6,596.66	174.57	38.789		
8,400.00	6,990.00	6,888.45	6,888.00	44.38	139.90	-89.68	-1,132.50	-5,022.95	6,863.62	6,688.94	174.68	39.293		
8,500.00	6,989.93	6,888.38	6,887.93	45.36	139.90	-89.27	-1,132.50	-5,022.95	6,963.17	6,788.42	174.75	39.846		
8,600.00	6,989.85	6,888.30	6,887.85	46.33	139.89	86.78	-1,132.50	-5,022.95	7,063.13	6,888.35	174.78	40.411		
8,700.00	6,989.78	6,888.23	6,887.78	47.28	139.89	89.48	-1,132.50	-5,022.95	7,163.00	6,988.23	174.76	40.987		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #108 - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		107-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:	0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,800.00	6,989.70	6,888.15	6,887.70	48.21	139.88	89.72	-1,132.50	-5,022.95	7,262.30	7,087.60	174.70	41.570		
8,900.00	6,989.63	6,888.08	6,887.63	49.11	139.88	89.81	-1,132.50	-5,022.95	7,360.59	7,185.99	174.60	42.157		
9,000.00	6,989.55	6,888.00	6,887.55	49.99	139.88	89.85	-1,132.50	-5,022.95	7,457.43	7,282.97	174.46	42.745		
9,100.00	6,989.48	6,887.93	6,887.48	50.84	139.87	89.88	-1,132.50	-5,022.95	7,552.43	7,378.14	174.29	43.332		
9,200.00	6,989.40	6,887.86	6,887.40	51.66	139.87	89.91	-1,132.50	-5,022.95	7,645.19	7,471.10	174.09	43.915		
9,300.00	6,989.33	6,887.78	6,887.33	52.45	139.86	89.92	-1,132.50	-5,022.95	7,735.35	7,561.48	173.87	44.490		
9,393.87	6,989.27	6,887.72	6,887.27	53.15	139.86	89.93	-1,132.50	-5,022.95	7,817.30	7,643.67	173.64	45.021		
9,400.00	6,989.26	6,887.71	6,887.26	53.20	139.86	89.93	-1,132.50	-5,022.95	7,822.57	7,648.95	173.62	45.056		
9,500.00	6,989.19	6,887.64	6,887.19	53.95	139.86	89.93	-1,132.50	-5,022.95	7,908.60	7,735.22	173.38	45.615		
9,600.00	6,989.12	6,887.57	6,887.12	54.73	139.85	89.93	-1,132.50	-5,022.95	7,994.95	7,821.80	173.15	46.174		
9,700.00	6,989.05	6,887.50	6,887.05	55.55	139.85	89.93	-1,132.50	-5,022.95	8,081.61	7,908.68	172.93	46.733		
9,800.00	6,988.98	6,887.43	6,886.98	56.40	139.84	89.93	-1,132.50	-5,022.95	8,168.58	7,995.85	172.73	47.292		
9,900.00	6,988.91	6,887.36	6,886.91	57.28	139.84	89.93	-1,132.50	-5,022.95	8,255.84	8,083.31	172.53	47.850		
10,000.00	6,988.84	6,887.29	6,886.84	58.20	139.84	89.93	-1,132.50	-5,022.95	8,343.39	8,171.04	172.35	48.409		
10,100.00	6,988.77	6,887.22	6,886.77	59.14	139.83	89.93	-1,132.50	-5,022.95	8,431.22	8,259.04	172.18	48.966		
10,200.00	6,988.70	6,887.15	6,886.70	60.11	139.83	89.93	-1,132.50	-5,022.95	8,519.32	8,347.29	172.02	49.524		
10,300.00	6,988.63	6,887.08	6,886.63	61.11	139.82	89.92	-1,132.50	-5,022.95	8,607.67	8,435.80	171.88	50.081		
10,400.00	6,988.56	6,887.01	6,886.56	62.14	139.82	89.92	-1,132.50	-5,022.95	8,696.28	8,524.54	171.74	50.637		
10,500.00	6,988.49	6,886.94	6,886.49	63.19	139.82	89.92	-1,132.50	-5,022.95	8,785.14	8,613.53	171.61	51.193		
10,600.00	6,988.42	6,886.87	6,886.42	64.26	139.81	89.92	-1,132.50	-5,022.95	8,874.23	8,702.74	171.49	51.748		
10,700.00	6,988.35	6,886.80	6,886.35	65.36	139.81	89.92	-1,132.50	-5,022.95	8,963.55	8,792.17	171.38	52.303		
10,800.00	6,988.28	6,886.74	6,886.28	66.48	139.81	89.92	-1,132.50	-5,022.95	9,053.09	8,881.81	171.28	52.857		
10,900.00	6,988.21	6,886.67	6,886.21	67.61	139.80	89.92	-1,132.50	-5,022.95	9,142.85	8,971.67	171.18	53.410		
11,000.00	6,988.14	6,886.60	6,886.14	68.77	139.80	89.92	-1,132.50	-5,022.95	9,232.82	9,061.72	171.10	53.963		
11,100.00	6,988.07	6,886.53	6,886.07	69.95	139.79	89.92	-1,132.50	-5,022.95	9,322.99	9,151.98	171.02	54.515		
11,200.00	6,988.01	6,886.46	6,886.01	71.14	139.79	89.92	-1,132.50	-5,022.95	9,413.37	9,242.42	170.95	55.066		
11,300.00	6,987.94	6,886.39	6,885.94	72.35	139.79	89.91	-1,132.50	-5,022.95	9,503.93	9,333.05	170.88	55.616		
11,400.00	6,987.87	6,886.32	6,885.87	73.57	139.78	89.91	-1,132.50	-5,022.95	9,594.69	9,423.86	170.83	56.166		
11,500.00	6,987.80	6,886.25	6,885.80	74.81	139.78	89.91	-1,132.50	-5,022.95	9,685.62	9,514.85	170.78	56.715		
11,600.00	6,987.73	6,886.18	6,885.73	76.07	139.78	89.91	-1,132.50	-5,022.95	9,776.74	9,606.00	170.73	57.263		
11,643.87	6,987.70	6,886.15	6,885.70	76.62	139.77	89.91	-1,132.50	-5,022.95	9,816.76	9,646.04	170.72	57.503		
11,700.00	6,987.66	6,886.11	6,885.66	77.33	139.77	89.92	-1,132.50	-5,022.95	9,867.80	9,697.10	170.69	57.810		
11,737.27	6,987.63	6,886.08	6,885.63	77.80	139.77	89.92	-1,132.50	-5,022.95	9,901.45	9,730.77	170.68	58.012		
11,800.00	6,987.59	6,886.04	6,885.59	78.59	139.77	89.92	-1,132.50	-5,022.95	9,957.99	9,787.34	170.66	58.351		
11,900.00	6,987.52	6,885.97	6,885.52	79.86	139.76	89.92	-1,132.50	-5,022.95	10,048.27	9,877.64	170.63	58.890		
12,000.00	6,987.46	6,885.91	6,885.46	81.14	139.76	89.92	-1,132.50	-5,022.95	10,138.74	9,968.13	170.61	59.428		
12,100.00	6,987.39	6,885.84	6,885.39	82.43	139.76	89.92	-1,132.50	-5,022.95	10,229.38	10,058.79	170.59	59.965		
12,200.00	6,987.32	6,885.77	6,885.32	83.73	139.75	89.92	-1,132.50	-5,022.95	10,320.19	10,149.61	170.58	60.501		
12,300.00	6,987.26	6,885.71	6,885.26	85.05	139.75	89.92	-1,132.50	-5,022.95	10,411.17	10,240.60	170.57	61.037		
12,400.00	6,987.19	6,885.64	6,885.19	86.38	139.75	89.91	-1,132.50	-5,022.95	10,502.32	10,331.75	170.57	61.572		
12,500.00	6,987.12	6,885.57	6,885.12	87.71	139.74	89.91	-1,132.50	-5,022.95	10,593.62	10,423.05	170.58	62.105		
12,600.00	6,987.06	6,885.51	6,885.06	89.06	139.74	89.91	-1,132.50	-5,022.95	10,685.08	10,514.50	170.58	62.638		
12,700.00	6,986.99	6,885.44	6,884.99	90.41	139.74	89.91	-1,132.50	-5,022.95	10,776.69	10,606.10	170.60	63.170		
12,800.00	6,986.92	6,885.37	6,884.92	91.77	139.73	89.91	-1,132.50	-5,022.95	10,868.46	10,697.84	170.61	63.702		
12,900.00	6,986.86	6,885.31	6,884.86	93.14	139.73	89.91	-1,132.50	-5,022.95	10,960.36	10,789.72	170.64	64.232		
13,000.00	6,986.79	6,885.24	6,884.79	94.52	139.72	89.91	-1,132.50	-5,022.95	11,052.41	10,881.74	170.66	64.762		
13,100.00	6,986.72	6,885.17	6,884.72	95.90	139.72	89.91	-1,132.50	-5,022.95	11,144.59	10,973.90	170.69	65.290		
13,200.00	6,986.66	6,885.11	6,884.66	97.30	139.72	89.91	-1,132.50	-5,022.95	11,236.90	11,066.18	170.73	65.818		
13,300.00	6,986.59	6,885.04	6,884.59	98.69	139.71	89.91	-1,132.50	-5,022.95	11,329.35	11,158.59	170.76	66.346		
13,400.00	6,986.52	6,884.97	6,884.52	100.10	139.71	89.91	-1,132.50	-5,022.95	11,421.92	11,251.12	170.80	66.872		
13,500.00	6,986.46	6,884.91	6,884.46	101.51	139.71	89.91	-1,132.50	-5,022.95	11,514.62	11,343.78	170.85	67.398		
13,600.00	6,986.39	6,884.84	6,884.39	102.93	139.70	89.90	-1,132.50	-5,022.95	11,607.44	11,436.55	170.89	67.922		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #108 - OH - OH-SVY											Offset Site Error: 0.00 usft		
Survey Program: 107-MWD OWSG Rev5								Rule Assigned:				Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
13,700.00	6,986.32	6,884.77	6,884.32	104.35	139.70	89.90	-1,132.50	-5,022.95	11,700.38	11,529.44	170.94	68.446	
13,800.00	6,986.25	6,884.71	6,884.25	105.78	139.69	89.90	-1,132.50	-5,022.95	11,793.43	11,622.44	170.99	68.970	
13,900.00	6,986.19	6,884.64	6,884.19	107.21	139.69	89.90	-1,132.50	-5,022.95	11,886.60	11,715.55	171.05	69.492	
14,000.00	6,986.12	6,884.57	6,884.12	108.65	139.69	89.90	-1,132.50	-5,022.95	11,979.87	11,808.77	171.11	70.014	
14,100.00	6,986.05	6,884.51	6,884.05	110.09	139.68	89.90	-1,132.50	-5,022.95	12,073.26	11,902.09	171.17	70.535	
14,200.00	6,985.99	6,884.44	6,883.99	111.54	139.68	89.90	-1,132.50	-5,022.95	12,166.75	11,995.52	171.23	71.055	
14,300.00	6,985.92	6,884.37	6,883.92	112.99	139.68	89.90	-1,132.50	-5,022.95	12,260.34	12,089.04	171.29	71.575	
14,400.00	6,985.85	6,884.31	6,883.85	114.45	139.67	89.90	-1,132.50	-5,022.95	12,354.03	12,182.67	171.36	72.093	
14,500.00	6,985.79	6,884.24	6,883.79	115.91	139.67	89.90	-1,132.50	-5,022.95	12,447.82	12,276.39	171.43	72.611	
14,600.00	6,985.72	6,884.17	6,883.72	117.38	139.67	89.90	-1,132.50	-5,022.95	12,541.71	12,370.20	171.50	73.129	
14,700.00	6,985.65	6,884.11	6,883.65	118.84	139.66	89.89	-1,132.50	-5,022.95	12,635.69	12,464.11	171.57	73.645	
14,800.00	6,985.59	6,884.04	6,883.59	120.32	139.66	89.89	-1,132.50	-5,022.95	12,729.76	12,558.11	171.65	74.161	
14,900.00	6,985.52	6,883.97	6,883.52	121.79	139.65	89.89	-1,132.50	-5,022.95	12,823.92	12,652.19	171.73	74.677	
15,000.00	6,985.45	6,883.90	6,883.45	123.27	139.65	89.89	-1,132.50	-5,022.95	12,918.17	12,746.36	171.80	75.191	
15,100.00	6,985.39	6,883.84	6,883.39	124.75	139.65	89.89	-1,132.50	-5,022.95	13,012.50	12,840.62	171.88	75.705	
15,200.00	6,985.32	6,883.77	6,883.32	126.24	139.64	89.89	-1,132.50	-5,022.95	13,106.92	12,934.96	171.96	76.219	
15,300.00	6,985.25	6,883.70	6,883.25	127.72	139.64	89.89	-1,132.50	-5,022.95	13,201.42	13,029.38	172.05	76.731	
15,400.00	6,985.19	6,883.64	6,883.19	129.21	139.64	89.89	-1,132.50	-5,022.95	13,296.01	13,123.87	172.13	77.243	
15,500.00	6,985.12	6,883.57	6,883.12	130.71	139.63	89.89	-1,132.50	-5,022.95	13,390.67	13,218.45	172.22	77.755	
15,600.00	6,985.05	6,883.50	6,883.05	132.20	139.63	89.89	-1,132.50	-5,022.95	13,485.40	13,313.10	172.30	78.265	
15,700.00	6,984.99	6,883.44	6,882.99	133.70	139.63	89.89	-1,132.50	-5,022.95	13,580.22	13,407.82	172.39	78.775	
15,800.00	6,984.92	6,883.37	6,882.92	135.20	139.62	89.88	-1,132.50	-5,022.95	13,675.10	13,502.62	172.48	79.285	
15,900.00	6,984.85	6,883.30	6,882.85	136.71	139.62	89.88	-1,132.50	-5,022.95	13,770.06	13,597.49	172.57	79.794	
16,000.00	6,984.79	6,883.24	6,882.79	138.21	139.61	89.88	-1,132.50	-5,022.95	13,865.09	13,692.43	172.66	80.302	
16,100.00	6,984.72	6,883.17	6,882.72	139.72	139.61	89.88	-1,132.50	-5,022.95	13,960.19	13,787.44	172.75	80.809	
16,200.00	6,984.65	6,883.10	6,882.65	141.23	139.61	89.88	-1,132.50	-5,022.95	14,055.36	13,882.51	172.85	81.316	
16,300.00	6,984.59	6,883.04	6,882.59	142.75	139.60	89.88	-1,132.50	-5,022.95	14,150.59	13,977.65	172.94	81.823	
16,400.00	6,984.52	6,882.97	6,882.52	144.26	139.60	89.88	-1,132.50	-5,022.95	14,245.89	14,072.85	173.04	82.328	
16,500.00	6,984.45	6,882.90	6,882.45	145.78	139.60	89.88	-1,132.50	-5,022.95	14,341.26	14,168.12	173.13	82.833	
16,600.00	6,984.39	6,882.84	6,882.39	147.29	139.59	89.88	-1,132.50	-5,022.95	14,436.68	14,263.45	173.23	83.338	
16,700.00	6,984.32	6,882.77	6,882.32	148.82	139.59	89.88	-1,132.50	-5,022.95	14,532.17	14,358.84	173.33	83.842	
16,800.00	6,984.25	6,882.70	6,882.25	150.34	139.59	89.88	-1,132.50	-5,022.95	14,627.72	14,454.29	173.43	84.345	
16,900.00	6,984.19	6,882.64	6,882.19	151.86	139.58	89.87	-1,132.50	-5,022.95	14,723.33	14,549.80	173.53	84.848	
17,000.00	6,984.12	6,882.57	6,882.12	153.39	139.58	89.87	-1,132.50	-5,022.95	14,818.99	14,645.36	173.63	85.350	
17,100.00	6,984.05	6,882.50	6,882.05	154.91	139.57	89.87	-1,132.50	-5,022.95	14,914.71	14,740.99	173.73	85.852	
17,200.00	6,983.99	6,882.44	6,881.99	156.44	139.57	89.87	-1,132.50	-5,022.95	15,010.49	14,836.66	173.83	86.353	
17,300.00	6,983.92	6,882.37	6,881.92	157.97	139.57	89.87	-1,132.50	-5,022.95	15,106.32	14,932.39	173.93	86.853	
17,400.00	6,983.85	6,882.30	6,881.85	159.50	139.56	89.87	-1,132.50	-5,022.95	15,202.21	15,028.18	174.03	87.353	
17,500.00	6,983.79	6,882.24	6,881.79	161.04	139.56	89.87	-1,132.50	-5,022.95	15,298.15	15,124.01	174.13	87.853	
17,600.00	6,983.72	6,882.17	6,881.72	162.57	139.56	89.87	-1,132.50	-5,022.95	15,394.14	15,219.90	174.24	88.351	
17,700.00	6,983.65	6,882.10	6,881.65	164.11	139.55	89.87	-1,132.50	-5,022.95	15,490.18	15,315.84	174.34	88.850	
17,800.00	6,983.59	6,882.04	6,881.59	165.65	139.55	89.87	-1,132.50	-5,022.95	15,586.27	15,411.82	174.45	89.347	
17,900.00	6,983.52	6,881.97	6,881.52	167.18	139.55	89.87	-1,132.50	-5,022.95	15,682.41	15,507.86	174.55	89.844	
18,000.00	6,983.45	6,881.90	6,881.45	168.72	139.54	89.87	-1,132.50	-5,022.95	15,778.60	15,603.94	174.66	90.341	
18,100.00	6,983.39	6,881.84	6,881.39	170.27	139.54	89.86	-1,132.50	-5,022.95	15,874.83	15,700.07	174.76	90.837	
18,200.00	6,983.32	6,881.77	6,881.32	171.81	139.53	89.86	-1,132.50	-5,022.95	15,971.11	15,796.25	174.87	91.332	
18,300.00	6,983.25	6,881.70	6,881.25	173.35	139.53	89.86	-1,132.50	-5,022.95	16,067.44	15,892.47	174.97	91.827	
18,400.00	6,983.19	6,881.64	6,881.19	174.90	139.53	89.86	-1,132.50	-5,022.95	16,163.81	15,988.73	175.08	92.321	
18,500.00	6,983.12	6,881.57	6,881.12	176.44	139.52	89.86	-1,132.50	-5,022.95	16,260.23	16,085.04	175.19	92.815	
18,600.00	6,983.05	6,881.50	6,881.05	177.99	139.52	89.86	-1,132.50	-5,022.95	16,356.69	16,181.39	175.30	93.308	
18,700.00	6,982.99	6,881.44	6,880.99	179.54	139.52	89.86	-1,132.50	-5,022.95	16,453.19	16,277.78	175.41	93.801	
18,800.00	6,982.92	6,881.37	6,880.92	181.09	139.51	89.86	-1,132.50	-5,022.95	16,549.73	16,374.22	175.51	94.293	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #108 - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 107-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (")	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
18,900.00	6,982.85	6,881.30	6,880.85	182.64	139.51	89.86	-1,132.50	-5,022.95	16,646.31	16,470.69	175.62	94.785	
19,000.00	6,982.78	6,881.24	6,880.78	184.19	139.51	89.86	-1,132.50	-5,022.95	16,742.93	16,567.20	175.73	95.276	
19,100.00	6,982.72	6,881.17	6,880.72	185.74	139.50	89.86	-1,132.50	-5,022.95	16,839.60	16,663.76	175.84	95.766	
19,200.00	6,982.65	6,881.10	6,880.65	187.29	139.50	89.85	-1,132.50	-5,022.95	16,936.30	16,760.35	175.95	96.256	
19,300.00	6,982.58	6,881.04	6,880.58	188.84	139.49	89.85	-1,132.50	-5,022.95	17,033.04	16,856.98	176.06	96.745	
19,400.00	6,982.52	6,880.97	6,880.52	190.40	139.49	89.85	-1,132.50	-5,022.95	17,129.81	16,953.64	176.17	97.234	
19,500.00	6,982.45	6,880.90	6,880.45	191.95	139.49	89.85	-1,132.50	-5,022.95	17,226.63	17,050.35	176.28	97.723	
19,600.00	6,982.38	6,880.84	6,880.38	193.51	139.48	89.85	-1,132.50	-5,022.95	17,323.48	17,147.09	176.39	98.210	
19,700.00	6,982.32	6,880.77	6,880.32	195.07	139.48	89.85	-1,132.50	-5,022.95	17,420.36	17,243.86	176.50	98.697	
19,800.00	6,982.25	6,880.70	6,880.25	196.62	139.48	89.85	-1,132.50	-5,022.95	17,517.28	17,340.67	176.61	99.184	
19,900.00	6,982.18	6,880.64	6,880.18	198.18	139.47	89.85	-1,132.50	-5,022.95	17,614.24	17,437.51	176.73	99.670	
20,000.00	6,982.12	6,880.57	6,880.12	199.74	139.47	89.85	-1,132.50	-5,022.95	17,711.23	17,534.39	176.84	100.156	
20,100.00	6,982.05	6,880.50	6,880.05	201.30	139.46	89.85	-1,132.50	-5,022.95	17,808.25	17,631.30	176.95	100.641	
20,176.02	6,982.00	6,880.45	6,880.00	202.36	139.46	89.85	-1,132.50	-5,022.95	17,882.02	17,700.88	181.14	98.717	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 117-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-95.35	-744.33	-7,949.04	7,984.33				
100.00	100.00	9.00	9.00	0.25	0.18	-95.35	-744.33	-7,949.04	7,983.81	7,983.38	0.43	N/A	
200.00	200.00	109.00	109.00	0.61	2.15	-95.35	-744.33	-7,949.04	7,983.81	7,981.06	2.76	2,896.181	
300.00	300.00	209.00	209.00	0.97	4.61	-95.35	-744.33	-7,949.04	7,983.81	7,978.24	5.57	1,432.440	
400.00	400.00	309.00	309.00	1.33	7.11	-95.35	-744.33	-7,949.04	7,983.81	7,975.38	8.43	946.748	
435.83	435.83	343.97	343.96	1.45	7.98	-95.35	-743.72	-7,949.04	7,983.76	7,974.32	9.44	846.113	
500.00	500.00	406.57	406.56	1.68	9.55	-95.35	-743.86	-7,949.04	7,983.77	7,972.54	11.23	710.852	
600.00	600.00	509.15	509.00	2.04	12.15	-95.35	-744.33	-7,949.04	7,983.81	7,969.62	14.19	562.633	
700.00	699.98	609.13	608.98	2.40	15.22	-85.36	-744.33	-7,949.04	7,983.67	7,966.05	17.62	453.167	
800.00	799.84	699.70	699.52	2.76	18.00	-85.40	-743.63	-7,949.04	7,983.19	7,962.43	20.76	384.620	
900.00	899.45	808.76	808.45	3.13	21.07	-85.49	-744.33	-7,949.04	7,982.56	7,958.37	24.18	330.067	
1,000.00	998.70	904.23	903.89	3.49	23.59	-85.58	-743.33	-7,949.04	7,981.50	7,954.44	27.07	294.865	
1,100.00	1,097.47	1,006.88	1,006.47	3.86	26.25	-85.73	-744.33	-7,949.04	7,980.40	7,950.29	30.11	265.067	
1,200.00	1,195.62	1,105.04	1,104.62	4.24	28.51	-85.89	-744.33	-7,949.04	7,978.98	7,946.23	32.75	243.602	
1,300.00	1,293.06	1,202.47	1,202.06	4.64	30.76	-86.08	-744.33	-7,949.04	7,977.36	7,941.96	35.40	225.351	
1,400.00	1,389.64	1,297.00	1,296.57	5.06	32.94	-86.28	-743.05	-7,949.04	7,975.44	7,937.45	38.00	209.897	
1,500.00	1,485.27	1,389.01	1,388.57	5.50	35.06	-86.51	-743.46	-7,949.04	7,973.57	7,933.02	40.56	196.598	
1,515.00	1,499.52	1,402.71	1,402.26	5.57	35.37	-86.55	-743.55	-7,949.04	7,973.29	7,932.35	40.94	194.750	
1,600.00	1,580.22	1,480.14	1,479.69	5.96	37.16	-86.73	-744.23	-7,949.04	7,971.73	7,928.61	43.12	184.885	
1,700.00	1,675.17	1,584.70	1,584.17	6.44	39.47	-86.97	-744.33	-7,949.04	7,969.92	7,924.02	45.90	173.626	
1,800.00	1,770.11	1,679.64	1,679.11	6.92	41.56	-87.18	-744.33	-7,949.04	7,968.24	7,919.76	48.48	164.378	
1,900.00	1,865.05	1,773.09	1,772.54	7.41	43.62	-87.38	-743.00	-7,949.04	7,966.50	7,915.48	51.02	156.139	
2,000.00	1,959.99	1,863.88	1,863.32	7.90	45.62	-87.59	-743.32	-7,949.04	7,965.10	7,911.58	53.52	148.836	
2,100.00	2,054.94	1,954.45	1,953.88	8.40	47.62	-87.80	-743.99	-7,949.04	7,963.87	7,907.86	56.01	142.187	
2,200.00	2,149.88	2,059.51	2,058.88	8.90	49.79	-88.04	-744.33	-7,949.04	7,962.71	7,904.03	58.68	135.688	
2,300.00	2,244.82	2,154.45	2,153.82	9.41	51.69	-88.25	-744.33	-7,949.04	7,961.64	7,900.55	61.09	130.323	
2,400.00	2,339.76	2,248.14	2,247.50	9.92	53.56	-88.46	-743.34	-7,949.04	7,960.55	7,897.07	63.48	125.408	
2,500.00	2,434.71	2,338.98	2,338.34	10.43	55.38	-88.66	-743.59	-7,949.04	7,959.76	7,893.95	65.81	120.955	
2,600.00	2,529.65	2,429.63	2,428.98	10.94	57.20	-88.87	-744.16	-7,949.04	7,959.15	7,891.01	68.14	116.811	
2,700.00	2,624.59	2,534.28	2,533.59	11.45	59.31	-89.11	-744.33	-7,949.04	7,958.60	7,887.84	70.76	112.476	
2,800.00	2,719.53	2,629.22	2,628.53	11.97	61.22	-89.32	-744.33	-7,949.04	7,958.14	7,884.96	73.19	108.735	
2,900.00	2,814.48	2,723.53	2,722.84	12.49	63.12	-89.53	-743.51	-7,949.04	7,957.68	7,882.07	75.61	105.251	
3,000.00	2,909.42	2,815.28	2,814.59	13.01	64.97	-89.74	-743.66	-7,949.04	7,957.50	7,879.52	77.98	102.052	
3,060.43	2,966.79	2,870.66	2,869.97	13.32	66.08	-89.87	-743.86	-7,949.04	7,957.47	7,878.06	79.41	100.213 CC	
3,100.00	3,004.36	2,906.89	2,906.20	13.53	66.81	-89.95	-744.03	-7,949.04	7,957.48	7,877.14	80.34	99.045	
3,200.00	3,099.30	3,009.05	3,008.30	14.05	68.83	-90.18	-744.33	-7,949.04	7,957.57	7,874.70	82.88	96.016	
3,300.00	3,194.25	3,103.99	3,103.25	14.57	70.66	-90.40	-744.33	-7,949.04	7,957.74	7,872.51	85.23	93.368	
3,400.00	3,289.19	3,198.93	3,198.19	15.09	72.49	-90.61	-744.33	-7,949.04	7,958.03	7,870.45	87.58	90.863	
3,500.00	3,384.13	3,291.45	3,290.70	15.62	74.27	-90.81	-743.15	-7,949.04	7,958.22	7,868.33	89.89	88.533	
3,600.00	3,479.07	3,382.04	3,381.28	16.14	76.02	-91.02	-743.43	-7,949.04	7,958.81	7,866.65	92.16	86.358	
3,700.00	3,574.02	3,472.47	3,471.71	16.67	77.76	-91.23	-743.96	-7,949.04	7,959.58	7,865.15	94.43	84.293	
3,800.00	3,668.96	3,578.75	3,577.96	17.19	79.93	-91.47	-744.33	-7,949.04	7,960.43	7,863.32	97.12	81.967	
3,900.00	3,763.90	3,671.67	3,670.88	17.72	81.90	-91.68	-744.10	-7,949.04	7,961.30	7,861.68	99.62	79.920	
4,000.00	3,858.84	3,768.68	3,767.84	18.24	84.13	-91.90	-744.33	-7,949.04	7,962.38	7,860.00	102.38	77.775	
4,100.00	3,953.79	3,863.62	3,862.79	18.77	87.46	-92.11	-744.33	-7,949.04	7,963.54	7,857.30	106.23	74.964	
4,200.00	4,048.73	3,958.56	3,957.73	19.30	90.79	-92.33	-744.33	-7,949.04	7,964.82	7,854.73	110.09	72.351	
4,300.00	4,143.67	4,049.45	4,048.60	19.82	93.98	-92.52	-742.76	-7,949.04	7,965.87	7,852.08	113.80	70.000	
4,400.00	4,238.61	4,136.25	4,135.38	20.35	97.02	-92.72	-743.15	-7,949.04	7,967.49	7,850.13	117.37	67.885	
4,500.00	4,333.56	4,222.80	4,221.92	20.88	100.06	-92.92	-743.95	-7,949.04	7,969.34	7,848.41	120.93	65.902	
4,600.00	4,428.50	4,328.58	4,327.09	21.41	104.74	-93.15	-743.26	-7,949.04	7,970.93	7,844.79	126.14	63.191	
4,700.00	4,523.44	4,430.96	4,429.13	21.93	109.72	-93.38	-743.42	-7,949.04	7,972.86	7,841.21	131.65	60.563	
4,800.00	4,618.38	4,525.91	4,523.82	22.46	114.28	-93.60	-743.51	-7,949.04	7,974.90	7,838.16	136.73	58.324	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 117-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
4,900.00	4,713.33	4,624.61	4,622.33	22.99	119.09	-93.83	-744.33	-7,949.04	7,977.24	7,835.17	142.07	56.151	
5,000.00	4,808.27	4,719.93	4,717.27	23.52	123.85	-94.04	-744.33	-7,949.04	7,979.51	7,832.15	147.36	54.151	
5,100.00	4,903.21	4,815.13	4,812.21	24.05	128.63	-94.25	-744.33	-7,949.04	7,981.90	7,829.23	152.66	52.285	
5,200.00	4,998.16	4,892.66	4,889.69	24.58	132.47	-94.42	-743.12	-7,949.04	7,984.12	7,827.09	157.03	50.844	
5,300.00	5,093.10	5,005.40	5,002.10	25.11	138.15	-94.68	-744.33	-7,949.04	7,987.05	7,823.81	163.23	48.930	
5,400.00	5,188.04	5,100.68	5,097.04	25.64	142.97	-94.89	-744.33	-7,949.04	7,989.80	7,821.23	168.58	47.395	
5,500.00	5,282.98	5,195.62	5,191.98	26.17	147.64	-95.11	-744.33	-7,949.04	7,992.68	7,818.90	173.78	45.992	
5,600.00	5,377.93	5,290.54	5,286.75	26.70	152.32	-95.29	-740.29	-7,949.04	7,994.60	7,815.61	178.99	44.666	
5,623.25	5,400.00	5,306.73	5,302.93	26.82	153.12	-95.33	-740.31	-7,949.04	7,995.32	7,815.41	179.91	44.442	
5,700.00	5,473.03	5,360.14	5,356.30	27.22	155.75	-95.47	-740.70	-7,949.04	7,997.81	7,814.88	182.94	43.719	
5,800.00	5,568.64	5,429.71	5,425.79	27.73	159.18	-95.66	-741.93	-7,949.04	8,001.29	7,814.42	186.87	42.818	
5,900.00	5,664.75	5,578.46	5,573.75	28.23	166.38	-96.00	-744.33	-7,949.04	8,004.73	7,810.17	194.57	41.142	
6,000.00	5,761.33	5,675.03	5,670.33	28.71	170.95	-96.21	-744.33	-7,949.04	8,007.59	7,807.97	199.62	40.115	
6,100.00	5,858.34	5,772.05	5,767.34	29.18	175.55	-96.40	-744.33	-7,949.04	8,010.33	7,805.66	204.68	39.137	
6,200.00	5,955.76	5,869.47	5,864.76	29.64	180.16	-96.58	-744.33	-7,949.04	8,012.95	7,803.21	209.74	38.204	
6,300.00	6,053.57	5,949.00	5,943.35	30.07	183.92	-96.73	-744.33	-7,949.04	8,015.45	7,801.51	213.94	37.466 ES	
6,400.00	6,151.72	5,949.00	5,943.35	30.50	183.92	-96.76	-744.33	-7,949.04	8,018.60	7,804.27	214.33	37.413	
6,500.00	6,250.19	5,949.00	5,943.35	30.91	183.92	-96.80	-744.33	-7,949.04	8,022.79	7,808.12	214.67	37.372	
6,600.00	6,348.94	5,949.00	5,943.35	31.30	183.92	-96.85	-744.33	-7,949.04	8,028.03	7,813.05	214.97	37.345	
6,659.67	6,408.00	5,949.00	5,943.35	31.53	183.92	-96.89	-744.33	-7,949.04	8,031.64	7,816.51	215.13	37.334	
6,700.00	6,447.82	5,949.00	5,943.35	31.68	183.92	-113.20	-744.33	-7,949.04	8,035.43	7,820.20	215.23	37.334 SF	
6,750.00	6,496.66	5,949.00	5,943.35	31.90	183.92	-124.13	-744.33	-7,949.04	8,043.51	7,828.15	215.36	37.349	
6,800.00	6,544.65	5,949.00	5,943.35	32.13	183.92	-129.96	-744.33	-7,949.04	8,055.27	7,839.77	215.50	37.379	
6,850.00	6,591.49	5,949.00	5,943.35	32.37	183.92	-133.22	-744.33	-7,949.04	8,070.63	7,854.98	215.65	37.425	
6,900.00	6,636.89	5,949.00	5,943.35	32.62	183.92	-134.97	-744.33	-7,949.04	8,089.46	7,873.66	215.80	37.486	
6,950.00	6,680.57	5,949.00	5,943.35	32.89	183.92	-135.71	-744.33	-7,949.04	8,111.64	7,895.68	215.96	37.562	
7,000.00	6,722.26	5,949.00	5,943.35	33.17	183.92	-135.70	-744.33	-7,949.04	8,136.99	7,920.87	216.11	37.651	
7,050.00	6,761.71	5,949.00	5,943.35	33.45	183.92	-135.04	-744.33	-7,949.04	8,165.33	7,949.05	216.28	37.754	
7,100.00	6,798.67	5,949.00	5,943.35	33.75	183.92	-133.78	-744.33	-7,949.04	8,196.45	7,980.01	216.44	37.869	
7,150.00	6,832.91	5,949.00	5,943.35	34.06	183.92	-131.90	-744.33	-7,949.04	8,230.14	8,013.53	216.61	37.996	
7,200.00	6,864.22	5,949.00	5,943.35	34.37	183.92	-129.36	-744.33	-7,949.04	8,266.16	8,049.38	216.78	38.132	
7,250.00	6,892.42	5,949.00	5,943.35	34.69	183.92	-126.08	-744.33	-7,949.04	8,304.25	8,087.30	216.95	38.277	
7,300.00	6,917.32	5,949.00	5,943.35	35.03	183.92	-121.96	-744.33	-7,949.04	8,344.15	8,127.02	217.13	38.430	
7,350.00	6,938.77	5,949.00	5,943.35	35.37	183.92	-116.88	-744.33	-7,949.04	8,385.60	8,168.29	217.31	38.589	
7,400.00	6,956.64	5,949.00	5,943.35	35.72	183.92	-110.74	-744.33	-7,949.04	8,428.32	8,210.83	217.49	38.753	
7,450.00	6,970.83	5,949.00	5,943.35	36.07	183.92	-103.50	-744.33	-7,949.04	8,472.02	8,254.34	217.68	38.920	
7,500.00	6,981.23	5,949.00	5,943.35	36.44	183.92	-95.26	-744.33	-7,949.04	8,516.43	8,298.56	217.86	39.090	
7,550.00	6,987.80	5,949.00	5,943.35	36.81	183.92	-86.30	-744.33	-7,949.04	8,561.26	8,343.20	218.06	39.262	
7,600.00	6,990.48	5,949.00	5,943.35	37.19	183.92	-77.08	-744.33	-7,949.04	8,606.23	8,387.98	218.25	39.432	
7,609.87	6,990.55	5,949.00	5,943.35	37.26	183.92	-75.28	-744.33	-7,949.04	8,615.10	8,396.80	218.29	39.466	
7,700.00	6,990.49	5,949.00	5,943.35	37.97	183.92	-75.28	-744.33	-7,949.04	8,696.16	8,477.51	218.65	39.773	
7,800.00	6,990.42	5,949.00	5,943.35	38.78	183.92	-75.28	-744.33	-7,949.04	8,786.30	8,567.26	219.04	40.113	
7,900.00	6,990.35	5,949.00	5,943.35	39.64	183.92	-75.28	-744.33	-7,949.04	8,876.65	8,657.23	219.43	40.454	
8,000.00	6,990.28	5,949.00	5,943.35	40.53	183.92	-75.28	-744.33	-7,949.04	8,967.21	8,747.40	219.81	40.795	
8,100.00	6,990.21	5,949.00	5,943.35	41.45	183.92	-75.28	-744.33	-7,949.04	9,057.97	8,837.78	220.19	41.137	
8,200.00	6,990.14	5,949.00	5,943.35	42.40	183.92	-75.28	-744.33	-7,949.04	9,148.92	8,928.35	220.57	41.479	
8,306.37	6,990.06	5,949.00	5,943.35	43.45	183.92	-75.28	-744.33	-7,949.04	9,245.86	9,024.90	220.97	41.843	
8,400.00	6,990.00	5,949.00	5,943.35	44.38	183.92	-72.75	-744.33	-7,949.04	9,332.51	9,111.22	221.29	42.174	
8,500.00	6,989.93	5,949.00	5,943.35	45.36	183.92	-68.77	-744.33	-7,949.04	9,427.41	9,205.83	221.58	42.547	
8,600.00	6,989.85	5,949.00	5,943.35	46.33	183.92	-62.34	-744.33	-7,949.04	9,524.23	9,302.42	221.81	42.939	
8,700.00	6,989.78	5,949.00	5,943.35	47.28	183.92	-50.79	-744.33	-7,949.04	9,622.44	9,400.47	221.98	43.349	
8,800.00	6,989.70	5,949.00	5,943.35	48.21	183.92	-27.94	-744.33	-7,949.04	9,721.54	9,499.46	222.08	43.774	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		117-A027Ua_INC-ONLY						Rule Assigned:		Offset Well Error:		0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,900.00	6,989.63	5,949.00	5,943.35	49.11	183.92	9.91	-744.33	-7,949.04	9,821.02	9,598.88	222.13	44.212		
9,000.00	6,989.55	5,949.00	5,943.35	49.99	183.92	41.55	-744.33	-7,949.04	9,920.39	9,698.26	222.13	44.661		
9,100.00	6,989.48	5,949.00	5,943.35	50.84	183.92	58.01	-744.33	-7,949.04	10,019.18	9,797.11	222.06	45.118		
9,200.00	6,989.40	5,949.00	5,943.35	51.66	183.92	66.64	-744.33	-7,949.04	10,116.92	9,894.97	221.95	45.582		
9,300.00	6,989.33	5,949.00	5,943.35	52.45	183.92	71.71	-744.33	-7,949.04	10,213.19	9,991.41	221.79	46.050		
9,393.87	6,989.27	5,949.00	5,943.35	53.15	183.92	74.83	-744.33	-7,949.04	10,301.84	10,080.24	221.59	46.490		
9,400.00	6,989.26	5,949.00	5,943.35	53.20	183.92	74.83	-744.33	-7,949.04	10,307.57	10,085.99	221.58	46.519		
9,500.00	6,989.19	5,949.00	5,943.35	53.95	183.92	74.83	-744.33	-7,949.04	10,401.06	10,179.70	221.36	46.987		
9,600.00	6,989.12	5,949.00	5,943.35	54.73	183.92	74.83	-744.33	-7,949.04	10,494.67	10,273.53	221.15	47.456		
9,700.00	6,989.05	5,949.00	5,943.35	55.55	183.92	74.83	-744.33	-7,949.04	10,588.41	10,367.46	220.94	47.924		
9,800.00	6,988.98	5,949.00	5,943.35	56.40	183.92	74.83	-744.33	-7,949.04	10,682.25	10,461.50	220.75	48.391		
9,900.00	6,988.91	5,949.00	5,943.35	57.28	183.92	74.83	-744.33	-7,949.04	10,776.20	10,555.65	220.56	48.859		
10,000.00	6,988.84	5,949.00	5,943.35	58.20	183.92	74.83	-744.33	-7,949.04	10,870.27	10,649.89	220.38	49.326		
10,100.00	6,988.77	5,949.00	5,943.35	59.14	183.92	74.83	-744.33	-7,949.04	10,964.43	10,744.23	220.20	49.793		
10,200.00	6,988.70	5,949.00	5,943.35	60.11	183.92	74.83	-744.33	-7,949.04	11,058.70	10,838.67	220.03	50.259		
10,300.00	6,988.63	5,949.00	5,943.35	61.11	183.92	74.83	-744.33	-7,949.04	11,153.07	10,933.20	219.87	50.725		
10,400.00	6,988.56	5,949.00	5,943.35	62.14	183.92	74.83	-744.33	-7,949.04	11,247.54	11,027.83	219.72	51.191		
10,500.00	6,988.49	5,949.00	5,943.35	63.19	183.92	74.83	-744.33	-7,949.04	11,342.10	11,122.54	219.57	51.657		
10,600.00	6,988.42	5,949.00	5,943.35	64.26	183.92	74.83	-744.33	-7,949.04	11,436.76	11,217.33	219.42	52.122		
10,700.00	6,988.35	5,949.00	5,943.35	65.36	183.92	74.83	-744.33	-7,949.04	11,531.50	11,312.22	219.29	52.586		
10,800.00	6,988.28	5,949.00	5,943.35	66.48	183.92	74.83	-744.33	-7,949.04	11,626.34	11,407.18	219.16	53.050		
10,900.00	6,988.21	5,949.00	5,943.35	67.61	183.92	74.83	-744.33	-7,949.04	11,721.25	11,502.22	219.03	53.514		
11,000.00	6,988.14	5,949.00	5,943.35	68.77	183.92	74.83	-744.33	-7,949.04	11,816.26	11,597.35	218.91	53.977		
11,100.00	6,988.07	5,949.00	5,943.35	69.95	183.92	74.83	-744.33	-7,949.04	11,911.34	11,692.54	218.80	54.440		
11,200.00	6,988.01	5,949.00	5,943.35	71.14	183.92	74.83	-744.33	-7,949.04	12,006.51	11,787.82	218.69	54.902		
11,300.00	6,987.94	5,949.00	5,943.35	72.35	183.92	74.83	-744.33	-7,949.04	12,101.75	11,883.16	218.59	55.364		
11,400.00	6,987.87	5,949.00	5,943.35	73.57	183.92	74.83	-744.33	-7,949.04	12,197.07	11,978.58	218.49	55.825		
11,500.00	6,987.80	5,949.00	5,943.35	74.81	183.92	74.83	-744.33	-7,949.04	12,292.46	12,074.07	218.39	56.286		
11,600.00	6,987.73	5,949.00	5,943.35	76.07	183.92	74.83	-744.33	-7,949.04	12,387.93	12,169.62	218.30	56.746		
11,643.87	6,987.70	5,949.00	5,943.35	76.62	183.92	74.83	-744.33	-7,949.04	12,429.82	12,211.56	218.27	56.948		
11,700.00	6,987.66	5,949.00	5,943.35	77.33	183.92	75.72	-744.33	-7,949.04	12,483.30	12,265.08	218.22	57.206		
11,737.27	6,987.63	5,949.00	5,943.35	77.80	183.92	76.26	-744.33	-7,949.04	12,518.64	12,300.45	218.18	57.377		
11,800.00	6,987.59	5,949.00	5,943.35	78.59	183.92	76.26	-744.33	-7,949.04	12,578.01	12,359.89	218.12	57.664		
11,900.00	6,987.52	5,949.00	5,943.35	79.86	183.92	76.26	-744.33	-7,949.04	12,672.73	12,454.70	218.04	58.122		
12,000.00	6,987.46	5,949.00	5,943.35	81.14	183.92	76.26	-744.33	-7,949.04	12,767.54	12,549.58	217.96	58.579		
12,100.00	6,987.39	5,949.00	5,943.35	82.43	183.92	76.26	-744.33	-7,949.04	12,862.41	12,644.54	217.88	59.035		
12,200.00	6,987.32	5,949.00	5,943.35	83.73	183.92	76.26	-744.33	-7,949.04	12,957.37	12,739.57	217.81	59.491		
12,300.00	6,987.26	5,949.00	5,943.35	85.05	183.92	76.26	-744.33	-7,949.04	13,052.40	12,834.66	217.74	59.946		
12,400.00	6,987.19	5,949.00	5,943.35	86.38	183.92	76.26	-744.33	-7,949.04	13,147.51	12,929.83	217.67	60.400		
12,500.00	6,987.12	5,949.00	5,943.35	87.71	183.92	76.26	-744.33	-7,949.04	13,242.68	13,025.07	217.62	60.854		
12,600.00	6,987.06	5,949.00	5,943.35	89.06	183.92	76.26	-744.33	-7,949.04	13,337.93	13,120.37	217.56	61.307		
12,700.00	6,986.99	5,949.00	5,943.35	90.41	183.92	76.26	-744.33	-7,949.04	13,433.25	13,215.74	217.51	61.759		
12,800.00	6,986.92	5,949.00	5,943.35	91.77	183.92	76.26	-744.33	-7,949.04	13,528.63	13,311.17	217.47	62.211		
12,900.00	6,986.86	5,949.00	5,943.35	93.14	183.92	76.26	-744.33	-7,949.04	13,624.08	13,406.66	217.42	62.662		
13,000.00	6,986.79	5,949.00	5,943.35	94.52	183.92	76.26	-744.33	-7,949.04	13,719.60	13,502.22	217.39	63.112		
13,100.00	6,986.72	5,949.00	5,943.35	95.90	183.92	76.26	-744.33	-7,949.04	13,815.18	13,597.83	217.35	63.562		
13,200.00	6,986.66	5,949.00	5,943.35	97.30	183.92	76.26	-744.33	-7,949.04	13,910.82	13,693.50	217.32	64.011		
13,300.00	6,986.59	5,949.00	5,943.35	98.69	183.92	76.26	-744.33	-7,949.04	14,006.52	13,789.23	217.29	64.459		
13,400.00	6,986.52	5,949.00	5,943.35	100.10	183.92	76.26	-744.33	-7,949.04	14,102.28	13,885.01	217.27	64.907		
13,500.00	6,986.46	5,949.00	5,943.35	101.51	183.92	76.26	-744.33	-7,949.04	14,198.10	13,980.85	217.25	65.354		
13,600.00	6,986.39	5,949.00	5,943.35	102.93	183.92	76.26	-744.33	-7,949.04	14,293.98	14,076.75	217.23	65.800		
13,700.00	6,986.32	5,949.00	5,943.35	104.35	183.92	76.26	-744.33	-7,949.04	14,389.92	14,172.69	217.22	66.245		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149 - OH - OH-INC												Offset Site Error:	0.00 usft		
Survey Program: 117-A027Ua_INC-ONLY				Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
13,800.00	6,986.25	5,949.00	5,943.35	105.78	183.92	76.26	-744.33	-7,949.04	14,485.90	14,268.69	217.21	66.690			
13,900.00	6,986.19	5,949.00	5,943.35	107.21	183.92	76.26	-744.33	-7,949.04	14,581.95	14,364.74	217.20	67.135			
14,000.00	6,986.12	5,949.00	5,943.35	108.65	183.92	76.26	-744.33	-7,949.04	14,678.04	14,460.84	217.20	67.578			
14,100.00	6,986.05	5,949.00	5,943.35	110.09	183.92	76.26	-744.33	-7,949.04	14,774.19	14,556.99	217.20	68.021			
14,200.00	6,985.99	5,949.00	5,943.35	111.54	183.92	76.26	-744.33	-7,949.04	14,870.39	14,653.18	217.20	68.463			
14,300.00	6,985.92	5,949.00	5,943.35	112.99	183.92	76.26	-744.33	-7,949.04	14,966.64	14,749.43	217.21	68.905			
14,400.00	6,985.85	5,949.00	5,943.35	114.45	183.92	76.26	-744.33	-7,949.04	15,062.93	14,845.72	217.22	69.345			
14,500.00	6,985.79	5,949.00	5,943.35	115.91	183.92	76.26	-744.33	-7,949.04	15,159.28	14,942.05	217.23	69.785			
14,600.00	6,985.72	5,949.00	5,943.35	117.38	183.92	76.26	-744.33	-7,949.04	15,255.67	15,038.43	217.24	70.225			
14,700.00	6,985.65	5,949.00	5,943.35	118.84	183.92	76.26	-744.33	-7,949.04	15,352.11	15,134.85	217.26	70.664			
14,800.00	6,985.59	5,949.00	5,943.35	120.32	183.92	76.26	-744.33	-7,949.04	15,448.59	15,231.31	217.27	71.102			
14,900.00	6,985.52	5,949.00	5,943.35	121.79	183.92	76.26	-744.33	-7,949.04	15,545.12	15,327.82	217.30	71.539			
15,000.00	6,985.45	5,949.00	5,943.35	123.27	183.92	76.26	-744.33	-7,949.04	15,641.69	15,424.37	217.32	71.976			
15,100.00	6,985.39	5,949.00	5,943.35	124.75	183.92	76.26	-744.33	-7,949.04	15,738.30	15,520.96	217.34	72.412			
15,200.00	6,985.32	5,949.00	5,943.35	126.24	183.92	76.26	-744.33	-7,949.04	15,834.96	15,617.59	217.37	72.847			
15,300.00	6,985.25	5,949.00	5,943.35	127.72	183.92	76.26	-744.33	-7,949.04	15,931.66	15,714.25	217.40	73.282			
15,400.00	6,985.19	5,949.00	5,943.35	129.21	183.92	76.26	-744.33	-7,949.04	16,028.39	15,810.96	217.43	73.716			
15,500.00	6,985.12	5,949.00	5,943.35	130.71	183.92	76.26	-744.33	-7,949.04	16,125.17	15,907.70	217.47	74.149			
15,600.00	6,985.05	5,949.00	5,943.35	132.20	183.92	76.26	-744.33	-7,949.04	16,221.99	16,004.48	217.51	74.582			
15,700.00	6,984.99	5,949.00	5,943.35	133.70	183.92	76.26	-744.33	-7,949.04	16,318.84	16,101.30	217.54	75.014			
15,800.00	6,984.92	5,949.00	5,943.35	135.20	183.92	76.26	-744.33	-7,949.04	16,415.74	16,198.15	217.58	75.445			
15,900.00	6,984.85	5,949.00	5,943.35	136.71	183.92	76.26	-744.33	-7,949.04	16,512.67	16,295.04	217.63	75.876			
16,000.00	6,984.79	5,949.00	5,943.35	138.21	183.92	76.26	-744.33	-7,949.04	16,609.63	16,391.96	217.67	76.306			
16,100.00	6,984.72	5,949.00	5,943.35	139.72	183.92	76.26	-744.33	-7,949.04	16,706.63	16,488.92	217.72	76.736			
16,200.00	6,984.65	5,949.00	5,943.35	141.23	183.92	76.26	-744.33	-7,949.04	16,803.67	16,585.91	217.76	77.164			
16,300.00	6,984.59	5,949.00	5,943.35	142.75	183.92	76.26	-744.33	-7,949.04	16,900.74	16,682.93	217.81	77.593			
16,400.00	6,984.52	5,949.00	5,943.35	144.26	183.92	76.26	-744.33	-7,949.04	16,997.85	16,779.98	217.87	78.020			
16,500.00	6,984.45	5,949.00	5,943.35	145.78	183.92	76.26	-744.33	-7,949.04	17,094.99	16,877.07	217.92	78.447			
16,600.00	6,984.39	5,949.00	5,943.35	147.29	183.92	76.26	-744.33	-7,949.04	17,192.16	16,974.19	217.97	78.873			
16,700.00	6,984.32	5,949.00	5,943.35	148.82	183.92	76.26	-744.33	-7,949.04	17,289.36	17,071.34	218.03	79.299			
16,800.00	6,984.25	5,949.00	5,943.35	150.34	183.92	76.26	-744.33	-7,949.04	17,386.60	17,168.51	218.09	79.724			
16,900.00	6,984.19	5,949.00	5,943.35	151.86	183.92	76.26	-744.33	-7,949.04	17,483.87	17,265.72	218.14	80.148			
17,000.00	6,984.12	5,949.00	5,943.35	153.39	183.92	76.26	-744.33	-7,949.04	17,581.17	17,362.96	218.21	80.572			
17,100.00	6,984.05	5,949.00	5,943.35	154.91	183.92	76.26	-744.33	-7,949.04	17,678.49	17,460.23	218.27	80.995			
17,200.00	6,983.99	5,949.00	5,943.35	156.44	183.92	76.26	-744.33	-7,949.04	17,775.85	17,557.52	218.33	81.417			
17,300.00	6,983.92	5,949.00	5,943.35	157.97	183.92	76.26	-744.33	-7,949.04	17,873.24	17,654.84	218.40	81.839			
17,400.00	6,983.85	5,949.00	5,943.35	159.50	183.92	76.26	-744.33	-7,949.04	17,970.65	17,752.19	218.46	82.260			
17,500.00	6,983.79	5,949.00	5,943.35	161.04	183.92	76.26	-744.33	-7,949.04	18,068.10	17,849.57	218.53	82.681			
17,600.00	6,983.72	5,949.00	5,943.35	162.57	183.92	76.26	-744.33	-7,949.04	18,165.57	17,946.97	218.60	83.101			
17,700.00	6,983.65	5,949.00	5,943.35	164.11	183.92	76.26	-744.33	-7,949.04	18,263.07	18,044.40	218.67	83.520			
17,800.00	6,983.59	5,949.00	5,943.35	165.65	183.92	76.26	-744.33	-7,949.04	18,360.59	18,141.86	218.74	83.939			
17,900.00	6,983.52	5,949.00	5,943.35	167.18	183.92	76.26	-744.33	-7,949.04	18,458.14	18,239.34	218.81	84.357			
18,000.00	6,983.45	5,949.00	5,943.35	168.72	183.92	76.26	-744.33	-7,949.04	18,555.72	18,336.84	218.88	84.775			
18,100.00	6,983.39	5,949.00	5,943.35	170.27	183.92	76.26	-744.33	-7,949.04	18,653.33	18,434.37	218.96	85.192			
18,200.00	6,983.32	5,949.00	5,943.35	171.81	183.92	76.26	-744.33	-7,949.04	18,750.96	18,531.92	219.03	85.608			
18,300.00	6,983.25	5,949.00	5,943.35	173.35	183.92	76.26	-744.33	-7,949.04	18,848.61	18,629.50	219.11	86.024			
18,400.00	6,983.19	5,949.00	5,943.35	174.90	183.92	76.26	-744.33	-7,949.04	18,946.29	18,727.10	219.19	86.439			
18,500.00	6,983.12	5,949.00	5,943.35	176.44	183.92	76.26	-744.33	-7,949.04	19,043.99	18,824.73	219.27	86.854			
18,600.00	6,983.05	5,949.00	5,943.35	177.99	183.92	76.26	-744.33	-7,949.04	19,141.72	18,922.37	219.35	87.268			
18,700.00	6,982.99	5,949.00	5,943.35	179.54	183.92	76.26	-744.33	-7,949.04	19,239.47	19,020.04	219.43	87.681			
18,800.00	6,982.92	5,949.00	5,943.35	181.09	183.92	76.26	-744.33	-7,949.04	19,337.24	19,117.73	219.51	88.094			
18,900.00	6,982.85	5,949.00	5,943.35	182.64	183.92	76.26	-744.33	-7,949.04	19,435.04	19,215.45	219.59	88.506			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 117-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,000.00	6,982.78	5,949.00	5,943.35	184.19	183.92	76.26	-744.33	-7,949.04	19,532.85	19,313.18	219.67	88.918	
19,100.00	6,982.72	5,949.00	5,943.35	185.74	183.92	76.26	-744.33	-7,949.04	19,630.69	19,410.94	219.76	89.329	
19,200.00	6,982.65	5,949.00	5,943.35	187.29	183.92	76.26	-744.33	-7,949.04	19,728.55	19,508.71	219.84	89.740	
19,300.00	6,982.58	5,949.00	5,943.35	188.84	183.92	76.26	-744.33	-7,949.04	19,826.44	19,606.51	219.93	90.150	
19,400.00	6,982.52	5,949.00	5,943.35	190.40	183.92	76.26	-744.33	-7,949.04	19,924.34	19,704.33	220.02	90.559	
19,500.00	6,982.45	5,949.00	5,943.35	191.95	183.92	76.26	-744.33	-7,949.04	20,022.26	19,802.16	220.10	90.968	
19,600.00	6,982.38	5,949.00	5,943.35	193.51	183.92	76.26	-744.33	-7,949.04	20,120.21	19,900.02	220.19	91.376	
19,700.00	6,982.32	5,949.00	5,943.35	195.07	183.92	76.26	-744.33	-7,949.04	20,218.17	19,997.89	220.28	91.784	
19,800.00	6,982.25	5,949.00	5,943.35	196.62	183.92	76.26	-744.33	-7,949.04	20,316.16	20,095.79	220.37	92.191	
19,900.00	6,982.18	5,949.00	5,943.35	198.18	183.92	76.26	-744.33	-7,949.04	20,414.16	20,193.70	220.46	92.598	
20,000.00	6,982.12	5,949.00	5,943.35	199.74	183.92	76.26	-744.33	-7,949.04	20,512.19	20,291.64	220.55	93.004	
20,100.00	6,982.05	5,949.00	5,943.35	201.30	183.92	76.26	-744.33	-7,949.04	20,610.23	20,389.59	220.64	93.409	
20,176.02	6,982.00	5,949.00	5,943.35	202.36	183.92	76.26	-744.33	-7,949.04	20,684.77	20,459.79	224.98	91.939	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149A - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 245-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-96.77	-1,107.03	-9,328.37	9,394.29				
100.00	100.00	7.00	7.00	0.25	0.12	-96.77	-1,107.03	-9,328.37	9,393.83	9,393.46	0.38	N/A	
200.00	200.00	107.00	107.00	0.61	1.90	-96.77	-1,107.03	-9,328.37	9,393.83	9,391.33	2.51	3,749.688	
300.00	300.00	207.00	207.00	0.97	3.67	-96.77	-1,107.03	-9,328.37	9,393.83	9,389.20	4.64	2,026.578	
400.00	400.00	307.00	307.00	1.33	5.44	-96.77	-1,107.03	-9,328.37	9,393.83	9,387.07	6.77	1,388.497	
456.81	456.81	363.81	363.81	1.53	6.45	-96.77	-1,106.90	-9,328.37	9,393.82	9,385.84	7.98	1,177.826	
500.00	500.00	406.13	406.13	1.68	7.20	-96.77	-1,106.92	-9,328.37	9,393.82	9,384.94	8.88	1,057.838	
600.00	600.00	507.00	507.00	2.04	9.00	-96.77	-1,107.03	-9,328.37	9,393.83	9,382.79	11.04	850.793	
700.00	699.98	606.98	606.98	2.40	10.83	-86.78	-1,107.03	-9,328.37	9,393.73	9,380.50	13.23	709.924	
800.00	799.84	705.47	705.47	2.76	12.64	-86.82	-1,106.92	-9,328.37	9,393.43	9,378.03	15.40	610.153	
900.00	899.45	806.47	806.45	3.13	14.51	-86.88	-1,107.03	-9,328.37	9,392.96	9,375.33	17.63	532.872	
1,000.00	998.70	905.72	905.70	3.49	16.38	-86.97	-1,107.03	-9,328.37	9,392.30	9,372.44	19.86	472.821	
1,100.00	1,097.47	1,004.48	1,004.47	3.86	18.24	-87.08	-1,107.03	-9,328.37	9,391.48	9,369.38	22.10	424.934	
1,200.00	1,195.62	1,100.05	1,100.03	4.24	20.05	-87.20	-1,106.31	-9,328.37	9,390.42	9,366.13	24.29	386.607	
1,300.00	1,293.06	1,194.47	1,194.44	4.64	21.83	-87.36	-1,106.64	-9,328.37	9,389.37	9,362.90	26.47	354.700	
1,400.00	1,389.64	1,296.69	1,296.64	5.06	23.76	-87.54	-1,107.03	-9,328.37	9,388.23	9,359.41	28.82	325.728	
1,500.00	1,485.27	1,392.31	1,392.27	5.50	25.57	-87.74	-1,107.03	-9,328.37	9,386.97	9,355.89	31.08	302.056	
1,515.00	1,499.52	1,406.57	1,406.52	5.57	25.84	-87.77	-1,107.03	-9,328.37	9,386.78	9,355.36	31.42	298.798	
1,600.00	1,580.22	1,487.27	1,487.22	5.96	27.38	-87.92	-1,107.03	-9,328.37	9,385.72	9,352.38	33.34	281.532	
1,700.00	1,675.17	1,580.63	1,580.58	6.44	29.15	-88.10	-1,106.53	-9,328.37	9,384.51	9,348.92	35.58	263.751	
1,800.00	1,770.11	1,673.35	1,673.31	6.92	30.90	-88.28	-1,106.72	-9,328.37	9,383.49	9,345.67	37.82	248.106	
1,900.00	1,865.05	1,772.13	1,772.05	7.41	32.81	-88.47	-1,107.03	-9,328.37	9,382.60	9,342.39	40.21	233.339	
2,000.00	1,959.99	1,867.07	1,866.99	7.90	34.83	-88.65	-1,107.03	-9,328.37	9,381.77	9,339.04	42.73	219.578	
2,100.00	2,054.94	1,962.01	1,961.94	8.40	36.85	-88.83	-1,107.03	-9,328.37	9,381.04	9,335.80	45.25	207.329	
2,200.00	2,149.88	2,055.22	2,055.14	8.90	38.84	-89.01	-1,106.24	-9,328.37	9,380.30	9,332.56	47.74	196.507	
2,300.00	2,244.82	2,146.56	2,146.48	9.41	40.78	-89.18	-1,106.46	-9,328.37	9,379.82	9,329.63	50.19	186.899	
2,400.00	2,339.76	2,237.76	2,237.68	9.92	42.72	-89.36	-1,106.89	-9,328.37	9,379.48	9,326.84	52.64	178.188	
2,500.00	2,434.71	2,341.88	2,341.71	10.43	44.97	-89.56	-1,107.03	-9,328.37	9,379.19	9,323.80	55.40	169.311	
2,600.00	2,529.65	2,436.82	2,436.65	10.94	47.03	-89.74	-1,107.03	-9,328.37	9,378.99	9,321.03	57.97	161.803	
2,700.00	2,624.59	2,529.68	2,529.49	11.45	49.04	-89.91	-1,105.44	-9,328.37	9,378.62	9,318.13	60.49	155.040	
2,714.00	2,637.88	2,541.92	2,541.72	11.53	49.30	-89.94	-1,105.46	-9,328.37	9,378.62	9,317.79	60.83	154.180 CC	
2,800.00	2,719.53	2,616.95	2,616.74	11.97	50.93	-90.08	-1,105.75	-9,328.37	9,378.69	9,315.79	62.90	149.109	
2,900.00	2,814.48	2,703.97	2,703.75	12.49	52.81	-90.25	-1,106.47	-9,328.37	9,378.94	9,313.64	65.30	143.627	
3,000.00	2,909.42	2,816.69	2,816.42	13.01	55.17	-90.47	-1,107.03	-9,328.37	9,379.24	9,311.06	68.18	137.569	
3,100.00	3,004.36	2,911.63	2,911.36	13.53	57.11	-90.65	-1,107.03	-9,328.37	9,379.57	9,308.93	70.64	132.789	
3,200.00	3,099.30	3,006.19	3,005.91	14.05	59.04	-90.83	-1,106.22	-9,328.37	9,379.85	9,306.76	73.09	128.341	
3,300.00	3,194.25	3,096.80	3,096.52	14.57	60.88	-91.01	-1,106.35	-9,328.37	9,380.40	9,304.95	75.46	124.317	
3,400.00	3,289.19	3,187.28	3,186.99	15.09	62.73	-91.18	-1,106.70	-9,328.37	9,381.11	9,303.29	77.82	120.544	
3,500.00	3,384.13	3,291.46	3,291.13	15.62	64.82	-91.38	-1,107.03	-9,328.37	9,381.92	9,301.48	80.44	116.634	
3,600.00	3,479.07	3,386.41	3,386.07	16.14	66.69	-91.57	-1,107.03	-9,328.37	9,382.77	9,299.94	82.83	113.273	
3,700.00	3,574.02	3,481.35	3,481.02	16.67	68.56	-91.75	-1,107.03	-9,328.37	9,383.73	9,298.50	85.23	110.101	
3,800.00	3,668.96	3,574.09	3,573.75	17.19	70.39	-91.92	-1,105.78	-9,328.37	9,384.53	9,296.95	87.58	107.154	
3,900.00	3,763.90	3,663.68	3,663.33	17.72	72.15	-92.09	-1,106.00	-9,328.37	9,385.74	9,295.87	89.87	104.437	
4,000.00	3,858.84	3,753.12	3,752.76	18.24	73.92	-92.26	-1,106.46	-9,328.37	9,387.11	9,294.95	92.16	101.860	
4,100.00	3,953.79	3,861.17	3,860.79	18.77	76.04	-92.47	-1,107.03	-9,328.37	9,388.60	9,293.79	94.81	99.024	
4,200.00	4,048.73	3,956.11	3,955.73	19.30	77.91	-92.66	-1,107.03	-9,328.37	9,390.08	9,292.87	97.21	96.598	
4,300.00	4,143.67	4,051.05	4,050.67	19.82	79.78	-92.84	-1,107.03	-9,328.37	9,391.66	9,292.06	99.60	94.290	
4,400.00	4,238.61	4,142.85	4,142.46	20.35	81.59	-93.01	-1,106.57	-9,328.37	9,393.25	9,291.31	101.94	92.146	
4,500.00	4,333.56	4,234.07	4,233.69	20.88	83.39	-93.19	-1,106.79	-9,328.37	9,395.09	9,290.83	104.26	90.110	
4,600.00	4,428.50	4,335.92	4,335.50	21.41	85.42	-93.38	-1,107.03	-9,328.37	9,397.05	9,290.22	106.82	87.969	
4,700.00	4,523.44	4,430.87	4,430.44	21.93	87.36	-93.56	-1,107.03	-9,328.37	9,399.05	9,289.76	109.29	86.004	
4,800.00	4,618.38	4,525.81	4,525.38	22.46	89.30	-93.75	-1,107.03	-9,328.37	9,401.16	9,289.41	111.75	84.126	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149A - OH - OH-INC													Offset Site Error:	0.00 usft		
Survey Program:		245-A027Ua_INC-ONLY					Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned:		Offset Well Error:	0.00 usft
Reference	Vertical	Reference	Vertical	Reference	Offset	Highside			Distance				Warning			
Measured Depth (usft)	Depth (usft)	Measured Depth (usft)	Depth (usft)	Reference (usft)	Offset (usft)	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor				
4,900.00	4,713.33	4,615.24	4,614.80	22.99	91.12	-93.91	-1,106.03	-9,328.37	9,403.13	9,289.02	114.10	82.409				
5,000.00	4,808.27	4,702.94	4,702.50	23.52	92.91	-94.08	-1,106.38	-9,328.37	9,405.53	9,289.11	116.42	80.790				
5,100.00	4,903.21	4,810.70	4,810.21	24.05	95.09	-94.29	-1,107.03	-9,328.37	9,408.11	9,288.98	119.12	78.978 ES				
5,200.00	4,998.16	4,905.64	4,905.16	24.58	96.89	-94.47	-1,107.03	-9,328.37	9,410.63	9,289.18	121.45	77.484				
5,300.00	5,093.10	5,000.58	5,000.10	25.11	98.70	-94.65	-1,107.03	-9,328.37	9,413.26	9,289.48	123.78	76.047				
5,400.00	5,188.04	5,092.40	5,091.92	25.64	100.44	-94.82	-1,106.25	-9,328.37	9,415.79	9,289.74	126.05	74.697				
5,500.00	5,282.98	5,181.50	5,181.01	26.17	102.13	-94.99	-1,106.46	-9,328.37	9,418.68	9,290.41	128.27	73.428				
5,600.00	5,377.93	5,270.46	5,269.97	26.70	103.82	-95.16	-1,106.89	-9,328.37	9,421.74	9,291.26	130.49	72.205				
5,623.25	5,400.00	5,307.51	5,307.00	26.82	104.55	-95.24	-1,107.03	-9,328.37	9,422.47	9,291.14	131.33	71.744				
5,700.00	5,473.03	5,380.54	5,380.03	27.22	106.04	-95.39	-1,107.03	-9,328.37	9,424.77	9,291.54	133.22	70.744				
5,800.00	5,568.64	5,476.15	5,475.64	27.73	107.99	-95.59	-1,107.03	-9,328.37	9,427.70	9,292.01	135.68	69.483				
5,900.00	5,664.75	5,570.84	5,570.33	28.23	109.92	-95.78	-1,106.50	-9,328.37	9,430.40	9,292.29	138.11	68.282				
6,000.00	5,761.33	5,663.13	5,662.61	28.71	111.80	-95.95	-1,106.62	-9,328.37	9,433.18	9,292.71	140.47	67.153				
6,100.00	5,858.34	5,755.76	5,755.24	29.18	113.69	-96.11	-1,106.90	-9,328.37	9,435.89	9,293.06	142.83	66.065				
6,200.00	5,955.76	5,863.34	5,862.76	29.64	116.17	-96.29	-1,107.03	-9,328.37	9,438.42	9,292.67	145.75	64.757				
6,300.00	6,053.57	5,961.14	5,960.57	30.07	118.52	-96.43	-1,107.03	-9,328.37	9,440.79	9,292.25	148.54	63.558				
6,400.00	6,151.72	6,000.00	5,999.35	30.50	119.45	-96.50	-1,107.03	-9,328.37	9,443.18	9,293.29	149.89	63.002				
6,500.00	6,250.19	6,000.00	5,999.35	30.91	119.45	-96.53	-1,107.03	-9,328.37	9,446.35	9,296.08	150.27	62.863				
6,600.00	6,348.94	6,000.00	5,999.35	31.30	119.45	-96.57	-1,107.03	-9,328.37	9,450.39	9,299.76	150.62	62.743				
6,659.67	6,408.00	6,000.00	5,999.35	31.53	119.45	-96.60	-1,107.03	-9,328.37	9,453.20	9,302.38	150.82	62.680				
6,700.00	6,447.82	6,000.00	5,999.35	31.68	119.45	-112.94	-1,107.03	-9,328.37	9,456.41	9,305.47	150.95	62.646				
6,750.00	6,496.66	6,000.00	5,999.35	31.90	119.45	-123.90	-1,107.03	-9,328.37	9,463.73	9,312.61	151.12	62.622				
6,800.00	6,544.65	6,000.00	5,999.35	32.13	119.45	-129.77	-1,107.03	-9,328.37	9,474.70	9,323.39	151.31	62.618 SF				
6,850.00	6,591.49	6,000.00	5,999.35	32.37	119.45	-133.06	-1,107.03	-9,328.37	9,489.22	9,337.72	151.50	62.635				
6,900.00	6,636.89	6,000.00	5,999.35	32.62	119.45	-134.85	-1,107.03	-9,328.37	9,507.20	9,355.50	151.70	62.671				
6,950.00	6,680.57	6,000.00	5,999.35	32.89	119.45	-135.65	-1,107.03	-9,328.37	9,528.51	9,376.61	151.90	62.727				
7,000.00	6,722.26	6,000.00	5,999.35	33.17	119.45	-135.70	-1,107.03	-9,328.37	9,552.99	9,400.88	152.11	62.803				
7,050.00	6,761.71	6,000.00	5,999.35	33.45	119.45	-135.12	-1,107.03	-9,328.37	9,580.47	9,428.15	152.32	62.896				
7,100.00	6,798.67	6,000.00	5,999.35	33.75	119.45	-133.96	-1,107.03	-9,328.37	9,610.75	9,458.22	152.53	63.007				
7,150.00	6,832.91	6,000.00	5,999.35	34.06	119.45	-132.20	-1,107.03	-9,328.37	9,643.63	9,490.88	152.75	63.135				
7,200.00	6,864.22	6,000.00	5,999.35	34.37	119.45	-129.82	-1,107.03	-9,328.37	9,678.87	9,525.91	152.96	63.277				
7,250.00	6,892.42	6,000.00	5,999.35	34.69	119.45	-126.74	-1,107.03	-9,328.37	9,716.23	9,563.06	153.17	63.433				
7,300.00	6,917.32	6,000.00	5,999.35	35.03	119.45	-122.86	-1,107.03	-9,328.37	9,755.46	9,602.08	153.39	63.601				
7,350.00	6,938.77	6,000.00	5,999.35	35.37	119.45	-118.09	-1,107.03	-9,328.37	9,796.30	9,642.71	153.60	63.780				
7,400.00	6,956.64	6,000.00	5,999.35	35.72	119.45	-112.32	-1,107.03	-9,328.37	9,838.48	9,684.67	153.80	63.967				
7,450.00	6,970.83	6,000.00	5,999.35	36.07	119.45	-105.50	-1,107.03	-9,328.37	9,881.71	9,727.70	154.01	64.162				
7,500.00	6,981.23	6,000.00	5,999.35	36.44	119.45	-97.69	-1,107.03	-9,328.37	9,925.73	9,771.52	154.22	64.362				
7,550.00	6,987.80	6,000.00	5,999.35	36.81	119.45	-89.09	-1,107.03	-9,328.37	9,970.26	9,815.84	154.42	64.567				
7,600.00	6,990.48	6,000.00	5,999.35	37.19	119.45	-80.11	-1,107.03	-9,328.37	10,015.00	9,860.38	154.62	64.773				
7,609.87	6,990.55	6,000.00	5,999.35	37.26	119.45	-78.33	-1,107.03	-9,328.37	10,023.83	9,869.18	154.66	64.813				
7,700.00	6,990.49	6,000.00	5,999.35	37.97	119.45	-78.33	-1,107.03	-9,328.37	10,104.58	9,949.57	155.01	65.185				
7,800.00	6,990.42	6,000.00	5,999.35	38.78	119.45	-78.33	-1,107.03	-9,328.37	10,194.35	10,038.95	155.41	65.597				
7,900.00	6,990.35	6,000.00	5,999.35	39.64	119.45	-78.33	-1,107.03	-9,328.37	10,284.32	10,128.51	155.80	66.009				
8,000.00	6,990.28	6,000.00	5,999.35	40.53	119.45	-78.33	-1,107.03	-9,328.37	10,374.46	10,218.27	156.19	66.421				
8,100.00	6,990.21	6,000.00	5,999.35	41.45	119.45	-78.33	-1,107.03	-9,328.37	10,464.78	10,308.20	156.58	66.833				
8,200.00	6,990.14	6,000.00	5,999.35	42.40	119.45	-78.33	-1,107.03	-9,328.37	10,555.28	10,398.32	156.97	67.246				
8,306.37	6,990.06	6,000.00	5,999.35	43.45	119.45	-78.33	-1,107.03	-9,328.37	10,651.73	10,494.35	157.37	67.684				
8,400.00	6,990.00	6,000.00	5,999.35	44.38	119.45	-76.38	-1,107.03	-9,328.37	10,737.97	10,580.26	157.71	68.088				
8,500.00	6,989.93	6,000.00	5,999.35	45.36	119.45	-73.33	-1,107.03	-9,328.37	10,832.53	10,674.53	158.01	68.558				
8,600.00	6,989.85	6,000.00	5,999.35	46.33	119.45	-68.42	-1,107.03	-9,328.37	10,929.12	10,770.88	158.24	69.065				
8,700.00	6,989.78	6,000.00	5,999.35	47.28	119.45	-59.50	-1,107.03	-9,328.37	11,027.22	10,868.80	158.42	69.608				
8,800.00	6,989.70	6,000.00	5,999.35	48.21	119.45	-40.41	-1,107.03	-9,328.37	11,126.32	10,967.79	158.53	70.184				

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149A - OH - OH-INC											Offset Site Error: 0.00 usft			
Survey Program: Reference		245-A027Ua_INC-ONLY Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance				Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,900.00	6,989.63	6,000.00	5,999.35	49.11	119.45	0.39	-1,107.03	-9,328.37	11,225.91	11,067.33	158.58	70.789		
9,000.00	6,989.55	6,000.00	5,999.35	49.99	119.45	41.11	-1,107.03	-9,328.37	11,325.51	11,166.93	158.58	71.420		
9,100.00	6,989.48	6,000.00	5,999.35	50.84	119.45	60.14	-1,107.03	-9,328.37	11,424.62	11,266.12	158.51	72.075		
9,200.00	6,989.40	6,000.00	5,999.35	51.66	119.45	69.05	-1,107.03	-9,328.37	11,522.80	11,364.41	158.39	72.750		
9,300.00	6,989.33	6,000.00	5,999.35	52.45	119.45	73.95	-1,107.03	-9,328.37	11,619.59	11,461.38	158.22	73.441		
9,393.87	6,989.27	6,000.00	5,999.35	53.15	119.45	76.85	-1,107.03	-9,328.37	11,708.80	11,550.79	158.01	74.102		
9,400.00	6,989.26	6,000.00	5,999.35	53.20	119.45	76.85	-1,107.03	-9,328.37	11,714.57	11,556.57	157.99	74.146		
9,500.00	6,989.19	6,000.00	5,999.35	53.95	119.45	76.85	-1,107.03	-9,328.37	11,808.68	11,650.92	157.76	74.852		
9,600.00	6,989.12	6,000.00	5,999.35	54.73	119.45	76.85	-1,107.03	-9,328.37	11,902.89	11,745.35	157.53	75.558		
9,700.00	6,989.05	6,000.00	5,999.35	55.55	119.45	76.85	-1,107.03	-9,328.37	11,997.19	11,839.87	157.31	76.263		
9,800.00	6,988.98	6,000.00	5,999.35	56.40	119.45	76.85	-1,107.03	-9,328.37	12,091.58	11,934.48	157.10	76.967		
9,900.00	6,988.91	6,000.00	5,999.35	57.28	119.45	76.85	-1,107.03	-9,328.37	12,186.06	12,029.16	156.90	77.669		
10,000.00	6,988.84	6,000.00	5,999.35	58.20	119.45	76.85	-1,107.03	-9,328.37	12,280.63	12,123.93	156.70	78.371		
10,100.00	6,988.77	6,000.00	5,999.35	59.14	119.45	76.85	-1,107.03	-9,328.37	12,375.29	12,218.78	156.51	79.071		
10,200.00	6,988.70	6,000.00	5,999.35	60.11	119.45	76.85	-1,107.03	-9,328.37	12,470.02	12,313.70	156.32	79.771		
10,300.00	6,988.63	6,000.00	5,999.35	61.11	119.45	76.85	-1,107.03	-9,328.37	12,564.84	12,408.70	156.15	80.469		
10,400.00	6,988.56	6,000.00	5,999.35	62.14	119.45	76.85	-1,107.03	-9,328.37	12,659.74	12,503.77	155.97	81.166		
10,500.00	6,988.49	6,000.00	5,999.35	63.19	119.45	76.85	-1,107.03	-9,328.37	12,754.72	12,598.91	155.81	81.861		
10,600.00	6,988.42	6,000.00	5,999.35	64.26	119.45	76.85	-1,107.03	-9,328.37	12,849.77	12,694.13	155.65	82.556		
10,700.00	6,988.35	6,000.00	5,999.35	65.36	119.45	76.85	-1,107.03	-9,328.37	12,944.90	12,789.41	155.50	83.249		
10,800.00	6,988.28	6,000.00	5,999.35	66.48	119.45	76.85	-1,107.03	-9,328.37	13,040.10	12,884.75	155.35	83.941		
10,900.00	6,988.21	6,000.00	5,999.35	67.61	119.45	76.85	-1,107.03	-9,328.37	13,135.38	12,980.17	155.21	84.631		
11,000.00	6,988.14	6,000.00	5,999.35	68.77	119.45	76.85	-1,107.03	-9,328.37	13,230.72	13,075.65	155.07	85.320		
11,100.00	6,988.07	6,000.00	5,999.35	69.95	119.45	76.85	-1,107.03	-9,328.37	13,326.13	13,171.19	154.94	86.007		
11,200.00	6,988.01	6,000.00	5,999.35	71.14	119.45	76.85	-1,107.03	-9,328.37	13,421.61	13,266.79	154.82	86.693		
11,300.00	6,987.94	6,000.00	5,999.35	72.35	119.45	76.85	-1,107.03	-9,328.37	13,517.15	13,362.45	154.70	87.378		
11,400.00	6,987.87	6,000.00	5,999.35	73.57	119.45	76.85	-1,107.03	-9,328.37	13,612.76	13,458.17	154.58	88.061		
11,500.00	6,987.80	6,000.00	5,999.35	74.81	119.45	76.85	-1,107.03	-9,328.37	13,708.43	13,553.95	154.47	88.743		
11,600.00	6,987.73	6,000.00	5,999.35	76.07	119.45	76.85	-1,107.03	-9,328.37	13,804.16	13,649.79	154.37	89.423		
11,643.87	6,987.70	6,000.00	5,999.35	76.62	119.45	76.85	-1,107.03	-9,328.37	13,846.17	13,691.84	154.32	89.721		
11,700.00	6,987.66	6,000.00	5,999.35	77.33	119.45	77.65	-1,107.03	-9,328.37	13,899.79	13,745.52	154.27	90.102		
11,737.27	6,987.63	6,000.00	5,999.35	77.80	119.45	78.14	-1,107.03	-9,328.37	13,935.22	13,781.00	154.23	90.356		
11,800.00	6,987.59	6,000.00	5,999.35	78.59	119.45	78.14	-1,107.03	-9,328.37	13,994.76	13,840.61	154.16	90.782		
11,900.00	6,987.52	6,000.00	5,999.35	79.86	119.45	78.14	-1,107.03	-9,328.37	14,089.73	13,935.68	154.05	91.459		
12,000.00	6,987.46	6,000.00	5,999.35	81.14	119.45	78.14	-1,107.03	-9,328.37	14,184.77	14,030.81	153.96	92.135		
12,100.00	6,987.39	6,000.00	5,999.35	82.43	119.45	78.14	-1,107.03	-9,328.37	14,279.88	14,126.01	153.86	92.809		
12,200.00	6,987.32	6,000.00	5,999.35	83.73	119.45	78.14	-1,107.03	-9,328.37	14,375.05	14,221.27	153.78	93.481		
12,300.00	6,987.26	6,000.00	5,999.35	85.05	119.45	78.14	-1,107.03	-9,328.37	14,470.29	14,316.59	153.69	94.151		
12,400.00	6,987.19	6,000.00	5,999.35	86.38	119.45	78.14	-1,107.03	-9,328.37	14,565.59	14,411.97	153.61	94.819		
12,500.00	6,987.12	6,000.00	5,999.35	87.71	119.45	78.14	-1,107.03	-9,328.37	14,660.95	14,507.41	153.54	95.486		
12,600.00	6,987.06	6,000.00	5,999.35	89.06	119.45	78.14	-1,107.03	-9,328.37	14,756.38	14,602.90	153.47	96.150		
12,700.00	6,986.99	6,000.00	5,999.35	90.41	119.45	78.14	-1,107.03	-9,328.37	14,851.86	14,698.45	153.41	96.813		
12,800.00	6,986.92	6,000.00	5,999.35	91.77	119.45	78.14	-1,107.03	-9,328.37	14,947.40	14,794.06	153.35	97.474		
12,900.00	6,986.86	6,000.00	5,999.35	93.14	119.45	78.14	-1,107.03	-9,328.37	15,043.01	14,889.71	153.29	98.133		
13,000.00	6,986.79	6,000.00	5,999.35	94.52	119.45	78.14	-1,107.03	-9,328.37	15,138.67	14,985.42	153.24	98.790		
13,100.00	6,986.72	6,000.00	5,999.35	95.90	119.45	78.14	-1,107.03	-9,328.37	15,234.38	15,081.19	153.19	99.445		
13,200.00	6,986.66	6,000.00	5,999.35	97.30	119.45	78.14	-1,107.03	-9,328.37	15,330.15	15,177.00	153.15	100.098		
13,300.00	6,986.59	6,000.00	5,999.35	98.69	119.45	78.14	-1,107.03	-9,328.37	15,425.97	15,272.86	153.11	100.749		
13,400.00	6,986.52	6,000.00	5,999.35	100.10	119.45	78.14	-1,107.03	-9,328.37	15,521.85	15,368.77	153.08	101.399		
13,500.00	6,986.46	6,000.00	5,999.35	101.51	119.45	78.14	-1,107.03	-9,328.37	15,617.78	15,464.73	153.05	102.046		
13,600.00	6,986.39	6,000.00	5,999.35	102.93	119.45	78.14	-1,107.03	-9,328.37	15,713.76	15,560.74	153.02	102.692		
13,700.00	6,986.32	6,000.00	5,999.35	104.35	119.45	78.14	-1,107.03	-9,328.37	15,809.78	15,656.79	152.99	103.336		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149A - OH - OH-INC												Offset Site Error: 0.00 usft															
Survey Program: 245-A027Ua_INC-ONLY				Reference				Rule Assigned:				Offset Well Error: 0.00 usft															
Measured Depth (usft)		Vertical Depth (usft)		Measured Depth (usft)		Vertical Depth (usft)		Semi Major Axis		Offset		Highside Toolface (°)		Offset Wellbore Centre		Distance		Minimum Separation (usft)		Separation Factor		Warning					
Depth (usft)		Vertical Depth (usft)		Depth (usft)		Vertical Depth (usft)		Reference (usft)		Offset (usft)		Highside Toolface (°)		+N/-S (usft)		+E/-W (usft)		Between Centres (usft)		Between Ellipses (usft)		Minimum Separation (usft)		Separation Factor		Warning	
13,800.00	6,986.25	6,000.00	5,999.35	105.78	119.45	78.14	-1,107.03	-9,328.37	15,905.86	15,752.89	152.97	103.978															
13,900.00	6,986.19	6,000.00	5,999.35	107.21	119.45	78.14	-1,107.03	-9,328.37	16,001.99	15,849.03	152.96	104.618															
14,000.00	6,986.12	6,000.00	5,999.35	108.65	119.45	78.14	-1,107.03	-9,328.37	16,098.16	15,945.22	152.94	105.256															
14,100.00	6,986.05	6,000.00	5,999.35	110.09	119.45	78.14	-1,107.03	-9,328.37	16,194.38	16,041.45	152.93	105.892															
14,200.00	6,985.99	6,000.00	5,999.35	111.54	119.45	78.14	-1,107.03	-9,328.37	16,290.64	16,137.72	152.93	106.527															
14,300.00	6,985.92	6,000.00	5,999.35	112.99	119.45	78.14	-1,107.03	-9,328.37	16,386.95	16,234.03	152.92	107.159															
14,400.00	6,985.85	6,000.00	5,999.35	114.45	119.45	78.14	-1,107.03	-9,328.37	16,483.30	16,330.38	152.92	107.790															
14,500.00	6,985.79	6,000.00	5,999.35	115.91	119.45	78.14	-1,107.03	-9,328.37	16,579.70	16,426.78	152.92	108.418															
14,600.00	6,985.72	6,000.00	5,999.35	117.38	119.45	78.14	-1,107.03	-9,328.37	16,676.14	16,523.21	152.93	109.045															
14,700.00	6,985.65	6,000.00	5,999.35	118.84	119.45	78.14	-1,107.03	-9,328.37	16,772.62	16,619.68	152.94	109.670															
14,800.00	6,985.59	6,000.00	5,999.35	120.32	119.45	78.14	-1,107.03	-9,328.37	16,869.14	16,716.19	152.95	110.294															
14,900.00	6,985.52	6,000.00	5,999.35	121.79	119.45	78.14	-1,107.03	-9,328.37	16,965.70	16,812.74	152.96	110.915															
15,000.00	6,985.45	6,000.00	5,999.35	123.27	119.45	78.14	-1,107.03	-9,328.37	17,062.30	16,909.33	152.98	111.535															
15,100.00	6,985.39	6,000.00	5,999.35	124.75	119.45	78.14	-1,107.03	-9,328.37	17,158.94	17,005.95	153.00	112.153															
15,200.00	6,985.32	6,000.00	5,999.35	126.24	119.45	78.14	-1,107.03	-9,328.37	17,255.62	17,102.61	153.02	112.769															
15,300.00	6,985.25	6,000.00	5,999.35	127.72	119.45	78.14	-1,107.03	-9,328.37	17,352.34	17,199.30	153.04	113.383															
15,400.00	6,985.19	6,000.00	5,999.35	129.21	119.45	78.14	-1,107.03	-9,328.37	17,449.09	17,296.02	153.07	113.996															
15,500.00	6,985.12	6,000.00	5,999.35	130.71	119.45	78.14	-1,107.03	-9,328.37	17,545.88	17,392.79	153.10	114.606															
15,600.00	6,985.05	6,000.00	5,999.35	132.20	119.45	78.14	-1,107.03	-9,328.37	17,642.71	17,489.58	153.13	115.215															
15,700.00	6,984.99	6,000.00	5,999.35	133.70	119.45	78.14	-1,107.03	-9,328.37	17,739.57	17,586.41	153.16	115.823															
15,800.00	6,984.92	6,000.00	5,999.35	135.20	119.45	78.14	-1,107.03	-9,328.37	17,836.46	17,683.27	153.20	116.428															
15,900.00	6,984.85	6,000.00	5,999.35	136.71	119.45	78.14	-1,107.03	-9,328.37	17,933.39	17,780.16	153.23	117.032															
16,000.00	6,984.79	6,000.00	5,999.35	138.21	119.45	78.14	-1,107.03	-9,328.37	18,030.36	17,877.08	153.27	117.634															
16,100.00	6,984.72	6,000.00	5,999.35	139.72	119.45	78.14	-1,107.03	-9,328.37	18,127.35	17,974.04	153.32	118.235															
16,200.00	6,984.65	6,000.00	5,999.35	141.23	119.45	78.14	-1,107.03	-9,328.37	18,224.38	18,071.02	153.36	118.833															
16,300.00	6,984.59	6,000.00	5,999.35	142.75	119.45	78.14	-1,107.03	-9,328.37	18,321.44	18,168.03	153.41	119.431															
16,400.00	6,984.52	6,000.00	5,999.35	144.26	119.45	78.14	-1,107.03	-9,328.37	18,418.53	18,265.08	153.45	120.026															
16,500.00	6,984.45	6,000.00	5,999.35	145.78	119.45	78.14	-1,107.03	-9,328.37	18,515.66	18,362.15	153.50	120.620															
16,600.00	6,984.39	6,000.00	5,999.35	147.29	119.45	78.14	-1,107.03	-9,328.37	18,612.81	18,459.25	153.56	121.212															
16,700.00	6,984.32	6,000.00	5,999.35	148.82	119.45	78.14	-1,107.03	-9,328.37	18,709.99	18,556.38	153.61	121.803															
16,800.00	6,984.25	6,000.00	5,999.35	150.34	119.45	78.14	-1,107.03	-9,328.37	18,807.20	18,653.54	153.66	122.392															
16,900.00	6,984.19	6,000.00	5,999.35	151.86	119.45	78.14	-1,107.03	-9,328.37	18,904.45	18,750.73	153.72	122.979															
17,000.00	6,984.12	6,000.00	5,999.35	153.39	119.45	78.14	-1,107.03	-9,328.37	19,001.72	18,847.94	153.78	123.565															
17,100.00	6,984.05	6,000.00	5,999.35	154.91	119.45	78.14	-1,107.03	-9,328.37	19,099.02	18,945.18	153.84	124.149															
17,200.00	6,983.99	6,000.00	5,999.35	156.44	119.45	78.14	-1,107.03	-9,328.37	19,196.34	19,042.44	153.90	124.732															
17,300.00	6,983.92	6,000.00	5,999.35	157.97	119.45	78.14	-1,107.03	-9,328.37	19,293.70	19,139.73	153.96	125.313															
17,400.00	6,983.85	6,000.00	5,999.35	159.50	119.45	78.14	-1,107.03	-9,328.37	19,391.08	19,237.05	154.03	125.892															
17,500.00	6,983.79	6,000.00	5,999.35	161.04	119.45	78.14	-1,107.03	-9,328.37	19,488.48	19,334.39	154.10	126.470															
17,600.00	6,983.72	6,000.00	5,999.35	162.57	119.45	78.14	-1,107.03	-9,328.37	19,585.92	19,431.75	154.16	127.047															
17,700.00	6,983.65	6,000.00	5,999.35	164.11	119.45	78.14	-1,107.03	-9,328.37	19,683.38	19,529.14	154.23	127.622															
17,800.00	6,983.59	6,000.00	5,999.35	165.65	119.45	78.14	-1,107.03	-9,328.37	19,780.86	19,626.56	154.30	128.195															
17,900.00	6,983.52	6,000.00	5,999.35	167.18	119.45	78.14	-1,107.03	-9,328.37	19,878.37	19,724.00	154.37	128.767															
18,000.00	6,983.45	6,000.00	5,999.35	168.72	119.45	78.14	-1,107.03	-9,328.37	19,975.90	19,821.46	154.45	129.338															
18,100.00	6,983.39	6,000.00	5,999.35	170.27	119.45	78.14	-1,107.03	-9,328.37	20,073.46	19,918.94	154.52	129.907															
18,200.00	6,983.32	6,000.00	5,999.35	171.81	119.45	78.14	-1,107.03	-9,328.37	20,171.05	20,016.45	154.60	130.475															
18,300.00	6,983.25	6,000.00	5,999.35	173.35	119.45	78.14	-1,107.03	-9,328.37	20,268.65	20,113.98	154.67	131.041															
18,400.00	6,983.19	6,000.00	5,999.35	174.90	119.45	78.14	-1,107.03	-9,328.37	20,366.28	20,211.53	154.75	131.606															
18,500.00	6,983.12	6,000.00	5,999.35	176.44	119.45	78.14	-1,107.03	-9,328.37	20,463.93	20,309.10	154.83	132.169															
18,600.00	6,983.05	6,000.00	5,999.35	177.99	119.45	78.14	-1,107.03	-9,328.37	20,561.61	20,406.70	154.91	132.731															
18,700.00	6,982.99	6,000.00	5,999.35	179.54	119.45	78.14	-1,107.03	-9,328.37	20,659.30	20,504.31	154.99	133.292															
18,800.00	6,982.92	6,000.00	5,999.35	181.09	119.45	78.14	-1,107.03	-9,328.37	20,757.02	20,601.95	155.08	133.851															
18,900.00	6,982.85	6,000.00	5,999.35	182.64	119.45	78.14	-1,107.03	-9,328.37	20,854.76	20,699.60	155.16	134.409															

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149A - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 245-A027Ua_INC-ONLY													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
19,000.00	6,982.78	6,000.00	5,999.35	184.19	119.45	78.14	-1,107.03	-9,328.37	20,952.52	20,797.28	155.24	134.966		
19,100.00	6,982.72	6,000.00	5,999.35	185.74	119.45	78.14	-1,107.03	-9,328.37	21,050.31	20,894.98	155.33	135.521		
19,200.00	6,982.65	6,000.00	5,999.35	187.29	119.45	78.14	-1,107.03	-9,328.37	21,148.11	20,992.70	155.42	136.075		
19,300.00	6,982.58	6,000.00	5,999.35	188.84	119.45	78.14	-1,107.03	-9,328.37	21,245.93	21,090.43	155.50	136.627		
19,400.00	6,982.52	6,000.00	5,999.35	190.40	119.45	78.14	-1,107.03	-9,328.37	21,343.78	21,188.19	155.59	137.178		
19,500.00	6,982.45	6,000.00	5,999.35	191.95	119.45	78.14	-1,107.03	-9,328.37	21,441.64	21,285.96	155.68	137.728		
19,600.00	6,982.38	6,000.00	5,999.35	193.51	119.45	78.14	-1,107.03	-9,328.37	21,539.53	21,383.76	155.77	138.277		
19,700.00	6,982.32	6,000.00	5,999.35	195.07	119.45	78.14	-1,107.03	-9,328.37	21,637.43	21,481.57	155.86	138.824		
19,800.00	6,982.25	6,000.00	5,999.35	196.62	119.45	78.14	-1,107.03	-9,328.37	21,735.35	21,579.40	155.95	139.370		
19,900.00	6,982.18	6,000.00	5,999.35	198.18	119.45	78.14	-1,107.03	-9,328.37	21,833.29	21,677.25	156.05	139.915		
20,000.00	6,982.12	6,000.00	5,999.35	199.74	119.45	78.14	-1,107.03	-9,328.37	21,931.25	21,775.11	156.14	140.459		
20,100.00	6,982.05	6,000.00	5,999.35	201.30	119.45	78.14	-1,107.03	-9,328.37	22,029.23	21,872.99	156.23	141.001		
20,176.02	6,982.00	6,000.00	5,999.35	202.36	119.45	78.14	-1,107.03	-9,328.37	22,103.72	21,943.13	160.59	137.644		

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149B - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 520-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	44.00	44.00	0.00	0.94	-93.19	-627.92	-11,265.44	11,282.93				
100.00	100.00	144.00	144.00	0.25	3.06	-93.19	-627.92	-11,265.44	11,282.93	11,279.61	3.32	3,402.714	
200.00	200.00	244.00	244.00	0.61	5.19	-93.19	-627.92	-11,265.44	11,282.93	11,277.13	5.80	1,944.454	
300.00	300.00	344.00	344.00	0.97	7.32	-93.19	-627.92	-11,265.44	11,282.93	11,274.64	8.29	1,361.131	
400.00	400.00	444.00	444.00	1.33	9.45	-93.19	-627.92	-11,265.44	11,282.93	11,272.15	10.78	1,047.029	
500.00	500.00	544.03	544.00	1.68	11.58	-93.19	-627.92	-11,265.44	11,282.93	11,269.67	13.26	850.678	
600.00	600.00	644.03	644.00	2.04	13.71	-93.19	-627.92	-11,265.44	11,282.93	11,267.18	15.75	716.365	
700.00	699.98	744.01	743.98	2.40	15.83	-83.20	-627.92	-11,265.44	11,282.72	11,264.49	18.24	618.709	
800.00	799.84	841.93	841.89	2.76	17.92	-83.24	-627.01	-11,265.44	11,282.05	11,261.38	20.68	545.618	
900.00	899.45	939.24	939.19	3.13	19.99	-83.30	-627.48	-11,265.44	11,281.05	11,257.95	23.11	488.183	
1,000.00	998.70	1,042.80	1,042.70	3.49	22.28	-83.40	-627.92	-11,265.44	11,279.66	11,253.90	25.76	437.888	
1,100.00	1,097.47	1,141.56	1,141.47	3.86	24.55	-83.51	-627.92	-11,265.44	11,277.85	11,249.44	28.41	396.952	
1,200.00	1,195.62	1,239.72	1,239.62	4.24	26.82	-83.65	-627.92	-11,265.44	11,275.68	11,244.62	31.06	363.019	
1,300.00	1,293.06	1,334.95	1,334.84	4.64	29.02	-83.80	-626.97	-11,265.44	11,273.10	11,239.44	33.66	334.928	
1,400.00	1,389.64	1,429.05	1,428.93	5.06	31.19	-83.98	-627.42	-11,265.44	11,270.28	11,234.03	36.25	310.923	
1,500.00	1,485.27	1,529.49	1,529.27	5.50	33.57	-84.19	-627.92	-11,265.44	11,267.16	11,228.09	39.07	288.377	
1,515.00	1,499.52	1,543.74	1,543.52	5.57	33.93	-84.23	-627.92	-11,265.44	11,266.67	11,227.17	39.50	285.266	
1,600.00	1,580.22	1,624.44	1,624.22	5.96	35.95	-84.36	-627.92	-11,265.44	11,263.87	11,221.97	41.91	268.785	
1,700.00	1,675.17	1,719.39	1,719.17	6.44	38.32	-84.51	-627.92	-11,265.44	11,260.67	11,215.91	44.75	251.612	
1,800.00	1,770.11	1,811.39	1,811.15	6.92	40.63	-84.65	-626.40	-11,265.44	11,257.43	11,209.89	47.54	236.814	
1,900.00	1,865.05	1,902.04	1,901.78	7.41	42.90	-84.79	-626.93	-11,265.44	11,254.43	11,204.14	50.29	223.778	
2,000.00	1,959.99	2,004.38	2,003.99	7.90	45.47	-84.96	-627.92	-11,265.44	11,251.56	11,198.21	53.36	210.873	
2,100.00	2,054.94	2,099.33	2,098.94	8.40	47.95	-85.11	-627.92	-11,265.44	11,248.70	11,192.37	56.34	199.670	
2,200.00	2,149.88	2,194.27	2,193.88	8.90	50.43	-85.26	-627.92	-11,265.44	11,245.93	11,186.61	59.32	189.581	
2,300.00	2,244.82	2,286.71	2,286.29	9.41	52.85	-85.40	-626.38	-11,265.44	11,243.10	11,180.86	62.24	180.637	
2,400.00	2,339.76	2,376.57	2,376.15	9.92	55.20	-85.55	-626.82	-11,265.44	11,240.54	11,175.44	65.10	172.669	
2,500.00	2,434.71	2,466.17	2,465.73	10.43	57.54	-85.70	-627.69	-11,265.44	11,238.11	11,170.16	67.95	165.384	
2,600.00	2,529.65	2,574.24	2,573.65	10.94	60.19	-85.87	-627.92	-11,265.44	11,235.70	11,164.59	71.11	157.996	
2,700.00	2,624.59	2,669.18	2,668.59	11.45	62.48	-86.02	-627.92	-11,265.44	11,233.37	11,159.44	73.92	151.959	
2,800.00	2,719.53	2,762.72	2,762.10	11.97	64.74	-86.16	-625.97	-11,265.44	11,230.91	11,154.21	76.70	146.424	
2,900.00	2,814.48	2,851.36	2,850.72	12.49	66.89	-86.30	-626.31	-11,265.44	11,228.78	11,149.42	79.36	141.488	
3,000.00	2,909.42	2,939.71	2,939.06	13.01	69.02	-86.45	-627.11	-11,265.44	11,226.80	11,144.78	82.02	136.883	
3,100.00	3,004.36	3,049.10	3,048.36	13.53	71.52	-86.63	-627.92	-11,265.44	11,224.89	11,139.85	85.03	132.006	
3,200.00	3,099.30	3,144.04	3,143.30	14.05	73.53	-86.78	-627.92	-11,265.44	11,222.99	11,135.42	87.56	128.171	
3,300.00	3,194.25	3,238.99	3,238.25	14.57	75.53	-86.93	-627.92	-11,265.44	11,221.17	11,131.08	90.09	124.551	
3,400.00	3,289.19	3,333.93	3,333.19	15.09	77.54	-87.08	-627.92	-11,265.44	11,219.45	11,126.82	92.62	121.129	
3,500.00	3,384.13	3,426.88	3,426.13	15.62	79.51	-87.23	-626.37	-11,265.44	11,217.62	11,122.50	95.11	117.939	
3,600.00	3,479.07	3,518.70	3,517.94	16.14	81.45	-87.37	-626.60	-11,265.44	11,216.09	11,118.51	97.58	114.942	
3,700.00	3,574.02	3,610.39	3,609.62	16.67	83.39	-87.52	-627.03	-11,265.44	11,214.68	11,114.64	100.04	112.097	
3,800.00	3,668.96	3,701.95	3,701.17	17.19	85.32	-87.67	-627.67	-11,265.44	11,213.39	11,110.88	102.51	109.392	
3,900.00	3,763.90	3,808.75	3,807.90	17.72	87.89	-87.84	-627.92	-11,265.44	11,212.13	11,106.53	105.60	106.178	
4,000.00	3,858.84	3,903.70	3,902.84	18.24	90.28	-88.00	-627.92	-11,265.44	11,210.93	11,102.42	108.52	103.312	
4,100.00	3,953.79	3,998.64	3,997.79	18.77	92.67	-88.15	-627.92	-11,265.44	11,209.82	11,098.39	111.43	100.596	
4,200.00	4,048.73	4,093.58	4,092.73	19.30	95.06	-88.30	-627.92	-11,265.44	11,208.80	11,094.44	114.35	98.019	
4,300.00	4,143.67	4,188.52	4,187.67	19.82	97.46	-88.45	-627.92	-11,265.44	11,207.86	11,090.59	117.27	95.571	
4,400.00	4,238.61	4,283.47	4,282.61	20.35	99.85	-88.61	-627.92	-11,265.44	11,207.01	11,086.82	120.19	93.242	
4,500.00	4,333.56	4,378.41	4,377.56	20.88	102.24	-88.76	-627.92	-11,265.44	11,206.25	11,083.14	123.11	91.025	
4,600.00	4,428.50	4,473.35	4,472.50	21.41	104.63	-88.91	-627.92	-11,265.44	11,205.58	11,079.55	126.03	88.910	
4,700.00	4,523.44	4,568.29	4,567.44	21.93	107.02	-89.06	-627.92	-11,265.44	11,204.99	11,076.04	128.95	86.892	
4,800.00	4,618.38	4,663.24	4,662.38	22.46	109.41	-89.22	-627.92	-11,265.44	11,204.50	11,072.62	131.87	84.964	
4,900.00	4,713.33	4,757.97	4,757.08	22.99	111.80	-89.35	-623.51	-11,265.44	11,203.37	11,068.58	134.79	83.118	
5,000.00	4,808.27	4,851.43	4,850.54	23.52	114.15	-89.50	-623.56	-11,265.44	11,203.05	11,065.38	137.67	81.375	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149B - OH - OH-INC											Offset Site Error: 0.00 usft
Survey Program: 520-A027Ua_INC-ONLY											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
5,100.00	4,903.21	4,944.85	4,943.95	24.05	116.51	-89.65	-623.68	-11,265.44	11,202.82	11,062.27	
5,200.00	4,998.16	5,038.21	5,037.31	24.58	118.86	-89.80	-623.88	-11,265.44	11,202.70	11,059.27	
5,268.98	5,063.64	5,102.59	5,101.68	24.94	120.48	-89.90	-624.06	-11,265.44	11,202.68	11,057.25	
5,300.00	5,093.10	5,131.53	5,130.63	25.11	121.21	-89.95	-624.16	-11,265.44	11,202.68	11,056.37	
5,400.00	5,188.04	5,224.81	5,223.89	25.64	123.56	-90.10	-624.50	-11,265.44	11,202.77	11,053.57	
5,500.00	5,282.98	5,318.03	5,317.11	26.17	125.91	-90.25	-624.93	-11,265.44	11,202.95	11,050.88	
5,600.00	5,377.93	5,411.21	5,410.28	26.70	128.26	-90.40	-625.43	-11,265.44	11,203.24	11,048.29	
5,623.25	5,400.00	5,432.87	5,431.94	26.82	128.80	-90.44	-625.55	-11,265.44	11,203.33	11,047.71	
5,700.00	5,473.03	5,504.50	5,503.57	27.22	130.61	-90.56	-626.00	-11,265.44	11,203.64	11,045.81	
5,800.00	5,568.64	5,598.25	5,597.32	27.73	132.97	-90.71	-626.65	-11,265.44	11,204.11	11,043.41	
5,900.00	5,664.75	5,692.47	5,691.52	28.23	135.34	-90.85	-627.38	-11,265.44	11,204.65	11,041.08	
6,000.00	5,761.33	5,806.90	5,805.33	28.71	138.44	-91.01	-627.92	-11,265.44	11,205.18	11,038.03	
6,100.00	5,858.34	5,903.91	5,902.34	29.18	141.31	-91.13	-627.92	-11,265.44	11,205.65	11,035.16	
6,200.00	5,955.76	6,001.33	5,999.76	29.64	144.18	-91.25	-627.92	-11,265.44	11,206.13	11,032.31	
6,300.00	6,053.57	6,099.14	6,097.57	30.07	147.07	-91.36	-627.92	-11,265.44	11,206.61	11,029.47	
6,400.00	6,151.72	6,197.29	6,195.72	30.50	149.97	-91.46	-627.92	-11,265.44	11,207.09	11,026.62	
6,500.00	6,250.19	6,295.76	6,294.19	30.91	152.88	-91.55	-627.92	-11,265.44	11,207.56	11,023.77	
6,600.00	6,348.94	6,394.51	6,392.94	31.30	155.80	-91.63	-627.92	-11,265.44	11,208.00	11,020.90	
6,659.67	6,408.00	6,453.57	6,452.00	31.53	157.54	-91.68	-627.92	-11,265.44	11,208.25	11,019.18	
6,700.00	6,447.82	6,493.39	6,491.82	31.68	158.72	-108.13	-627.92	-11,265.44	11,209.49	11,019.08	
6,750.00	6,496.66	6,542.23	6,540.66	31.90	160.16	-119.23	-627.92	-11,265.44	11,213.99	11,021.93	
6,800.00	6,544.65	6,590.22	6,588.65	32.13	161.58	-125.25	-627.92	-11,265.44	11,221.76	11,028.06	
6,850.00	6,591.49	6,637.06	6,635.49	32.37	162.96	-128.72	-627.92	-11,265.44	11,232.75	11,037.43	
6,900.00	6,636.89	6,682.46	6,680.89	32.62	164.30	-130.71	-627.92	-11,265.44	11,246.91	11,049.99	
6,950.00	6,680.57	6,726.14	6,724.57	32.89	165.59	-131.74	-627.92	-11,265.44	11,264.15	11,065.68	
7,000.00	6,722.26	6,767.83	6,766.26	33.17	166.83	-132.07	-627.92	-11,265.44	11,284.38	11,084.41	
7,050.00	6,761.71	6,807.28	6,805.71	33.45	167.99	-131.82	-627.92	-11,265.44	11,307.47	11,106.06	
7,100.00	6,798.67	6,844.24	6,842.67	33.75	169.08	-131.06	-627.92	-11,265.44	11,333.30	11,130.52	
7,150.00	6,832.91	6,878.48	6,876.91	34.06	170.09	-129.82	-627.92	-11,265.44	11,361.71	11,157.63	
7,200.00	6,864.22	6,909.79	6,908.22	34.37	171.02	-128.08	-627.92	-11,265.44	11,392.53	11,187.25	
7,250.00	6,892.42	6,937.99	6,936.42	34.69	171.85	-125.81	-627.92	-11,265.44	11,425.58	11,219.18	
7,300.00	6,917.32	6,962.89	6,961.32	35.03	172.59	-122.98	-627.92	-11,265.44	11,460.66	11,253.25	
7,350.00	6,938.77	6,984.34	6,982.77	35.37	173.22	-119.52	-627.92	-11,265.44	11,497.56	11,289.24	
7,400.00	6,956.64	7,002.21	7,000.64	35.72	173.75	-115.36	-627.92	-11,265.44	11,536.06	11,326.94	
7,450.00	6,970.83	7,016.40	7,014.83	36.07	174.17	-110.47	-627.92	-11,265.44	11,575.92	11,366.10	
7,500.00	6,981.23	7,026.80	7,025.23	36.44	174.48	-104.80	-627.92	-11,265.44	11,616.89	11,406.51	
7,550.00	6,987.80	7,033.37	7,031.80	36.81	174.67	-98.40	-627.92	-11,265.44	11,658.72	11,447.89	
7,600.00	6,990.48	7,036.05	7,034.48	37.19	174.75	-91.38	-627.92	-11,265.44	11,701.16	11,490.00	
7,609.87	6,990.55	7,036.12	7,034.55	37.26	174.75	-89.93	-627.92	-11,265.44	11,709.58	11,498.37	
7,700.00	6,990.49	7,036.06	7,034.49	37.97	174.75	-89.93	-627.92	-11,265.44	11,786.67	11,575.03	
7,800.00	6,990.42	7,035.99	7,034.42	38.78	174.75	-89.93	-627.92	-11,265.44	11,872.41	11,660.29	
7,900.00	6,990.35	7,035.92	7,034.35	39.64	174.75	-89.93	-627.92	-11,265.44	11,958.37	11,745.78	
8,000.00	6,990.28	7,035.85	7,034.28	40.53	174.74	-89.93	-627.92	-11,265.44	12,044.55	11,831.48	
8,100.00	6,990.21	7,035.78	7,034.21	41.45	174.74	-89.93	-627.92	-11,265.44	12,130.95	11,917.39	
8,200.00	6,990.14	7,035.71	7,034.14	42.40	174.74	-89.93	-627.92	-11,265.44	12,217.55	12,003.52	
8,306.37	6,990.06	7,035.63	7,034.06	43.45	174.74	-89.93	-627.92	-11,265.44	12,309.88	12,095.34	
8,400.00	6,990.00	7,035.57	7,034.00	44.38	174.73	-89.91	-627.92	-11,265.44	12,392.80	12,177.84	
8,500.00	6,989.93	7,035.50	7,033.93	45.36	174.73	-89.89	-627.92	-11,265.44	12,484.42	12,269.07	
8,600.00	6,989.85	7,035.42	7,033.85	46.33	174.73	-89.86	-627.92	-11,265.44	12,578.70	12,363.03	
8,700.00	6,989.78	7,035.35	7,033.78	47.28	174.73	-89.82	-627.92	-11,265.44	12,675.14	12,459.20	
8,800.00	6,989.70	7,035.27	7,033.70	48.21	174.73	-89.73	-627.92	-11,265.44	12,773.22	12,557.09	
8,900.00	6,989.63	7,035.20	7,033.63	49.11	174.72	-89.52	-627.92	-11,265.44	12,872.43	12,656.17	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149B - OH - OH-INC											Offset Site Error: 0.00 usft			
Survey Program: Reference		520-A027Ua_INC-ONLY Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance				Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,000.00	6,989.55	7,035.12	7,033.55	49.99	174.72	-87.71	-627.92	-11,265.44	12,972.26	12,755.94	216.32	59.968		
9,100.00	6,989.48	7,035.05	7,033.48	50.84	174.72	89.17	-627.92	-11,265.44	13,072.23	12,855.92	216.31	60.431		
9,200.00	6,989.40	7,034.98	7,033.40	51.66	174.72	89.65	-627.92	-11,265.44	13,171.84	12,955.60	216.25	60.911		
9,300.00	6,989.33	7,034.90	7,033.33	52.45	174.72	89.79	-627.92	-11,265.44	13,270.63	13,054.51	216.12	61.405		
9,393.87	6,989.27	7,034.84	7,033.27	53.15	174.71	89.85	-627.92	-11,265.44	13,362.20	13,146.26	215.94	61.878		
9,400.00	6,989.26	7,034.83	7,033.26	53.20	174.71	89.85	-627.92	-11,265.44	13,368.14	13,152.21	215.93	61.910		
9,500.00	6,989.19	7,034.76	7,033.19	53.95	174.71	89.84	-627.92	-11,265.44	13,464.99	13,249.26	215.72	62.418		
9,600.00	6,989.12	7,034.69	7,033.12	54.73	174.71	89.84	-627.92	-11,265.44	13,561.88	13,346.36	215.52	62.926		
9,700.00	6,989.05	7,034.62	7,033.05	55.55	174.71	89.84	-627.92	-11,265.44	13,658.82	13,443.49	215.33	63.433		
9,800.00	6,988.98	7,034.55	7,032.98	56.40	174.70	89.84	-627.92	-11,265.44	13,755.80	13,540.66	215.13	63.940		
9,900.00	6,988.91	7,034.48	7,032.91	57.28	174.70	89.84	-627.92	-11,265.44	13,852.82	13,637.87	214.95	64.447		
10,000.00	6,988.84	7,034.41	7,032.84	58.20	174.70	89.84	-627.92	-11,265.44	13,949.89	13,735.12	214.77	64.953		
10,100.00	6,988.77	7,034.34	7,032.77	59.14	174.70	89.84	-627.92	-11,265.44	14,047.00	13,832.41	214.59	65.459		
10,200.00	6,988.70	7,034.27	7,032.70	60.11	174.70	89.84	-627.92	-11,265.44	14,144.14	13,929.72	214.42	65.965		
10,300.00	6,988.63	7,034.20	7,032.63	61.11	174.69	89.83	-627.92	-11,265.44	14,241.33	14,027.08	214.25	66.470		
10,400.00	6,988.56	7,034.13	7,032.56	62.14	174.69	89.83	-627.92	-11,265.44	14,338.56	14,124.47	214.09	66.974		
10,500.00	6,988.49	7,034.06	7,032.49	63.19	174.69	89.83	-627.92	-11,265.44	14,435.82	14,221.89	213.93	67.478		
10,600.00	6,988.42	7,033.99	7,032.42	64.26	174.69	89.83	-627.92	-11,265.44	14,533.12	14,319.34	213.78	67.982		
10,700.00	6,988.35	7,033.92	7,032.35	65.36	174.69	89.83	-627.92	-11,265.44	14,630.46	14,416.83	213.63	68.485		
10,800.00	6,988.28	7,033.85	7,032.28	66.48	174.68	89.83	-627.92	-11,265.44	14,727.83	14,514.35	213.48	68.988		
10,900.00	6,988.21	7,033.79	7,032.21	67.61	174.68	89.83	-627.92	-11,265.44	14,825.24	14,611.90	213.34	69.490		
11,000.00	6,988.14	7,033.72	7,032.14	68.77	174.68	89.83	-627.92	-11,265.44	14,922.68	14,709.47	213.21	69.991		
11,100.00	6,988.07	7,033.65	7,032.07	69.95	174.68	89.82	-627.92	-11,265.44	15,020.16	14,807.08	213.07	70.492		
11,200.00	6,988.01	7,033.58	7,032.01	71.14	174.68	89.82	-627.92	-11,265.44	15,117.67	14,904.72	212.95	70.993		
11,300.00	6,987.94	7,033.51	7,031.94	72.35	174.67	89.82	-627.92	-11,265.44	15,215.21	15,002.39	212.82	71.493		
11,400.00	6,987.87	7,033.44	7,031.87	73.57	174.67	89.82	-627.92	-11,265.44	15,312.78	15,100.08	212.70	71.992		
11,500.00	6,987.80	7,033.37	7,031.80	74.81	174.67	89.82	-627.92	-11,265.44	15,410.38	15,197.80	212.58	72.491		
11,600.00	6,987.73	7,033.30	7,031.73	76.07	174.67	89.82	-627.92	-11,265.44	15,508.02	15,295.55	212.47	72.989		
11,643.87	6,987.70	7,033.27	7,031.70	76.62	174.67	89.82	-627.92	-11,265.44	15,550.86	15,338.43	212.42	73.208		
11,700.00	6,987.66	7,033.23	7,031.66	77.33	174.67	89.84	-627.92	-11,265.44	15,605.56	15,393.20	212.36	73.488		
11,737.27	6,987.63	7,033.20	7,031.63	77.80	174.67	89.85	-627.92	-11,265.44	15,641.75	15,429.44	212.31	73.674		
11,800.00	6,987.59	7,033.16	7,031.59	78.59	174.66	89.85	-627.92	-11,265.44	15,702.57	15,490.34	212.23	73.988		
11,900.00	6,987.52	7,033.09	7,031.52	79.86	174.66	89.85	-627.92	-11,265.44	15,799.56	15,587.45	212.11	74.487		
12,000.00	6,987.46	7,033.03	7,031.46	81.14	174.66	89.85	-627.92	-11,265.44	15,896.58	15,684.59	211.99	74.986		
12,100.00	6,987.39	7,032.96	7,031.39	82.43	174.66	89.85	-627.92	-11,265.44	15,993.64	15,781.76	211.88	75.484		
12,200.00	6,987.32	7,032.89	7,031.32	83.73	174.66	89.84	-627.92	-11,265.44	16,090.74	15,878.97	211.77	75.982		
12,300.00	6,987.26	7,032.83	7,031.26	85.05	174.65	89.84	-627.92	-11,265.44	16,187.87	15,976.20	211.67	76.478		
12,400.00	6,987.19	7,032.76	7,031.19	86.38	174.65	89.84	-627.92	-11,265.44	16,285.04	16,073.47	211.56	76.974		
12,500.00	6,987.12	7,032.69	7,031.12	87.71	174.65	89.84	-627.92	-11,265.44	16,382.24	16,170.77	211.47	77.469		
12,600.00	6,987.06	7,032.63	7,031.06	89.06	174.65	89.84	-627.92	-11,265.44	16,479.47	16,268.10	211.37	77.964		
12,700.00	6,986.99	7,032.56	7,030.99	90.41	174.65	89.84	-627.92	-11,265.44	16,576.74	16,365.46	211.28	78.458		
12,800.00	6,986.92	7,032.49	7,030.92	91.77	174.64	89.84	-627.92	-11,265.44	16,674.04	16,462.84	211.20	78.951		
12,900.00	6,986.86	7,032.43	7,030.86	93.14	174.64	89.84	-627.92	-11,265.44	16,771.37	16,560.26	211.11	79.443		
13,000.00	6,986.79	7,032.36	7,030.79	94.52	174.64	89.84	-627.92	-11,265.44	16,868.73	16,657.70	211.03	79.934		
13,100.00	6,986.72	7,032.29	7,030.72	95.90	174.64	89.84	-627.92	-11,265.44	16,966.13	16,755.17	210.96	80.425		
13,200.00	6,986.66	7,032.23	7,030.66	97.30	174.64	89.83	-627.92	-11,265.44	17,063.55	16,852.67	210.88	80.915		
13,300.00	6,986.59	7,032.16	7,030.59	98.69	174.63	89.83	-627.92	-11,265.44	17,161.00	16,950.19	210.81	81.404		
13,400.00	6,986.52	7,032.09	7,030.52	100.10	174.63	89.83	-627.92	-11,265.44	17,258.49	17,047.74	210.75	81.892		
13,500.00	6,986.46	7,032.03	7,030.46	101.51	174.63	89.83	-627.92	-11,265.44	17,356.00	17,145.31	210.68	82.379		
13,600.00	6,986.39	7,031.96	7,030.39	102.93	174.63	89.83	-627.92	-11,265.44	17,453.54	17,242.91	210.62	82.866		
13,700.00	6,986.32	7,031.89	7,030.32	104.35	174.63	89.83	-627.92	-11,265.44	17,551.10	17,340.54	210.57	83.352		
13,800.00	6,986.25	7,031.83	7,030.25	105.78	174.62	89.83	-627.92	-11,265.44	17,648.70	17,438.18	210.51	83.837		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149B - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		520-A027Ua_INC-ONLY				Rule Assigned:				Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
13,900.00	6,986.19	7,031.76	7,030.19	107.21	174.62	89.83	-627.92	-11,265.44	17,746.32	17,535.86	210.46	84.321	
14,000.00	6,986.12	7,031.69	7,030.12	108.65	174.62	89.83	-627.92	-11,265.44	17,843.97	17,633.55	210.41	84.804	
14,100.00	6,986.05	7,031.63	7,030.05	110.09	174.62	89.83	-627.92	-11,265.44	17,941.64	17,731.27	210.37	85.287	
14,200.00	6,985.99	7,031.56	7,029.99	111.54	174.62	89.82	-627.92	-11,265.44	18,039.34	17,829.01	210.33	85.768	
14,300.00	6,985.92	7,031.49	7,029.92	112.99	174.61	89.82	-627.92	-11,265.44	18,137.06	17,926.77	210.29	86.249	
14,400.00	6,985.85	7,031.43	7,029.85	114.45	174.61	89.82	-627.92	-11,265.44	18,234.81	18,024.56	210.25	86.729	
14,500.00	6,985.79	7,031.36	7,029.79	115.91	174.61	89.82	-627.92	-11,265.44	18,332.58	18,122.37	210.22	87.209	
14,600.00	6,985.72	7,031.29	7,029.72	117.38	174.61	89.82	-627.92	-11,265.44	18,430.38	18,220.19	210.18	87.687	
14,700.00	6,985.65	7,031.22	7,029.65	118.84	174.61	89.82	-627.92	-11,265.44	18,528.20	18,318.04	210.15	88.165	
14,800.00	6,985.59	7,031.16	7,029.59	120.32	174.60	89.82	-627.92	-11,265.44	18,626.04	18,415.91	210.13	88.641	
14,900.00	6,985.52	7,031.09	7,029.52	121.79	174.60	89.82	-627.92	-11,265.44	18,723.91	18,513.80	210.10	89.117	
15,000.00	6,985.45	7,031.02	7,029.45	123.27	174.60	89.82	-627.92	-11,265.44	18,821.80	18,611.71	210.08	89.592	
15,100.00	6,985.39	7,030.96	7,029.39	124.75	174.60	89.82	-627.92	-11,265.44	18,919.71	18,709.64	210.06	90.066	
15,200.00	6,985.32	7,030.89	7,029.32	126.24	174.60	89.81	-627.92	-11,265.44	19,017.64	18,807.59	210.05	90.539	
15,300.00	6,985.25	7,030.82	7,029.25	127.72	174.59	89.81	-627.92	-11,265.44	19,115.59	18,905.56	210.03	91.012	
15,400.00	6,985.19	7,030.76	7,029.19	129.21	174.59	89.81	-627.92	-11,265.44	19,213.57	19,003.55	210.02	91.484	
15,500.00	6,985.12	7,030.69	7,029.12	130.71	174.59	89.81	-627.92	-11,265.44	19,311.56	19,101.55	210.01	91.954	
15,600.00	6,985.05	7,030.62	7,029.05	132.20	174.59	89.81	-627.92	-11,265.44	19,409.58	19,199.57	210.01	92.424	
15,700.00	6,984.99	7,030.56	7,028.99	133.70	174.59	89.81	-627.92	-11,265.44	19,507.62	19,297.61	210.00	92.893	
15,800.00	6,984.92	7,030.49	7,028.92	135.20	174.58	89.81	-627.92	-11,265.44	19,605.67	19,395.67	210.00	93.361	
15,900.00	6,984.85	7,030.42	7,028.85	136.71	174.58	89.81	-627.92	-11,265.44	19,703.75	19,493.75	210.00	93.829	
16,000.00	6,984.79	7,030.36	7,028.79	138.21	174.58	89.81	-627.92	-11,265.44	19,801.84	19,591.84	210.00	94.295	
16,100.00	6,984.72	7,030.29	7,028.72	139.72	174.58	89.81	-627.92	-11,265.44	19,899.96	19,689.95	210.00	94.761	
16,200.00	6,984.65	7,030.22	7,028.65	141.23	174.58	89.80	-627.92	-11,265.44	19,998.09	19,788.08	210.01	95.226	
16,300.00	6,984.59	7,030.16	7,028.59	142.75	174.58	89.80	-627.92	-11,265.44	20,096.24	19,886.22	210.01	95.690	
16,400.00	6,984.52	7,030.09	7,028.52	144.26	174.57	89.80	-627.92	-11,265.44	20,194.41	19,984.38	210.02	96.153	
16,500.00	6,984.45	7,030.02	7,028.45	145.78	174.57	89.80	-627.92	-11,265.44	20,292.59	20,082.56	210.04	96.615	
16,600.00	6,984.39	7,029.96	7,028.39	147.29	174.57	89.80	-627.92	-11,265.44	20,390.80	20,180.75	210.05	97.076	
16,700.00	6,984.32	7,029.89	7,028.32	148.82	174.57	89.80	-627.92	-11,265.44	20,489.02	20,278.96	210.06	97.537	
16,800.00	6,984.25	7,029.82	7,028.25	150.34	174.57	89.80	-627.92	-11,265.44	20,587.26	20,377.18	210.08	97.997	
16,900.00	6,984.19	7,029.76	7,028.19	151.86	174.56	89.80	-627.92	-11,265.44	20,685.52	20,475.42	210.10	98.456	
17,000.00	6,984.12	7,029.69	7,028.12	153.39	174.56	89.80	-627.92	-11,265.44	20,783.79	20,573.67	210.12	98.914	
17,100.00	6,984.05	7,029.62	7,028.05	154.91	174.56	89.80	-627.92	-11,265.44	20,882.08	20,671.93	210.14	99.371	
17,200.00	6,983.99	7,029.56	7,027.99	156.44	174.56	89.79	-627.92	-11,265.44	20,980.38	20,770.21	210.17	99.827	
17,300.00	6,983.92	7,029.49	7,027.92	157.97	174.56	89.79	-627.92	-11,265.44	21,078.70	20,868.51	210.19	100.283	
17,400.00	6,983.85	7,029.42	7,027.85	159.50	174.55	89.79	-627.92	-11,265.44	21,177.04	20,966.82	210.22	100.737	
17,500.00	6,983.79	7,029.36	7,027.79	161.04	174.55	89.79	-627.92	-11,265.44	21,275.39	21,065.14	210.25	101.191	
17,600.00	6,983.72	7,029.29	7,027.72	162.57	174.55	89.79	-627.92	-11,265.44	21,373.76	21,163.48	210.28	101.644	
17,700.00	6,983.65	7,029.22	7,027.65	164.11	174.55	89.79	-627.92	-11,265.44	21,472.14	21,261.83	210.31	102.096	
17,800.00	6,983.59	7,029.16	7,027.59	165.65	174.55	89.79	-627.92	-11,265.44	21,570.54	21,360.19	210.35	102.548	
17,900.00	6,983.52	7,029.09	7,027.52	167.18	174.54	89.79	-627.92	-11,265.44	21,668.95	21,458.57	210.38	102.998	
18,000.00	6,983.45	7,029.02	7,027.45	168.72	174.54	89.79	-627.92	-11,265.44	21,767.38	21,556.96	210.42	103.448	
18,100.00	6,983.39	7,028.96	7,027.39	170.27	174.54	89.79	-627.92	-11,265.44	21,865.82	21,655.36	210.46	103.897	
18,200.00	6,983.32	7,028.89	7,027.32	171.81	174.54	89.78	-627.92	-11,265.44	21,964.27	21,753.78	210.50	104.345	
18,300.00	6,983.25	7,028.82	7,027.25	173.35	174.54	89.78	-627.92	-11,265.44	22,062.74	21,852.20	210.54	104.792	
18,400.00	6,983.19	7,028.76	7,027.19	174.90	174.53	89.78	-627.92	-11,265.44	22,161.23	21,950.64	210.58	105.239	
18,500.00	6,983.12	7,028.69	7,027.12	176.44	174.53	89.78	-627.92	-11,265.44	22,259.72	22,049.10	210.62	105.684	
18,600.00	6,983.05	7,028.62	7,027.05	177.99	174.53	89.78	-627.92	-11,265.44	22,358.23	22,147.56	210.67	106.129	
18,700.00	6,982.99	7,028.56	7,026.99	179.54	174.53	89.78	-627.92	-11,265.44	22,456.75	22,246.04	210.72	106.573	
18,800.00	6,982.92	7,028.49	7,026.92	181.09	174.53	89.78	-627.92	-11,265.44	22,555.29	22,344.52	210.77	107.016	
18,900.00	6,982.85	7,028.42	7,026.85	182.64	174.52	89.78	-627.92	-11,265.44	22,653.84	22,443.02	210.81	107.459	
19,000.00	6,982.78	7,028.36	7,026.78	184.19	174.52	89.78	-627.92	-11,265.44	22,752.40	22,541.53	210.87	107.900	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149B - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 520-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
19,100.00	6,982.72	7,028.29	7,026.72	185.74	174.52	89.78	-627.92	-11,265.44	22,850.97	22,640.06		210.92	108.341
19,200.00	6,982.65	7,028.22	7,026.65	187.29	174.52	89.77	-627.92	-11,265.44	22,949.56	22,738.59		210.97	108.781
19,300.00	6,982.58	7,028.16	7,026.58	188.84	174.52	89.77	-627.92	-11,265.44	23,048.16	22,837.13		211.02	109.220
19,400.00	6,982.52	7,028.09	7,026.52	190.40	174.51	89.77	-627.92	-11,265.44	23,146.77	22,935.69		211.08	109.659
19,500.00	6,982.45	7,028.02	7,026.45	191.95	174.51	89.77	-627.92	-11,265.44	23,245.39	23,034.25		211.14	110.096
19,600.00	6,982.38	7,027.96	7,026.38	193.51	174.51	89.77	-627.92	-11,265.44	23,344.02	23,132.83		211.20	110.533
19,700.00	6,982.32	7,027.89	7,026.32	195.07	174.51	89.77	-627.92	-11,265.44	23,442.67	23,231.41		211.25	110.969
19,800.00	6,982.25	7,027.82	7,026.25	196.62	174.51	89.77	-627.92	-11,265.44	23,541.33	23,330.01		211.31	111.404
19,900.00	6,982.18	7,027.75	7,026.18	198.18	174.50	89.77	-627.92	-11,265.44	23,639.99	23,428.62		211.38	111.839
20,000.00	6,982.12	7,027.69	7,026.12	199.74	174.50	89.77	-627.92	-11,265.44	23,738.67	23,527.23		211.44	112.273
20,100.00	6,982.05	7,027.62	7,026.05	201.30	174.50	89.77	-627.92	-11,265.44	23,837.36	23,625.86		211.50	112.706
20,176.02	6,982.00	7,027.57	7,026.00	202.36	174.50	89.76	-627.92	-11,265.44	23,912.39	23,696.26		216.13	110.641

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		327-MWD OWSG Rev5							Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.00	0.00	2,707.00	2,536.45	0.00	15.45	-93.65	-559.24	-8,768.46	9,166.43					
100.00	100.00	2,738.00	2,565.17	0.25	15.64	-93.60	-550.77	-8,760.44	9,138.17	9,122.47	15.70	581.879		
200.00	200.00	2,738.00	2,565.17	0.61	15.64	-93.60	-550.77	-8,760.44	9,110.87	9,095.00	15.88	573.890		
300.00	300.00	2,738.00	2,565.17	0.97	15.64	-93.60	-550.77	-8,760.44	9,084.59	9,068.46	16.13	563.092		
400.00	400.00	2,800.00	2,623.28	1.33	16.00	-93.50	-534.59	-8,746.14	9,059.11	9,042.30	16.80	539.113		
500.00	500.00	2,800.00	2,623.28	1.68	16.00	-93.50	-534.59	-8,746.14	9,034.24	9,017.12	17.12	527.683		
600.00	600.00	2,800.00	2,623.28	2.04	16.00	-93.50	-534.59	-8,746.14	9,010.42	8,992.97	17.45	516.404		
700.00	699.98	2,835.28	2,656.71	2.40	16.19	-83.92	-526.09	-8,738.73	8,987.25	8,969.26	17.99	499.518		
800.00	799.84	2,988.00	2,802.59	2.76	16.95	-84.26	-494.89	-8,706.07	8,963.68	8,944.57	19.11	468.989		
900.00	899.45	2,988.00	2,802.59	3.13	16.95	-84.75	-494.89	-8,706.07	8,940.12	8,920.66	19.45	459.543		
1,000.00	998.70	3,019.00	2,832.38	3.49	17.09	-85.21	-489.08	-8,699.76	8,917.13	8,897.18	19.95	446.938		
1,100.00	1,097.47	3,034.41	2,847.25	3.86	17.16	-85.67	-486.36	-8,696.77	8,894.72	8,874.34	20.38	436.449		
1,200.00	1,195.62	3,082.00	2,893.27	4.24	17.36	-86.13	-478.34	-8,687.69	8,872.69	8,851.72	20.97	423.181		
1,300.00	1,293.06	3,145.00	2,954.24	4.64	17.63	-86.60	-467.75	-8,675.90	8,850.83	8,829.19	21.64	408.969		
1,400.00	1,389.64	3,175.00	2,983.33	5.06	17.75	-87.06	-462.81	-8,670.50	8,829.44	8,807.26	22.18	398.132		
1,500.00	1,485.27	3,206.00	3,013.49	5.50	17.86	-87.52	-458.02	-8,665.13	8,808.64	8,785.90	22.74	387.434		
1,515.00	1,499.52	3,206.00	3,013.49	5.57	17.86	-87.58	-458.02	-8,665.13	8,805.57	8,782.77	22.80	386.193		
1,600.00	1,580.22	3,237.00	3,043.73	5.96	17.98	-87.62	-453.58	-8,659.95	8,788.47	8,765.16	23.31	377.023		
1,700.00	1,675.17	3,269.00	3,075.01	6.44	18.09	-87.66	-449.24	-8,654.82	8,769.07	8,745.17	23.90	366.937		
1,800.00	1,770.11	3,301.00	3,106.36	6.92	18.19	-87.71	-445.07	-8,649.93	8,750.43	8,725.94	24.49	357.273		
1,900.00	1,865.05	3,333.00	3,137.76	7.41	18.30	-87.75	-440.97	-8,645.31	8,732.60	8,707.51	25.09	348.034		
2,000.00	1,959.99	3,353.66	3,158.05	7.90	18.36	-87.78	-438.32	-8,642.52	8,715.58	8,689.93	25.65	339.813		
2,100.00	2,054.94	3,394.00	3,197.72	8.40	18.48	-87.84	-433.20	-8,637.19	8,699.24	8,672.95	26.29	330.931		
2,200.00	2,149.88	3,426.00	3,229.25	8.90	18.57	-87.88	-429.47	-8,633.21	8,683.69	8,656.79	26.89	322.880		
2,300.00	2,244.82	3,445.06	3,248.06	9.41	18.62	-87.91	-427.45	-8,630.97	8,668.95	8,641.50	27.45	315.781		
2,400.00	2,339.76	3,458.00	3,260.86	9.92	18.65	-87.93	-426.18	-8,629.51	8,655.10	8,627.11	27.99	309.232		
2,500.00	2,434.71	3,488.00	3,290.58	10.43	18.72	-87.98	-423.51	-8,626.40	8,642.16	8,613.57	28.59	302.300		
2,600.00	2,529.65	3,500.79	3,303.27	10.94	18.75	-88.00	-422.48	-8,625.21	8,630.17	8,601.05	29.12	296.343		
2,700.00	2,624.59	3,519.00	3,321.36	11.45	18.78	-88.03	-421.06	-8,623.63	8,619.12	8,589.44	29.68	290.441		
2,800.00	2,719.53	3,550.00	3,352.18	11.97	18.84	-88.08	-418.72	-8,621.27	8,609.00	8,578.73	30.27	284.418		
2,900.00	2,814.48	3,550.00	3,352.18	12.49	18.84	-88.08	-418.72	-8,621.27	8,599.81	8,569.05	30.76	279.598		
3,000.00	2,909.42	3,582.00	3,384.03	13.01	18.90	-88.14	-416.39	-8,619.28	8,591.50	8,560.15	31.35	274.076		
3,100.00	3,004.36	3,613.00	3,414.93	13.53	18.94	-88.19	-414.37	-8,617.72	8,584.16	8,552.23	31.93	268.875		
3,200.00	3,099.30	3,613.00	3,414.93	14.05	18.94	-88.19	-414.37	-8,617.72	8,577.73	8,545.32	32.41	264.646		
3,300.00	3,194.25	3,644.00	3,445.86	14.57	18.98	-88.25	-412.86	-8,616.53	8,572.20	8,539.22	32.98	259.890		
3,400.00	3,289.19	3,658.83	3,460.68	15.09	18.99	-88.28	-412.41	-8,616.10	8,567.68	8,534.17	33.51	255.694		
3,500.00	3,384.13	3,676.00	3,477.84	15.62	19.01	-88.31	-412.14	-8,615.71	8,564.13	8,530.09	34.04	251.621		
3,600.00	3,479.07	3,697.76	3,499.61	16.14	19.01	-88.36	-412.09	-8,615.39	8,561.54	8,526.97	34.56	247.696		
3,700.00	3,574.02	3,738.00	3,539.84	16.67	19.00	-88.44	-412.36	-8,615.04	8,559.78	8,524.67	35.11	243.806		
3,800.00	3,668.96	3,769.00	3,570.84	17.19	18.99	-88.51	-412.60	-8,614.97	8,558.78	8,523.18	35.60	240.414		
3,900.00	3,763.90	3,840.00	3,641.84	17.72	19.00	-88.66	-412.71	-8,615.28	8,558.43	8,522.40	36.03	237.545		
4,000.00	3,858.84	3,935.39	3,737.22	18.24	31.10	-88.86	-412.80	-8,615.77	8,558.26	8,509.43	48.83	175.267		
4,069.18	3,924.53	3,999.50	3,801.33	18.61	39.28	-88.99	-412.87	-8,616.11	8,558.23	8,500.80	57.42	149.035 CC		
4,100.00	3,953.79	4,028.06	3,829.90	18.77	42.93	-89.05	-412.90	-8,616.27	8,558.24	8,496.98	61.25	139.724		
4,200.00	4,048.73	4,120.73	3,922.57	19.30	54.78	-89.25	-413.00	-8,616.79	8,558.35	8,484.69	73.66	116.184		
4,300.00	4,143.67	4,213.41	4,015.24	19.82	66.63	-89.44	-413.10	-8,617.34	8,558.60	8,472.53	86.07	99.439		
4,400.00	4,238.61	4,306.08	4,107.91	20.35	78.49	-89.64	-413.21	-8,617.91	8,559.00	8,460.52	98.47	86.917		
4,500.00	4,333.56	4,398.75	4,200.58	20.88	90.36	-89.83	-413.33	-8,618.50	8,559.53	8,448.66	110.88	77.199		
4,600.00	4,428.50	4,491.42	4,293.25	21.41	102.22	-90.03	-413.45	-8,619.12	8,560.21	8,436.93	123.28	69.437		
4,700.00	4,523.44	4,584.09	4,385.92	21.93	114.09	-90.22	-413.57	-8,619.76	8,561.02	8,425.34	135.68	63.096		
4,800.00	4,618.38	4,676.76	4,478.58	22.46	125.96	-90.42	-413.70	-8,620.43	8,561.98	8,413.89	148.09	57.818		
4,900.00	4,713.33	4,769.43	4,571.25	22.99	137.83	-90.61	-413.83	-8,621.12	8,563.07	8,402.59	160.49	53.357		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149C - OH - OH-SVY													Offset Site Error: 0.00 usft	
Survey Program: 327-MWD OWSG Rev5		Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned:				Offset Well Error: 0.00 usft		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,000.00	4,808.27	4,862.10	4,663.92	23.52	149.69	-90.81	-413.97	-8,621.83	8,564.31	8,391.42	172.89	49.536		
5,100.00	4,903.21	4,954.77	4,756.58	24.05	161.56	-91.00	-414.11	-8,622.57	8,565.69	8,380.39	185.29	46.228		
5,200.00	4,998.16	5,047.44	4,849.25	24.58	173.43	-91.20	-414.25	-8,623.33	8,567.20	8,369.51	197.70	43.335		
5,300.00	5,093.10	5,140.11	4,941.91	25.11	185.30	-91.39	-414.41	-8,624.12	8,568.86	8,358.76	210.10	40.785		
5,400.00	5,188.04	5,232.77	5,034.57	25.64	197.17	-91.59	-414.56	-8,624.93	8,570.66	8,348.16	222.50	38.520		
5,500.00	5,282.98	5,325.44	5,127.24	26.17	209.04	-91.78	-414.72	-8,625.76	8,572.59	8,337.69	234.90	36.494		
5,600.00	5,377.93	5,418.10	5,219.90	26.70	220.91	-91.97	-414.89	-8,626.62	8,574.67	8,327.37	247.30	34.673		
5,623.25	5,400.00	5,439.65	5,241.44	26.82	223.67	-92.02	-414.92	-8,626.83	8,575.17	8,324.99	250.19	34.275		
5,700.00	5,473.03	5,510.92	5,312.71	27.22	232.80	-92.18	-415.06	-8,627.51	8,576.87	8,317.15	259.72	33.023		
5,800.00	5,568.64	5,604.24	5,406.02	27.73	244.75	-92.39	-415.23	-8,628.42	8,579.13	8,306.94	272.19	31.519		
5,900.00	5,664.75	5,698.04	5,499.82	28.23	256.77	-92.58	-415.41	-8,629.36	8,581.44	8,296.74	284.70	30.142		
6,000.00	5,761.33	5,792.30	5,594.07	28.71	268.84	-92.77	-415.60	-8,630.34	8,583.78	8,286.52	297.26	28.876		
6,100.00	5,858.34	5,886.98	5,688.75	29.18	280.97	-92.95	-415.79	-8,631.34	8,586.14	8,276.27	309.86	27.710		
6,200.00	5,955.76	5,982.07	5,783.83	29.64	293.15	-93.11	-415.99	-8,632.37	8,588.49	8,265.99	322.50	26.631		
6,300.00	6,053.57	6,077.52	5,879.28	30.07	305.38	-93.27	-416.19	-8,633.43	8,590.83	8,255.67	335.16	25.632		
6,400.00	6,151.72	6,173.31	5,975.06	30.50	317.65	-93.41	-416.40	-8,634.52	8,593.15	8,245.29	347.86	24.703		
6,500.00	6,250.19	6,269.41	6,071.16	30.91	329.96	-93.55	-416.62	-8,635.64	8,595.42	8,234.84	360.58	23.838		
6,600.00	6,348.94	6,365.80	6,167.54	31.30	342.31	-93.67	-416.84	-8,636.79	8,597.65	8,224.33	373.32	23.030		
6,659.67	6,408.00	6,423.44	6,225.17	31.53	349.69	-93.74	-416.97	-8,637.49	8,598.95	8,218.02	380.94	22.573		
6,700.00	6,447.82	6,462.28	6,264.01	31.68	354.67	-110.16	-417.06	-8,637.96	8,600.92	8,214.85	386.07	22.278		
6,750.00	6,496.66	6,509.90	6,311.62	31.90	360.77	-121.24	-417.18	-8,638.55	8,606.41	8,214.02	392.38	21.934 ES		
6,800.00	6,544.65	6,556.64	6,358.36	32.13	366.75	-127.25	-417.29	-8,639.14	8,615.23	8,216.63	398.60	21.614		
6,850.00	6,591.49	6,602.22	6,403.93	32.37	372.59	-130.70	-417.40	-8,639.72	8,627.34	8,222.67	404.67	21.319		
6,900.00	6,636.89	6,646.35	6,448.06	32.62	378.24	-132.69	-417.51	-8,640.28	8,642.68	8,232.10	410.57	21.050		
6,950.00	6,680.57	6,688.75	6,490.46	32.89	383.68	-133.71	-417.61	-8,640.83	8,661.15	8,244.89	416.26	20.807		
7,000.00	6,722.26	6,729.18	6,530.89	33.17	388.86	-134.02	-417.71	-8,641.35	8,682.66	8,260.95	421.70	20.589		
7,050.00	6,761.71	6,767.37	6,569.08	33.45	393.75	-133.76	-417.81	-8,641.86	8,707.07	8,280.21	426.86	20.398		
7,100.00	6,798.67	6,803.10	6,604.80	33.75	398.32	-132.98	-417.90	-8,642.33	8,734.25	8,302.54	431.71	20.232		
7,150.00	6,832.91	6,836.14	6,637.84	34.06	402.56	-131.70	-417.98	-8,642.77	8,764.03	8,327.82	436.21	20.091		
7,200.00	6,864.22	6,866.28	6,667.98	34.37	406.42	-129.90	-418.06	-8,643.17	8,796.24	8,355.90	440.34	19.976		
7,250.00	6,892.42	6,893.35	6,695.05	34.69	409.89	-127.55	-418.13	-8,643.54	8,830.69	8,386.61	444.08	19.885		
7,300.00	6,917.32	6,917.18	6,718.87	35.03	412.94	-124.57	-418.19	-8,643.86	8,867.16	8,419.77	447.40	19.819		
7,350.00	6,938.77	6,937.61	6,739.30	35.37	415.56	-120.88	-418.25	-8,644.14	8,905.44	8,455.17	450.27	19.778		
7,400.00	6,956.64	6,954.53	6,756.22	35.72	417.72	-116.41	-418.29	-8,644.37	8,945.30	8,492.60	452.70	19.760 SF		
7,450.00	6,970.83	6,967.83	6,769.52	36.07	419.43	-111.08	-418.33	-8,644.56	8,986.48	8,531.83	454.65	19.766		
7,500.00	6,981.23	6,977.44	6,779.12	36.44	420.66	-104.83	-418.35	-8,644.69	9,028.73	8,572.62	456.12	19.795		
7,550.00	6,987.80	6,983.28	6,784.96	36.81	421.41	-97.71	-418.37	-8,644.77	9,071.80	8,614.71	457.09	19.847		
7,600.00	6,990.48	6,985.33	6,787.01	37.19	421.67	-89.87	-418.37	-8,644.80	9,115.42	8,657.84	457.58	19.921		
7,609.87	6,990.55	6,985.29	6,786.97	37.26	421.66	-88.26	-418.37	-8,644.80	9,124.07	8,666.45	457.62	19.938		
7,700.00	6,990.49	6,984.20	6,785.89	37.97	421.52	-88.25	-418.37	-8,644.78	9,203.21	8,745.35	457.87	20.100		
7,800.00	6,990.42	6,983.00	6,784.69	38.78	421.37	-88.23	-418.37	-8,644.76	9,291.26	8,833.12	458.14	20.280		
7,900.00	6,990.35	6,981.80	6,783.49	39.64	421.22	-88.21	-418.36	-8,644.75	9,379.54	8,921.13	458.41	20.461		
8,000.00	6,990.28	6,980.60	6,782.29	40.53	421.06	-88.20	-418.36	-8,644.73	9,468.06	9,009.38	458.68	20.642		
8,100.00	6,990.21	6,979.41	6,781.09	41.45	420.91	-88.18	-418.36	-8,644.71	9,556.80	9,097.85	458.95	20.823		
8,200.00	6,990.14	6,978.21	6,779.89	42.40	420.76	-88.17	-418.35	-8,644.70	9,645.76	9,186.55	459.21	21.005		
8,306.37	6,990.06	6,976.93	6,778.62	43.45	420.59	-88.15	-418.35	-8,644.68	9,740.62	9,281.13	459.49	21.199		
8,400.00	6,990.00	6,975.79	6,777.47	44.38	420.45	-87.85	-418.35	-8,644.66	9,825.63	9,365.92	459.70	21.374		
8,500.00	6,989.93	6,974.52	6,776.20	45.36	420.28	-87.38	-418.34	-8,644.65	9,919.17	9,459.30	459.87	21.570		
8,600.00	6,989.85	6,973.21	6,774.89	46.33	420.12	-86.64	-418.34	-8,644.63	10,015.03	9,555.06	459.97	21.773		
8,700.00	6,989.78	6,971.86	6,773.54	47.28	419.94	-85.32	-418.34	-8,644.61	10,112.69	9,652.69	460.00	21.984		
8,800.00	6,989.70	6,970.48	6,772.17	48.21	419.77	-82.29	-418.33	-8,644.59	10,211.63	9,751.67	459.96	22.201		
8,900.00	6,989.63	6,969.08	6,770.76	49.11	419.59	-68.78	-418.33	-8,644.57	10,311.33	9,851.48	459.85	22.423		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		327-MWD OWSG Rev5					Rule Assigned:			Offset Well Error:		0.00 usft		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,000.00	6,989.55	6,967.66	6,769.35	49.99	419.40	65.62	-418.33	-8,644.55	10,411.30	9,951.61	459.69	22.649		
9,100.00	6,989.48	6,966.23	6,767.92	50.84	419.22	81.80	-418.32	-8,644.53	10,511.04	10,051.58	459.46	22.877		
9,200.00	6,989.40	6,964.80	6,766.49	51.66	419.04	85.08	-418.32	-8,644.51	10,610.09	10,150.92	459.18	23.107		
9,300.00	6,989.33	6,963.38	6,765.07	52.45	418.86	86.47	-418.31	-8,644.49	10,707.99	10,249.15	458.84	23.337		
9,393.87	6,989.27	6,962.05	6,763.74	53.15	418.69	87.20	-418.31	-8,644.48	10,798.45	10,339.97	458.48	23.553		
9,400.00	6,989.26	6,961.97	6,763.65	53.20	418.68	87.20	-418.31	-8,644.47	10,804.30	10,345.85	458.45	23.567		
9,500.00	6,989.19	6,960.56	6,762.25	53.95	418.50	87.17	-418.31	-8,644.46	10,899.84	10,441.79	458.05	23.796		
9,600.00	6,989.12	6,959.16	6,760.84	54.73	418.32	87.15	-418.30	-8,644.44	10,995.46	10,537.80	457.66	24.026		
9,700.00	6,989.05	6,957.75	6,759.44	55.55	418.14	87.12	-418.30	-8,644.42	11,091.15	10,633.88	457.27	24.255		
9,800.00	6,988.98	6,956.35	6,758.03	56.40	417.96	87.10	-418.30	-8,644.40	11,186.92	10,730.03	456.89	24.485		
9,900.00	6,988.91	6,954.95	6,756.63	57.28	417.78	87.07	-418.29	-8,644.38	11,282.76	10,826.25	456.52	24.715		
10,000.00	6,988.84	6,953.54	6,755.23	58.20	417.60	87.05	-418.29	-8,644.36	11,378.68	10,922.53	456.15	24.945		
10,100.00	6,988.77	6,952.14	6,753.83	59.14	417.42	87.02	-418.29	-8,644.34	11,474.66	11,018.87	455.79	25.175		
10,200.00	6,988.70	6,950.74	6,752.43	60.11	417.24	87.00	-418.28	-8,644.32	11,570.71	11,115.28	455.43	25.406		
10,300.00	6,988.63	6,949.34	6,751.03	61.11	417.06	86.97	-418.28	-8,644.30	11,666.83	11,211.75	455.08	25.637		
10,400.00	6,988.56	6,947.94	6,749.63	62.14	416.88	86.95	-418.27	-8,644.28	11,763.01	11,308.27	454.74	25.868		
10,500.00	6,988.49	6,946.55	6,748.23	63.19	416.70	86.92	-418.27	-8,644.26	11,859.26	11,404.86	454.40	26.099		
10,600.00	6,988.42	6,945.15	6,746.84	64.26	416.52	86.90	-418.27	-8,644.24	11,955.56	11,501.50	454.07	26.330		
10,700.00	6,988.35	6,943.75	6,745.44	65.36	416.34	86.87	-418.26	-8,644.22	12,051.93	11,598.19	453.74	26.561		
10,800.00	6,988.28	6,942.36	6,744.04	66.48	416.16	86.85	-418.26	-8,644.21	12,148.36	11,694.94	453.42	26.793		
10,900.00	6,988.21	6,940.96	6,742.65	67.61	415.98	86.82	-418.26	-8,644.19	12,244.84	11,791.74	453.10	27.025		
11,000.00	6,988.14	6,939.57	6,741.25	68.77	415.81	86.80	-418.25	-8,644.17	12,341.38	11,888.59	452.79	27.256		
11,100.00	6,988.07	6,938.17	6,739.86	69.95	415.63	86.77	-418.25	-8,644.15	12,437.97	11,985.49	452.48	27.488		
11,200.00	6,988.01	6,936.78	6,738.47	71.14	415.45	86.75	-418.24	-8,644.13	12,534.62	12,082.44	452.18	27.720		
11,300.00	6,987.94	6,935.39	6,737.08	72.35	415.27	86.72	-418.24	-8,644.11	12,631.31	12,179.43	451.88	27.953		
11,400.00	6,987.87	6,934.00	6,735.69	73.57	415.09	86.70	-418.24	-8,644.09	12,728.06	12,276.47	451.59	28.185		
11,500.00	6,987.80	6,932.61	6,734.30	74.81	414.91	86.67	-418.23	-8,644.07	12,824.86	12,373.56	451.30	28.418		
11,600.00	6,987.73	6,931.22	6,732.91	76.07	414.74	86.65	-418.23	-8,644.05	12,921.71	12,470.69	451.02	28.650		
11,643.87	6,987.70	6,930.61	6,732.30	76.62	414.66	86.64	-418.23	-8,644.05	12,964.21	12,513.31	450.89	28.752		
11,700.00	6,987.66	6,929.83	6,731.52	77.33	414.56	86.87	-418.23	-8,644.03	13,018.46	12,567.73	450.73	28.883		
11,737.27	6,987.63	6,929.32	6,731.00	77.80	414.49	87.00	-418.23	-8,644.03	13,054.33	12,603.71	450.63	28.969		
11,800.00	6,987.59	6,928.45	6,730.14	78.59	414.38	86.99	-418.22	-8,644.02	13,114.62	12,664.18	450.44	29.115		
11,900.00	6,987.52	6,927.07	6,728.76	79.86	414.21	86.97	-418.22	-8,644.00	13,210.78	12,760.62	450.16	29.347		
12,000.00	6,987.46	6,925.70	6,727.39	81.14	414.03	86.95	-418.22	-8,643.98	13,306.99	12,857.11	449.88	29.579		
12,100.00	6,987.39	6,924.32	6,726.01	82.43	413.85	86.92	-418.21	-8,643.96	13,403.25	12,953.65	449.60	29.811		
12,200.00	6,987.32	6,922.95	6,724.64	83.73	413.68	86.90	-418.21	-8,643.94	13,499.57	13,050.24	449.33	30.044		
12,300.00	6,987.26	6,921.57	6,723.26	85.05	413.50	86.88	-418.21	-8,643.92	13,595.94	13,146.88	449.06	30.276		
12,400.00	6,987.19	6,920.20	6,721.89	86.38	413.33	86.86	-418.20	-8,643.90	13,692.37	13,243.56	448.80	30.509		
12,500.00	6,987.12	6,918.83	6,720.52	87.71	413.15	86.84	-418.20	-8,643.88	13,788.84	13,340.30	448.54	30.741		
12,600.00	6,987.06	6,917.46	6,719.15	89.06	412.97	86.82	-418.19	-8,643.87	13,885.37	13,437.08	448.29	30.974		
12,700.00	6,986.99	6,916.09	6,717.78	90.41	412.80	86.79	-418.19	-8,643.85	13,981.94	13,533.90	448.04	31.207		
12,800.00	6,986.92	6,914.72	6,716.41	91.77	412.62	86.77	-418.19	-8,643.83	14,078.56	13,630.77	447.79	31.440		
12,900.00	6,986.86	6,913.35	6,715.04	93.14	412.45	86.75	-418.18	-8,643.81	14,175.23	13,727.68	447.55	31.673		
13,000.00	6,986.79	6,911.98	6,713.67	94.52	412.27	86.73	-418.18	-8,643.79	14,271.94	13,824.63	447.31	31.906		
13,100.00	6,986.72	6,910.61	6,712.30	95.90	412.10	86.71	-418.18	-8,643.77	14,368.70	13,921.62	447.07	32.139		
13,200.00	6,986.66	6,909.24	6,710.94	97.30	411.92	86.69	-418.17	-8,643.75	14,465.50	14,018.66	446.84	32.373		
13,300.00	6,986.59	6,907.88	6,709.57	98.69	411.75	86.66	-418.17	-8,643.74	14,562.34	14,115.73	446.62	32.606		
13,400.00	6,986.52	6,906.51	6,708.20	100.10	411.57	86.64	-418.17	-8,643.72	14,659.23	14,212.84	446.39	32.839		
13,500.00	6,986.46	6,905.15	6,706.84	101.51	411.40	86.62	-418.16	-8,643.70	14,756.16	14,309.99	446.17	33.073		
13,600.00	6,986.39	6,903.78	6,705.48	102.93	411.22	86.60	-418.16	-8,643.68	14,853.13	14,407.18	445.95	33.307		
13,700.00	6,986.32	6,902.42	6,704.11	104.35	411.05	86.58	-418.16	-8,643.66	14,950.14	14,504.40	445.74	33.540		
13,800.00	6,986.25	6,901.06	6,702.75	105.78	410.87	86.56	-418.15	-8,643.64	15,047.19	14,601.66	445.53	33.774		

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		327-MWD OWSG Rev5					Rule Assigned:			Offset Well Error:		0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,900.00	6,986.19	6,899.70	6,701.39	107.21	410.70	86.54	-418.15	-8,643.63	15,144.27	14,698.96	445.32	34.008		
14,000.00	6,986.12	6,898.33	6,700.03	108.65	410.52	86.51	-418.14	-8,643.61	15,241.40	14,796.28	445.11	34.242		
14,100.00	6,986.05	6,896.97	6,698.67	110.09	410.35	86.49	-418.14	-8,643.59	15,338.56	14,893.65	444.91	34.476		
14,200.00	6,985.99	6,895.61	6,697.31	111.54	410.18	86.47	-418.14	-8,643.57	15,435.76	14,991.04	444.71	34.709		
14,300.00	6,985.92	6,894.26	6,695.95	112.99	410.00	86.45	-418.13	-8,643.55	15,532.99	15,088.47	444.52	34.944		
14,400.00	6,985.85	6,892.90	6,694.59	114.45	409.83	86.43	-418.13	-8,643.53	15,630.26	15,185.93	444.32	35.178		
14,500.00	6,985.79	6,891.54	6,693.23	115.91	409.65	86.41	-418.13	-8,643.51	15,727.56	15,283.42	444.13	35.412		
14,600.00	6,985.72	6,890.18	6,691.88	117.38	409.48	86.38	-418.12	-8,643.50	15,824.89	15,380.95	443.95	35.646		
14,700.00	6,985.65	6,888.83	6,690.52	118.84	409.31	86.36	-418.12	-8,643.48	15,922.26	15,478.50	443.76	35.880		
14,800.00	6,985.59	6,887.47	6,689.16	120.32	409.13	86.34	-418.12	-8,643.46	16,019.66	15,576.08	443.58	36.115		
14,900.00	6,985.52	6,886.12	6,687.81	121.79	408.96	86.32	-418.11	-8,643.44	16,117.09	15,673.69	443.40	36.349		
15,000.00	6,985.45	6,884.76	6,686.46	123.27	408.79	86.30	-418.11	-8,643.42	16,214.56	15,771.33	443.22	36.583		
15,100.00	6,985.39	6,883.41	6,685.10	124.75	408.61	86.28	-418.11	-8,643.40	16,312.05	15,869.00	443.05	36.818		
15,200.00	6,985.32	6,882.06	6,683.75	126.24	408.44	86.26	-418.10	-8,643.39	16,409.57	15,966.70	442.87	37.052		
15,300.00	6,985.25	6,880.70	6,682.40	127.72	408.27	86.24	-418.10	-8,643.37	16,507.13	16,064.42	442.70	37.287		
15,400.00	6,985.19	6,879.35	6,681.05	129.21	408.09	86.21	-418.10	-8,643.35	16,604.71	16,162.17	442.54	37.522		
15,500.00	6,985.12	6,878.00	6,679.70	130.71	407.92	86.19	-418.09	-8,643.33	16,702.32	16,259.95	442.37	37.756		
15,600.00	6,985.05	6,876.65	6,678.35	132.20	407.75	86.17	-418.09	-8,643.31	16,799.96	16,357.75	442.21	37.991		
15,700.00	6,984.99	6,875.30	6,677.00	133.70	407.57	86.15	-418.08	-8,643.30	16,897.62	16,455.57	442.05	38.226		
15,800.00	6,984.92	6,873.96	6,675.65	135.20	407.40	86.13	-418.08	-8,643.28	16,995.32	16,553.43	441.89	38.461		
15,900.00	6,984.85	6,872.61	6,674.30	136.71	407.23	86.11	-418.08	-8,643.26	17,093.04	16,651.30	441.73	38.695		
16,000.00	6,984.79	6,871.26	6,672.96	138.21	407.06	86.09	-418.07	-8,643.24	17,190.78	16,749.20	441.58	38.930		
16,100.00	6,984.72	6,869.92	6,671.61	139.72	406.88	86.06	-418.07	-8,643.22	17,288.55	16,847.13	441.43	39.165		
16,200.00	6,984.65	6,868.57	6,670.27	141.23	406.71	86.04	-418.07	-8,643.20	17,386.35	16,945.07	441.28	39.400		
16,300.00	6,984.59	6,867.23	6,668.92	142.75	406.54	86.02	-418.06	-8,643.19	17,484.17	17,043.04	441.13	39.635		
16,400.00	6,984.52	6,865.88	6,667.58	144.26	406.37	86.00	-418.06	-8,643.17	17,582.02	17,141.04	440.98	39.870		
16,500.00	6,984.45	6,864.54	6,666.23	145.78	406.19	85.98	-418.06	-8,643.15	17,679.89	17,239.05	440.84	40.105		
16,600.00	6,984.39	6,863.20	6,664.89	147.29	406.02	85.96	-418.05	-8,643.13	17,777.78	17,337.09	440.69	40.340		
16,700.00	6,984.32	6,861.86	6,663.55	148.82	405.85	85.94	-418.05	-8,643.11	17,875.70	17,435.14	440.55	40.576		
16,800.00	6,984.25	6,860.51	6,662.21	150.34	405.68	85.92	-418.05	-8,643.10	17,973.64	17,533.22	440.41	40.811		
16,900.00	6,984.19	6,859.17	6,660.87	151.86	405.51	85.90	-418.04	-8,643.08	18,071.60	17,631.32	440.28	41.046		
17,000.00	6,984.12	6,857.83	6,659.53	153.39	405.34	85.87	-418.04	-8,643.06	18,169.58	17,729.44	440.14	41.281		
17,100.00	6,984.05	6,856.50	6,658.19	154.91	405.16	85.85	-418.04	-8,643.04	18,267.59	17,827.58	440.01	41.516		
17,200.00	6,983.99	6,855.16	6,656.85	156.44	404.99	85.83	-418.03	-8,643.02	18,365.62	17,925.74	439.88	41.752		
17,300.00	6,983.92	6,853.82	6,655.52	157.97	404.82	85.81	-418.03	-8,643.01	18,463.67	18,023.92	439.75	41.987		
17,400.00	6,983.85	6,852.48	6,654.18	159.50	404.65	85.79	-418.03	-8,642.99	18,561.74	18,122.12	439.62	42.223		
17,500.00	6,983.79	6,851.15	6,652.84	161.04	404.48	85.77	-418.02	-8,642.97	18,659.82	18,220.34	439.49	42.458		
17,600.00	6,983.72	6,849.81	6,651.51	162.57	404.31	85.75	-418.02	-8,642.95	18,757.93	18,318.57	439.36	42.693		
17,700.00	6,983.65	6,848.48	6,650.17	164.11	404.14	85.73	-418.02	-8,642.93	18,856.06	18,416.83	439.24	42.929		
17,800.00	6,983.59	6,847.14	6,648.84	165.65	403.97	85.71	-418.01	-8,642.92	18,954.21	18,515.10	439.12	43.164		
17,900.00	6,983.52	6,845.81	6,647.51	167.18	403.80	85.68	-418.01	-8,642.90	19,052.38	18,613.39	438.99	43.400		
18,000.00	6,983.45	6,844.48	6,646.18	168.72	403.63	85.66	-418.01	-8,642.88	19,150.57	18,711.69	438.87	43.636		
18,100.00	6,983.39	6,843.15	6,644.84	170.27	403.45	85.64	-418.00	-8,642.86	19,248.77	18,810.02	438.76	43.871		
18,200.00	6,983.32	6,841.82	6,643.51	171.81	403.28	85.62	-418.00	-8,642.85	19,347.00	18,908.36	438.64	44.107		
18,300.00	6,983.25	6,840.49	6,642.18	173.35	403.11	85.60	-417.99	-8,642.83	19,445.24	19,006.71	438.52	44.343		
18,400.00	6,983.19	6,839.16	6,640.85	174.90	402.94	85.58	-417.99	-8,642.81	19,543.50	19,105.09	438.41	44.578		
18,500.00	6,983.12	6,837.83	6,639.52	176.44	402.77	85.56	-417.99	-8,642.79	19,641.77	19,203.48	438.30	44.814		
18,600.00	6,983.05	6,836.50	6,638.20	177.99	402.60	85.54	-417.98	-8,642.77	19,740.07	19,301.88	438.18	45.050		
18,700.00	6,982.99	6,835.17	6,636.87	179.54	402.43	85.52	-417.98	-8,642.76	19,838.38	19,400.31	438.07	45.285		
18,800.00	6,982.92	6,833.84	6,635.54	181.09	402.26	85.50	-417.98	-8,642.74	19,936.71	19,498.74	437.96	45.521		
18,900.00	6,982.85	6,832.52	6,634.22	182.64	402.09	85.47	-417.97	-8,642.72	20,035.05	19,597.20	437.86	45.757		
19,000.00	6,982.78	6,831.19	6,632.89	184.19	401.92	85.45	-417.97	-8,642.70	20,133.41	19,695.66	437.75	45.993		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #149C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 327-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
19,100.00	6,982.72	6,829.87	6,631.57	185.74	401.75	85.43	-417.97	-8,642.69	20,231.79	19,794.14		437.64	46.229
19,200.00	6,982.65	6,828.54	6,630.24	187.29	401.58	85.41	-417.96	-8,642.67	20,330.18	19,892.64		437.54	46.465
19,300.00	6,982.58	6,827.22	6,628.92	188.84	401.41	85.39	-417.96	-8,642.65	20,428.59	19,991.15		437.44	46.701
19,400.00	6,982.52	6,825.90	6,627.60	190.40	401.24	85.37	-417.96	-8,642.63	20,527.01	20,089.68		437.33	46.937
19,500.00	6,982.45	6,824.58	6,626.28	191.95	401.08	85.35	-417.95	-8,642.61	20,625.45	20,188.22		437.23	47.173
19,600.00	6,982.38	6,823.26	6,624.95	193.51	400.91	85.33	-417.95	-8,642.60	20,723.90	20,286.77		437.13	47.409
19,700.00	6,982.32	6,821.93	6,623.63	195.07	400.74	85.31	-417.95	-8,642.58	20,822.37	20,385.34		437.03	47.645
19,800.00	6,982.25	6,820.61	6,622.31	196.62	400.57	85.29	-417.94	-8,642.56	20,920.85	20,483.92		436.94	47.881
19,900.00	6,982.18	6,819.30	6,621.00	198.18	400.40	85.27	-417.94	-8,642.54	21,019.35	20,582.51		436.84	48.117
20,000.00	6,982.12	6,817.98	6,619.68	199.74	400.23	85.25	-417.94	-8,642.53	21,117.86	20,681.12		436.74	48.353
20,100.00	6,982.05	6,816.66	6,618.36	201.30	400.06	85.22	-417.93	-8,642.51	21,216.38	20,779.73		436.65	48.589
20,176.02	6,982.00	6,815.66	6,617.36	202.36	399.93	85.21	-417.93	-8,642.50	21,291.29	20,850.20		441.08	48.271

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164 - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 497-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-74.92	2,270.93	-8,425.41	8,726.31				
100.00	100.00	38.00	38.00	0.25	1.20	-74.92	2,270.93	-8,425.41	8,726.09	8,724.64	1.45	5,998.732	
200.00	200.00	138.00	138.00	0.61	4.37	-74.92	2,270.93	-8,425.41	8,726.09	8,721.11	4.98	1,752.122	
300.00	300.00	238.00	238.00	0.97	7.54	-74.92	2,270.93	-8,425.41	8,726.09	8,717.59	8.51	1,025.882	
400.00	400.00	338.00	338.00	1.33	10.71	-74.92	2,270.93	-8,425.41	8,726.09	8,714.06	12.03	725.265	
500.00	500.00	438.00	438.00	1.68	13.87	-74.92	2,270.93	-8,425.41	8,726.09	8,710.54	15.56	560.903	
510.00	510.00	448.00	448.00	1.72	14.19	-74.92	2,270.93	-8,425.41	8,726.09	8,710.18	15.91	548.473	
600.00	600.00	497.00	497.00	2.04	15.74	-74.92	2,270.93	-8,425.41	8,726.19	8,708.41	17.78	490.672	
700.00	699.98	546.42	546.42	2.40	15.79	-64.92	2,271.45	-8,425.62	8,726.17	8,707.99	18.18	480.116	
800.00	799.84	578.48	578.47	2.76	15.80	-64.94	2,272.13	-8,425.96	8,725.43	8,706.89	18.54	470.606	
900.00	899.45	623.09	623.05	3.13	15.82	-64.98	2,273.11	-8,426.69	8,723.89	8,704.98	18.91	461.348	
1,000.00	998.70	639.03	638.99	3.49	15.82	-65.03	2,273.47	-8,427.02	8,721.60	8,702.33	19.27	452.579	
1,100.00	1,097.47	670.04	669.98	3.86	15.83	-65.11	2,274.21	-8,428.07	8,718.80	8,699.16	19.64	443.846	
1,200.00	1,195.62	700.74	700.64	4.24	15.84	-65.21	2,274.90	-8,429.40	8,715.36	8,695.33	20.03	435.181	
1,300.00	1,293.06	714.54	714.42	4.64	15.84	-65.30	2,275.22	-8,430.05	8,711.26	8,690.85	20.42	426.665	
1,400.00	1,389.64	731.10	730.94	5.06	15.85	-65.41	2,275.71	-8,431.09	8,706.79	8,685.97	20.82	418.127	
1,500.00	1,485.27	778.64	778.37	5.50	15.87	-65.59	2,276.46	-8,434.25	8,701.44	8,680.17	21.27	409.097	
1,515.00	1,499.52	793.71	793.39	5.57	15.87	-65.63	2,276.63	-8,435.46	8,700.68	8,679.33	21.34	407.648	
1,600.00	1,580.22	793.71	793.39	5.96	15.87	-65.63	2,276.63	-8,435.46	8,696.14	8,674.43	21.71	400.557	
1,700.00	1,675.17	806.95	806.57	6.44	15.88	-65.66	2,276.78	-8,436.64	8,691.81	8,669.65	22.16	392.253	
1,800.00	1,770.11	829.75	829.26	6.92	15.89	-65.70	2,276.95	-8,438.90	8,688.43	8,665.81	22.62	384.097	
1,900.00	1,865.05	887.61	886.80	7.41	15.91	-65.82	2,277.38	-8,444.91	8,685.71	8,662.60	23.11	375.886	
2,000.00	1,959.99	887.61	886.80	7.90	15.91	-65.82	2,277.38	-8,444.91	8,683.85	8,660.29	23.56	368.545	
2,100.00	2,054.94	918.16	917.14	8.40	15.92	-65.88	2,277.89	-8,448.52	8,682.93	8,658.89	24.04	361.132	
2,140.40	2,093.29	918.16	917.14	8.60	15.92	-65.88	2,277.89	-8,448.52	8,682.84	8,658.61	24.23	358.358 CC	
2,200.00	2,149.88	940.11	938.90	8.90	15.93	-65.92	2,278.24	-8,451.36	8,682.96	8,658.43	24.52	354.111 ES	
2,300.00	2,244.82	984.53	982.90	9.41	15.96	-66.01	2,278.83	-8,457.44	8,683.79	8,658.77	25.02	347.049	
2,400.00	2,339.76	1,011.83	1,009.93	9.92	15.97	-66.07	2,279.21	-8,461.22	8,685.22	8,659.71	25.51	340.470	
2,500.00	2,434.71	1,043.02	1,040.75	10.43	16.00	-66.13	2,279.51	-8,465.98	8,687.63	8,661.62	26.01	334.023	
2,600.00	2,529.65	1,043.02	1,040.75	10.94	16.00	-66.13	2,279.51	-8,465.98	8,690.98	8,664.51	26.47	328.330	
2,700.00	2,624.59	1,043.02	1,040.75	11.45	16.00	-66.13	2,279.51	-8,465.98	8,695.47	8,668.54	26.93	322.897	
2,800.00	2,719.53	1,058.95	1,056.43	11.97	16.02	-66.16	2,279.68	-8,468.82	8,700.98	8,673.57	27.41	317.407	
2,900.00	2,814.48	1,074.75	1,071.93	12.49	16.03	-66.20	2,279.92	-8,471.86	8,707.55	8,679.66	27.89	312.163	
3,000.00	2,909.42	1,074.75	1,071.93	13.01	16.03	-66.20	2,279.92	-8,471.86	8,715.14	8,686.79	28.35	307.440	
3,100.00	3,004.36	1,105.75	1,102.26	13.53	16.06	-66.26	2,280.48	-8,478.22	8,723.62	8,694.78	28.84	302.441	
3,200.00	3,099.30	1,105.75	1,102.26	14.05	16.06	-66.26	2,280.48	-8,478.22	8,733.14	8,703.85	29.29	298.140	
3,300.00	3,194.25	1,136.35	1,132.08	14.57	16.09	-66.32	2,281.31	-8,485.03	8,743.58	8,713.80	29.79	293.556	
3,400.00	3,289.19	1,168.18	1,163.01	15.09	16.12	-66.39	2,282.26	-8,492.48	8,754.98	8,724.70	30.28	289.150	
3,500.00	3,384.13	1,168.18	1,163.01	15.62	16.12	-66.39	2,282.26	-8,492.48	8,767.22	8,736.50	30.72	285.410	
3,600.00	3,479.07	1,199.00	1,192.87	16.14	16.15	-66.45	2,283.14	-8,500.06	8,780.34	8,749.13	31.21	281.358	
3,700.00	3,574.02	1,217.62	1,210.85	16.67	16.17	-66.49	2,283.63	-8,504.89	8,794.43	8,762.76	31.67	277.654	
3,800.00	3,668.96	1,261.54	1,253.19	17.19	16.21	-66.59	2,284.34	-8,516.54	8,809.25	8,777.07	32.19	273.702	
3,900.00	3,763.90	1,261.54	1,253.19	17.72	16.21	-66.59	2,284.34	-8,516.54	8,824.96	8,792.35	32.61	270.602	
4,000.00	3,858.84	1,292.54	1,282.93	18.24	16.24	-66.65	2,284.69	-8,525.29	8,841.59	8,808.49	33.10	267.116	
4,100.00	3,953.79	1,292.54	1,282.93	18.77	16.24	-66.65	2,284.69	-8,525.29	8,859.17	8,825.65	33.52	264.302	
4,200.00	4,048.73	1,310.49	1,300.04	19.30	16.27	-66.69	2,284.81	-8,530.69	8,877.75	8,843.77	33.98	261.296	
4,300.00	4,143.67	1,323.84	1,312.75	19.82	16.28	-66.72	2,284.92	-8,534.80	8,897.23	8,862.81	34.42	258.504	
4,400.00	4,238.61	1,354.82	1,342.15	20.35	16.32	-66.79	2,285.05	-8,544.55	8,917.50	8,882.61	34.90	255.539	
4,500.00	4,333.56	1,385.50	1,371.20	20.88	16.36	-66.86	2,285.14	-8,554.41	8,938.53	8,903.16	35.37	252.694	
4,600.00	4,428.50	1,399.92	1,384.82	21.41	16.38	-66.90	2,285.26	-8,559.16	8,960.45	8,924.65	35.81	250.233	
4,700.00	4,523.44	1,414.27	1,398.31	21.93	16.39	-66.93	2,285.42	-8,564.03	8,983.33	8,947.09	36.24	247.884	
4,800.00	4,618.38	1,443.67	1,425.89	22.46	16.43	-66.99	2,285.69	-8,574.23	9,007.04	8,970.33	36.71	245.359	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164 - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		497-MWD OWSG Rev5						Rule Assigned:					Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
4,900.00	4,713.33	1,443.67	1,425.89	22.99	16.43	-66.99	2,285.69	-8,574.23	9,031.63	8,994.53	37.10	243.471		
5,000.00	4,808.27	1,459.30	1,440.48	23.52	16.46	-67.03	2,285.83	-8,579.82	9,057.08	9,019.56	37.52	241.375		
5,100.00	4,903.21	1,475.04	1,455.07	24.05	16.48	-67.06	2,286.06	-8,585.72	9,083.59	9,045.64	37.95	239.376		
5,200.00	4,998.16	1,475.04	1,455.07	24.58	16.48	-67.06	2,286.06	-8,585.72	9,110.94	9,072.63	38.32	237.771		
5,300.00	5,093.10	1,475.04	1,455.07	25.11	16.48	-67.06	2,286.06	-8,585.72	9,139.31	9,100.63	38.68	236.257		
5,400.00	5,188.04	1,505.65	1,483.22	25.64	16.54	-67.13	2,286.80	-8,597.73	9,168.48	9,129.33	39.15	234.184		
5,500.00	5,282.98	1,505.65	1,483.22	26.17	16.54	-67.13	2,286.80	-8,597.73	9,198.55	9,159.04	39.51	232.832		
5,600.00	5,377.93	1,537.35	1,512.16	26.70	16.59	-67.20	2,287.38	-8,610.65	9,229.39	9,189.42	39.97	230.928		
5,623.25	5,400.00	1,537.35	1,512.16	26.82	16.59	-67.20	2,287.38	-8,610.65	9,236.67	9,196.63	40.05	230.642		
5,700.00	5,473.03	1,567.98	1,539.96	27.22	16.64	-67.51	2,287.22	-8,623.50	9,261.22	9,220.80	40.42	229.148		
5,800.00	5,568.64	1,567.98	1,539.96	27.73	16.64	-67.84	2,287.22	-8,623.50	9,294.41	9,253.67	40.74	228.125		
5,900.00	5,664.75	1,598.26	1,567.29	28.23	16.69	-68.25	2,286.87	-8,636.53	9,328.98	9,287.82	41.16	226.650		
6,000.00	5,761.33	1,612.05	1,579.68	28.71	16.71	-68.63	2,286.80	-8,642.58	9,364.95	9,323.45	41.50	225.647		
6,100.00	5,858.34	1,629.61	1,595.41	29.18	16.74	-69.04	2,286.81	-8,650.39	9,402.28	9,360.44	41.84	224.708		
6,200.00	5,955.76	1,660.93	1,623.35	29.64	16.80	-69.49	2,286.76	-8,664.54	9,440.88	9,398.66	42.22	223.617		
6,300.00	6,053.57	1,683.67	1,643.57	30.07	16.84	-69.94	2,286.65	-8,674.95	9,480.69	9,438.14	42.55	222.803		
6,400.00	6,151.72	1,722.18	1,677.68	30.50	16.92	-70.42	2,286.57	-8,692.82	9,521.70	9,478.76	42.94	221.765		
6,500.00	6,250.19	1,736.22	1,690.08	30.91	16.95	-70.88	2,286.58	-8,699.41	9,563.82	9,520.62	43.20	221.382		
6,600.00	6,348.94	1,752.80	1,704.68	31.30	16.99	-71.36	2,286.58	-8,707.27	9,607.11	9,563.65	43.46	221.057		
6,659.67	6,408.00	1,752.80	1,704.68	31.53	16.99	-71.64	2,286.58	-8,707.27	9,633.56	9,590.00	43.57	221.131		
6,700.00	6,447.82	1,752.80	1,704.68	31.68	16.99	-86.57	2,286.58	-8,707.27	9,652.33	9,608.69	43.64	221.174		
6,750.00	6,496.66	1,784.13	1,732.06	31.90	17.06	-95.74	2,287.00	-8,722.49	9,677.52	9,633.62	43.89	220.478		
6,800.00	6,544.65	1,784.13	1,732.06	32.13	17.06	-99.63	2,287.00	-8,722.49	9,704.64	9,660.62	44.02	220.438		
6,850.00	6,591.49	1,784.13	1,732.06	32.37	17.06	-100.80	2,287.00	-8,722.49	9,733.61	9,689.43	44.17	220.355		
6,900.00	6,636.89	1,784.13	1,732.06	32.62	17.06	-100.35	2,287.00	-8,722.49	9,764.21	9,719.88	44.34	220.228		
6,950.00	6,680.57	1,815.08	1,758.94	32.89	17.14	-98.94	2,287.68	-8,737.81	9,796.19	9,751.53	44.66	219.357		
7,000.00	6,722.26	1,815.08	1,758.94	33.17	17.14	-96.58	2,287.68	-8,737.81	9,829.37	9,784.52	44.86	219.133		
7,050.00	6,761.71	1,832.06	1,773.68	33.45	17.19	-93.70	2,287.92	-8,746.24	9,863.51	9,818.37	45.15	218.480		
7,100.00	6,798.67	1,846.38	1,786.06	33.75	17.23	-90.32	2,288.05	-8,753.43	9,898.51	9,853.07	45.44	217.836		
7,150.00	6,832.91	1,846.38	1,786.06	34.06	17.23	-86.47	2,288.05	-8,753.43	9,934.05	9,888.36	45.68	217.457		
7,200.00	6,864.22	1,846.38	1,786.06	34.37	17.23	-82.36	2,288.05	-8,753.43	9,969.95	9,924.01	45.94	217.023		
7,250.00	6,892.42	1,846.38	1,786.06	34.69	17.23	-78.11	2,288.05	-8,753.43	10,006.00	9,959.79	46.21	216.532		
7,300.00	6,917.32	1,846.38	1,786.06	35.03	17.23	-73.82	2,288.05	-8,753.43	10,041.97	9,995.47	46.49	215.984		
7,350.00	6,938.77	1,846.38	1,786.06	35.37	17.23	-69.59	2,288.05	-8,753.43	10,077.64	10,030.85	46.79	215.377		
7,400.00	6,956.64	1,846.38	1,786.06	35.72	17.23	-65.52	2,288.05	-8,753.43	10,112.79	10,065.69	47.10	214.713		
7,450.00	6,970.83	1,846.38	1,786.06	36.07	17.23	-61.65	2,288.05	-8,753.43	10,147.23	10,099.81	47.42	213.991		
7,500.00	6,981.23	1,846.38	1,786.06	36.44	17.23	-58.04	2,288.05	-8,753.43	10,180.73	10,132.98	47.75	213.214		
7,550.00	6,987.80	1,846.38	1,786.06	36.81	17.23	-54.70	2,288.05	-8,753.43	10,213.11	10,165.02	48.09	212.384		
7,600.00	6,990.48	1,846.38	1,786.06	37.19	17.23	-51.65	2,288.05	-8,753.43	10,244.18	10,195.74	48.44	211.503		
7,609.87	6,990.55	1,846.38	1,786.06	37.26	17.23	-51.08	2,288.05	-8,753.43	10,250.14	10,201.63	48.50	211.329		
7,700.00	6,990.49	1,833.48	1,774.91	37.97	17.19	-51.00	2,287.93	-8,746.95	10,304.53	10,255.44	49.09	209.931		
7,800.00	6,990.42	1,815.08	1,758.94	38.78	17.14	-50.88	2,287.68	-8,737.81	10,365.47	10,315.76	49.72	208.491		
7,900.00	6,990.35	1,815.08	1,758.94	39.64	17.14	-50.88	2,287.68	-8,737.81	10,426.94	10,376.50	50.44	206.729		
8,000.00	6,990.28	1,784.13	1,732.06	40.53	17.06	-50.68	2,287.00	-8,722.49	10,488.98	10,437.96	51.02	205.603		
8,100.00	6,990.21	1,784.13	1,732.06	41.45	17.06	-50.68	2,287.00	-8,722.49	10,551.53	10,499.79	51.74	203.933		
8,200.00	6,990.14	1,784.13	1,732.06	42.40	17.06	-50.68	2,287.00	-8,722.49	10,614.64	10,562.18	52.46	202.320		
8,306.37	6,990.06	1,784.13	1,732.06	43.45	17.06	-50.68	2,287.00	-8,722.49	10,682.40	10,629.17	53.23	200.666		
8,400.00	6,990.00	1,767.94	1,717.96	44.38	17.02	-48.44	2,286.68	-8,714.54	10,744.22	10,690.40	53.82	199.628		
8,500.00	6,989.93	1,752.80	1,704.68	45.36	16.99	-45.65	2,286.58	-8,707.27	10,814.52	10,760.10	54.42	198.724		
8,600.00	6,989.85	1,752.80	1,704.68	46.33	16.99	-42.47	2,286.58	-8,707.27	10,888.62	10,833.58	55.04	197.820		
8,700.00	6,989.78	1,752.80	1,704.68	47.28	16.99	-38.73	2,286.58	-8,707.27	10,966.18	10,910.57	55.62	197.176		
8,800.00	6,989.70	1,752.80	1,704.68	48.21	16.99	-34.36	2,286.58	-8,707.27	11,046.75	10,990.61	56.14	196.784 SF		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164 - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 497-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
8,900.00	6,989.63	1,736.17	1,690.03	49.11	16.95	-29.18	2,286.58	-8,699.39	11,129.82	11,073.29	56.53	196.890	
9,000.00	6,989.55	1,722.18	1,677.68	49.99	16.92	-23.28	2,286.57	-8,692.82	11,214.96	11,158.09	56.88	197.186	
9,100.00	6,989.48	1,722.18	1,677.68	50.84	16.92	-16.73	2,286.57	-8,692.82	11,301.70	11,244.48	57.22	197.498	
9,200.00	6,989.40	1,722.18	1,677.68	51.66	16.92	-9.54	2,286.57	-8,692.82	11,389.63	11,332.12	57.51	198.031	
9,300.00	6,989.33	1,687.27	1,646.76	52.45	16.85	-1.88	2,286.63	-8,676.61	11,478.11	11,420.51	57.60	199.279	
9,393.87	6,989.27	1,660.93	1,623.35	53.15	16.80	5.35	2,286.76	-8,664.54	11,561.48	11,503.83	57.66	200.528	
9,400.00	6,989.26	1,660.93	1,623.35	53.20	16.80	5.35	2,286.76	-8,664.54	11,566.93	11,509.26	57.66	200.590	
9,500.00	6,989.19	1,660.93	1,623.35	53.95	16.80	5.35	2,286.76	-8,664.54	11,655.75	11,597.93	57.82	201.601	
9,600.00	6,989.12	1,660.93	1,623.35	54.73	16.80	5.35	2,286.76	-8,664.54	11,744.75	11,686.79	57.97	202.612	
9,700.00	6,989.05	1,629.61	1,595.41	55.55	16.74	5.32	2,286.81	-8,650.39	11,833.88	11,775.88	58.00	204.033	
9,800.00	6,988.98	1,629.61	1,595.41	56.40	16.74	5.32	2,286.81	-8,650.39	11,923.11	11,864.96	58.15	205.039	
9,900.00	6,988.91	1,629.61	1,595.41	57.28	16.74	5.32	2,286.81	-8,650.39	12,012.51	11,954.21	58.30	206.045	
10,000.00	6,988.84	1,614.53	1,581.91	58.20	16.72	5.31	2,286.80	-8,643.68	12,102.03	12,043.63	58.40	207.239	
10,100.00	6,988.77	1,598.26	1,567.29	59.14	16.69	5.30	2,286.87	-8,636.53	12,191.70	12,133.21	58.49	208.443	
10,200.00	6,988.70	1,598.26	1,567.29	60.11	16.69	5.30	2,286.87	-8,636.53	12,281.48	12,222.84	58.64	209.444	
10,300.00	6,988.63	1,598.26	1,567.29	61.11	16.69	5.30	2,286.87	-8,636.53	12,371.41	12,312.63	58.79	210.447	
10,400.00	6,988.56	1,585.22	1,555.54	62.14	16.67	5.29	2,286.99	-8,630.87	12,461.45	12,402.56	58.89	211.597	
10,500.00	6,988.49	1,567.98	1,539.96	63.19	16.64	5.27	2,287.22	-8,623.50	12,551.66	12,492.68	58.99	212.791	
10,600.00	6,988.42	1,567.98	1,539.96	64.26	16.64	5.27	2,287.22	-8,623.50	12,641.94	12,582.81	59.13	213.789	
10,700.00	6,988.35	1,567.98	1,539.96	65.36	16.64	5.27	2,287.22	-8,623.50	12,732.37	12,673.09	59.28	214.787	
10,800.00	6,988.28	1,567.98	1,539.96	66.48	16.64	5.27	2,287.22	-8,623.50	12,822.94	12,763.51	59.42	215.787	
10,900.00	6,988.21	1,551.15	1,524.70	67.61	16.61	5.26	2,287.38	-8,616.41	12,913.58	12,854.06	59.52	216.960	
11,000.00	6,988.14	1,537.35	1,512.16	68.77	16.59	5.25	2,287.38	-8,610.65	13,004.37	12,944.74	59.63	218.098	
11,100.00	6,988.07	1,537.35	1,512.16	69.95	16.59	5.25	2,287.38	-8,610.65	13,095.24	13,035.47	59.77	219.093	
11,200.00	6,988.01	1,537.35	1,512.16	71.14	16.59	5.25	2,287.38	-8,610.65	13,186.26	13,126.34	59.91	220.089	
11,300.00	6,987.94	1,537.35	1,512.16	72.35	16.59	5.25	2,287.38	-8,610.65	13,277.40	13,217.34	60.06	221.086	
11,400.00	6,987.87	1,521.48	1,497.70	73.57	16.56	5.23	2,287.19	-8,604.13	13,368.59	13,308.43	60.15	222.237	
11,500.00	6,987.80	1,505.65	1,483.22	74.81	16.54	5.23	2,286.80	-8,597.73	13,459.96	13,399.70	60.25	223.386	
11,600.00	6,987.73	1,505.65	1,483.22	76.07	16.54	5.23	2,286.80	-8,597.73	13,551.38	13,490.98	60.40	224.378	
11,643.87	6,987.70	1,505.65	1,483.22	76.62	16.54	5.23	2,286.80	-8,597.73	13,591.51	13,531.06	60.46	224.814	
11,700.00	6,987.66	1,505.65	1,483.22	77.33	16.54	7.76	2,286.80	-8,597.73	13,642.89	13,582.36	60.53	225.383	
11,737.27	6,987.63	1,505.65	1,483.22	77.80	16.54	9.43	2,286.80	-8,597.73	13,676.99	13,616.41	60.58	225.775	
11,800.00	6,987.59	1,505.65	1,483.22	78.59	16.54	9.43	2,286.80	-8,597.73	13,734.40	13,673.74	60.65	226.443	
11,900.00	6,987.52	1,505.65	1,483.22	79.86	16.54	9.43	2,286.80	-8,597.73	13,826.01	13,765.23	60.77	227.507	
12,000.00	6,987.46	1,505.65	1,483.22	81.14	16.54	9.43	2,286.80	-8,597.73	13,917.73	13,856.84	60.89	228.570	
12,100.00	6,987.39	1,475.04	1,455.07	82.43	16.48	9.39	2,286.06	-8,585.72	14,009.53	13,948.60	60.93	229.920	
12,200.00	6,987.32	1,475.04	1,455.07	83.73	16.48	9.39	2,286.06	-8,585.72	14,101.40	14,040.35	61.05	230.977	
12,300.00	6,987.26	1,475.04	1,455.07	85.05	16.48	9.39	2,286.06	-8,585.72	14,193.37	14,132.20	61.17	232.033	
12,400.00	6,987.19	1,475.04	1,455.07	86.38	16.48	9.39	2,286.06	-8,585.72	14,285.45	14,224.17	61.29	233.088	
12,500.00	6,987.12	1,475.04	1,455.07	87.71	16.48	9.39	2,286.06	-8,585.72	14,377.64	14,316.23	61.41	234.143	
12,600.00	6,987.06	1,475.04	1,455.07	89.06	16.48	9.39	2,286.06	-8,585.72	14,469.93	14,408.41	61.52	235.197	
12,700.00	6,986.99	1,475.04	1,455.07	90.41	16.48	9.39	2,286.06	-8,585.72	14,562.32	14,500.68	61.64	236.251	
12,800.00	6,986.92	1,475.04	1,455.07	91.77	16.48	9.39	2,286.06	-8,585.72	14,654.82	14,593.06	61.76	237.304	
12,900.00	6,986.86	1,475.04	1,455.07	93.14	16.48	9.39	2,286.06	-8,585.72	14,747.41	14,685.54	61.87	238.357	
13,000.00	6,986.79	1,475.04	1,455.07	94.52	16.48	9.39	2,286.06	-8,585.72	14,840.09	14,778.11	61.99	239.409	
13,100.00	6,986.72	1,475.04	1,455.07	95.90	16.48	9.39	2,286.06	-8,585.72	14,932.88	14,870.77	62.10	240.460	
13,200.00	6,986.66	1,459.20	1,440.39	97.30	16.46	9.37	2,285.83	-8,579.78	15,025.59	14,963.40	62.19	241.614	
13,300.00	6,986.59	1,443.67	1,425.89	98.69	16.43	9.35	2,285.69	-8,574.23	15,118.63	15,056.35	62.28	242.762	
13,400.00	6,986.52	1,443.67	1,425.89	100.10	16.43	9.35	2,285.69	-8,574.23	15,211.61	15,149.22	62.39	243.806	
13,500.00	6,986.46	1,443.67	1,425.89	101.51	16.43	9.35	2,285.69	-8,574.23	15,304.68	15,242.17	62.51	244.849	
13,600.00	6,986.39	1,443.67	1,425.89	102.93	16.43	9.35	2,285.69	-8,574.23	15,397.83	15,335.21	62.62	245.891	
13,700.00	6,986.32	1,443.67	1,425.89	104.35	16.43	9.35	2,285.69	-8,574.23	15,491.07	15,428.34	62.73	246.933	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164 - OH - OH-SVY												Offset Site Error:	0.00 usft				
Survey Program: 497-MWD OWSG Rev5				Reference				Offset				Rule Assigned:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning				
13,800.00	6,986.25	1,443.67	1,425.89	105.78	16.43	9.35	2,285.69	-8,574.23	15,584.40	15,521.55	62.85	247.974					
13,900.00	6,986.19	1,443.67	1,425.89	107.21	16.43	9.35	2,285.69	-8,574.23	15,677.80	15,614.84	62.96	249.014					
14,000.00	6,986.12	1,443.67	1,425.89	108.65	16.43	9.35	2,285.69	-8,574.23	15,771.29	15,708.22	63.07	250.053					
14,100.00	6,986.05	1,443.67	1,425.89	110.09	16.43	9.35	2,285.69	-8,574.23	15,864.85	15,801.67	63.18	251.092					
14,200.00	6,985.99	1,426.02	1,409.34	111.54	16.41	9.32	2,285.55	-8,568.10	15,958.47	15,895.19	63.28	252.205					
14,300.00	6,985.92	1,414.27	1,398.31	112.99	16.39	9.30	2,285.42	-8,564.03	16,052.14	15,988.76	63.37	253.289					
14,400.00	6,985.85	1,414.27	1,398.31	114.45	16.39	9.30	2,285.42	-8,564.03	16,145.87	16,082.39	63.49	254.320					
14,500.00	6,985.79	1,414.27	1,398.31	115.91	16.39	9.30	2,285.42	-8,564.03	16,239.68	16,176.08	63.60	255.350					
14,600.00	6,985.72	1,414.27	1,398.31	117.38	16.39	9.30	2,285.42	-8,564.03	16,333.56	16,269.85	63.71	256.379					
14,700.00	6,985.65	1,414.27	1,398.31	118.84	16.39	9.30	2,285.42	-8,564.03	16,427.52	16,363.70	63.82	257.407					
14,800.00	6,985.59	1,414.27	1,398.31	120.32	16.39	9.30	2,285.42	-8,564.03	16,521.54	16,457.61	63.93	258.435					
14,900.00	6,985.52	1,399.47	1,384.39	121.79	16.37	9.28	2,285.26	-8,559.01	16,615.54	16,551.52	64.03	259.507					
15,000.00	6,985.45	1,385.50	1,371.20	123.27	16.36	9.26	2,285.14	-8,554.41	16,709.73	16,645.60	64.13	260.572					
15,100.00	6,985.39	1,385.50	1,371.20	124.75	16.36	9.26	2,285.14	-8,554.41	16,803.90	16,739.67	64.24	261.592					
15,200.00	6,985.32	1,385.50	1,371.20	126.24	16.36	9.26	2,285.14	-8,554.41	16,898.14	16,833.80	64.35	262.611					
15,300.00	6,985.25	1,385.50	1,371.20	127.72	16.36	9.26	2,285.14	-8,554.41	16,992.45	16,927.99	64.46	263.629					
15,400.00	6,985.19	1,385.50	1,371.20	129.21	16.36	9.26	2,285.14	-8,554.41	17,086.82	17,022.26	64.56	264.645					
15,500.00	6,985.12	1,385.50	1,371.20	130.71	16.36	9.26	2,285.14	-8,554.41	17,181.26	17,116.58	64.67	265.661					
15,600.00	6,985.05	1,385.50	1,371.20	132.20	16.36	9.26	2,285.14	-8,554.41	17,275.75	17,210.97	64.78	266.676					
15,700.00	6,984.99	1,367.83	1,354.48	133.70	16.34	9.23	2,285.06	-8,548.71	17,370.28	17,305.40	64.88	267.717					
15,800.00	6,984.92	1,354.82	1,342.15	135.20	16.32	9.21	2,285.05	-8,544.55	17,464.86	17,399.87	64.99	268.744					
15,900.00	6,984.85	1,354.82	1,342.15	136.71	16.32	9.21	2,285.05	-8,544.55	17,559.48	17,494.39	65.10	269.751					
16,000.00	6,984.79	1,354.82	1,342.15	138.21	16.32	9.21	2,285.05	-8,544.55	17,654.17	17,588.96	65.20	270.756					
16,100.00	6,984.72	1,354.82	1,342.15	139.72	16.32	9.21	2,285.05	-8,544.55	17,748.91	17,683.60	65.31	271.761					
16,200.00	6,984.65	1,337.23	1,325.47	141.23	16.30	9.19	2,285.01	-8,538.98	17,843.65	17,778.24	65.41	272.778					
16,300.00	6,984.59	1,323.84	1,312.75	142.75	16.28	9.17	2,284.92	-8,534.80	17,938.48	17,872.96	65.52	273.788					
16,400.00	6,984.52	1,323.84	1,312.75	144.26	16.28	9.17	2,284.92	-8,534.80	18,033.34	17,967.71	65.63	274.785					
16,500.00	6,984.45	1,323.84	1,312.75	145.78	16.28	9.17	2,284.92	-8,534.80	18,128.25	18,062.52	65.73	275.780					
16,600.00	6,984.39	1,323.84	1,312.75	147.29	16.28	9.17	2,284.92	-8,534.80	18,223.22	18,157.38	65.84	276.774					
16,700.00	6,984.32	1,323.84	1,312.75	148.82	16.28	9.17	2,284.92	-8,534.80	18,318.24	18,252.29	65.95	277.767					
16,800.00	6,984.25	1,323.84	1,312.75	150.34	16.28	9.17	2,284.92	-8,534.80	18,413.31	18,347.26	66.05	278.758					
16,900.00	6,984.19	1,309.27	1,298.88	151.86	16.26	9.15	2,284.80	-8,530.32	18,508.38	18,442.22	66.16	279.757					
17,000.00	6,984.12	1,292.54	1,282.93	153.39	16.24	9.12	2,284.69	-8,525.29	18,603.58	18,537.31	66.26	280.751					
17,100.00	6,984.05	1,292.54	1,282.93	154.91	16.24	9.12	2,284.69	-8,525.29	18,698.75	18,632.38	66.37	281.735					
17,200.00	6,983.99	1,292.54	1,282.93	156.44	16.24	9.12	2,284.69	-8,525.29	18,793.98	18,727.50	66.48	282.717					
17,300.00	6,983.92	1,292.54	1,282.93	157.97	16.24	9.12	2,284.69	-8,525.29	18,889.25	18,822.67	66.58	283.698					
17,400.00	6,983.85	1,292.54	1,282.93	159.50	16.24	9.12	2,284.69	-8,525.29	18,984.58	18,917.89	66.69	284.677					
17,500.00	6,983.79	1,292.54	1,282.93	161.04	16.24	9.12	2,284.69	-8,525.29	19,079.95	19,013.15	66.79	285.655					
17,600.00	6,983.72	1,292.54	1,282.93	162.57	16.24	9.12	2,284.69	-8,525.29	19,175.37	19,108.47	66.90	286.632					
17,700.00	6,983.65	1,292.54	1,282.93	164.11	16.24	9.12	2,284.69	-8,525.29	19,270.83	19,203.83	67.00	287.607					
17,800.00	6,983.59	1,292.54	1,282.93	165.65	16.24	9.12	2,284.69	-8,525.29	19,366.34	19,299.23	67.11	288.581					
17,900.00	6,983.52	1,292.54	1,282.93	167.18	16.24	9.12	2,284.69	-8,525.29	19,461.90	19,394.68	67.21	289.553					
18,000.00	6,983.45	1,292.54	1,282.93	168.72	16.24	9.12	2,284.69	-8,525.29	19,557.50	19,490.18	67.32	290.524					
18,100.00	6,983.39	1,292.54	1,282.93	170.27	16.24	9.12	2,284.69	-8,525.29	19,653.14	19,585.72	67.42	291.493					
18,200.00	6,983.32	1,292.54	1,282.93	171.81	16.24	9.12	2,284.69	-8,525.29	19,748.83	19,681.30	67.53	292.461					
18,300.00	6,983.25	1,292.54	1,282.93	173.35	16.24	9.12	2,284.69	-8,525.29	19,844.56	19,776.93	67.63	293.427					
18,400.00	6,983.19	1,292.54	1,282.93	174.90	16.24	9.12	2,284.69	-8,525.29	19,940.33	19,872.59	67.73	294.392					
18,500.00	6,983.12	1,277.72	1,268.75	176.44	16.23	9.10	2,284.56	-8,520.99	20,036.02	19,968.18	67.84	295.327					
18,600.00	6,983.05	1,276.43	1,267.51	177.99	16.22	9.10	2,284.55	-8,520.62	20,131.85	20,063.91	67.95	296.285					
18,700.00	6,982.99	1,261.54	1,253.19	179.54	16.21	9.08	2,284.34	-8,516.54	20,227.83	20,159.77	68.06	297.216					
18,800.00	6,982.92	1,261.54	1,253.19	181.09	16.21	9.08	2,284.34	-8,516.54	20,323.72	20,255.55	68.16	298.171					
18,900.00	6,982.85	1,261.54	1,253.19	182.64	16.21	9.08	2,284.34	-8,516.54	20,419.65	20,351.38	68.26	299.125					

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164 - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 497-MWD OWSG Rev5							Rule Assigned:						Offset Well Error: 0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
19,000.00	6,982.78	1,261.54	1,253.19	184.19	16.21	9.08	2,284.34	-8,516.54	20,515.61	20,447.25	68.37	300.076	
19,100.00	6,982.72	1,261.54	1,253.19	185.74	16.21	9.08	2,284.34	-8,516.54	20,611.62	20,543.15	68.47	301.026	
19,200.00	6,982.65	1,261.54	1,253.19	187.29	16.21	9.08	2,284.34	-8,516.54	20,707.67	20,639.09	68.57	301.975	
19,300.00	6,982.58	1,261.54	1,253.19	188.84	16.21	9.08	2,284.34	-8,516.54	20,803.75	20,735.07	68.68	302.922	
19,400.00	6,982.52	1,261.54	1,253.19	190.40	16.21	9.08	2,284.34	-8,516.54	20,899.87	20,831.09	68.78	303.867	
19,500.00	6,982.45	1,261.54	1,253.19	191.95	16.21	9.08	2,284.34	-8,516.54	20,996.02	20,927.14	68.88	304.810	
19,600.00	6,982.38	1,261.54	1,253.19	193.51	16.21	9.08	2,284.34	-8,516.54	21,092.21	21,023.23	68.98	305.752	
19,700.00	6,982.32	1,261.54	1,253.19	195.07	16.21	9.08	2,284.34	-8,516.54	21,188.44	21,119.35	69.09	306.692	
19,800.00	6,982.25	1,261.54	1,253.19	196.62	16.21	9.08	2,284.34	-8,516.54	21,284.70	21,215.51	69.19	307.630	
19,900.00	6,982.18	1,251.25	1,243.27	198.18	16.20	9.06	2,284.17	-8,513.80	21,380.99	21,311.69	69.30	308.529	
20,000.00	6,982.12	1,237.97	1,230.47	199.74	16.19	9.04	2,283.97	-8,510.27	21,477.30	21,407.89	69.41	309.412	
20,100.00	6,982.05	1,230.05	1,222.84	201.30	16.18	9.03	2,283.85	-8,508.17	21,573.63	21,504.10	69.52	310.311	
20,176.02	6,982.00	1,230.05	1,222.84	202.36	16.18	9.03	2,283.85	-8,508.17	21,646.87	21,574.84	72.03	300.540	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164A - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 535-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				(usft)	(usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-74.78	2,265.36	-8,325.07	8,628.02				
100.00	100.00	36.00	36.00	0.25	0.83	-74.78	2,265.36	-8,325.07	8,627.78	8,626.70	1.08	7,952.609	
200.00	200.00	136.00	136.00	0.61	3.15	-74.78	2,265.36	-8,325.07	8,627.78	8,624.03	3.76	2,294.991	
300.00	300.00	236.00	236.00	0.97	5.47	-74.78	2,265.36	-8,325.07	8,627.78	8,621.35	6.43	1,340.989	
400.00	400.00	336.00	336.00	1.33	7.78	-74.78	2,265.36	-8,325.07	8,627.78	8,618.68	9.11	947.234	
500.00	500.00	436.00	436.00	1.68	10.10	-74.78	2,265.36	-8,325.07	8,627.78	8,616.00	11.78	732.230	
600.00	600.00	536.04	536.00	2.04	12.42	-74.78	2,265.36	-8,325.07	8,627.78	8,613.33	14.46	596.733	
700.00	699.98	636.02	635.98	2.40	14.73	-64.80	2,265.36	-8,325.07	8,627.04	8,609.91	17.13	503.568	
800.00	799.84	735.88	735.84	2.76	17.04	-64.87	2,265.36	-8,325.07	8,624.81	8,605.01	19.80	435.541	
900.00	899.45	835.49	835.45	3.13	19.35	-64.99	2,265.36	-8,325.07	8,621.11	8,598.64	22.47	383.683	
1,000.00	998.70	934.74	934.70	3.49	21.65	-65.16	2,265.36	-8,325.07	8,615.94	8,590.81	25.13	342.828	
1,100.00	1,097.47	1,034.31	1,034.24	3.86	23.96	-65.36	2,268.00	-8,325.07	8,610.01	8,582.20	27.81	309.612	
1,200.00	1,195.62	1,137.62	1,137.54	4.24	26.35	-65.63	2,267.84	-8,325.07	8,601.93	8,571.35	30.58	281.267	
1,300.00	1,293.06	1,240.07	1,239.98	4.64	28.72	-65.94	2,267.44	-8,325.07	8,592.40	8,559.05	33.35	257.648	
1,400.00	1,389.64	1,341.50	1,341.40	5.06	31.07	-66.31	2,266.82	-8,325.07	8,581.46	8,545.35	36.11	237.659	
1,500.00	1,485.27	1,441.77	1,441.66	5.50	33.39	-66.72	2,265.98	-8,325.07	8,569.15	8,530.29	38.86	220.520	
1,515.00	1,499.52	1,456.70	1,456.59	5.57	33.74	-66.79	2,265.83	-8,325.07	8,567.19	8,527.92	39.27	218.155	
1,600.00	1,580.22	1,516.50	1,516.22	5.96	35.15	-66.91	2,265.36	-8,325.07	8,556.08	8,515.02	41.06	208.359	
1,700.00	1,675.17	1,611.44	1,611.17	6.44	37.54	-67.09	2,265.36	-8,325.07	8,543.26	8,499.35	43.91	194.560	
1,800.00	1,770.11	1,706.38	1,706.11	6.92	39.94	-67.28	2,265.36	-8,325.07	8,530.55	8,483.78	46.77	182.408	
1,900.00	1,865.05	1,806.01	1,805.72	7.41	42.45	-67.47	2,266.67	-8,325.07	8,518.23	8,468.49	49.75	171.232	
2,000.00	1,959.99	1,909.83	1,909.53	7.90	45.06	-67.68	2,266.19	-8,325.07	8,505.60	8,452.76	52.84	160.974	
2,100.00	2,054.94	2,013.35	2,013.04	8.40	47.67	-67.89	2,265.25	-8,325.07	8,492.98	8,437.05	55.93	151.856	
2,200.00	2,149.88	2,086.32	2,085.88	8.90	49.34	-68.03	2,265.36	-8,325.07	8,480.64	8,422.56	58.08	146.007	
2,300.00	2,244.82	2,181.27	2,180.82	9.41	51.53	-68.22	2,265.36	-8,325.07	8,468.41	8,407.64	60.77	139.346	
2,400.00	2,339.76	2,279.40	2,278.92	9.92	53.81	-68.40	2,267.24	-8,325.07	8,456.69	8,393.15	63.54	133.097	
2,500.00	2,434.71	2,386.28	2,385.79	10.43	56.28	-68.62	2,266.70	-8,325.07	8,444.55	8,378.04	66.51	126.970	
2,600.00	2,529.65	2,492.74	2,492.22	10.94	58.75	-68.84	2,265.47	-8,325.07	8,432.38	8,362.91	69.47	121.379	
2,700.00	2,624.59	2,561.16	2,560.59	11.45	60.09	-68.98	2,265.36	-8,325.07	8,420.49	8,349.17	71.32	118.067	
2,800.00	2,719.53	2,656.10	2,655.53	11.97	61.92	-69.17	2,265.36	-8,325.07	8,408.75	8,335.11	73.65	114.174	
2,900.00	2,814.48	2,751.05	2,750.48	12.49	63.74	-69.36	2,265.36	-8,325.07	8,397.12	8,321.14	75.98	110.517	
3,000.00	2,909.42	2,845.99	2,845.42	13.01	65.57	-69.55	2,265.36	-8,325.07	8,385.60	8,307.28	78.31	107.078	
3,100.00	3,004.36	2,940.93	2,940.36	13.53	67.40	-69.74	2,265.36	-8,325.07	8,374.17	8,293.52	80.65	103.836	
3,200.00	3,099.30	3,035.87	3,035.30	14.05	69.22	-69.94	2,265.36	-8,325.07	8,362.84	8,279.86	82.98	100.776	
3,300.00	3,194.25	3,132.30	3,131.71	14.57	71.08	-70.12	2,267.14	-8,325.07	8,351.95	8,266.60	85.35	97.856	
3,400.00	3,289.19	3,228.98	3,228.39	15.09	72.94	-70.32	2,266.99	-8,325.07	8,340.80	8,253.08	87.72	95.082	
3,500.00	3,384.13	3,325.60	3,325.01	15.62	74.79	-70.52	2,266.73	-8,325.07	8,329.74	8,239.64	90.09	92.456	
3,600.00	3,479.07	3,422.14	3,421.55	16.14	76.65	-70.72	2,266.37	-8,325.07	8,318.75	8,226.29	92.47	89.966	
3,700.00	3,574.02	3,518.61	3,518.01	16.67	78.51	-70.92	2,265.89	-8,325.07	8,307.86	8,213.02	94.84	87.601	
3,800.00	3,668.96	3,615.01	3,614.41	17.19	80.36	-71.12	2,265.30	-8,325.07	8,297.06	8,199.85	97.21	85.353	
3,900.00	3,763.90	3,700.57	3,699.90	17.72	82.29	-71.30	2,265.36	-8,325.07	8,286.47	8,186.81	99.65	83.153	
4,000.00	3,858.84	3,795.51	3,794.84	18.24	84.39	-71.50	2,265.36	-8,325.07	8,275.97	8,173.70	102.28	80.916	
4,100.00	3,953.79	3,891.59	3,890.92	18.77	86.52	-71.69	2,266.17	-8,325.07	8,265.72	8,160.79	104.93	78.773	
4,200.00	4,048.73	3,989.80	3,989.13	19.30	88.70	-71.90	2,265.97	-8,325.07	8,255.40	8,147.77	107.63	76.702	
4,300.00	4,143.67	4,087.86	4,087.18	19.82	90.88	-72.10	2,265.51	-8,325.07	8,245.16	8,134.84	110.33	74.734	
4,400.00	4,238.61	4,175.38	4,174.61	20.35	93.26	-72.29	2,265.36	-8,325.07	8,235.07	8,121.84	113.23	72.730	
4,500.00	4,333.56	4,270.32	4,269.56	20.88	96.00	-72.49	2,265.36	-8,325.07	8,225.11	8,108.61	116.50	70.603	
4,600.00	4,428.50	4,366.18	4,365.39	21.41	98.78	-72.68	2,266.93	-8,325.07	8,215.49	8,095.69	119.80	68.579	
4,700.00	4,523.44	4,467.39	4,466.59	21.93	101.71	-72.89	2,266.58	-8,325.07	8,205.69	8,082.44	123.25	66.578	
4,800.00	4,618.38	4,568.26	4,567.44	22.46	104.63	-73.11	2,265.67	-8,325.07	8,195.94	8,069.25	126.69	64.691	
4,900.00	4,713.33	4,650.39	4,649.33	22.99	107.34	-73.28	2,265.36	-8,325.07	8,186.36	8,056.43	129.94	63.003	
5,000.00	4,808.27	4,745.34	4,744.27	23.52	110.65	-73.49	2,265.36	-8,325.07	8,176.95	8,043.18	133.77	61.128	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164A - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		535-A027Ua_INC-ONLY					Rule Assigned:						Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	4,903.21	4,840.28	4,839.21	24.05	113.95	-73.69	2,265.36	-8,325.07	8,167.64	8,030.04	137.60	59.358		
5,200.00	4,998.16	4,935.22	4,934.16	24.58	117.26	-73.89	2,265.36	-8,325.07	8,158.45	8,017.02	141.43	57.684		
5,300.00	5,093.10	5,030.16	5,029.10	25.11	120.56	-74.09	2,265.36	-8,325.07	8,149.37	8,004.10	145.27	56.100		
5,400.00	5,188.04	5,125.11	5,124.04	25.64	123.87	-74.29	2,265.36	-8,325.07	8,140.39	7,991.29	149.10	54.597		
5,500.00	5,282.98	5,220.05	5,218.98	26.17	127.17	-74.50	2,265.36	-8,325.07	8,131.53	7,978.60	152.93	53.170		
5,600.00	5,377.93	5,314.99	5,313.93	26.70	130.48	-74.70	2,265.36	-8,325.07	8,122.78	7,966.01	156.77	51.814		
5,623.25	5,400.00	5,337.07	5,336.00	26.82	131.25	-74.75	2,265.36	-8,325.07	8,120.76	7,963.10	157.66	51.508		
5,700.00	5,473.03	5,410.09	5,409.03	27.22	133.79	-74.84	2,265.36	-8,325.07	8,114.28	7,953.67	160.61	50.523		
5,800.00	5,568.64	5,505.71	5,504.64	27.73	137.12	-74.95	2,265.36	-8,325.07	8,106.32	7,941.87	164.45	49.294		
5,900.00	5,664.75	5,601.81	5,600.75	28.23	140.46	-75.06	2,265.36	-8,325.07	8,098.91	7,930.61	168.29	48.124		
6,000.00	5,761.33	5,698.39	5,697.33	28.71	143.83	-75.17	2,265.36	-8,325.07	8,092.02	7,919.88	172.14	47.009		
6,100.00	5,858.34	5,795.41	5,794.34	29.18	147.20	-75.27	2,265.36	-8,325.07	8,085.66	7,909.67	175.99	45.945		
6,200.00	5,955.76	5,892.83	5,891.76	29.64	150.59	-75.36	2,265.36	-8,325.07	8,079.80	7,899.97	179.83	44.929		
6,300.00	6,053.57	5,990.63	5,989.57	30.07	154.00	-75.45	2,265.36	-8,325.07	8,074.44	7,890.76	183.68	43.959		
6,400.00	6,151.72	6,060.00	6,057.39	30.50	156.41	-75.49	2,265.36	-8,325.07	8,069.62	7,883.09	186.52	43.263		
6,500.00	6,250.19	6,060.00	6,057.39	30.91	156.41	-75.46	2,265.36	-8,325.07	8,066.18	7,879.25	186.93	43.151		
6,600.00	6,348.94	6,060.00	6,057.39	31.30	156.41	-75.44	2,265.36	-8,325.07	8,064.43	7,877.14	187.29	43.059		
6,654.66	6,403.03	6,060.00	6,057.39	31.51	156.41	-75.44	2,265.36	-8,325.07	8,064.18	7,876.71	187.47	43.016 CC		
6,659.67	6,408.00	6,060.00	6,057.39	31.53	156.41	-75.44	2,265.36	-8,325.07	8,064.18	7,876.69	187.49	43.012 ES		
6,700.00	6,447.82	6,060.00	6,057.39	31.68	156.41	-91.85	2,265.36	-8,325.07	8,065.14	7,877.53	187.62	42.987		
6,750.00	6,496.66	6,060.00	6,057.39	31.90	156.41	-102.87	2,265.36	-8,325.07	8,068.93	7,881.13	187.80	42.966		
6,800.00	6,544.65	6,060.00	6,057.39	32.13	156.41	-108.76	2,265.36	-8,325.07	8,075.54	7,887.55	187.99	42.957 SF		
6,850.00	6,591.49	6,060.00	6,057.39	32.37	156.41	-112.06	2,265.36	-8,325.07	8,084.95	7,896.75	188.20	42.959		
6,900.00	6,636.89	6,060.00	6,057.39	32.62	156.41	-113.85	2,265.36	-8,325.07	8,097.07	7,908.65	188.42	42.973		
6,950.00	6,680.57	6,060.00	6,057.39	32.89	156.41	-114.65	2,265.36	-8,325.07	8,111.82	7,923.17	188.66	42.998		
7,000.00	6,722.26	6,060.00	6,057.39	33.17	156.41	-114.73	2,265.36	-8,325.07	8,129.10	7,940.20	188.90	43.034		
7,050.00	6,761.71	6,060.00	6,057.39	33.45	156.41	-114.22	2,265.36	-8,325.07	8,148.79	7,959.63	189.16	43.079		
7,100.00	6,798.67	6,060.00	6,057.39	33.75	156.41	-113.22	2,265.36	-8,325.07	8,170.74	7,981.31	189.43	43.134		
7,150.00	6,832.91	6,060.00	6,057.39	34.06	156.41	-111.78	2,265.36	-8,325.07	8,194.81	8,005.10	189.71	43.197		
7,200.00	6,864.22	6,060.00	6,057.39	34.37	156.41	-109.91	2,265.36	-8,325.07	8,220.82	8,030.82	190.00	43.268		
7,250.00	6,892.42	6,060.00	6,057.39	34.69	156.41	-107.65	2,265.36	-8,325.07	8,248.60	8,058.30	190.30	43.345		
7,300.00	6,917.32	6,060.00	6,057.39	35.03	156.41	-105.00	2,265.36	-8,325.07	8,277.97	8,087.36	190.61	43.428		
7,350.00	6,938.77	6,060.00	6,057.39	35.37	156.41	-101.99	2,265.36	-8,325.07	8,308.72	8,117.78	190.93	43.517		
7,400.00	6,956.64	6,060.00	6,057.39	35.72	156.41	-98.63	2,265.36	-8,325.07	8,340.65	8,149.38	191.26	43.609		
7,450.00	6,970.83	6,060.00	6,057.39	36.07	156.41	-94.97	2,265.36	-8,325.07	8,373.55	8,181.95	191.60	43.703		
7,500.00	6,981.23	6,060.00	6,057.39	36.44	156.41	-91.04	2,265.36	-8,325.07	8,407.21	8,215.27	191.94	43.800		
7,550.00	6,987.80	6,060.00	6,057.39	36.81	156.41	-86.91	2,265.36	-8,325.07	8,441.41	8,249.12	192.29	43.899		
7,600.00	6,990.48	6,060.00	6,057.39	37.19	156.41	-82.64	2,265.36	-8,325.07	8,475.95	8,283.30	192.65	43.997		
7,609.87	6,990.55	6,060.00	6,057.39	37.26	156.41	-81.79	2,265.36	-8,325.07	8,482.78	8,290.06	192.72	44.017		
7,700.00	6,990.49	6,060.00	6,057.39	37.97	156.41	-81.79	2,265.36	-8,325.07	8,545.48	8,352.11	193.36	44.194		
7,800.00	6,990.42	6,060.00	6,057.39	38.78	156.41	-81.79	2,265.36	-8,325.07	8,615.60	8,421.52	194.08	44.392		
7,900.00	6,990.35	6,060.00	6,057.39	39.64	156.41	-81.79	2,265.36	-8,325.07	8,686.32	8,491.52	194.79	44.592		
8,000.00	6,990.28	6,060.00	6,057.39	40.53	156.41	-81.79	2,265.36	-8,325.07	8,757.60	8,562.09	195.51	44.794		
8,100.00	6,990.21	6,060.00	6,057.39	41.45	156.41	-81.79	2,265.36	-8,325.07	8,829.44	8,633.22	196.22	44.998		
8,200.00	6,990.14	6,060.00	6,057.39	42.40	156.41	-81.79	2,265.36	-8,325.07	8,901.82	8,704.89	196.93	45.203		
8,306.37	6,990.06	6,060.00	6,057.39	43.45	156.41	-81.79	2,265.36	-8,325.07	8,979.40	8,781.72	197.68	45.424		
8,400.00	6,990.00	6,060.00	6,057.39	44.38	156.41	-81.15	2,265.36	-8,325.07	9,050.17	8,851.86	198.31	45.636		
8,500.00	6,989.93	6,060.00	6,057.39	45.36	156.41	-80.28	2,265.36	-8,325.07	9,130.35	8,931.41	198.94	45.895		
8,600.00	6,989.85	6,060.00	6,057.39	46.33	156.41	-79.14	2,265.36	-8,325.07	9,214.78	9,015.28	199.50	46.189		
8,700.00	6,989.78	6,060.00	6,057.39	47.28	156.41	-77.63	2,265.36	-8,325.07	9,302.94	9,102.94	200.00	46.516		
8,800.00	6,989.70	6,060.00	6,057.39	48.21	156.41	-75.54	2,265.36	-8,325.07	9,394.30	9,193.88	200.42	46.872		
8,900.00	6,989.63	6,060.00	6,057.39	49.11	156.41	-72.49	2,265.36	-8,325.07	9,488.33	9,287.55	200.78	47.257		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164A - OH - OH-INC													Offset Site Error:	0.00 usft	
Survey Program:		535-A027Ua_INC-ONLY					Rule Assigned:							Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
9,000.00	6,989.55	6,060.00	6,057.39	49.99	156.41	-67.69	2,265.36	-8,325.07	9,584.50	9,383.43	201.07	47.668			
9,100.00	6,989.48	6,060.00	6,057.39	50.84	156.41	-59.32	2,265.36	-8,325.07	9,682.28	9,481.00	201.28	48.103			
9,200.00	6,989.40	6,060.00	6,057.39	51.66	156.41	-42.55	2,265.36	-8,325.07	9,781.17	9,579.74	201.43	48.559			
9,300.00	6,989.33	6,060.00	6,057.39	52.45	156.41	-7.85	2,265.36	-8,325.07	9,880.64	9,679.13	201.50	49.034			
9,393.87	6,989.27	6,060.00	6,057.39	53.15	156.41	31.08	2,265.36	-8,325.07	9,974.10	9,772.59	201.51	49.496			
9,400.00	6,989.26	6,060.00	6,057.39	53.20	156.41	31.08	2,265.36	-8,325.07	9,980.20	9,778.69	201.51	49.527			
9,500.00	6,989.19	6,060.00	6,057.39	53.95	156.41	31.08	2,265.36	-8,325.07	10,079.68	9,878.19	201.49	50.025			
9,600.00	6,989.12	6,060.00	6,057.39	54.73	156.41	31.08	2,265.36	-8,325.07	10,179.17	9,977.70	201.47	50.524			
9,700.00	6,989.05	6,060.00	6,057.39	55.55	156.41	31.08	2,265.36	-8,325.07	10,278.67	10,077.22	201.45	51.022			
9,800.00	6,988.98	6,060.00	6,057.39	56.40	156.41	31.08	2,265.36	-8,325.07	10,378.18	10,176.75	201.44	51.521			
9,900.00	6,988.91	6,060.00	6,057.39	57.28	156.41	31.08	2,265.36	-8,325.07	10,477.70	10,276.28	201.42	52.019			
10,000.00	6,988.84	6,060.00	6,057.39	58.20	156.41	31.08	2,265.36	-8,325.07	10,577.23	10,375.83	201.41	52.517			
10,100.00	6,988.77	6,060.00	6,057.39	59.14	156.41	31.08	2,265.36	-8,325.07	10,676.77	10,475.38	201.39	53.015			
10,200.00	6,988.70	6,060.00	6,057.39	60.11	156.41	31.08	2,265.36	-8,325.07	10,776.31	10,574.94	201.38	53.513			
10,300.00	6,988.63	6,060.00	6,057.39	61.11	156.41	31.08	2,265.36	-8,325.07	10,875.87	10,674.50	201.37	54.010			
10,400.00	6,988.56	6,060.00	6,057.39	62.14	156.41	31.08	2,265.36	-8,325.07	10,975.43	10,774.07	201.36	54.508			
10,500.00	6,988.49	6,060.00	6,057.39	63.19	156.41	31.08	2,265.36	-8,325.07	11,075.00	10,873.65	201.35	55.005			
10,600.00	6,988.42	6,060.00	6,057.39	64.26	156.41	31.08	2,265.36	-8,325.07	11,174.58	10,973.24	201.34	55.502			
10,700.00	6,988.35	6,060.00	6,057.39	65.36	156.41	31.08	2,265.36	-8,325.07	11,274.16	11,072.83	201.33	55.999			
10,800.00	6,988.28	6,060.00	6,057.39	66.48	156.41	31.08	2,265.36	-8,325.07	11,373.76	11,172.43	201.32	56.496			
10,900.00	6,988.21	6,060.00	6,057.39	67.61	156.41	31.08	2,265.36	-8,325.07	11,473.35	11,272.04	201.32	56.992			
11,000.00	6,988.14	6,060.00	6,057.39	68.77	156.41	31.08	2,265.36	-8,325.07	11,572.96	11,371.65	201.31	57.488			
11,100.00	6,988.07	6,060.00	6,057.39	69.95	156.41	31.08	2,265.36	-8,325.07	11,672.57	11,471.27	201.31	57.984			
11,200.00	6,988.01	6,060.00	6,057.39	71.14	156.41	31.08	2,265.36	-8,325.07	11,772.19	11,570.89	201.30	58.480			
11,300.00	6,987.94	6,060.00	6,057.39	72.35	156.41	31.08	2,265.36	-8,325.07	11,871.82	11,670.52	201.30	58.976			
11,400.00	6,987.87	6,060.00	6,057.39	73.57	156.41	31.08	2,265.36	-8,325.07	11,971.45	11,770.15	201.30	59.471			
11,500.00	6,987.80	6,060.00	6,057.39	74.81	156.41	31.08	2,265.36	-8,325.07	12,071.09	11,869.79	201.30	59.967			
11,600.00	6,987.73	6,060.00	6,057.39	76.07	156.41	31.08	2,265.36	-8,325.07	12,170.73	11,969.44	201.30	60.462			
11,643.87	6,987.70	6,060.00	6,057.39	76.62	156.41	31.08	2,265.36	-8,325.07	12,214.45	12,013.15	201.30	60.679			
11,700.00	6,987.66	6,060.00	6,057.39	77.33	156.41	41.22	2,265.36	-8,325.07	12,270.36	12,069.06	201.29	60.958			
11,737.27	6,987.63	6,060.00	6,057.39	77.80	156.41	46.62	2,265.36	-8,325.07	12,307.44	12,106.15	201.29	61.144			
11,800.00	6,987.59	6,060.00	6,057.39	78.59	156.41	46.62	2,265.36	-8,325.07	12,369.84	12,168.57	201.27	61.458			
11,900.00	6,987.52	6,060.00	6,057.39	79.86	156.41	46.62	2,265.36	-8,325.07	12,469.31	12,268.06	201.25	61.959			
12,000.00	6,987.46	6,060.00	6,057.39	81.14	156.41	46.62	2,265.36	-8,325.07	12,568.79	12,367.56	201.23	62.459			
12,100.00	6,987.39	6,060.00	6,057.39	82.43	156.41	46.62	2,265.36	-8,325.07	12,668.28	12,467.07	201.21	62.959			
12,200.00	6,987.32	6,060.00	6,057.39	83.73	156.41	46.62	2,265.36	-8,325.07	12,767.78	12,566.59	201.20	63.459			
12,300.00	6,987.26	6,060.00	6,057.39	85.05	156.41	46.62	2,265.36	-8,325.07	12,867.29	12,666.11	201.18	63.959			
12,400.00	6,987.19	6,060.00	6,057.39	86.38	156.41	46.62	2,265.36	-8,325.07	12,966.80	12,765.64	201.17	64.458			
12,500.00	6,987.12	6,060.00	6,057.39	87.71	156.41	46.62	2,265.36	-8,325.07	13,066.32	12,865.17	201.15	64.958			
12,600.00	6,987.06	6,060.00	6,057.39	89.06	156.41	46.62	2,265.36	-8,325.07	13,165.85	12,964.71	201.14	65.456			
12,700.00	6,986.99	6,060.00	6,057.39	90.41	156.41	46.62	2,265.36	-8,325.07	13,265.38	13,064.26	201.13	65.955			
12,800.00	6,986.92	6,060.00	6,057.39	91.77	156.41	46.62	2,265.36	-8,325.07	13,364.93	13,163.81	201.12	66.453			
12,900.00	6,986.86	6,060.00	6,057.39	93.14	156.41	46.62	2,265.36	-8,325.07	13,464.47	13,263.37	201.11	66.951			
13,000.00	6,986.79	6,060.00	6,057.39	94.52	156.41	46.62	2,265.36	-8,325.07	13,564.03	13,362.93	201.10	67.449			
13,100.00	6,986.72	6,060.00	6,057.39	95.90	156.41	46.62	2,265.36	-8,325.07	13,663.59	13,462.50	201.09	67.946			
13,200.00	6,986.66	6,060.00	6,057.39	97.30	156.41	46.62	2,265.36	-8,325.07	13,763.16	13,562.07	201.09	68.443			
13,300.00	6,986.59	6,060.00	6,057.39	98.69	156.41	46.62	2,265.36	-8,325.07	13,862.73	13,661.65	201.08	68.940			
13,400.00	6,986.52	6,060.00	6,057.39	100.10	156.41	46.62	2,265.36	-8,325.07	13,962.31	13,761.23	201.08	69.436			
13,500.00	6,986.46	6,060.00	6,057.39	101.51	156.41	46.62	2,265.36	-8,325.07	14,061.90	13,860.82	201.08	69.932			
13,600.00	6,986.39	6,060.00	6,057.39	102.93	156.41	46.62	2,265.36	-8,325.07	14,161.49	13,960.42	201.08	70.428			
13,700.00	6,986.32	6,060.00	6,057.39	104.35	156.41	46.62	2,265.36	-8,325.07	14,261.09	14,060.01	201.08	70.924			
13,800.00	6,986.25	6,060.00	6,057.39	105.78	156.41	46.62	2,265.36	-8,325.07	14,360.69	14,159.62	201.08	71.419			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164A - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		535-A027Ua_INC-ONLY						Rule Assigned:					Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
13,900.00	6,986.19	6,060.00	6,057.39	107.21	156.41	46.62	2,265.36	-8,325.07	14,460.30	14,259.22	201.08	71.914		
14,000.00	6,986.12	6,060.00	6,057.39	108.65	156.41	46.62	2,265.36	-8,325.07	14,559.92	14,358.84	201.08	72.408		
14,100.00	6,986.05	6,060.00	6,057.39	110.09	156.41	46.62	2,265.36	-8,325.07	14,659.54	14,458.45	201.09	72.902		
14,200.00	6,985.99	6,060.00	6,057.39	111.54	156.41	46.62	2,265.36	-8,325.07	14,759.16	14,558.07	201.09	73.396		
14,300.00	6,985.92	6,060.00	6,057.39	112.99	156.41	46.62	2,265.36	-8,325.07	14,858.79	14,657.70	201.10	73.889		
14,400.00	6,985.85	6,060.00	6,057.39	114.45	156.41	46.62	2,265.36	-8,325.07	14,958.43	14,757.32	201.10	74.382		
14,500.00	6,985.79	6,060.00	6,057.39	115.91	156.41	46.62	2,265.36	-8,325.07	15,058.07	14,856.96	201.11	74.875		
14,600.00	6,985.72	6,060.00	6,057.39	117.38	156.41	46.62	2,265.36	-8,325.07	15,157.71	14,956.59	201.12	75.367		
14,700.00	6,985.65	6,060.00	6,057.39	118.84	156.41	46.62	2,265.36	-8,325.07	15,257.36	15,056.23	201.13	75.859		
14,800.00	6,985.59	6,060.00	6,057.39	120.32	156.41	46.62	2,265.36	-8,325.07	15,357.01	15,155.88	201.14	76.351		
14,900.00	6,985.52	6,060.00	6,057.39	121.79	156.41	46.62	2,265.36	-8,325.07	15,456.67	15,255.52	201.15	76.842		
15,000.00	6,985.45	6,060.00	6,057.39	123.27	156.41	46.62	2,265.36	-8,325.07	15,556.33	15,355.17	201.16	77.332		
15,100.00	6,985.39	6,060.00	6,057.39	124.75	156.41	46.62	2,265.36	-8,325.07	15,656.00	15,454.83	201.17	77.823		
15,200.00	6,985.32	6,060.00	6,057.39	126.24	156.41	46.62	2,265.36	-8,325.07	15,755.67	15,554.48	201.19	78.313		
15,300.00	6,985.25	6,060.00	6,057.39	127.72	156.41	46.62	2,265.36	-8,325.07	15,855.35	15,654.14	201.20	78.802		
15,400.00	6,985.19	6,060.00	6,057.39	129.21	156.41	46.62	2,265.36	-8,325.07	15,955.03	15,753.81	201.22	79.292		
15,500.00	6,985.12	6,060.00	6,057.39	130.71	156.41	46.62	2,265.36	-8,325.07	16,054.71	15,853.47	201.24	79.780		
15,600.00	6,985.05	6,060.00	6,057.39	132.20	156.41	46.62	2,265.36	-8,325.07	16,154.40	15,953.14	201.25	80.269		
15,700.00	6,984.99	6,060.00	6,057.39	133.70	156.41	46.62	2,265.36	-8,325.07	16,254.09	16,052.82	201.27	80.757		
15,800.00	6,984.92	6,060.00	6,057.39	135.20	156.41	46.62	2,265.36	-8,325.07	16,353.78	16,152.49	201.29	81.244		
15,900.00	6,984.85	6,060.00	6,057.39	136.71	156.41	46.62	2,265.36	-8,325.07	16,453.48	16,252.17	201.31	81.732		
16,000.00	6,984.79	6,060.00	6,057.39	138.21	156.41	46.62	2,265.36	-8,325.07	16,553.18	16,351.85	201.33	82.218		
16,100.00	6,984.72	6,060.00	6,057.39	139.72	156.41	46.62	2,265.36	-8,325.07	16,652.89	16,451.53	201.35	82.705		
16,200.00	6,984.65	6,060.00	6,057.39	141.23	156.41	46.62	2,265.36	-8,325.07	16,752.60	16,551.22	201.38	83.191		
16,300.00	6,984.59	6,060.00	6,057.39	142.75	156.41	46.62	2,265.36	-8,325.07	16,852.31	16,650.91	201.40	83.676		
16,400.00	6,984.52	6,060.00	6,057.39	144.26	156.41	46.62	2,265.36	-8,325.07	16,952.03	16,750.60	201.42	84.161		
16,500.00	6,984.45	6,060.00	6,057.39	145.78	156.41	46.62	2,265.36	-8,325.07	17,051.74	16,850.30	201.45	84.646		
16,600.00	6,984.39	6,060.00	6,057.39	147.29	156.41	46.62	2,265.36	-8,325.07	17,151.47	16,949.99	201.47	85.130		
16,700.00	6,984.32	6,060.00	6,057.39	148.82	156.41	46.62	2,265.36	-8,325.07	17,251.19	17,049.69	201.50	85.614		
16,800.00	6,984.25	6,060.00	6,057.39	150.34	156.41	46.62	2,265.36	-8,325.07	17,350.92	17,149.39	201.53	86.097		
16,900.00	6,984.19	6,060.00	6,057.39	151.86	156.41	46.62	2,265.36	-8,325.07	17,450.65	17,249.10	201.56	86.580		
17,000.00	6,984.12	6,060.00	6,057.39	153.39	156.41	46.62	2,265.36	-8,325.07	17,550.39	17,348.80	201.58	87.062		
17,100.00	6,984.05	6,060.00	6,057.39	154.91	156.41	46.62	2,265.36	-8,325.07	17,650.13	17,448.51	201.61	87.544		
17,200.00	6,983.99	6,060.00	6,057.39	156.44	156.41	46.62	2,265.36	-8,325.07	17,749.87	17,548.22	201.64	88.026		
17,300.00	6,983.92	6,060.00	6,057.39	157.97	156.41	46.62	2,265.36	-8,325.07	17,849.61	17,647.94	201.67	88.507		
17,400.00	6,983.85	6,060.00	6,057.39	159.50	156.41	46.62	2,265.36	-8,325.07	17,949.36	17,747.65	201.71	88.988		
17,500.00	6,983.79	6,060.00	6,057.39	161.04	156.41	46.62	2,265.36	-8,325.07	18,049.11	17,847.37	201.74	89.468		
17,600.00	6,983.72	6,060.00	6,057.39	162.57	156.41	46.62	2,265.36	-8,325.07	18,148.86	17,947.09	201.77	89.947		
17,700.00	6,983.65	6,060.00	6,057.39	164.11	156.41	46.62	2,265.36	-8,325.07	18,248.62	18,046.81	201.81	90.427		
17,800.00	6,983.59	6,060.00	6,057.39	165.65	156.41	46.62	2,265.36	-8,325.07	18,348.37	18,146.53	201.84	90.905		
17,900.00	6,983.52	6,060.00	6,057.39	167.18	156.41	46.62	2,265.36	-8,325.07	18,448.13	18,246.26	201.88	91.384		
18,000.00	6,983.45	6,060.00	6,057.39	168.72	156.41	46.62	2,265.36	-8,325.07	18,547.90	18,345.98	201.91	91.861		
18,100.00	6,983.39	6,060.00	6,057.39	170.27	156.41	46.62	2,265.36	-8,325.07	18,647.66	18,445.71	201.95	92.339		
18,200.00	6,983.32	6,060.00	6,057.39	171.81	156.41	46.62	2,265.36	-8,325.07	18,747.43	18,545.44	201.99	92.816		
18,300.00	6,983.25	6,060.00	6,057.39	173.35	156.41	46.62	2,265.36	-8,325.07	18,847.20	18,645.18	202.02	93.292		
18,400.00	6,983.19	6,060.00	6,057.39	174.90	156.41	46.62	2,265.36	-8,325.07	18,946.97	18,744.91	202.06	93.768		
18,500.00	6,983.12	6,060.00	6,057.39	176.44	156.41	46.62	2,265.36	-8,325.07	19,046.75	18,844.65	202.10	94.243		
18,600.00	6,983.05	6,060.00	6,057.39	177.99	156.41	46.62	2,265.36	-8,325.07	19,146.53	18,944.38	202.14	94.718		
18,700.00	6,982.99	6,060.00	6,057.39	179.54	156.41	46.62	2,265.36	-8,325.07	19,246.31	19,044.12	202.18	95.192		
18,800.00	6,982.92	6,060.00	6,057.39	181.09	156.41	46.62	2,265.36	-8,325.07	19,346.09	19,143.86	202.22	95.666		
18,900.00	6,982.85	6,060.00	6,057.39	182.64	156.41	46.62	2,265.36	-8,325.07	19,445.87	19,243.61	202.27	96.140		
19,000.00	6,982.78	6,060.00	6,057.39	184.19	156.41	46.62	2,265.36	-8,325.07	19,545.66	19,343.35	202.31	96.613		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164A - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 535-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	6,060.00	6,057.39	185.74	156.41	46.62	2,265.36	-8,325.07	19,645.45	19,443.09	202.35	97.085	
19,200.00	6,982.65	6,060.00	6,057.39	187.29	156.41	46.62	2,265.36	-8,325.07	19,745.24	19,542.84	202.40	97.557	
19,300.00	6,982.58	6,060.00	6,057.39	188.84	156.41	46.62	2,265.36	-8,325.07	19,845.03	19,642.59	202.44	98.028	
19,400.00	6,982.52	6,060.00	6,057.39	190.40	156.41	46.62	2,265.36	-8,325.07	19,944.83	19,742.34	202.49	98.499	
19,500.00	6,982.45	6,060.00	6,057.39	191.95	156.41	46.62	2,265.36	-8,325.07	20,044.62	19,842.09	202.53	98.970	
19,600.00	6,982.38	6,060.00	6,057.39	193.51	156.41	46.62	2,265.36	-8,325.07	20,144.42	19,941.84	202.58	99.439	
19,700.00	6,982.32	6,060.00	6,057.39	195.07	156.41	46.62	2,265.36	-8,325.07	20,244.22	20,041.60	202.63	99.909	
19,800.00	6,982.25	6,060.00	6,057.39	196.62	156.41	46.62	2,265.36	-8,325.07	20,344.03	20,141.35	202.67	100.378	
19,900.00	6,982.18	6,060.00	6,057.39	198.18	156.41	46.62	2,265.36	-8,325.07	20,443.83	20,241.11	202.72	100.846	
20,000.00	6,982.12	6,060.00	6,057.39	199.74	156.41	46.62	2,265.36	-8,325.07	20,543.64	20,340.87	202.77	101.314	
20,100.00	6,982.05	6,060.00	6,057.39	201.30	156.41	46.62	2,265.36	-8,325.07	20,643.45	20,440.63	202.82	101.781	
20,176.02	6,982.00	6,060.00	6,057.39	202.36	156.41	46.62	2,265.36	-8,325.07	20,719.32	20,512.61	206.71	100.234	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164B - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 563-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-74.82	2,267.23	-8,359.15	8,661.37				
100.00	100.00	38.03	38.03	0.25	0.68	-74.83	2,267.21	-8,359.16	8,661.17	8,660.24	0.93	9,362.994	
200.00	200.00	133.09	133.09	0.61	2.36	-74.83	2,266.98	-8,359.27	8,661.22	8,658.25	2.97	2,917.919	
300.00	300.00	228.16	228.16	0.97	4.05	-74.83	2,266.51	-8,359.51	8,661.33	8,656.32	5.01	1,728.293	
400.00	400.00	323.22	323.21	1.33	5.74	-74.84	2,265.78	-8,359.87	8,661.49	8,654.44	7.05	1,227.774	
500.00	500.00	418.27	418.26	1.68	7.43	-74.84	2,264.80	-8,360.35	8,661.72	8,652.62	9.10	952.080	
600.00	600.00	513.32	513.30	2.04	9.12	-74.85	2,263.57	-8,360.96	8,661.99	8,650.85	11.14	777.517	
700.00	699.98	563.00	562.97	2.40	10.00	-64.86	2,262.83	-8,361.33	8,661.72	8,649.34	12.38	699.732	
800.00	799.84	611.96	611.92	2.76	10.18	-64.91	2,261.86	-8,362.05	8,660.54	8,647.66	12.88	672.383	
900.00	899.45	654.00	653.92	3.13	10.34	-64.97	2,260.73	-8,363.21	8,658.72	8,645.36	13.36	648.164	
1,000.00	998.70	654.00	653.92	3.49	10.34	-65.02	2,260.73	-8,363.21	8,656.27	8,642.55	13.72	630.960	
1,100.00	1,097.47	654.00	653.92	3.86	10.34	-65.07	2,260.73	-8,363.21	8,653.50	8,639.41	14.09	614.367	
1,200.00	1,195.62	706.81	706.62	4.24	10.56	-65.21	2,258.65	-8,365.79	8,649.59	8,635.01	14.58	593.063	
1,300.00	1,293.06	744.00	743.66	4.64	10.73	-65.35	2,256.63	-8,368.56	8,645.59	8,630.54	15.05	574.430	
1,400.00	1,389.64	744.00	743.66	5.06	10.73	-65.44	2,256.63	-8,368.56	8,640.89	8,625.44	15.45	559.123	
1,500.00	1,485.27	787.76	787.15	5.50	10.90	-65.63	2,253.86	-8,372.45	8,635.65	8,619.68	15.97	540.720	
1,515.00	1,499.52	794.09	793.45	5.57	10.92	-65.66	2,253.44	-8,373.04	8,634.80	8,618.75	16.05	538.021	
1,600.00	1,580.22	835.00	834.06	5.96	11.08	-65.76	2,250.61	-8,377.01	8,630.19	8,613.68	16.51	522.771	
1,700.00	1,675.17	867.15	865.94	6.44	11.17	-65.85	2,248.14	-8,380.39	8,625.43	8,608.42	17.01	507.069	
1,800.00	1,770.11	928.00	926.11	6.92	11.33	-66.01	2,242.51	-8,387.51	8,621.53	8,603.97	17.57	490.767	
1,900.00	1,865.05	928.00	926.11	7.41	11.33	-66.01	2,242.51	-8,387.51	8,618.25	8,600.22	18.03	477.971	
2,000.00	1,959.99	969.70	967.21	7.90	11.48	-66.12	2,238.05	-8,392.95	8,615.84	8,597.25	18.59	463.488	
2,100.00	2,054.94	1,023.00	1,019.59	8.40	11.68	-66.27	2,231.80	-8,400.59	8,614.35	8,595.18	19.18	449.204	
2,200.00	2,149.88	1,023.00	1,019.59	8.90	11.68	-66.27	2,231.80	-8,400.59	8,613.55	8,593.90	19.65	438.299	
2,218.97	2,167.89	1,023.00	1,019.59	9.00	11.68	-66.27	2,231.80	-8,400.59	8,613.53	8,593.79	19.74	436.289 CC	
2,300.00	2,244.82	1,023.00	1,019.59	9.41	11.68	-66.27	2,231.80	-8,400.59	8,613.91	8,593.79	20.13	427.946 ES	
2,400.00	2,339.76	1,072.48	1,068.04	9.92	11.85	-66.42	2,225.61	-8,408.50	8,614.84	8,594.11	20.73	415.539	
2,500.00	2,434.71	1,118.00	1,112.44	10.43	12.01	-66.55	2,219.75	-8,416.63	8,617.03	8,595.71	21.33	404.032	
2,600.00	2,529.65	1,118.00	1,112.44	10.94	12.01	-66.55	2,219.75	-8,416.63	8,619.89	8,598.08	21.81	395.276	
2,700.00	2,624.59	1,118.00	1,112.44	11.45	12.01	-66.55	2,219.75	-8,416.63	8,623.90	8,601.61	22.29	386.969	
2,800.00	2,719.53	1,177.45	1,170.19	11.97	12.20	-66.73	2,211.64	-8,428.19	8,628.49	8,605.56	22.93	376.313	
2,900.00	2,814.48	1,210.00	1,201.68	12.49	12.31	-66.83	2,206.89	-8,434.89	8,634.04	8,610.54	23.50	367.423	
3,000.00	2,909.42	1,210.00	1,201.68	13.01	12.31	-66.83	2,206.89	-8,434.89	8,640.57	8,616.59	23.98	360.384	
3,100.00	3,004.36	1,265.51	1,255.15	13.53	12.53	-67.01	2,198.14	-8,446.98	8,647.69	8,623.06	24.63	351.084	
3,200.00	3,099.30	1,305.00	1,292.95	14.05	12.68	-67.13	2,191.30	-8,456.12	8,655.84	8,630.61	25.24	342.988	
3,300.00	3,194.25	1,305.00	1,292.95	14.57	12.68	-67.13	2,191.30	-8,456.12	8,664.86	8,639.15	25.71	337.015	
3,400.00	3,289.19	1,305.00	1,292.95	15.09	12.68	-67.13	2,191.30	-8,456.12	8,675.02	8,648.84	26.18	331.342	
3,500.00	3,384.13	1,356.38	1,341.83	15.62	12.90	-67.31	2,181.86	-8,468.83	8,685.67	8,658.81	26.85	323.466	
3,600.00	3,479.07	1,395.00	1,378.32	16.14	13.07	-67.44	2,174.45	-8,479.07	8,697.59	8,670.11	27.47	316.580	
3,700.00	3,574.02	1,395.00	1,378.32	16.67	13.07	-67.44	2,174.45	-8,479.07	8,710.27	8,682.33	27.94	311.759	
3,800.00	3,668.96	1,395.00	1,378.32	17.19	13.07	-67.44	2,174.45	-8,479.07	8,724.08	8,695.68	28.40	307.178	
3,900.00	3,763.90	1,439.80	1,420.31	17.72	13.30	-67.59	2,165.23	-8,491.65	8,738.57	8,709.49	29.08	300.481	
4,000.00	3,858.84	1,487.00	1,464.08	18.24	13.55	-67.76	2,154.49	-8,505.68	8,754.24	8,724.46	29.78	293.985	
4,100.00	3,953.79	1,487.00	1,464.08	18.77	13.55	-67.76	2,154.49	-8,505.68	8,770.52	8,740.29	30.23	290.096	
4,200.00	4,048.73	1,487.00	1,464.08	19.30	13.55	-67.76	2,154.49	-8,505.68	8,787.92	8,757.23	30.68	286.401	
4,300.00	4,143.67	1,487.00	1,464.08	19.82	13.55	-67.76	2,154.49	-8,505.68	8,806.42	8,775.29	31.13	282.890	
4,400.00	4,238.61	1,538.97	1,511.73	20.35	13.83	-67.96	2,141.74	-8,522.06	8,825.34	8,793.47	31.87	276.918	
4,500.00	4,333.56	1,578.00	1,547.14	20.88	14.04	-68.11	2,131.71	-8,535.03	8,845.56	8,813.03	32.54	271.855	
4,600.00	4,428.50	1,578.00	1,547.14	21.41	14.04	-68.11	2,131.71	-8,535.03	8,866.50	8,833.52	32.98	268.877	
4,700.00	4,523.44	1,578.00	1,547.14	21.93	14.04	-68.11	2,131.71	-8,535.03	8,888.50	8,855.09	33.41	266.049	
4,800.00	4,618.38	1,578.00	1,547.14	22.46	14.04	-68.11	2,131.71	-8,535.03	8,911.58	8,877.74	33.84	263.365	
4,900.00	4,713.33	1,616.85	1,582.04	22.99	14.25	-68.26	2,121.35	-8,548.60	8,935.22	8,900.71	34.51	258.913	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164B - OH - OH-SVY												Offset Site Error: 0.00 usft
Survey Program: 563-MWD OWSG Rev5												Offset Well Error: 0.00 usft
Reference												
Offset												
Semi Major Axis												
Highside												
Offset Wellbore Centre												
Distance												
Between												
Ellipses												
Minimum												
Separation												
Factor												
Warning												
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor
5,000.00	4,808.27	1,630.19	1,593.93	23.52	14.32	-68.31	2,117.71	-8,553.44	8,960.01	8,924.99	35.02	255.868
5,100.00	4,903.21	1,670.00	1,629.11	24.05	14.53	-68.47	2,106.61	-8,568.40	8,985.96	8,950.26	35.70	251.729
5,200.00	4,998.16	1,670.00	1,629.11	24.58	14.53	-68.47	2,106.61	-8,568.40	9,012.43	8,976.32	36.11	249.578
5,300.00	5,093.10	1,670.00	1,629.11	25.11	14.53	-68.47	2,106.61	-8,568.40	9,039.92	9,003.40	36.52	247.541
5,400.00	5,188.04	1,670.00	1,629.11	25.64	14.53	-68.47	2,106.61	-8,568.40	9,068.44	9,031.52	36.92	245.612
5,500.00	5,282.98	1,670.00	1,629.11	26.17	14.53	-68.47	2,106.61	-8,568.40	9,097.97	9,060.65	37.32	243.788
5,600.00	5,377.93	1,713.05	1,666.74	26.70	14.73	-68.64	2,094.45	-8,585.41	9,127.96	9,089.95	38.01	240.156
5,623.25	5,400.00	1,716.41	1,669.66	26.82	14.74	-68.65	2,093.51	-8,586.77	9,135.11	9,096.99	38.12	239.625
5,700.00	5,473.03	1,763.00	1,709.97	27.22	14.96	-69.07	2,080.44	-8,606.14	9,159.60	9,120.85	38.74	236.429
5,800.00	5,568.64	1,763.00	1,709.97	27.73	14.96	-69.39	2,080.44	-8,606.14	9,192.07	9,152.96	39.11	235.028
5,900.00	5,664.75	1,763.00	1,709.97	28.23	14.96	-69.73	2,080.44	-8,606.14	9,226.09	9,186.63	39.46	233.809
6,000.00	5,761.33	1,763.00	1,709.97	28.71	14.96	-70.09	2,080.44	-8,606.14	9,261.64	9,221.85	39.79	232.763
6,100.00	5,858.34	1,763.00	1,709.97	29.18	14.96	-70.46	2,080.44	-8,606.14	9,298.67	9,258.57	40.10	231.885
6,200.00	5,955.76	1,814.06	1,753.67	29.64	15.15	-71.03	2,065.93	-8,628.22	9,336.61	9,295.88	40.74	229.193
6,300.00	6,053.57	1,859.00	1,791.69	30.07	15.32	-71.59	2,052.76	-8,648.22	9,376.16	9,334.85	41.32	226.933
6,400.00	6,151.72	1,859.00	1,791.69	30.50	15.32	-72.01	2,052.76	-8,648.22	9,416.69	9,375.11	41.57	226.502
6,500.00	6,250.19	1,859.00	1,791.69	30.91	15.32	-72.45	2,052.76	-8,648.22	9,458.58	9,416.77	41.81	226.209
6,600.00	6,348.94	1,859.00	1,791.69	31.30	15.32	-72.91	2,052.76	-8,648.22	9,501.82	9,459.79	42.03	226.050
6,659.67	6,408.00	1,859.00	1,791.69	31.53	15.32	-73.19	2,052.76	-8,648.22	9,528.25	9,486.09	42.16	226.015
6,700.00	6,447.82	1,859.00	1,791.69	31.68	15.32	-88.16	2,052.76	-8,648.22	9,547.03	9,504.78	42.25	225.986
6,750.00	6,496.66	1,859.00	1,791.69	31.90	15.32	-97.29	2,052.76	-8,648.22	9,572.35	9,529.98	42.37	225.901
6,800.00	6,544.65	1,902.54	1,827.93	32.13	15.55	-101.39	2,039.37	-8,668.30	9,599.11	9,556.20	42.91	223.720
6,850.00	6,591.49	1,907.03	1,831.62	32.37	15.57	-102.61	2,037.94	-8,670.42	9,628.28	9,585.17	43.11	223.340
6,900.00	6,636.89	1,911.00	1,834.87	32.62	15.59	-102.19	2,036.66	-8,672.30	9,659.16	9,615.84	43.33	222.943
6,950.00	6,680.57	1,952.00	1,868.09	32.89	15.81	-100.88	2,023.08	-8,692.13	9,692.05	9,648.16	43.89	220.830
7,000.00	6,722.26	1,952.00	1,868.09	33.17	15.81	-98.49	2,023.08	-8,692.13	9,725.67	9,681.57	44.10	220.536
7,050.00	6,761.71	1,952.00	1,868.09	33.45	15.81	-95.42	2,023.08	-8,692.13	9,760.39	9,716.07	44.33	220.197
7,100.00	6,798.67	1,952.00	1,868.09	33.75	15.81	-91.82	2,023.08	-8,692.13	9,796.00	9,751.43	44.57	219.814
7,150.00	6,832.91	1,952.00	1,868.09	34.06	15.81	-87.80	2,023.08	-8,692.13	9,832.25	9,787.43	44.82	219.383
7,200.00	6,864.22	1,952.00	1,868.09	34.37	15.81	-83.49	2,023.08	-8,692.13	9,868.92	9,823.83	45.08	218.903
7,250.00	6,892.42	1,952.00	1,868.09	34.69	15.81	-79.00	2,023.08	-8,692.13	9,905.78	9,860.42	45.36	218.373
7,300.00	6,917.32	1,952.00	1,868.09	35.03	15.81	-74.47	2,023.08	-8,692.13	9,942.60	9,896.95	45.65	217.793
7,350.00	6,938.77	1,952.00	1,868.09	35.37	15.81	-70.00	2,023.08	-8,692.13	9,979.16	9,933.21	45.95	217.162
7,400.00	6,956.64	1,952.00	1,868.09	35.72	15.81	-65.68	2,023.08	-8,692.13	10,015.24	9,968.97	46.26	216.480
7,450.00	6,970.83	1,952.00	1,868.09	36.07	15.81	-61.60	2,023.08	-8,692.13	10,050.62	10,004.03	46.59	215.747
7,500.00	6,981.23	1,952.00	1,868.09	36.44	15.81	-57.79	2,023.08	-8,692.13	10,085.08	10,038.17	46.92	214.965
7,550.00	6,987.80	1,911.47	1,835.26	36.81	15.60	-54.05	2,036.51	-8,672.52	10,117.86	10,070.97	46.89	215.797
7,600.00	6,990.48	1,907.87	1,832.31	37.19	15.58	-50.85	2,037.67	-8,670.81	10,149.80	10,102.60	47.20	215.047
7,609.87	6,990.55	1,907.11	1,831.68	37.26	15.57	-50.26	2,037.91	-8,670.45	10,155.93	10,108.67	47.26	214.901
7,700.00	6,990.49	1,900.14	1,825.95	37.97	15.54	-50.22	2,040.13	-8,667.17	10,211.89	10,164.06	47.83	213.493
7,800.00	6,990.42	1,859.00	1,791.69	38.78	15.32	-50.01	2,052.76	-8,648.22	10,274.90	10,226.73	48.17	213.287
7,900.00	6,990.35	1,859.00	1,791.69	39.64	15.32	-50.01	2,052.76	-8,648.22	10,337.90	10,289.02	48.89	211.463
8,000.00	6,990.28	1,859.00	1,791.69	40.53	15.32	-50.01	2,052.76	-8,648.22	10,401.48	10,351.88	49.60	209.698
8,100.00	6,990.21	1,859.00	1,791.69	41.45	15.32	-50.01	2,052.76	-8,648.22	10,465.64	10,415.32	50.32	207.994
8,200.00	6,990.14	1,859.00	1,791.69	42.40	15.32	-50.01	2,052.76	-8,648.22	10,530.34	10,479.31	51.03	206.351
8,306.37	6,990.06	1,859.00	1,791.69	43.45	15.32	-50.01	2,052.76	-8,648.22	10,599.77	10,547.99	51.79	204.671
8,400.00	6,990.00	1,859.00	1,791.69	44.38	15.32	-47.75	2,052.76	-8,648.22	10,663.11	10,610.68	52.44	203.344
8,500.00	6,989.93	1,859.00	1,791.69	45.36	15.32	-44.90	2,052.76	-8,648.22	10,734.81	10,681.71	53.09	202.197
8,600.00	6,989.85	1,820.61	1,759.23	46.33	15.18	-41.37	2,064.04	-8,631.10	10,809.94	10,756.50	53.44	202.291
8,700.00	6,989.78	1,809.45	1,749.74	47.28	15.13	-37.39	2,067.27	-8,626.19	10,888.49	10,834.57	53.92	201.954 SF
8,800.00	6,989.70	1,763.00	1,709.97	48.21	14.96	-32.62	2,080.44	-8,606.14	10,970.13	10,916.03	54.11	202.745
8,900.00	6,989.63	1,763.00	1,709.97	49.11	14.96	-27.34	2,080.44	-8,606.14	11,053.73	10,999.18	54.55	202.634

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program:		563-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
9,000.00	6,989.55	1,763.00	1,709.97	49.99	14.96	-21.32	2,080.44	-8,606.14	11,139.29	11,084.36	54.93	202.778	
9,100.00	6,989.48	1,763.00	1,709.97	50.84	14.96	-14.58	2,080.44	-8,606.14	11,226.36	11,171.10	55.26	203.169	
9,200.00	6,989.40	1,763.00	1,709.97	51.66	14.96	-7.26	2,080.44	-8,606.14	11,314.47	11,258.96	55.52	203.796	
9,300.00	6,989.33	1,763.00	1,709.97	52.45	14.96	0.41	2,080.44	-8,606.14	11,403.20	11,347.48	55.72	204.647	
9,393.87	6,989.27	1,763.00	1,709.97	53.15	14.96	7.68	2,080.44	-8,606.14	11,486.63	11,430.77	55.86	205.639	
9,400.00	6,989.26	1,763.00	1,709.97	53.20	14.96	7.68	2,080.44	-8,606.14	11,492.08	11,436.22	55.87	205.710	
9,500.00	6,989.19	1,763.00	1,709.97	53.95	14.96	7.68	2,080.44	-8,606.14	11,581.02	11,525.04	55.98	206.862	
9,600.00	6,989.12	1,763.00	1,709.97	54.73	14.96	7.68	2,080.44	-8,606.14	11,670.14	11,614.04	56.10	208.012	
9,700.00	6,989.05	1,763.00	1,709.97	55.55	14.96	7.68	2,080.44	-8,606.14	11,759.44	11,703.21	56.22	209.162	
9,800.00	6,988.98	1,718.05	1,671.09	56.40	14.75	7.49	2,093.04	-8,587.44	11,848.35	11,792.30	56.05	211.396	
9,900.00	6,988.91	1,711.67	1,665.54	57.28	14.72	7.47	2,094.84	-8,584.85	11,937.82	11,881.69	56.13	212.686	
10,000.00	6,988.84	1,670.00	1,629.11	58.20	14.53	7.30	2,106.61	-8,568.40	12,027.77	11,971.78	55.99	214.828	
10,100.00	6,988.77	1,670.00	1,629.11	59.14	14.53	7.30	2,106.61	-8,568.40	12,117.41	12,061.30	56.11	215.949	
10,200.00	6,988.70	1,670.00	1,629.11	60.11	14.53	7.30	2,106.61	-8,568.40	12,207.21	12,150.97	56.24	217.069	
10,300.00	6,988.63	1,670.00	1,629.11	61.11	14.53	7.30	2,106.61	-8,568.40	12,297.17	12,240.81	56.36	218.189	
10,400.00	6,988.56	1,670.00	1,629.11	62.14	14.53	7.30	2,106.61	-8,568.40	12,387.29	12,330.80	56.48	219.308	
10,500.00	6,988.49	1,670.00	1,629.11	63.19	14.53	7.30	2,106.61	-8,568.40	12,477.55	12,420.94	56.61	220.427	
10,600.00	6,988.42	1,670.00	1,629.11	64.26	14.53	7.30	2,106.61	-8,568.40	12,567.96	12,511.23	56.73	221.546	
10,700.00	6,988.35	1,670.00	1,629.11	65.36	14.53	7.30	2,106.61	-8,568.40	12,658.52	12,601.67	56.85	222.664	
10,800.00	6,988.28	1,670.00	1,629.11	66.48	14.53	7.30	2,106.61	-8,568.40	12,749.22	12,692.24	56.97	223.782	
10,900.00	6,988.21	1,670.00	1,629.11	67.61	14.53	7.30	2,106.61	-8,568.40	12,840.05	12,782.96	57.09	224.899	
11,000.00	6,988.14	1,670.00	1,629.11	68.77	14.53	7.30	2,106.61	-8,568.40	12,931.02	12,873.81	57.21	226.016	
11,100.00	6,988.07	1,670.00	1,629.11	69.95	14.53	7.30	2,106.61	-8,568.40	13,022.13	12,964.79	57.33	227.132	
11,200.00	6,988.01	1,670.00	1,629.11	71.14	14.53	7.30	2,106.61	-8,568.40	13,113.36	13,055.91	57.45	228.248	
11,300.00	6,987.94	1,670.00	1,629.11	72.35	14.53	7.30	2,106.61	-8,568.40	13,204.72	13,147.15	57.57	229.364	
11,400.00	6,987.87	1,670.00	1,629.11	73.57	14.53	7.30	2,106.61	-8,568.40	13,296.20	13,238.52	57.69	230.479	
11,500.00	6,987.80	1,670.00	1,629.11	74.81	14.53	7.30	2,106.61	-8,568.40	13,387.81	13,330.00	57.81	231.593	
11,600.00	6,987.73	1,625.26	1,589.54	76.07	14.29	7.12	2,119.06	-8,551.64	13,478.87	13,421.19	57.68	233.685	
11,643.87	6,987.70	1,623.44	1,587.92	76.62	14.28	7.11	2,119.55	-8,550.98	13,519.09	13,461.37	57.72	234.209	
11,700.00	6,987.66	1,621.14	1,585.87	77.33	14.27	9.65	2,120.18	-8,550.15	13,570.56	13,512.79	57.77	234.892	
11,737.27	6,987.63	1,619.64	1,584.53	77.80	14.26	11.32	2,120.59	-8,549.61	13,604.71	13,546.90	57.80	235.359	
11,800.00	6,987.59	1,578.00	1,547.14	78.59	14.04	11.13	2,131.71	-8,535.03	13,662.70	13,605.05	57.64	237.019	
11,900.00	6,987.52	1,578.00	1,547.14	79.86	14.04	11.13	2,131.71	-8,535.03	13,754.32	13,696.58	57.75	238.187	
12,000.00	6,987.46	1,578.00	1,547.14	81.14	14.04	11.13	2,131.71	-8,535.03	13,846.06	13,788.21	57.85	239.353	
12,100.00	6,987.39	1,578.00	1,547.14	82.43	14.04	11.13	2,131.71	-8,535.03	13,937.91	13,879.96	57.95	240.517	
12,200.00	6,987.32	1,578.00	1,547.14	83.73	14.04	11.13	2,131.71	-8,535.03	14,029.88	13,971.83	58.05	241.681	
12,300.00	6,987.26	1,578.00	1,547.14	85.05	14.04	11.13	2,131.71	-8,535.03	14,121.95	14,063.80	58.15	242.842	
12,400.00	6,987.19	1,578.00	1,547.14	86.38	14.04	11.13	2,131.71	-8,535.03	14,214.13	14,155.88	58.25	244.002	
12,500.00	6,987.12	1,578.00	1,547.14	87.71	14.04	11.13	2,131.71	-8,535.03	14,306.42	14,248.06	58.36	245.161	
12,600.00	6,987.06	1,578.00	1,547.14	89.06	14.04	11.13	2,131.71	-8,535.03	14,398.81	14,340.35	58.46	246.318	
12,700.00	6,986.99	1,578.00	1,547.14	90.41	14.04	11.13	2,131.71	-8,535.03	14,491.30	14,432.74	58.56	247.474	
12,800.00	6,986.92	1,578.00	1,547.14	91.77	14.04	11.13	2,131.71	-8,535.03	14,583.89	14,525.23	58.66	248.628	
12,900.00	6,986.86	1,578.00	1,547.14	93.14	14.04	11.13	2,131.71	-8,535.03	14,676.57	14,617.82	58.76	249.781	
13,000.00	6,986.79	1,578.00	1,547.14	94.52	14.04	11.13	2,131.71	-8,535.03	14,769.36	14,710.50	58.86	250.932	
13,100.00	6,986.72	1,578.00	1,547.14	95.90	14.04	11.13	2,131.71	-8,535.03	14,862.23	14,803.27	58.96	252.082	
13,200.00	6,986.66	1,578.00	1,547.14	97.30	14.04	11.13	2,131.71	-8,535.03	14,955.20	14,896.14	59.06	253.230	
13,300.00	6,986.59	1,578.00	1,547.14	98.69	14.04	11.13	2,131.71	-8,535.03	15,048.26	14,989.10	59.16	254.376	
13,400.00	6,986.52	1,578.00	1,547.14	100.10	14.04	11.13	2,131.71	-8,535.03	15,141.40	15,082.15	59.26	255.521	
13,500.00	6,986.46	1,578.00	1,547.14	101.51	14.04	11.13	2,131.71	-8,535.03	15,234.64	15,175.28	59.36	256.665	
13,600.00	6,986.39	1,578.00	1,547.14	102.93	14.04	11.13	2,131.71	-8,535.03	15,327.95	15,268.50	59.46	257.807	
13,700.00	6,986.32	1,578.00	1,547.14	104.35	14.04	11.13	2,131.71	-8,535.03	15,421.36	15,361.80	59.55	258.947	
13,800.00	6,986.25	1,536.40	1,509.38	105.78	13.82	10.95	2,142.39	-8,521.23	15,514.41	15,454.92	59.48	260.820	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 563-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
13,900.00	6,986.19	1,532.26	1,505.61	107.21	13.79	10.93	2,143.43	-8,519.89	15,607.88	15,548.31	59.57	262.022	
14,000.00	6,986.12	1,528.17	1,501.87	108.65	13.77	10.91	2,144.45	-8,518.57	15,701.43	15,641.78	59.65	263.221	
14,100.00	6,986.05	1,487.00	1,464.08	110.09	13.55	10.73	2,154.49	-8,505.68	15,795.39	15,735.80	59.59	265.070	
14,200.00	6,985.99	1,487.00	1,464.08	111.54	13.55	10.73	2,154.49	-8,505.68	15,889.01	15,829.32	59.69	266.185	
14,300.00	6,985.92	1,487.00	1,464.08	112.99	13.55	10.73	2,154.49	-8,505.68	15,982.70	15,922.91	59.79	267.299	
14,400.00	6,985.85	1,487.00	1,464.08	114.45	13.55	10.73	2,154.49	-8,505.68	16,076.47	16,016.58	59.89	268.411	
14,500.00	6,985.79	1,487.00	1,464.08	115.91	13.55	10.73	2,154.49	-8,505.68	16,170.32	16,110.32	60.00	269.522	
14,600.00	6,985.72	1,487.00	1,464.08	117.38	13.55	10.73	2,154.49	-8,505.68	16,264.24	16,204.14	60.10	270.631	
14,700.00	6,985.65	1,487.00	1,464.08	118.84	13.55	10.73	2,154.49	-8,505.68	16,358.23	16,298.03	60.20	271.738	
14,800.00	6,985.59	1,487.00	1,464.08	120.32	13.55	10.73	2,154.49	-8,505.68	16,452.29	16,391.99	60.30	272.844	
14,900.00	6,985.52	1,487.00	1,464.08	121.79	13.55	10.73	2,154.49	-8,505.68	16,546.42	16,486.02	60.40	273.949	
15,000.00	6,985.45	1,487.00	1,464.08	123.27	13.55	10.73	2,154.49	-8,505.68	16,640.62	16,580.12	60.50	275.052	
15,100.00	6,985.39	1,487.00	1,464.08	124.75	13.55	10.73	2,154.49	-8,505.68	16,734.88	16,674.28	60.60	276.153	
15,200.00	6,985.32	1,487.00	1,464.08	126.24	13.55	10.73	2,154.49	-8,505.68	16,829.22	16,768.52	60.70	277.252	
15,300.00	6,985.25	1,487.00	1,464.08	127.72	13.55	10.73	2,154.49	-8,505.68	16,923.61	16,862.81	60.80	278.350	
15,400.00	6,985.19	1,487.00	1,464.08	129.21	13.55	10.73	2,154.49	-8,505.68	17,018.08	16,957.18	60.90	279.446	
15,500.00	6,985.12	1,487.00	1,464.08	130.71	13.55	10.73	2,154.49	-8,505.68	17,112.60	17,051.60	61.00	280.541	
15,600.00	6,985.05	1,487.00	1,464.08	132.20	13.55	10.73	2,154.49	-8,505.68	17,207.19	17,146.09	61.10	281.633	
15,700.00	6,984.99	1,487.00	1,464.08	133.70	13.55	10.73	2,154.49	-8,505.68	17,301.84	17,240.64	61.20	282.724	
15,800.00	6,984.92	1,487.00	1,464.08	135.20	13.55	10.73	2,154.49	-8,505.68	17,396.54	17,335.25	61.30	283.813	
15,900.00	6,984.85	1,487.00	1,464.08	136.71	13.55	10.73	2,154.49	-8,505.68	17,491.31	17,429.91	61.39	284.901	
16,000.00	6,984.79	1,487.00	1,464.08	138.21	13.55	10.73	2,154.49	-8,505.68	17,586.13	17,524.64	61.49	285.987	
16,100.00	6,984.72	1,487.00	1,464.08	139.72	13.55	10.73	2,154.49	-8,505.68	17,681.01	17,619.42	61.59	287.071	
16,200.00	6,984.65	1,487.00	1,464.08	141.23	13.55	10.73	2,154.49	-8,505.68	17,775.95	17,714.26	61.69	288.153	
16,300.00	6,984.59	1,443.44	1,423.71	142.75	13.32	10.56	2,164.44	-8,492.71	17,870.49	17,808.82	61.67	289.799	
16,400.00	6,984.52	1,440.12	1,420.61	144.26	13.30	10.54	2,165.16	-8,491.75	17,965.46	17,903.71	61.75	290.915	
16,500.00	6,984.45	1,436.82	1,417.53	145.78	13.29	10.53	2,165.87	-8,490.79	18,060.48	17,998.64	61.85	292.028	
16,600.00	6,984.39	1,395.00	1,378.32	147.29	13.07	10.37	2,174.45	-8,479.07	18,155.91	18,094.09	61.83	293.648	
16,700.00	6,984.32	1,395.00	1,378.32	148.82	13.07	10.37	2,174.45	-8,479.07	18,250.98	18,189.05	61.93	294.707	
16,800.00	6,984.25	1,395.00	1,378.32	150.34	13.07	10.37	2,174.45	-8,479.07	18,346.09	18,284.06	62.03	295.765	
16,900.00	6,984.19	1,395.00	1,378.32	151.86	13.07	10.37	2,174.45	-8,479.07	18,441.26	18,379.13	62.13	296.821	
17,000.00	6,984.12	1,395.00	1,378.32	153.39	13.07	10.37	2,174.45	-8,479.07	18,536.47	18,474.24	62.23	297.875	
17,100.00	6,984.05	1,395.00	1,378.32	154.91	13.07	10.37	2,174.45	-8,479.07	18,631.74	18,569.41	62.33	298.927	
17,200.00	6,983.99	1,395.00	1,378.32	156.44	13.07	10.37	2,174.45	-8,479.07	18,727.05	18,664.63	62.43	299.977	
17,300.00	6,983.92	1,395.00	1,378.32	157.97	13.07	10.37	2,174.45	-8,479.07	18,822.42	18,759.89	62.53	301.026	
17,400.00	6,983.85	1,395.00	1,378.32	159.50	13.07	10.37	2,174.45	-8,479.07	18,917.83	18,855.20	62.63	302.072	
17,500.00	6,983.79	1,395.00	1,378.32	161.04	13.07	10.37	2,174.45	-8,479.07	19,013.29	18,950.57	62.73	303.117	
17,600.00	6,983.72	1,395.00	1,378.32	162.57	13.07	10.37	2,174.45	-8,479.07	19,108.80	19,045.97	62.82	304.159	
17,700.00	6,983.65	1,395.00	1,378.32	164.11	13.07	10.37	2,174.45	-8,479.07	19,204.35	19,141.43	62.92	305.200	
17,800.00	6,983.59	1,395.00	1,378.32	165.65	13.07	10.37	2,174.45	-8,479.07	19,299.95	19,236.92	63.02	306.239	
17,900.00	6,983.52	1,395.00	1,378.32	167.18	13.07	10.37	2,174.45	-8,479.07	19,395.59	19,332.47	63.12	307.276	
18,000.00	6,983.45	1,395.00	1,378.32	168.72	13.07	10.37	2,174.45	-8,479.07	19,491.27	19,428.05	63.22	308.311	
18,100.00	6,983.39	1,395.00	1,378.32	170.27	13.07	10.37	2,174.45	-8,479.07	19,587.00	19,523.68	63.32	309.344	
18,200.00	6,983.32	1,395.00	1,378.32	171.81	13.07	10.37	2,174.45	-8,479.07	19,682.77	19,619.35	63.42	310.375	
18,300.00	6,983.25	1,395.00	1,378.32	173.35	13.07	10.37	2,174.45	-8,479.07	19,778.58	19,715.07	63.51	311.404	
18,400.00	6,983.19	1,395.00	1,378.32	174.90	13.07	10.37	2,174.45	-8,479.07	19,874.44	19,810.82	63.61	312.431	
18,500.00	6,983.12	1,395.00	1,378.32	176.44	13.07	10.37	2,174.45	-8,479.07	19,970.33	19,906.62	63.71	313.455	
18,600.00	6,983.05	1,395.00	1,378.32	177.99	13.07	10.37	2,174.45	-8,479.07	20,066.27	20,002.46	63.81	314.478	
18,700.00	6,982.99	1,395.00	1,378.32	179.54	13.07	10.37	2,174.45	-8,479.07	20,162.24	20,098.33	63.91	315.499	
18,800.00	6,982.92	1,395.00	1,378.32	181.09	13.07	10.37	2,174.45	-8,479.07	20,258.25	20,194.25	64.00	316.517	
18,900.00	6,982.85	1,395.00	1,378.32	182.64	13.07	10.37	2,174.45	-8,479.07	20,354.30	20,290.20	64.10	317.534	
19,000.00	6,982.78	1,395.00	1,378.32	184.19	13.07	10.37	2,174.45	-8,479.07	20,450.39	20,386.19	64.20	318.548	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 563-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	1,395.00	1,378.32	185.74	13.07	10.37	2,174.45	-8,479.07	20,546.52	20,482.22	64.30	319.560	
19,200.00	6,982.65	1,395.00	1,378.32	187.29	13.07	10.37	2,174.45	-8,479.07	20,642.68	20,578.29	64.39	320.571	
19,300.00	6,982.58	1,395.00	1,378.32	188.84	13.07	10.37	2,174.45	-8,479.07	20,738.88	20,674.39	64.49	321.578	
19,400.00	6,982.52	1,352.02	1,337.69	190.40	12.88	10.22	2,182.68	-8,467.71	20,834.68	20,770.14	64.54	322.833	
19,500.00	6,982.45	1,349.44	1,335.25	191.95	12.87	10.21	2,183.16	-8,467.05	20,930.90	20,866.27	64.63	323.847	
19,600.00	6,982.38	1,346.89	1,332.83	193.51	12.86	10.20	2,183.64	-8,466.40	21,027.15	20,962.42	64.73	324.858	
19,700.00	6,982.32	1,305.00	1,292.95	195.07	12.68	10.05	2,191.30	-8,456.12	21,123.79	21,059.02	64.78	326.096	
19,800.00	6,982.25	1,305.00	1,292.95	196.62	12.68	10.05	2,191.30	-8,456.12	21,220.06	21,155.18	64.88	327.083	
19,900.00	6,982.18	1,305.00	1,292.95	198.18	12.68	10.05	2,191.30	-8,456.12	21,316.36	21,251.39	64.98	328.069	
20,000.00	6,982.12	1,305.00	1,292.95	199.74	12.68	10.05	2,191.30	-8,456.12	21,412.70	21,347.62	65.07	329.052	
20,100.00	6,982.05	1,305.00	1,292.95	201.30	12.68	10.05	2,191.30	-8,456.12	21,509.07	21,443.89	65.17	330.032	
20,176.02	6,982.00	1,305.00	1,292.95	202.36	12.68	10.05	2,191.30	-8,456.12	21,582.34	21,514.64	67.70	318.776	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 386-APC_ISCWSA REV 2 MWD												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Offset												Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-71.79	2,627.92	-7,988.71	8,409.86				
100.00	100.00	1,690.00	1,571.11	0.25	9.49	-75.03	2,135.87	-7,987.59	8,401.43	8,391.81	9.62	873.611	
200.00	200.00	1,722.00	1,597.57	0.61	9.78	-75.15	2,117.86	-7,987.62	8,384.16	8,374.01	10.15	826.317	
300.00	300.00	1,811.44	1,671.95	0.97	10.58	-75.48	2,068.20	-7,987.65	8,367.48	8,356.23	11.25	744.058	
400.00	400.00	1,868.65	1,719.43	1.33	11.15	-75.70	2,036.28	-7,987.59	8,351.02	8,338.87	12.14	687.674	
500.00	500.00	1,897.40	1,743.46	1.68	11.41	-75.80	2,020.51	-7,987.71	8,335.45	8,322.70	12.75	653.874	
600.00	600.00	1,945.00	1,783.49	2.04	11.83	-75.98	1,994.74	-7,988.05	8,320.69	8,307.17	13.52	615.404	
700.00	699.98	1,997.90	1,827.81	2.40	12.35	-66.45	1,965.87	-7,988.61	8,305.79	8,291.39	14.40	576.914	
800.00	799.84	2,166.00	1,968.29	2.76	13.97	-67.43	1,873.59	-7,990.80	8,290.25	8,273.90	16.35	507.145	
900.00	899.45	2,198.00	1,994.84	3.13	14.29	-67.90	1,855.73	-7,991.19	8,273.09	8,256.06	17.04	485.602	
1,000.00	998.70	2,198.00	1,994.84	3.49	14.29	-68.22	1,855.73	-7,991.19	8,255.60	8,238.18	17.42	473.974	
1,100.00	1,097.47	2,366.78	2,134.84	3.86	15.91	-69.37	1,761.52	-7,993.60	8,236.91	8,217.52	19.39	424.767	
1,200.00	1,195.62	2,484.00	2,233.63	4.24	16.99	-70.30	1,698.43	-7,993.54	8,217.01	8,196.16	20.85	394.062	
1,300.00	1,293.06	2,611.84	2,341.40	4.64	18.21	-71.34	1,629.66	-7,993.10	8,196.49	8,174.04	22.46	365.010	
1,400.00	1,389.64	2,643.00	2,367.74	5.06	18.50	-71.91	1,613.02	-7,992.85	8,175.16	8,151.99	23.17	352.767	
1,500.00	1,485.27	2,916.00	2,596.67	5.50	21.16	-73.83	1,464.38	-7,989.53	8,153.59	8,127.37	26.22	311.001	
1,515.00	1,499.52	2,916.00	2,596.67	5.57	21.16	-73.89	1,464.38	-7,989.53	8,150.08	8,123.79	26.29	310.010	
1,600.00	1,580.22	2,931.00	2,609.07	5.96	21.31	-73.98	1,455.95	-7,989.24	8,130.62	8,103.78	26.85	302.870	
1,700.00	1,675.17	2,948.70	2,623.74	6.44	21.48	-74.08	1,446.06	-7,988.96	8,108.69	8,081.19	27.50	294.867	
1,800.00	1,770.11	3,077.23	2,733.45	6.92	22.60	-74.77	1,379.26	-7,985.45	8,087.21	8,058.13	29.09	278.029	
1,900.00	1,865.05	3,109.93	2,761.97	7.41	22.87	-74.95	1,363.31	-7,984.26	8,066.35	8,036.48	29.86	270.117	
2,000.00	1,959.99	3,122.00	2,772.57	7.90	22.97	-75.01	1,357.55	-7,983.85	8,046.50	8,016.02	30.48	264.007	
2,100.00	2,054.94	3,153.00	2,799.98	8.40	23.21	-75.17	1,343.11	-7,982.94	8,027.63	7,996.39	31.24	256.975	
2,200.00	2,149.88	3,184.00	2,827.59	8.90	23.45	-75.33	1,329.04	-7,982.20	8,009.78	7,977.79	32.00	250.314	
2,300.00	2,244.82	3,216.00	2,856.26	9.41	23.70	-75.49	1,314.84	-7,981.49	7,992.83	7,960.06	32.77	243.938	
2,400.00	2,339.76	3,247.00	2,884.26	9.92	23.92	-75.64	1,301.54	-7,980.92	7,976.83	7,943.31	33.52	237.962	
2,500.00	2,434.71	3,247.00	2,884.26	10.43	23.92	-75.64	1,301.54	-7,980.92	7,961.90	7,927.84	34.06	233.792	
2,600.00	2,529.65	3,279.00	2,913.47	10.94	24.15	-75.79	1,288.49	-7,980.72	7,948.08	7,913.27	34.81	228.324	
2,700.00	2,624.59	3,279.00	2,913.47	11.45	24.15	-75.79	1,288.49	-7,980.72	7,935.32	7,899.97	35.34	224.515	
2,800.00	2,719.53	3,468.00	3,090.72	11.97	25.30	-76.64	1,223.17	-7,978.53	7,922.47	7,885.46	37.01	214.048	
2,900.00	2,814.48	3,482.65	3,104.70	12.49	25.38	-76.70	1,218.81	-7,978.25	7,910.22	7,872.59	37.63	210.231	
3,000.00	2,909.42	3,500.00	3,121.31	13.01	25.47	-76.77	1,213.81	-7,978.14	7,899.14	7,860.88	38.25	206.498	
3,100.00	3,004.36	3,511.11	3,131.98	13.53	25.52	-76.82	1,210.71	-7,978.16	7,889.14	7,850.30	38.84	203.110	
3,200.00	3,099.30	3,646.41	3,263.12	14.05	26.14	-77.34	1,177.46	-7,978.15	7,880.01	7,840.02	39.99	197.067	
3,300.00	3,194.25	3,688.00	3,303.67	14.57	26.31	-77.49	1,168.22	-7,977.99	7,870.81	7,830.12	40.69	193.422	
3,400.00	3,289.19	3,719.00	3,334.05	15.09	26.43	-77.61	1,162.06	-7,978.08	7,862.53	7,821.19	41.34	190.186	
3,500.00	3,384.13	3,875.00	3,487.89	15.62	26.93	-78.13	1,136.27	-7,977.77	7,854.53	7,812.15	42.37	185.372	
3,600.00	3,479.07	3,907.00	3,519.62	16.14	27.02	-78.23	1,132.12	-7,977.61	7,846.57	7,803.58	42.99	182.520	
3,700.00	3,574.02	3,926.29	3,538.79	16.67	27.06	-78.29	1,129.96	-7,977.66	7,839.58	7,796.02	43.57	179.945	
3,800.00	3,668.96	3,938.00	3,550.44	17.19	27.09	-78.32	1,128.78	-7,977.76	7,833.63	7,789.51	44.12	177.542	
3,900.00	3,763.90	3,974.44	3,586.74	17.72	27.15	-78.43	1,125.74	-7,978.39	7,828.64	7,783.92	44.72	175.066	
4,000.00	3,858.84	4,060.98	3,673.15	18.24	27.27	-78.65	1,121.45	-7,980.33	7,824.28	7,778.91	45.37	172.470	
4,100.00	3,953.79	4,156.24	3,768.31	18.77	27.39	-78.89	1,117.67	-7,982.45	7,820.09	7,774.07	46.02	169.935	
4,200.00	4,048.73	4,251.92	3,863.89	19.30	27.52	-79.14	1,113.91	-7,984.56	7,816.03	7,769.36	46.67	167.466	
4,300.00	4,143.67	4,347.63	3,959.51	19.82	27.64	-79.38	1,110.19	-7,986.64	7,812.11	7,764.78	47.33	165.069	
4,400.00	4,238.61	4,443.38	4,055.16	20.35	27.76	-79.62	1,106.52	-7,988.71	7,808.31	7,760.32	47.98	162.739	
4,500.00	4,333.56	4,539.15	4,150.84	20.88	27.89	-79.86	1,102.89	-7,990.74	7,804.63	7,756.00	48.63	160.475	
4,600.00	4,428.50	4,634.95	4,246.56	21.41	28.01	-80.11	1,099.30	-7,992.76	7,801.09	7,751.80	49.29	158.273	
4,700.00	4,523.44	4,730.78	4,342.31	21.93	28.13	-80.35	1,095.76	-7,994.74	7,797.68	7,747.73	49.94	156.132	
4,800.00	4,618.38	4,826.65	4,438.08	22.46	28.26	-80.59	1,092.25	-7,996.71	7,794.39	7,743.79	50.60	154.049	
4,900.00	4,713.33	4,922.54	4,533.90	22.99	28.38	-80.83	1,088.79	-7,998.65	7,791.23	7,739.98	51.25	152.021	
5,000.00	4,808.27	5,018.47	4,629.74	23.52	28.51	-81.08	1,085.38	-8,000.57	7,788.20	7,736.29	51.90	150.047	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164C - OH - OH-SVY												Offset Site Error: 0.00 usft
Survey Program: 386-APC_ISCWSA REV 2 MWD												Offset Well Error: 0.00 usft
Reference												
Offset												
Semi Major Axis												
Highside												
Offset Wellbore Centre												
Distance												
Between Centres												
Between Ellipses												
Minimum Separation												
Separation Factor												
Warning												
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor
5,100.00	4,903.21	5,114.42	4,725.62	24.05	28.63	-81.32	1,082.00	-8,002.46	7,785.29	7,732.73	52.56	148.125
5,200.00	4,998.16	5,210.40	4,821.52	24.58	28.75	-81.56	1,078.67	-8,004.33	7,782.51	7,729.30	53.21	146.253
5,300.00	5,093.10	5,306.42	4,917.46	25.11	28.88	-81.80	1,075.38	-8,006.18	7,779.85	7,725.99	53.87	144.428
5,400.00	5,188.04	5,402.46	5,013.44	25.64	29.00	-82.05	1,072.13	-8,008.00	7,777.32	7,722.80	54.52	142.650
5,500.00	5,282.98	5,498.54	5,109.44	26.17	29.13	-82.29	1,068.93	-8,009.80	7,774.92	7,719.74	55.17	140.918
5,600.00	5,377.93	5,594.64	5,205.48	26.70	29.25	-82.53	1,065.77	-8,011.57	7,772.64	7,716.81	55.83	139.228
5,623.25	5,400.00	5,616.99	5,227.81	26.82	29.28	-82.59	1,065.04	-8,011.98	7,772.13	7,716.15	55.98	138.842
5,700.00	5,473.03	5,690.95	5,301.72	27.22	29.37	-82.75	1,062.65	-8,013.32	7,770.55	7,714.07	56.48	137.592
5,800.00	5,568.64	5,787.86	5,398.57	27.73	29.50	-82.97	1,059.55	-8,015.06	7,768.78	7,711.67	57.11	136.030
5,900.00	5,664.75	5,885.36	5,496.00	28.23	29.63	-83.17	1,056.48	-8,016.78	7,767.33	7,709.59	57.73	134.541
6,000.00	5,761.33	5,983.40	5,593.98	28.71	29.75	-83.36	1,053.44	-8,018.49	7,766.16	7,707.82	58.34	133.120
6,100.00	5,858.34	6,081.97	5,692.48	29.18	29.88	-83.55	1,050.42	-8,020.18	7,765.28	7,706.34	58.93	131.766
6,200.00	5,955.76	6,181.02	5,791.48	29.64	30.01	-83.73	1,047.44	-8,021.85	7,764.64	7,705.13	59.51	130.474
6,300.00	6,053.57	6,280.53	5,890.93	30.07	30.14	-83.90	1,044.50	-8,023.51	7,764.25	7,704.17	60.07	129.243
6,400.00	6,151.72	6,380.47	5,990.81	30.50	30.27	-84.06	1,041.58	-8,025.14	7,764.08	7,703.45	60.62	128.069
6,432.13	6,183.32	6,412.66	6,022.99	30.63	30.31	-84.11	1,040.66	-8,025.66	7,764.07	7,703.27	60.80	127.707 CC
6,500.00	6,250.19	6,480.79	6,091.08	30.91	30.40	-84.21	1,038.71	-8,026.75	7,764.11	7,702.95	61.16	126.950
6,600.00	6,348.94	6,581.48	6,191.71	31.30	30.53	-84.34	1,035.87	-8,028.35	7,764.34	7,702.66	61.68	125.883
6,659.67	6,408.00	6,641.71	6,251.92	31.53	30.60	-84.42	1,034.19	-8,029.29	7,764.56	7,702.58	61.98	125.270 ES
6,700.00	6,447.82	6,682.29	6,292.48	31.68	30.66	-100.89	1,033.07	-8,029.91	7,765.71	7,703.52	62.19	124.866
6,750.00	6,496.66	6,731.97	6,342.13	31.90	30.72	-112.01	1,031.72	-8,030.68	7,769.84	7,707.37	62.47	124.380
6,800.00	6,544.65	6,780.66	6,390.80	32.13	30.78	-118.04	1,030.40	-8,031.42	7,776.94	7,714.18	62.76	123.913
6,850.00	6,591.49	6,828.07	6,438.19	32.37	30.84	-121.51	1,029.12	-8,032.13	7,786.99	7,723.92	63.07	123.472
6,900.00	6,636.89	6,873.91	6,484.00	32.62	30.90	-123.51	1,027.90	-8,032.82	7,799.94	7,736.56	63.38	123.058
6,950.00	6,680.57	6,917.89	6,527.97	32.89	30.96	-124.54	1,026.73	-8,033.47	7,815.73	7,752.02	63.71	122.675
7,000.00	6,722.26	6,959.76	6,569.81	33.17	31.02	-124.87	1,025.64	-8,034.09	7,834.27	7,770.22	64.04	122.326
7,050.00	6,761.71	6,999.24	6,609.28	33.45	31.07	-124.63	1,024.61	-8,034.66	7,855.46	7,791.08	64.38	122.012
7,100.00	6,798.67	7,036.10	6,646.12	33.75	31.11	-123.89	1,023.65	-8,035.20	7,879.20	7,814.47	64.72	121.736
7,150.00	6,832.91	7,070.11	6,680.12	34.06	31.16	-122.69	1,022.78	-8,035.69	7,905.34	7,840.28	65.07	121.497
7,200.00	6,864.22	7,101.06	6,711.06	34.37	31.20	-121.03	1,021.99	-8,036.13	7,933.75	7,868.34	65.41	121.297
7,250.00	6,892.42	7,128.76	6,738.75	34.69	31.23	-118.90	1,021.28	-8,036.53	7,964.26	7,898.51	65.75	121.136
7,300.00	6,917.32	7,153.04	6,763.01	35.03	31.27	-116.28	1,020.67	-8,036.87	7,996.69	7,930.61	66.08	121.014
7,350.00	6,938.77	7,173.75	6,783.71	35.37	31.29	-113.15	1,020.15	-8,037.17	8,030.86	7,964.45	66.41	120.930
7,400.00	6,956.64	7,190.74	6,800.70	35.72	31.31	-109.47	1,019.72	-8,037.41	8,066.55	7,999.82	66.73	120.884
7,450.00	6,970.83	7,203.93	6,813.88	36.07	31.33	-105.24	1,019.39	-8,037.59	8,103.55	8,036.51	67.04	120.873 SF
7,500.00	6,981.23	7,213.22	6,823.17	36.44	31.34	-100.46	1,019.16	-8,037.72	8,141.65	8,074.30	67.34	120.896
7,550.00	6,987.80	7,218.56	6,828.50	36.81	31.35	-95.18	1,019.03	-8,037.80	8,180.59	8,112.95	67.63	120.952
7,600.00	6,990.48	7,219.90	6,829.85	37.19	31.35	-89.48	1,018.99	-8,037.81	8,220.14	8,152.23	67.91	121.038
7,609.87	6,990.55	7,219.69	6,829.64	37.26	31.35	-88.31	1,019.00	-8,037.81	8,227.99	8,160.03	67.97	121.058
7,700.00	6,990.49	7,217.08	6,827.03	37.97	31.35	-88.28	1,019.07	-8,037.77	8,299.99	8,231.54	68.45	121.252
7,800.00	6,990.42	7,214.18	6,824.12	38.78	31.34	-88.25	1,019.14	-8,037.73	8,380.27	8,311.29	68.99	121.475
7,900.00	6,990.35	7,211.27	6,821.22	39.64	31.34	-88.21	1,019.21	-8,037.69	8,460.98	8,391.46	69.52	121.705
8,000.00	6,990.28	7,208.36	6,818.31	40.53	31.34	-88.18	1,019.28	-8,037.65	8,542.09	8,472.04	70.05	121.944
8,100.00	6,990.21	7,205.45	6,815.40	41.45	31.33	-88.15	1,019.36	-8,037.61	8,623.60	8,553.02	70.57	122.193
8,200.00	6,990.14	7,202.54	6,812.49	42.40	31.33	-88.11	1,019.43	-8,037.57	8,705.49	8,634.40	71.09	122.451
8,306.37	6,990.06	7,199.43	6,809.38	43.45	31.33	-88.08	1,019.51	-8,037.53	8,793.01	8,721.36	71.64	122.737
8,400.00	6,990.00	7,196.72	6,806.67	44.38	31.32	-87.83	1,019.57	-8,037.49	8,872.04	8,799.95	72.10	123.057
8,500.00	6,989.93	7,193.89	6,803.84	45.36	31.32	-87.48	1,019.64	-8,037.45	8,960.14	8,887.61	72.53	123.539
8,600.00	6,989.85	7,191.14	6,801.09	46.33	31.31	-87.00	1,019.71	-8,037.41	9,051.51	8,978.61	72.90	124.164
8,700.00	6,989.78	7,188.47	6,798.43	47.28	31.31	-86.29	1,019.78	-8,037.37	9,145.63	9,072.42	73.21	124.927
8,800.00	6,989.70	7,185.92	6,795.87	48.21	31.31	-85.16	1,019.84	-8,037.34	9,241.96	9,168.50	73.45	125.822
8,900.00	6,989.63	7,183.48	6,793.44	49.11	31.30	-83.04	1,019.91	-8,037.30	9,339.96	9,266.33	73.63	126.842

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		386-APC_ISCWSA REV 2 MWD					Rule Assigned:						Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,000.00	6,989.55	7,181.17	6,791.13	49.99	31.30	-77.74	1,019.96	-8,037.27	9,439.12	9,365.37	73.75	127.982		
9,100.00	6,989.48	7,179.00	6,788.96	50.84	31.30	-46.25	1,020.02	-8,037.24	9,538.93	9,465.12	73.81	129.235		
9,200.00	6,989.40	7,176.99	6,786.95	51.66	31.30	68.03	1,020.07	-8,037.21	9,638.88	9,565.07	73.81	130.594		
9,300.00	6,989.33	7,175.13	6,785.10	52.45	31.29	80.48	1,020.11	-8,037.19	9,738.49	9,664.74	73.75	132.053		
9,393.87	6,989.27	7,173.55	6,783.52	53.15	31.29	83.79	1,020.15	-8,037.16	9,831.26	9,757.62	73.64	133.505		
9,400.00	6,989.26	7,173.45	6,783.42	53.20	31.29	83.79	1,020.16	-8,037.16	9,837.30	9,763.67	73.63	133.603		
9,500.00	6,989.19	7,171.85	6,781.82	53.95	31.29	83.74	1,020.20	-8,037.14	9,935.64	9,862.15	73.50	135.188		
9,600.00	6,989.12	7,170.25	6,780.21	54.73	31.29	83.69	1,020.24	-8,037.12	10,034.02	9,960.66	73.36	136.771		
9,700.00	6,989.05	7,168.64	6,778.61	55.55	31.29	83.64	1,020.28	-8,037.09	10,132.43	10,059.20	73.24	138.354		
9,800.00	6,988.98	7,167.04	6,777.00	56.40	31.28	83.59	1,020.32	-8,037.07	10,230.88	10,157.76	73.11	139.935		
9,900.00	6,988.91	7,165.43	6,775.40	57.28	31.28	83.54	1,020.36	-8,037.05	10,329.35	10,256.36	72.99	141.514		
10,000.00	6,988.84	7,163.83	6,773.79	58.20	31.28	83.48	1,020.40	-8,037.03	10,427.85	10,354.97	72.87	143.092		
10,100.00	6,988.77	7,162.22	6,772.19	59.14	31.28	83.43	1,020.44	-8,037.00	10,526.38	10,453.61	72.76	144.669		
10,200.00	6,988.70	7,160.61	6,770.58	60.11	31.28	83.38	1,020.48	-8,036.98	10,624.93	10,552.28	72.65	146.244		
10,300.00	6,988.63	7,159.00	6,768.97	61.11	31.27	83.33	1,020.52	-8,036.96	10,723.51	10,650.97	72.55	147.817		
10,400.00	6,988.56	7,157.39	6,767.36	62.14	31.27	83.28	1,020.56	-8,036.94	10,822.12	10,749.68	72.44	149.388		
10,500.00	6,988.49	7,155.78	6,765.75	63.19	31.27	83.23	1,020.60	-8,036.91	10,920.75	10,848.41	72.34	150.958		
10,600.00	6,988.42	7,154.16	6,764.13	64.26	31.27	83.18	1,020.64	-8,036.89	11,019.41	10,947.16	72.25	152.525		
10,700.00	6,988.35	7,152.55	6,762.52	65.36	31.26	83.13	1,020.68	-8,036.87	11,118.09	11,045.94	72.15	154.091		
10,800.00	6,988.28	7,150.94	6,760.91	66.48	31.26	83.07	1,020.72	-8,036.84	11,216.80	11,144.73	72.06	155.654		
10,900.00	6,988.21	7,149.32	6,759.29	67.61	31.26	83.02	1,020.76	-8,036.82	11,315.52	11,243.55	71.97	157.215		
11,000.00	6,988.14	7,147.70	6,757.68	68.77	31.26	82.97	1,020.81	-8,036.80	11,414.27	11,342.38	71.89	158.774		
11,100.00	6,988.07	7,146.09	6,756.06	69.95	31.26	82.92	1,020.85	-8,036.78	11,513.04	11,441.23	71.81	160.331		
11,200.00	6,988.01	7,144.47	6,754.44	71.14	31.25	82.87	1,020.89	-8,036.75	11,611.83	11,540.10	71.73	161.885		
11,300.00	6,987.94	7,142.85	6,752.82	72.35	31.25	82.82	1,020.93	-8,036.73	11,710.64	11,638.99	71.65	163.437		
11,400.00	6,987.87	7,141.23	6,751.21	73.57	31.25	82.77	1,020.97	-8,036.71	11,809.47	11,737.89	71.58	164.986		
11,500.00	6,987.80	7,139.61	6,749.58	74.81	31.25	82.71	1,021.01	-8,036.68	11,908.32	11,836.82	71.51	166.533		
11,600.00	6,987.73	7,137.98	6,747.96	76.07	31.25	82.66	1,021.05	-8,036.66	12,007.19	11,935.75	71.44	168.077		
11,643.87	6,987.70	7,137.27	6,747.25	76.62	31.25	82.64	1,021.07	-8,036.65	12,050.57	11,979.16	71.41	168.754		
11,700.00	6,987.66	7,136.38	6,746.36	77.33	31.24	83.47	1,021.09	-8,036.64	12,106.00	12,034.63	71.37	169.626		
11,737.27	6,987.63	7,135.80	6,745.78	77.80	31.24	83.92	1,021.11	-8,036.63	12,142.70	12,071.36	71.34	170.212		
11,800.00	6,987.59	7,134.84	6,744.81	78.59	31.24	83.90	1,021.13	-8,036.62	12,204.42	12,133.13	71.29	171.201		
11,900.00	6,987.52	7,133.30	6,743.28	79.86	31.24	83.86	1,021.17	-8,036.59	12,302.82	12,231.61	71.21	172.775		
12,000.00	6,987.46	7,131.76	6,741.74	81.14	31.24	83.82	1,021.21	-8,036.57	12,401.25	12,330.12	71.13	174.347		
12,100.00	6,987.39	7,130.22	6,740.21	82.43	31.24	83.78	1,021.25	-8,036.55	12,499.71	12,428.65	71.06	175.915		
12,200.00	6,987.32	7,128.69	6,738.67	83.73	31.23	83.74	1,021.29	-8,036.53	12,598.19	12,527.20	70.98	177.480		
12,300.00	6,987.26	7,127.15	6,737.13	85.05	31.23	83.70	1,021.33	-8,036.51	12,696.69	12,625.77	70.91	179.041		
12,400.00	6,987.19	7,125.61	6,735.59	86.38	31.23	83.65	1,021.36	-8,036.48	12,795.21	12,724.36	70.85	180.600		
12,500.00	6,987.12	7,124.07	6,734.05	87.71	31.23	83.61	1,021.40	-8,036.46	12,893.76	12,822.98	70.78	182.155		
12,600.00	6,987.06	7,122.52	6,732.51	89.06	31.23	83.57	1,021.44	-8,036.44	12,992.33	12,921.61	70.72	183.707		
12,700.00	6,986.99	7,120.98	6,730.97	90.41	31.22	83.53	1,021.48	-8,036.42	13,090.92	13,020.26	70.66	185.255		
12,800.00	6,986.92	7,119.44	6,729.42	91.77	31.22	83.49	1,021.52	-8,036.40	13,189.54	13,118.93	70.61	186.800		
12,900.00	6,986.86	7,117.89	6,727.88	93.14	31.22	83.45	1,021.56	-8,036.37	13,288.17	13,217.62	70.55	188.342		
13,000.00	6,986.79	7,116.35	6,726.34	94.52	31.22	83.41	1,021.60	-8,036.35	13,386.82	13,316.32	70.50	189.880		
13,100.00	6,986.72	7,114.80	6,724.79	95.90	31.22	83.37	1,021.64	-8,036.33	13,485.50	13,415.04	70.45	191.414		
13,200.00	6,986.66	7,113.25	6,723.24	97.30	31.21	83.33	1,021.68	-8,036.31	13,584.19	13,513.78	70.40	192.944		
13,300.00	6,986.59	7,111.71	6,721.70	98.69	31.21	83.29	1,021.72	-8,036.29	13,682.90	13,612.54	70.36	194.471		
13,400.00	6,986.52	7,110.16	6,720.15	100.10	31.21	83.25	1,021.76	-8,036.26	13,781.63	13,711.31	70.32	195.993		
13,500.00	6,986.46	7,108.61	6,718.60	101.51	31.21	83.21	1,021.80	-8,036.24	13,880.38	13,810.10	70.28	197.512		
13,600.00	6,986.39	7,107.06	6,717.05	102.93	31.21	83.17	1,021.84	-8,036.22	13,979.14	13,908.90	70.24	199.027		
13,700.00	6,986.32	7,105.51	6,715.50	104.35	31.20	83.13	1,021.88	-8,036.20	14,077.92	14,007.72	70.20	200.538		
13,800.00	6,986.25	7,103.95	6,713.95	105.78	31.20	83.09	1,021.91	-8,036.18	14,176.72	14,106.56	70.17	202.045		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 386-APC_ISCWSA REV 2 MWD												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				(usft)	(usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
13,900.00	6,986.19	7,102.40	6,712.39	107.21	31.20	83.05	1,021.95	-8,036.15	14,275.54	14,205.40	70.13	203.548	
14,000.00	6,986.12	7,100.85	6,710.84	108.65	31.20	83.01	1,021.99	-8,036.13	14,374.37	14,304.27	70.10	205.047	
14,100.00	6,986.05	7,099.29	6,709.29	110.09	31.20	82.97	1,022.03	-8,036.11	14,473.22	14,403.14	70.07	206.542	
14,200.00	6,985.99	7,097.74	6,707.73	111.54	31.19	82.93	1,022.07	-8,036.09	14,572.08	14,502.03	70.05	208.033	
14,300.00	6,985.92	7,096.18	6,706.18	112.99	31.19	82.89	1,022.11	-8,036.06	14,670.96	14,600.94	70.02	209.519	
14,400.00	6,985.85	7,094.62	6,704.62	114.45	31.19	82.84	1,022.15	-8,036.04	14,769.85	14,699.86	70.00	211.001	
14,500.00	6,985.79	7,093.07	6,703.06	115.91	31.19	82.80	1,022.19	-8,036.02	14,868.76	14,798.78	69.98	212.479	
14,600.00	6,985.72	7,091.51	6,701.50	117.38	31.19	82.76	1,022.23	-8,036.00	14,967.69	14,897.73	69.96	213.952	
14,700.00	6,985.65	7,089.95	6,699.94	118.84	31.18	82.72	1,022.27	-8,035.98	15,066.62	14,996.68	69.94	215.421	
14,800.00	6,985.59	7,088.39	6,698.38	120.32	31.18	82.68	1,022.31	-8,035.95	15,165.57	15,095.65	69.92	216.886	
14,900.00	6,985.52	7,086.82	6,696.82	121.79	31.18	82.64	1,022.35	-8,035.93	15,264.54	15,194.63	69.91	218.346	
15,000.00	6,985.45	7,085.26	6,695.26	123.27	31.18	82.60	1,022.39	-8,035.91	15,363.51	15,293.62	69.90	219.802	
15,100.00	6,985.39	7,083.70	6,693.70	124.75	31.18	82.56	1,022.43	-8,035.89	15,462.50	15,392.62	69.89	221.253	
15,200.00	6,985.32	7,082.13	6,692.14	126.24	31.17	82.52	1,022.47	-8,035.86	15,561.51	15,491.63	69.88	222.700	
15,300.00	6,985.25	7,080.57	6,690.57	127.72	31.17	82.48	1,022.51	-8,035.84	15,660.52	15,590.65	69.87	224.142	
15,400.00	6,985.19	7,079.00	6,689.01	129.21	31.17	82.44	1,022.55	-8,035.82	15,759.55	15,689.69	69.86	225.579	
15,500.00	6,985.12	7,077.44	6,687.44	130.71	31.17	82.40	1,022.59	-8,035.80	15,858.59	15,788.73	69.86	227.012	
15,600.00	6,985.05	7,075.87	6,685.87	132.20	31.17	82.36	1,022.63	-8,035.77	15,957.64	15,887.79	69.85	228.440	
15,700.00	6,984.99	7,074.30	6,684.30	133.70	31.16	82.31	1,022.67	-8,035.75	16,056.71	15,986.85	69.85	229.863	
15,800.00	6,984.92	7,072.73	6,682.74	135.20	31.16	82.27	1,022.71	-8,035.73	16,155.78	16,085.93	69.85	231.282	
15,900.00	6,984.85	7,071.16	6,681.17	136.71	31.16	82.23	1,022.75	-8,035.71	16,254.87	16,185.01	69.85	232.696	
16,000.00	6,984.79	7,069.59	6,679.59	138.21	31.16	82.19	1,022.79	-8,035.68	16,353.96	16,284.11	69.86	234.105	
16,100.00	6,984.72	7,068.02	6,678.02	139.72	31.16	82.15	1,022.83	-8,035.66	16,453.07	16,383.21	69.86	235.510	
16,200.00	6,984.65	7,066.44	6,676.45	141.23	31.15	82.11	1,022.87	-8,035.64	16,552.19	16,482.32	69.87	236.910	
16,300.00	6,984.59	7,064.87	6,674.88	142.75	31.15	82.07	1,022.91	-8,035.62	16,651.32	16,581.45	69.87	238.304	
16,400.00	6,984.52	7,063.29	6,673.30	144.26	31.15	82.03	1,022.95	-8,035.59	16,750.46	16,680.58	69.88	239.694	
16,500.00	6,984.45	7,061.72	6,671.73	145.78	31.15	81.99	1,022.99	-8,035.57	16,849.61	16,779.72	69.89	241.079	
16,600.00	6,984.39	7,060.14	6,670.15	147.29	31.15	81.95	1,023.04	-8,035.55	16,948.77	16,878.86	69.90	242.460	
16,700.00	6,984.32	7,058.56	6,668.58	148.82	31.14	81.91	1,023.08	-8,035.52	17,047.94	16,978.02	69.92	243.835	
16,800.00	6,984.25	7,056.99	6,667.00	150.34	31.14	81.86	1,023.12	-8,035.50	17,147.11	17,077.18	69.93	245.205	
16,900.00	6,984.19	7,055.41	6,665.42	151.86	31.14	81.82	1,023.16	-8,035.48	17,246.30	17,176.36	69.94	246.571	
17,000.00	6,984.12	7,053.83	6,663.84	153.39	31.14	81.78	1,023.20	-8,035.46	17,345.50	17,275.54	69.96	247.931	
17,100.00	6,984.05	7,052.25	6,662.26	154.91	31.13	81.74	1,023.24	-8,035.43	17,444.70	17,374.72	69.98	249.287	
17,200.00	6,983.99	7,050.66	6,660.68	156.44	31.13	81.70	1,023.28	-8,035.41	17,543.92	17,473.92	70.00	250.637	
17,300.00	6,983.92	7,049.08	6,659.10	157.97	31.13	81.66	1,023.32	-8,035.39	17,643.14	17,573.12	70.02	251.983	
17,400.00	6,983.85	7,047.50	6,657.51	159.50	31.13	81.62	1,023.36	-8,035.36	17,742.37	17,672.33	70.04	253.323	
17,500.00	6,983.79	7,045.91	6,655.93	161.04	31.13	81.58	1,023.40	-8,035.34	17,841.61	17,771.55	70.06	254.659	
17,600.00	6,983.72	7,044.33	6,654.35	162.57	31.12	81.53	1,023.44	-8,035.32	17,940.86	17,870.78	70.08	255.989	
17,700.00	6,983.65	7,042.74	6,652.76	164.11	31.12	81.49	1,023.48	-8,035.30	18,040.12	17,970.01	70.11	257.315	
17,800.00	6,983.59	7,041.15	6,651.17	165.65	31.12	81.45	1,023.52	-8,035.27	18,139.38	18,069.25	70.14	258.635	
17,900.00	6,983.52	7,039.57	6,649.59	167.18	31.12	81.41	1,023.56	-8,035.25	18,238.66	18,168.49	70.16	259.950	
18,000.00	6,983.45	7,037.98	6,648.00	168.72	31.12	81.37	1,023.61	-8,035.23	18,337.94	18,267.75	70.19	261.260	
18,100.00	6,983.39	7,036.39	6,646.41	170.27	31.11	81.33	1,023.65	-8,035.20	18,437.23	18,367.01	70.22	262.566	
18,200.00	6,983.32	7,034.80	6,644.82	171.81	31.11	81.29	1,023.69	-8,035.18	18,536.52	18,466.27	70.25	263.866	
18,300.00	6,983.25	7,033.20	6,643.23	173.35	31.11	81.25	1,023.73	-8,035.16	18,635.82	18,565.54	70.28	265.161	
18,400.00	6,983.19	7,031.61	6,641.64	174.90	31.11	81.20	1,023.77	-8,035.14	18,735.13	18,664.82	70.31	266.450	
18,500.00	6,983.12	7,030.02	6,640.04	176.44	31.11	81.16	1,023.81	-8,035.11	18,834.45	18,764.10	70.35	267.735	
18,600.00	6,983.05	7,028.42	6,638.45	177.99	31.10	81.12	1,023.85	-8,035.09	18,933.78	18,863.39	70.38	269.015	
18,700.00	6,982.99	7,026.83	6,636.85	179.54	31.10	81.08	1,023.89	-8,035.07	19,033.11	18,962.69	70.42	270.289	
18,800.00	6,982.92	7,025.23	6,635.26	181.09	31.10	81.04	1,023.93	-8,035.04	19,132.45	19,061.99	70.45	271.559	
18,900.00	6,982.85	7,023.64	6,633.66	182.64	31.10	81.00	1,023.98	-8,035.02	19,231.79	19,161.30	70.49	272.823	
19,000.00	6,982.78	7,022.04	6,632.07	184.19	31.10	80.96	1,024.02	-8,035.00	19,331.14	19,260.61	70.53	274.082	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #164C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program: 386-APC_ISCWSA REV 2 MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,100.00	6,982.72	7,020.44	6,630.47	185.74	31.09	80.92	1,024.06	-8,034.97	19,430.50	19,359.93	70.57	275.336		
19,200.00	6,982.65	7,018.84	6,628.87	187.29	31.09	80.87	1,024.10	-8,034.95	19,529.87	19,459.26	70.61	276.585		
19,300.00	6,982.58	7,017.24	6,627.27	188.84	31.09	80.83	1,024.14	-8,034.93	19,629.24	19,558.59	70.65	277.829		
19,400.00	6,982.52	7,015.64	6,625.67	190.40	31.09	80.79	1,024.18	-8,034.90	19,728.61	19,657.92	70.69	279.068		
19,500.00	6,982.45	7,014.03	6,624.07	191.95	31.09	80.75	1,024.22	-8,034.88	19,828.00	19,757.26	70.74	280.301		
19,600.00	6,982.38	7,012.43	6,622.46	193.51	31.08	80.71	1,024.27	-8,034.86	19,927.39	19,856.61	70.78	281.530		
19,700.00	6,982.32	7,010.83	6,620.86	195.07	31.08	80.67	1,024.31	-8,034.83	20,026.78	19,955.96	70.83	282.753		
19,800.00	6,982.25	7,009.22	6,619.26	196.62	31.08	80.62	1,024.35	-8,034.81	20,126.18	20,055.31	70.87	283.972		
19,900.00	6,982.18	7,007.62	6,617.65	198.18	31.08	80.58	1,024.39	-8,034.79	20,225.59	20,154.67	70.92	285.185		
20,000.00	6,982.12	7,006.01	6,616.04	199.74	31.08	80.54	1,024.43	-8,034.76	20,325.00	20,254.04	70.97	286.393		
20,100.00	6,982.05	7,004.40	6,614.44	201.30	31.07	80.50	1,024.47	-8,034.74	20,424.42	20,353.40	71.02	287.596		
20,176.02	6,982.00	7,003.18	6,613.21	202.36	31.07	80.47	1,024.51	-8,034.72	20,500.00	20,424.58	75.42	271.814		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171 - OH - OH-INC														Offset Site Error: 0.00 usft
Survey Program: 95-A027Ua_INC-ONLY														Offset Well Error: 0.00 usft
Reference														
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.00	0.00	0.00	0.00	0.00	0.00	-103.01	-1,108.91	-4,797.70	4,925.46					
100.00	100.00	0.00	0.00	0.25	0.00	-103.01	-1,108.91	-4,797.70	4,924.20	4,923.95	0.25	N/A		
137.88	137.88	25.88	25.88	0.39	0.48	-103.01	-1,108.91	-4,797.70	4,924.18	4,923.32	0.87	5,691.117		
200.00	200.00	88.00	88.00	0.61	1.63	-103.01	-1,108.91	-4,797.70	4,924.18	4,921.95	2.24	2,202.099		
286.68	286.68	174.43	174.43	0.92	3.22	-103.01	-1,108.74	-4,797.70	4,924.15	4,920.00	4.14	1,188.119		
300.00	300.00	186.95	186.94	0.97	3.46	-103.01	-1,108.75	-4,797.70	4,924.15	4,919.73	4.42	1,113.139		
400.00	400.00	288.01	288.00	1.33	5.32	-103.01	-1,108.91	-4,797.70	4,924.18	4,917.53	6.65	740.449		
480.54	480.54	368.53	368.52	1.62	6.81	-103.01	-1,108.64	-4,797.70	4,924.12	4,915.70	8.43	584.298 CC		
500.00	500.00	387.24	387.24	1.68	7.16	-103.01	-1,108.65	-4,797.70	4,924.13	4,915.28	8.84	556.828		
600.00	600.00	483.43	483.42	2.04	8.94	-103.01	-1,108.88	-4,797.70	4,924.18	4,913.20	10.98	448.479		
700.00	699.98	588.00	587.98	2.40	10.87	-93.03	-1,108.91	-4,797.70	4,924.28	4,911.01	13.27	371.071		
800.00	799.84	687.85	687.84	2.76	12.72	-93.09	-1,108.91	-4,797.70	4,924.56	4,909.08	15.47	318.247		
900.00	899.45	786.02	786.00	3.13	14.53	-93.17	-1,108.45	-4,797.70	4,924.93	4,907.28	17.65	279.056		
1,000.00	998.70	883.15	883.13	3.49	16.33	-93.30	-1,108.67	-4,797.70	4,925.68	4,905.87	19.81	248.656		
1,100.00	1,097.47	985.50	985.47	3.86	18.26	-93.47	-1,108.91	-4,797.70	4,926.66	4,904.55	22.12	222.762		
1,200.00	1,195.62	1,083.66	1,083.62	4.24	20.18	-93.66	-1,108.91	-4,797.70	4,927.87	4,903.45	24.42	201.780		
1,300.00	1,293.06	1,181.09	1,181.06	4.64	22.09	-93.88	-1,108.91	-4,797.70	4,929.39	4,902.66	26.73	184.421		
1,400.00	1,389.64	1,275.79	1,275.75	5.06	23.94	-94.13	-1,108.45	-4,797.70	4,931.15	4,902.15	29.00	170.034 ES		
1,500.00	1,485.27	1,369.28	1,369.24	5.50	25.77	-94.40	-1,108.67	-4,797.70	4,933.49	4,902.22	31.27	157.766		
1,515.00	1,499.52	1,383.20	1,383.16	5.57	26.04	-94.44	-1,108.72	-4,797.70	4,933.88	4,902.27	31.61	156.081		
1,600.00	1,580.22	1,468.30	1,468.22	5.96	27.71	-94.75	-1,108.91	-4,797.70	4,936.18	4,902.51	33.67	146.603		
1,700.00	1,675.17	1,563.24	1,563.17	6.44	29.57	-95.10	-1,108.91	-4,797.70	4,939.02	4,903.01	36.01	137.171		
1,800.00	1,770.11	1,658.19	1,658.11	6.92	31.43	-95.44	-1,108.91	-4,797.70	4,942.05	4,903.70	38.35	128.866		
1,900.00	1,865.05	1,750.74	1,750.65	7.41	33.25	-95.76	-1,107.80	-4,797.70	4,944.98	4,904.33	40.65	121.634		
2,000.00	1,959.99	1,841.46	1,841.37	7.90	35.03	-96.10	-1,108.09	-4,797.70	4,948.49	4,905.56	42.93	115.273		
2,100.00	2,054.94	1,932.02	1,931.92	8.40	36.81	-96.43	-1,108.65	-4,797.70	4,952.28	4,907.08	45.20	109.556		
2,200.00	2,149.88	2,038.00	2,037.88	8.90	38.89	-96.81	-1,108.91	-4,797.70	4,956.17	4,908.38	47.79	103.714		
2,300.00	2,244.82	2,132.95	2,132.82	9.41	40.76	-97.16	-1,108.91	-4,797.70	4,960.19	4,910.03	50.16	98.894		
2,400.00	2,339.76	2,226.57	2,226.44	9.92	42.60	-97.49	-1,108.45	-4,797.70	4,964.26	4,911.76	52.50	94.551		
2,500.00	2,434.71	2,318.65	2,318.52	10.43	44.41	-97.82	-1,108.61	-4,797.70	4,968.72	4,913.90	54.82	90.635		
2,600.00	2,529.65	2,417.81	2,417.65	10.94	46.35	-98.18	-1,108.91	-4,797.70	4,973.41	4,916.14	57.27	86.840		
2,700.00	2,624.59	2,512.75	2,512.59	11.45	48.16	-98.52	-1,108.91	-4,797.70	4,978.21	4,918.62	59.59	83.542		
2,800.00	2,719.53	2,607.55	2,607.38	11.97	49.97	-98.85	-1,108.02	-4,797.70	4,982.91	4,921.00	61.91	80.491		
2,900.00	2,814.48	2,696.10	2,695.92	12.49	51.65	-99.17	-1,108.20	-4,797.70	4,988.15	4,924.05	64.10	77.814		
3,000.00	2,909.42	2,784.43	2,784.25	13.01	53.33	-99.49	-1,108.71	-4,797.70	4,993.71	4,927.41	66.30	75.322		
3,100.00	3,004.36	2,892.55	2,892.36	13.53	55.29	-99.87	-1,108.91	-4,797.70	4,999.33	4,930.56	68.77	72.698		
3,200.00	3,099.30	2,987.49	2,987.30	14.05	56.98	-100.21	-1,108.91	-4,797.70	5,005.08	4,934.11	70.97	70.520		
3,300.00	3,194.25	3,082.00	3,081.81	14.57	58.67	-100.54	-1,108.64	-4,797.70	5,010.94	4,937.76	73.17	68.481		
3,400.00	3,289.19	3,175.42	3,175.23	15.09	60.33	-100.87	-1,108.70	-4,797.70	5,017.09	4,941.74	75.35	66.582		
3,500.00	3,384.13	3,268.79	3,268.59	15.62	61.99	-101.20	-1,108.84	-4,797.70	5,023.47	4,945.94	77.53	64.794		
3,600.00	3,479.07	3,367.28	3,367.07	16.14	63.91	-101.55	-1,108.91	-4,797.70	5,030.01	4,950.04	79.96	62.904		
3,700.00	3,574.02	3,462.22	3,462.02	16.67	65.84	-101.88	-1,108.91	-4,797.70	5,036.71	4,954.30	82.40	61.121		
3,800.00	3,668.96	3,557.16	3,556.96	17.19	67.77	-102.22	-1,108.91	-4,797.70	5,043.60	4,958.75	84.85	59.444		
3,900.00	3,763.90	3,652.10	3,651.90	17.72	69.69	-102.55	-1,108.91	-4,797.70	5,050.67	4,963.38	87.29	57.863		
4,000.00	3,858.84	3,747.05	3,746.84	18.24	71.62	-102.88	-1,108.91	-4,797.70	5,057.93	4,968.20	89.73	56.370		
4,100.00	3,953.79	3,841.99	3,841.79	18.77	73.55	-103.21	-1,108.91	-4,797.70	5,065.37	4,973.20	92.17	54.959		
4,200.00	4,048.73	3,936.93	3,936.73	19.30	75.48	-103.54	-1,108.91	-4,797.70	5,073.00	4,978.39	94.61	53.622		
4,300.00	4,143.67	4,031.48	4,031.27	19.82	77.39	-103.85	-1,107.38	-4,797.70	5,080.17	4,983.13	97.04	52.353		
4,400.00	4,238.61	4,125.17	4,124.96	20.35	79.30	-104.17	-1,107.43	-4,797.70	5,088.17	4,988.72	99.45	51.163		
4,500.00	4,333.56	4,218.82	4,218.61	20.88	81.20	-104.49	-1,107.53	-4,797.70	5,096.38	4,994.52	101.86	50.032		
4,600.00	4,428.50	4,312.44	4,312.23	21.41	83.10	-104.82	-1,107.68	-4,797.70	5,104.79	5,000.52	104.27	48.956		
4,700.00	4,523.44	4,406.03	4,405.81	21.93	85.00	-105.14	-1,107.89	-4,797.70	5,113.41	5,006.73	106.68	47.932		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		95-A027Ua_INC-ONLY					Rule Assigned:						Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,800.00	4,618.38	4,499.58	4,499.36	22.46	86.90	-105.46	-1,108.15	-4,797.70	5,122.23	5,013.14	109.09	46.955		
4,900.00	4,713.33	4,593.09	4,592.87	22.99	88.79	-105.78	-1,108.47	-4,797.70	5,131.26	5,019.76	111.49	46.022		
5,000.00	4,808.27	4,686.57	4,686.35	23.52	90.69	-106.10	-1,108.84	-4,797.70	5,140.49	5,026.59	113.90	45.132		
5,100.00	4,903.21	4,791.59	4,791.21	24.05	92.96	-106.45	-1,108.91	-4,797.70	5,149.75	5,033.07	116.67	44.138		
5,200.00	4,998.16	4,886.53	4,886.16	24.58	95.02	-106.77	-1,108.91	-4,797.70	5,159.16	5,039.91	119.25	43.264		
5,300.00	5,093.10	4,981.47	4,981.10	25.11	97.09	-107.09	-1,108.91	-4,797.70	5,168.75	5,046.92	121.82	42.429		
5,400.00	5,188.04	5,076.41	5,076.04	25.64	99.16	-107.41	-1,108.91	-4,797.70	5,178.51	5,054.11	124.40	41.629		
5,500.00	5,282.98	5,171.36	5,170.98	26.17	101.23	-107.72	-1,108.91	-4,797.70	5,188.44	5,061.47	126.97	40.864		
5,600.00	5,377.93	5,266.30	5,265.93	26.70	103.30	-108.04	-1,108.91	-4,797.70	5,198.54	5,069.00	129.54	40.131		
5,623.25	5,400.00	5,288.37	5,288.00	26.82	103.78	-108.11	-1,108.91	-4,797.70	5,200.91	5,070.77	130.14	39.965		
5,700.00	5,473.03	5,361.40	5,361.03	27.22	105.37	-108.42	-1,108.91	-4,797.70	5,208.65	5,076.54	132.11	39.427		
5,800.00	5,568.64	5,457.01	5,456.64	27.73	107.46	-108.80	-1,108.91	-4,797.70	5,218.38	5,083.70	134.68	38.747		
5,900.00	5,664.75	5,553.12	5,552.75	28.23	109.55	-109.17	-1,108.91	-4,797.70	5,227.69	5,090.44	137.25	38.090		
6,000.00	5,761.33	5,649.70	5,649.33	28.71	111.65	-109.51	-1,108.91	-4,797.70	5,236.55	5,096.74	139.81	37.455		
6,100.00	5,858.34	5,746.71	5,746.34	29.18	113.77	-109.84	-1,108.91	-4,797.70	5,244.93	5,102.57	142.37	36.841		
6,200.00	5,955.76	5,844.14	5,843.76	29.64	115.89	-110.14	-1,108.91	-4,797.70	5,252.82	5,107.90	144.92	36.245		
6,300.00	6,053.57	5,941.94	5,941.57	30.07	118.02	-110.41	-1,108.91	-4,797.70	5,260.19	5,112.71	147.47	35.669		
6,400.00	6,151.72	6,028.00	6,027.37	30.50	119.90	-110.65	-1,108.91	-4,797.70	5,267.03	5,117.28	149.75	35.172		
6,500.00	6,250.19	6,028.00	6,027.37	30.91	119.90	-110.72	-1,108.91	-4,797.70	5,274.44	5,124.36	150.08	35.144		
6,600.00	6,348.94	6,028.00	6,027.37	31.30	119.90	-110.80	-1,108.91	-4,797.70	5,283.13	5,132.78	150.34	35.140 SF		
6,659.67	6,408.00	6,028.00	6,027.37	31.53	119.90	-110.85	-1,108.91	-4,797.70	5,288.91	5,138.44	150.47	35.149		
6,700.00	6,447.82	6,028.00	6,027.37	31.68	119.90	-127.21	-1,108.91	-4,797.70	5,294.35	5,143.80	150.55	35.166		
6,750.00	6,496.66	6,028.00	6,027.37	31.90	119.90	-138.25	-1,108.91	-4,797.70	5,304.89	5,154.25	150.65	35.214		
6,800.00	6,544.65	6,028.00	6,027.37	32.13	119.90	-144.26	-1,108.91	-4,797.70	5,319.56	5,168.82	150.74	35.290		
6,850.00	6,591.49	6,028.00	6,027.37	32.37	119.90	-147.76	-1,108.91	-4,797.70	5,338.22	5,187.39	150.83	35.392		
6,900.00	6,636.89	6,028.00	6,027.37	32.62	119.90	-149.83	-1,108.91	-4,797.70	5,360.72	5,209.81	150.92	35.521		
6,950.00	6,680.57	6,028.00	6,027.37	32.89	119.90	-150.96	-1,108.91	-4,797.70	5,386.88	5,235.88	151.00	35.675		
7,000.00	6,722.26	6,028.00	6,027.37	33.17	119.90	-151.40	-1,108.91	-4,797.70	5,416.48	5,265.40	151.08	35.853		
7,050.00	6,761.71	6,028.00	6,027.37	33.45	119.90	-151.27	-1,108.91	-4,797.70	5,449.28	5,298.13	151.15	36.052		
7,100.00	6,798.67	6,028.00	6,027.37	33.75	119.90	-150.57	-1,108.91	-4,797.70	5,485.03	5,333.81	151.22	36.271		
7,150.00	6,832.91	6,028.00	6,027.37	34.06	119.90	-149.29	-1,108.91	-4,797.70	5,523.45	5,372.16	151.30	36.508		
7,200.00	6,864.22	6,028.00	6,027.37	34.37	119.90	-147.30	-1,108.91	-4,797.70	5,564.26	5,412.89	151.37	36.760		
7,250.00	6,892.42	6,028.00	6,027.37	34.69	119.90	-144.39	-1,108.91	-4,797.70	5,607.14	5,455.71	151.44	37.026		
7,300.00	6,917.32	6,028.00	6,027.37	35.03	119.90	-140.24	-1,108.91	-4,797.70	5,651.80	5,500.30	151.51	37.304		
7,350.00	6,938.77	6,028.00	6,027.37	35.37	119.90	-134.26	-1,108.91	-4,797.70	5,697.92	5,546.34	151.58	37.590		
7,400.00	6,956.64	6,028.00	6,027.37	35.72	119.90	-125.55	-1,108.91	-4,797.70	5,745.18	5,593.53	151.65	37.883		
7,450.00	6,970.83	6,028.00	6,027.37	36.07	119.90	-112.93	-1,108.91	-4,797.70	5,793.27	5,641.54	151.73	38.181		
7,500.00	6,981.23	6,028.00	6,027.37	36.44	119.90	-95.67	-1,108.91	-4,797.70	5,841.88	5,690.07	151.81	38.481		
7,550.00	6,987.80	6,028.00	6,027.37	36.81	119.90	-75.59	-1,108.91	-4,797.70	5,890.69	5,738.79	151.90	38.781		
7,600.00	6,990.48	6,028.00	6,027.37	37.19	119.90	-57.09	-1,108.91	-4,797.70	5,939.41	5,787.42	151.99	39.078		
7,609.87	6,990.55	6,028.00	6,027.37	37.26	119.90	-53.93	-1,108.91	-4,797.70	5,948.98	5,796.98	152.01	39.136		
7,700.00	6,990.49	6,028.00	6,027.37	37.97	119.90	-53.93	-1,108.91	-4,797.70	6,036.43	5,884.26	152.18	39.668		
7,800.00	6,990.42	6,028.00	6,027.37	38.78	119.90	-53.93	-1,108.91	-4,797.70	6,133.54	5,981.18	152.36	40.257		
7,900.00	6,990.35	6,028.00	6,027.37	39.64	119.90	-53.93	-1,108.91	-4,797.70	6,230.74	6,078.20	152.54	40.847		
8,000.00	6,990.28	6,028.00	6,027.37	40.53	119.90	-53.93	-1,108.91	-4,797.70	6,328.03	6,175.32	152.71	41.437		
8,100.00	6,990.21	6,028.00	6,027.37	41.45	119.90	-53.93	-1,108.91	-4,797.70	6,425.40	6,272.52	152.88	42.028		
8,200.00	6,990.14	6,028.00	6,027.37	42.40	119.90	-53.93	-1,108.91	-4,797.70	6,522.85	6,369.80	153.05	42.619		
8,306.37	6,990.06	6,028.00	6,027.37	43.45	119.90	-53.93	-1,108.91	-4,797.70	6,626.59	6,473.36	153.22	43.248		
8,400.00	6,990.00	6,028.00	6,027.37	44.38	119.90	-41.10	-1,108.91	-4,797.70	6,718.45	6,565.09	153.35	43.810		
8,500.00	6,989.93	6,028.00	6,027.37	45.36	119.90	-18.05	-1,108.91	-4,797.70	6,817.33	6,663.88	153.45	44.427		
8,600.00	6,989.85	6,028.00	6,027.37	46.33	119.90	12.95	-1,108.91	-4,797.70	6,916.53	6,763.03	153.50	45.059		
8,700.00	6,989.78	6,028.00	6,027.37	47.28	119.90	38.41	-1,108.91	-4,797.70	7,015.56	6,862.05	153.51	45.702		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171 - OH - OH-INC											Offset Site Error: 0.00 usft			
Survey Program: Reference		95-A027Ua_INC-ONLY Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance				Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,800.00	6,989.70	6,028.00	6,027.37	48.21	119.90	53.68	-1,108.91	-4,797.70	7,113.94	6,960.47	153.47	46.353		
8,900.00	6,989.63	6,028.00	6,027.37	49.11	119.90	62.60	-1,108.91	-4,797.70	7,211.25	7,057.84	153.40	47.009		
9,000.00	6,989.55	6,028.00	6,027.37	49.99	119.90	68.17	-1,108.91	-4,797.70	7,307.05	7,153.75	153.30	47.666		
9,100.00	6,989.48	6,028.00	6,027.37	50.84	119.90	71.91	-1,108.91	-4,797.70	7,400.94	7,247.79	153.16	48.323		
9,200.00	6,989.40	6,028.00	6,027.37	51.66	119.90	74.55	-1,108.91	-4,797.70	7,492.56	7,339.57	152.99	48.974		
9,300.00	6,989.33	6,028.00	6,027.37	52.45	119.90	76.51	-1,108.91	-4,797.70	7,581.54	7,428.74	152.80	49.617		
9,393.87	6,989.27	6,028.00	6,027.37	53.15	119.90	77.92	-1,108.91	-4,797.70	7,662.37	7,509.76	152.61	50.210		
9,400.00	6,989.26	6,028.00	6,027.37	53.20	119.90	77.92	-1,108.91	-4,797.70	7,667.56	7,514.97	152.59	50.249		
9,500.00	6,989.19	6,028.00	6,027.37	53.95	119.90	77.92	-1,108.91	-4,797.70	7,752.38	7,599.99	152.39	50.873		
9,600.00	6,989.12	6,028.00	6,027.37	54.73	119.90	77.92	-1,108.91	-4,797.70	7,837.57	7,685.37	152.20	51.496		
9,700.00	6,989.05	6,028.00	6,027.37	55.55	119.90	77.92	-1,108.91	-4,797.70	7,923.09	7,771.08	152.02	52.119		
9,800.00	6,988.98	6,028.00	6,027.37	56.40	119.90	77.92	-1,108.91	-4,797.70	8,008.96	7,857.11	151.85	52.742		
9,900.00	6,988.91	6,028.00	6,027.37	57.28	119.90	77.92	-1,108.91	-4,797.70	8,095.15	7,943.45	151.70	53.364		
10,000.00	6,988.84	6,028.00	6,027.37	58.20	119.90	77.92	-1,108.91	-4,797.70	8,181.65	8,030.10	151.55	53.985		
10,100.00	6,988.77	6,028.00	6,027.37	59.14	119.90	77.92	-1,108.91	-4,797.70	8,268.46	8,117.04	151.42	54.605		
10,200.00	6,988.70	6,028.00	6,027.37	60.11	119.90	77.92	-1,108.91	-4,797.70	8,355.56	8,204.26	151.30	55.225		
10,300.00	6,988.63	6,028.00	6,027.37	61.11	119.90	77.92	-1,108.91	-4,797.70	8,442.95	8,291.76	151.19	55.844		
10,400.00	6,988.56	6,028.00	6,027.37	62.14	119.90	77.92	-1,108.91	-4,797.70	8,530.61	8,379.53	151.09	56.462		
10,500.00	6,988.49	6,028.00	6,027.37	63.19	119.90	77.92	-1,108.91	-4,797.70	8,618.55	8,467.56	150.99	57.079		
10,600.00	6,988.42	6,028.00	6,027.37	64.26	119.90	77.92	-1,108.91	-4,797.70	8,706.74	8,555.83	150.91	57.695		
10,700.00	6,988.35	6,028.00	6,027.37	65.36	119.90	77.92	-1,108.91	-4,797.70	8,795.19	8,644.36	150.83	58.310		
10,800.00	6,988.28	6,028.00	6,027.37	66.48	119.90	77.92	-1,108.91	-4,797.70	8,883.88	8,733.11	150.77	58.924		
10,900.00	6,988.21	6,028.00	6,027.37	67.61	119.90	77.92	-1,108.91	-4,797.70	8,972.81	8,822.10	150.71	59.537		
11,000.00	6,988.14	6,028.00	6,027.37	68.77	119.90	77.92	-1,108.91	-4,797.70	9,061.97	8,911.32	150.66	60.149		
11,100.00	6,988.07	6,028.00	6,027.37	69.95	119.90	77.92	-1,108.91	-4,797.70	9,151.36	9,000.74	150.62	60.760		
11,200.00	6,988.01	6,028.00	6,027.37	71.14	119.90	77.92	-1,108.91	-4,797.70	9,240.96	9,090.38	150.58	61.370		
11,300.00	6,987.94	6,028.00	6,027.37	72.35	119.90	77.92	-1,108.91	-4,797.70	9,330.77	9,180.23	150.55	61.978		
11,400.00	6,987.87	6,028.00	6,027.37	73.57	119.90	77.92	-1,108.91	-4,797.70	9,420.79	9,270.27	150.53	62.586		
11,500.00	6,987.80	6,028.00	6,027.37	74.81	119.90	77.92	-1,108.91	-4,797.70	9,511.01	9,360.50	150.51	63.192		
11,600.00	6,987.73	6,028.00	6,027.37	76.07	119.90	77.92	-1,108.91	-4,797.70	9,601.42	9,450.93	150.50	63.798		
11,643.87	6,987.70	6,028.00	6,027.37	76.62	119.90	77.92	-1,108.91	-4,797.70	9,641.14	9,490.65	150.50	64.063		
11,700.00	6,987.66	6,028.00	6,027.37	77.33	119.90	78.41	-1,108.91	-4,797.70	9,691.79	9,541.30	150.49	64.401		
11,737.27	6,987.63	6,028.00	6,027.37	77.80	119.90	78.71	-1,108.91	-4,797.70	9,725.20	9,574.71	150.49	64.624		
11,800.00	6,987.59	6,028.00	6,027.37	78.59	119.90	78.71	-1,108.91	-4,797.70	9,781.31	9,630.82	150.49	64.997		
11,900.00	6,987.52	6,028.00	6,027.37	79.86	119.90	78.71	-1,108.91	-4,797.70	9,870.92	9,720.43	150.49	65.591		
12,000.00	6,987.46	6,028.00	6,027.37	81.14	119.90	78.71	-1,108.91	-4,797.70	9,960.73	9,810.22	150.50	66.184		
12,100.00	6,987.39	6,028.00	6,027.37	82.43	119.90	78.71	-1,108.91	-4,797.70	10,050.73	9,900.21	150.52	66.775		
12,200.00	6,987.32	6,028.00	6,027.37	83.73	119.90	78.71	-1,108.91	-4,797.70	10,140.91	9,990.38	150.54	67.365		
12,300.00	6,987.26	6,028.00	6,027.37	85.05	119.90	78.71	-1,108.91	-4,797.70	10,231.28	10,080.72	150.56	67.954		
12,400.00	6,987.19	6,028.00	6,027.37	86.38	119.90	78.71	-1,108.91	-4,797.70	10,321.83	10,171.24	150.59	68.542		
12,500.00	6,987.12	6,028.00	6,027.37	87.71	119.90	78.71	-1,108.91	-4,797.70	10,412.55	10,261.93	150.63	69.129		
12,600.00	6,987.06	6,028.00	6,027.37	89.06	119.90	78.71	-1,108.91	-4,797.70	10,503.44	10,352.78	150.66	69.714		
12,700.00	6,986.99	6,028.00	6,027.37	90.41	119.90	78.71	-1,108.91	-4,797.70	10,594.50	10,443.79	150.71	70.299		
12,800.00	6,986.92	6,028.00	6,027.37	91.77	119.90	78.71	-1,108.91	-4,797.70	10,685.71	10,534.95	150.75	70.882		
12,900.00	6,986.86	6,028.00	6,027.37	93.14	119.90	78.71	-1,108.91	-4,797.70	10,777.08	10,626.27	150.80	71.464		
13,000.00	6,986.79	6,028.00	6,027.37	94.52	119.90	78.71	-1,108.91	-4,797.70	10,868.60	10,717.74	150.86	72.045		
13,100.00	6,986.72	6,028.00	6,027.37	95.90	119.90	78.71	-1,108.91	-4,797.70	10,960.27	10,809.35	150.92	72.625		
13,200.00	6,986.66	6,028.00	6,027.37	97.30	119.90	78.71	-1,108.91	-4,797.70	11,052.08	10,901.11	150.98	73.204		
13,300.00	6,986.59	6,028.00	6,027.37	98.69	119.90	78.71	-1,108.91	-4,797.70	11,144.04	10,993.00	151.04	73.782		
13,400.00	6,986.52	6,028.00	6,027.37	100.10	119.90	78.71	-1,108.91	-4,797.70	11,236.13	11,085.02	151.11	74.359		
13,500.00	6,986.46	6,028.00	6,027.37	101.51	119.90	78.71	-1,108.91	-4,797.70	11,328.36	11,177.18	151.18	74.935		
13,600.00	6,986.39	6,028.00	6,027.37	102.93	119.90	78.71	-1,108.91	-4,797.70	11,420.71	11,269.46	151.25	75.509		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171 - OH - OH-INC											Offset Site Error: 0.00 usft			
Survey Program: Reference		95-A027Ua_INC-ONLY Offset		Semi Maior Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance				Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,700.00	6,986.32	6,028.00	6,027.37	104.35	119.90	78.71	-1,108.91	-4,797.70	11,513.20	11,361.87	151.32	76.083		
13,800.00	6,986.25	6,028.00	6,027.37	105.78	119.90	78.71	-1,108.91	-4,797.70	11,605.81	11,454.41	151.40	76.656		
13,900.00	6,986.19	6,028.00	6,027.37	107.21	119.90	78.71	-1,108.91	-4,797.70	11,698.54	11,547.06	151.48	77.228		
14,000.00	6,986.12	6,028.00	6,027.37	108.65	119.90	78.71	-1,108.91	-4,797.70	11,791.39	11,639.83	151.56	77.799		
14,100.00	6,986.05	6,028.00	6,027.37	110.09	119.90	78.71	-1,108.91	-4,797.70	11,884.35	11,732.71	151.65	78.369		
14,200.00	6,985.99	6,028.00	6,027.37	111.54	119.90	78.71	-1,108.91	-4,797.70	11,977.43	11,825.70	151.73	78.938		
14,300.00	6,985.92	6,028.00	6,027.37	112.99	119.90	78.71	-1,108.91	-4,797.70	12,070.62	11,918.80	151.82	79.506		
14,400.00	6,985.85	6,028.00	6,027.37	114.45	119.90	78.71	-1,108.91	-4,797.70	12,163.92	12,012.01	151.91	80.074		
14,500.00	6,985.79	6,028.00	6,027.37	115.91	119.90	78.71	-1,108.91	-4,797.70	12,257.33	12,105.33	152.00	80.640		
14,600.00	6,985.72	6,028.00	6,027.37	117.38	119.90	78.71	-1,108.91	-4,797.70	12,350.83	12,198.74	152.09	81.206		
14,700.00	6,985.65	6,028.00	6,027.37	118.84	119.90	78.71	-1,108.91	-4,797.70	12,444.44	12,292.25	152.19	81.770		
14,800.00	6,985.59	6,028.00	6,027.37	120.32	119.90	78.71	-1,108.91	-4,797.70	12,538.15	12,385.86	152.28	82.334		
14,900.00	6,985.52	6,028.00	6,027.37	121.79	119.90	78.71	-1,108.91	-4,797.70	12,631.95	12,479.57	152.38	82.897		
15,000.00	6,985.45	6,028.00	6,027.37	123.27	119.90	78.71	-1,108.91	-4,797.70	12,725.85	12,573.37	152.48	83.460		
15,100.00	6,985.39	6,028.00	6,027.37	124.75	119.90	78.71	-1,108.91	-4,797.70	12,819.84	12,667.26	152.58	84.021		
15,200.00	6,985.32	6,028.00	6,027.37	126.24	119.90	78.71	-1,108.91	-4,797.70	12,913.92	12,761.24	152.68	84.582		
15,300.00	6,985.25	6,028.00	6,027.37	127.72	119.90	78.71	-1,108.91	-4,797.70	13,008.09	12,855.31	152.78	85.141		
15,400.00	6,985.19	6,028.00	6,027.37	129.21	119.90	78.71	-1,108.91	-4,797.70	13,102.34	12,949.46	152.89	85.700		
15,500.00	6,985.12	6,028.00	6,027.37	130.71	119.90	78.71	-1,108.91	-4,797.70	13,196.68	13,043.69	152.99	86.259		
15,600.00	6,985.05	6,028.00	6,027.37	132.20	119.90	78.71	-1,108.91	-4,797.70	13,291.10	13,138.01	153.10	86.816		
15,700.00	6,984.99	6,028.00	6,027.37	133.70	119.90	78.71	-1,108.91	-4,797.70	13,385.61	13,232.41	153.20	87.373		
15,800.00	6,984.92	6,028.00	6,027.37	135.20	119.90	78.71	-1,108.91	-4,797.70	13,480.19	13,326.88	153.31	87.929		
15,900.00	6,984.85	6,028.00	6,027.37	136.71	119.90	78.71	-1,108.91	-4,797.70	13,574.85	13,421.43	153.42	88.484		
16,000.00	6,984.79	6,028.00	6,027.37	138.21	119.90	78.71	-1,108.91	-4,797.70	13,669.59	13,516.06	153.52	89.038		
16,100.00	6,984.72	6,028.00	6,027.37	139.72	119.90	78.71	-1,108.91	-4,797.70	13,764.40	13,610.76	153.63	89.592		
16,200.00	6,984.65	6,028.00	6,027.37	141.23	119.90	78.71	-1,108.91	-4,797.70	13,859.28	13,705.54	153.74	90.145		
16,300.00	6,984.59	6,028.00	6,027.37	142.75	119.90	78.71	-1,108.91	-4,797.70	13,954.24	13,800.38	153.86	90.697		
16,400.00	6,984.52	6,028.00	6,027.37	144.26	119.90	78.71	-1,108.91	-4,797.70	14,049.26	13,895.30	153.97	91.249		
16,500.00	6,984.45	6,028.00	6,027.37	145.78	119.90	78.71	-1,108.91	-4,797.70	14,144.36	13,990.28	154.08	91.799		
16,600.00	6,984.39	6,028.00	6,027.37	147.29	119.90	78.71	-1,108.91	-4,797.70	14,239.52	14,085.33	154.19	92.350		
16,700.00	6,984.32	6,028.00	6,027.37	148.82	119.90	78.71	-1,108.91	-4,797.70	14,334.74	14,180.44	154.30	92.899		
16,800.00	6,984.25	6,028.00	6,027.37	150.34	119.90	78.71	-1,108.91	-4,797.70	14,430.04	14,275.62	154.42	93.448		
16,900.00	6,984.19	6,028.00	6,027.37	151.86	119.90	78.71	-1,108.91	-4,797.70	14,525.39	14,370.86	154.53	93.996		
17,000.00	6,984.12	6,028.00	6,027.37	153.39	119.90	78.71	-1,108.91	-4,797.70	14,620.81	14,466.16	154.65	94.543		
17,100.00	6,984.05	6,028.00	6,027.37	154.91	119.90	78.71	-1,108.91	-4,797.70	14,716.28	14,561.52	154.76	95.090		
17,200.00	6,983.99	6,028.00	6,027.37	156.44	119.90	78.71	-1,108.91	-4,797.70	14,811.82	14,656.94	154.88	95.636		
17,300.00	6,983.92	6,028.00	6,027.37	157.97	119.90	78.71	-1,108.91	-4,797.70	14,907.42	14,752.42	154.99	96.181		
17,400.00	6,983.85	6,028.00	6,027.37	159.50	119.90	78.71	-1,108.91	-4,797.70	15,003.07	14,847.96	155.11	96.726		
17,500.00	6,983.79	6,028.00	6,027.37	161.04	119.90	78.71	-1,108.91	-4,797.70	15,098.78	14,943.56	155.23	97.270		
17,600.00	6,983.72	6,028.00	6,027.37	162.57	119.90	78.71	-1,108.91	-4,797.70	15,194.55	15,039.20	155.34	97.813		
17,700.00	6,983.65	6,028.00	6,027.37	164.11	119.90	78.71	-1,108.91	-4,797.70	15,290.37	15,134.91	155.46	98.355		
17,800.00	6,983.59	6,028.00	6,027.37	165.65	119.90	78.71	-1,108.91	-4,797.70	15,386.24	15,230.66	155.58	98.897		
17,900.00	6,983.52	6,028.00	6,027.37	167.18	119.90	78.71	-1,108.91	-4,797.70	15,482.16	15,326.47	155.70	99.439		
18,000.00	6,983.45	6,028.00	6,027.37	168.72	119.90	78.71	-1,108.91	-4,797.70	15,578.14	15,422.32	155.81	99.979		
18,100.00	6,983.39	6,028.00	6,027.37	170.27	119.90	78.71	-1,108.91	-4,797.70	15,674.16	15,518.23	155.93	100.519		
18,200.00	6,983.32	6,028.00	6,027.37	171.81	119.90	78.71	-1,108.91	-4,797.70	15,770.24	15,614.19	156.05	101.058		
18,300.00	6,983.25	6,028.00	6,027.37	173.35	119.90	78.71	-1,108.91	-4,797.70	15,866.36	15,710.19	156.17	101.597		
18,400.00	6,983.19	6,028.00	6,027.37	174.90	119.90	78.71	-1,108.91	-4,797.70	15,962.54	15,806.25	156.29	102.135		
18,500.00	6,983.12	6,028.00	6,027.37	176.44	119.90	78.71	-1,108.91	-4,797.70	16,058.75	15,902.35	156.41	102.672		
18,600.00	6,983.05	6,028.00	6,027.37	177.99	119.90	78.71	-1,108.91	-4,797.70	16,155.02	15,998.49	156.53	103.209		
18,700.00	6,982.99	6,028.00	6,027.37	179.54	119.90	78.71	-1,108.91	-4,797.70	16,251.33	16,094.68	156.65	103.745		
18,800.00	6,982.92	6,028.00	6,027.37	181.09	119.90	78.71	-1,108.91	-4,797.70	16,347.68	16,190.92	156.77	104.281		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 95-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
18,900.00	6,982.85	6,028.00	6,027.37	182.64	119.90	78.71	-1,108.91	-4,797.70	16,444.08	16,287.19	156.89	104.815	
19,000.00	6,982.78	6,028.00	6,027.37	184.19	119.90	78.71	-1,108.91	-4,797.70	16,540.52	16,383.51	157.01	105.349	
19,100.00	6,982.72	6,028.00	6,027.37	185.74	119.90	78.71	-1,108.91	-4,797.70	16,637.00	16,479.88	157.13	105.883	
19,200.00	6,982.65	6,028.00	6,027.37	187.29	119.90	78.71	-1,108.91	-4,797.70	16,733.53	16,576.28	157.25	106.416	
19,300.00	6,982.58	6,028.00	6,027.37	188.84	119.90	78.71	-1,108.91	-4,797.70	16,830.09	16,672.72	157.37	106.948	
19,400.00	6,982.52	6,028.00	6,027.37	190.40	119.90	78.71	-1,108.91	-4,797.70	16,926.69	16,769.21	157.49	107.479	
19,500.00	6,982.45	6,028.00	6,027.37	191.95	119.90	78.71	-1,108.91	-4,797.70	17,023.34	16,865.73	157.61	108.010	
19,600.00	6,982.38	6,028.00	6,027.37	193.51	119.90	78.71	-1,108.91	-4,797.70	17,120.02	16,962.29	157.73	108.540	
19,700.00	6,982.32	6,028.00	6,027.37	195.07	119.90	78.71	-1,108.91	-4,797.70	17,216.74	17,058.89	157.85	109.070	
19,800.00	6,982.25	6,028.00	6,027.37	196.62	119.90	78.71	-1,108.91	-4,797.70	17,313.49	17,155.52	157.97	109.599	
19,900.00	6,982.18	6,028.00	6,027.37	198.18	119.90	78.71	-1,108.91	-4,797.70	17,410.29	17,252.20	158.09	110.127	
20,000.00	6,982.12	6,028.00	6,027.37	199.74	119.90	78.71	-1,108.91	-4,797.70	17,507.12	17,348.90	158.21	110.655	
20,100.00	6,982.05	6,028.00	6,027.37	201.30	119.90	78.71	-1,108.91	-4,797.70	17,603.98	17,445.65	158.33	111.182	
20,176.02	6,982.00	6,028.00	6,027.37	202.36	119.90	78.71	-1,108.91	-4,797.70	17,677.64	17,515.33	162.31	108.914	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171A - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 561-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-102.87	-1,113.08	-4,873.53	5,000.26				
100.00	100.00	0.00	0.00	0.25	0.00	-102.87	-1,113.08	-4,873.53	4,999.04	4,998.79	0.25	N/A	
111.00	111.00	0.00	0.00	0.29	0.00	-102.87	-1,113.08	-4,873.53	4,999.03	4,998.73	0.29	N/A CC, ES	
200.00	200.00	0.00	0.00	0.61	0.00	-102.87	-1,113.08	-4,873.53	4,999.82	4,999.21	0.61	8,184.504	
300.00	300.00	0.00	0.00	0.97	0.00	-102.87	-1,113.08	-4,873.53	5,002.60	5,001.63	0.97	5,150.151	
400.00	400.00	0.00	0.00	1.33	0.00	-102.87	-1,113.08	-4,873.53	5,007.37	5,006.04	1.33	3,761.539	
500.00	500.00	0.00	0.00	1.68	0.00	-102.87	-1,113.08	-4,873.53	5,014.14	5,012.45	1.69	2,967.082	
576.23	576.23	175.18	175.07	1.96	10.88	-102.85	-1,113.31	-4,878.68	5,012.50	4,999.72	12.78	392.238	
600.00	600.00	184.10	183.99	2.04	11.43	-102.85	-1,113.34	-4,879.22	5,013.91	5,000.49	13.42	373.612	
700.00	699.98	221.62	221.42	2.40	13.76	-92.72	-1,113.45	-4,881.77	5,020.70	5,004.59	16.12	311.543	
800.00	799.84	259.04	258.72	2.76	16.08	-92.57	-1,113.59	-4,884.79	5,028.89	5,010.08	18.81	267.400	
900.00	899.45	296.32	295.83	3.13	18.40	-92.41	-1,113.75	-4,888.25	5,038.47	5,016.98	21.49	234.454	
1,000.00	998.70	333.39	332.69	3.49	20.70	-92.23	-1,113.92	-4,892.17	5,049.43	5,025.26	24.16	208.965	
1,100.00	1,097.47	370.21	369.26	3.86	22.99	-92.04	-1,114.12	-4,896.50	5,061.75	5,034.93	26.83	188.686	
1,200.00	1,195.62	561.00	557.68	4.24	34.83	-92.15	-1,115.46	-4,926.19	5,081.70	5,042.71	38.99	130.326	
1,300.00	1,293.06	561.00	557.68	4.64	34.83	-91.90	-1,115.46	-4,926.19	5,094.12	5,054.72	39.41	129.266	
1,400.00	1,389.64	561.00	557.68	5.06	34.83	-91.61	-1,115.46	-4,926.19	5,108.59	5,068.77	39.82	128.287	
1,500.00	1,485.27	561.00	557.68	5.50	34.83	-91.27	-1,115.46	-4,926.19	5,125.06	5,084.83	40.23	127.379	
1,515.00	1,499.52	561.00	557.68	5.57	34.83	-91.22	-1,115.46	-4,926.19	5,127.71	5,087.41	40.30	127.250	
1,600.00	1,580.22	561.00	557.68	5.96	34.83	-91.22	-1,115.46	-4,926.19	5,143.48	5,102.84	40.65	126.542	
1,700.00	1,675.17	643.51	638.71	6.44	34.91	-91.48	-1,116.30	-4,941.71	5,163.55	5,122.40	41.15	125.490	
1,800.00	1,770.11	682.00	676.53	6.92	34.92	-91.61	-1,116.47	-4,948.88	5,183.72	5,142.14	41.58	124.670	
1,900.00	1,865.05	712.00	705.89	7.41	34.94	-91.69	-1,116.08	-4,955.02	5,205.20	5,163.19	42.01	123.907	
2,000.00	1,959.99	712.00	705.89	7.90	34.94	-91.69	-1,116.08	-4,955.02	5,228.27	5,185.86	42.41	123.286	
2,100.00	2,054.94	773.00	765.06	8.40	34.99	-91.85	-1,114.07	-4,969.69	5,252.67	5,209.78	42.89	122.463	
2,200.00	2,149.88	773.00	765.06	8.90	34.99	-91.85	-1,114.07	-4,969.69	5,278.23	5,234.96	43.27	121.974	
2,300.00	2,244.82	823.10	813.37	9.41	35.02	-91.97	-1,112.39	-4,982.84	5,305.01	5,261.29	43.71	121.360	
2,400.00	2,339.76	852.52	841.65	9.92	35.03	-92.04	-1,111.37	-4,990.93	5,332.92	5,288.80	44.12	120.876	
2,500.00	2,434.71	881.97	869.77	10.43	35.04	-92.11	-1,109.93	-4,999.51	5,362.05	5,317.53	44.52	120.439	
2,600.00	2,529.65	923.00	908.77	10.94	35.07	-92.19	-1,107.45	-5,012.05	5,392.27	5,347.33	44.94	119.994	
2,700.00	2,624.59	955.00	939.07	11.45	35.08	-92.25	-1,105.50	-5,022.15	5,423.51	5,378.17	45.33	119.635	
2,800.00	2,719.53	980.48	963.10	11.97	35.10	-92.30	-1,103.99	-5,030.50	5,455.94	5,410.22	45.72	119.347	
2,900.00	2,814.48	1,017.00	997.34	12.49	35.13	-92.37	-1,101.80	-5,042.98	5,489.57	5,443.45	46.12	119.039	
3,000.00	2,909.42	1,017.00	997.34	13.01	35.13	-92.37	-1,101.80	-5,042.98	5,524.39	5,477.97	46.42	119.020	
3,100.00	3,004.36	1,066.63	1,043.57	13.53	35.19	-92.46	-1,098.82	-5,060.79	5,560.11	5,513.25	46.86	118.649	
3,200.00	3,099.30	1,109.00	1,082.76	14.05	35.24	-92.53	-1,096.29	-5,076.69	5,597.05	5,549.77	47.28	118.379	
3,300.00	3,194.25	1,159.06	1,128.86	14.57	35.29	-92.62	-1,093.11	-5,095.93	5,634.79	5,587.08	47.71	118.095	
3,400.00	3,289.19	1,203.00	1,169.26	15.09	35.33	-92.68	-1,089.98	-5,112.94	5,672.95	5,624.82	48.12	117.880	
3,500.00	3,384.13	1,241.89	1,204.80	15.62	35.38	-92.74	-1,086.93	-5,128.41	5,711.95	5,663.43	48.53	117.706	
3,600.00	3,479.07	1,297.00	1,254.58	16.14	35.45	-92.81	-1,082.09	-5,151.57	5,752.33	5,703.34	48.99	117.420	
3,700.00	3,574.02	1,297.00	1,254.58	16.67	35.45	-92.81	-1,082.09	-5,151.57	5,793.24	5,744.01	49.23	117.677	
3,800.00	3,668.96	1,359.98	1,311.38	17.19	35.56	-92.90	-1,077.98	-5,178.43	5,835.15	5,785.40	49.76	117.273	
3,900.00	3,763.90	1,443.55	1,387.45	17.72	35.67	-93.06	-1,076.63	-5,213.01	5,877.32	5,826.98	50.34	116.747	
4,000.00	3,858.84	1,517.63	1,454.93	18.24	35.75	-93.21	-1,075.94	-5,243.56	5,919.60	5,868.74	50.86	116.383	
4,100.00	3,953.79	1,575.00	1,507.08	18.77	35.82	-93.32	-1,075.28	-5,267.48	5,962.30	5,910.99	51.31	116.199	
4,200.00	4,048.73	1,629.84	1,556.73	19.30	35.88	-93.42	-1,074.34	-5,290.73	6,005.54	5,953.78	51.76	116.031	
4,300.00	4,143.67	1,684.26	1,605.75	19.82	35.95	-93.51	-1,072.88	-5,314.32	6,049.36	5,997.16	52.20	115.879	
4,400.00	4,238.61	1,763.00	1,676.34	20.35	36.05	-93.63	-1,069.85	-5,349.08	6,093.62	6,040.86	52.76	115.488	
4,500.00	4,333.56	1,821.99	1,728.97	20.88	36.13	-93.71	-1,066.80	-5,375.55	6,138.17	6,084.92	53.24	115.288	
4,600.00	4,428.50	1,856.00	1,759.21	21.41	36.17	-93.76	-1,064.69	-5,390.97	6,183.15	6,129.55	53.60	115.353	
4,700.00	4,523.44	1,921.33	1,816.82	21.93	36.27	-93.82	-1,059.53	-5,421.33	6,228.59	6,174.45	54.14	115.049	
4,800.00	4,618.38	1,978.60	1,866.74	22.46	36.37	-93.86	-1,053.78	-5,448.80	6,274.73	6,220.09	54.64	114.841	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		561-MWD OWSG Rev5						Rule Assigned:		Offset Well Error:		0.00 usft		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
4,900.00	4,713.33	2,066.20	1,942.98	22.99	36.51	-93.92	-1,044.83	-5,491.00	6,321.06	6,265.75	55.30	114.295		
5,000.00	4,808.27	2,387.74	2,225.89	23.52	37.07	-94.14	-1,009.95	-5,639.66	6,364.50	6,307.23	57.27	111.140		
5,100.00	4,903.21	2,506.00	2,331.56	24.05	37.30	-94.25	-999.29	-5,691.66	6,407.18	6,349.04	58.13	110.214		
5,200.00	4,998.16	2,546.06	2,367.51	24.58	37.40	-94.30	-996.40	-5,709.08	6,450.10	6,391.50	58.60	110.071		
5,300.00	5,093.10	3,337.00	3,088.56	25.11	39.41	-95.16	-932.06	-6,022.71	6,493.37	6,430.18	63.19	102.757	SF	
5,400.00	5,188.04	3,337.00	3,088.56	25.64	39.41	-95.16	-932.06	-6,022.71	6,527.57	6,464.06	63.51	102.784		
5,500.00	5,282.98	3,337.00	3,088.56	26.17	39.41	-95.16	-932.06	-6,022.71	6,563.11	6,499.30	63.81	102.855		
5,600.00	5,377.93	3,337.00	3,088.56	26.70	39.41	-95.16	-932.06	-6,022.71	6,599.97	6,535.88	64.10	102.969		
5,623.25	5,400.00	3,337.00	3,088.56	26.82	39.41	-95.16	-932.06	-6,022.71	6,608.73	6,544.57	64.16	103.002		
5,700.00	5,473.03	3,337.00	3,088.56	27.22	39.41	-95.47	-932.06	-6,022.71	6,638.10	6,573.73	64.37	103.130		
5,800.00	5,568.64	3,337.00	3,088.56	27.73	39.41	-95.90	-932.06	-6,022.71	6,677.35	6,612.74	64.61	103.346		
5,900.00	5,664.75	3,337.00	3,088.56	28.23	39.41	-96.34	-932.06	-6,022.71	6,717.70	6,652.87	64.83	103.616		
6,000.00	5,761.33	3,337.00	3,088.56	28.71	39.41	-96.79	-932.06	-6,022.71	6,759.12	6,694.09	65.03	103.939		
6,100.00	5,858.34	3,337.00	3,088.56	29.18	39.41	-97.25	-932.06	-6,022.71	6,801.56	6,736.36	65.20	104.313		
6,200.00	5,955.76	3,337.00	3,088.56	29.64	39.41	-97.73	-932.06	-6,022.71	6,845.01	6,779.65	65.35	104.737		
6,300.00	6,053.57	3,337.00	3,088.56	30.07	39.41	-98.22	-932.06	-6,022.71	6,889.42	6,823.94	65.48	105.209		
6,400.00	6,151.72	3,337.00	3,088.56	30.50	39.41	-98.73	-932.06	-6,022.71	6,934.77	6,869.18	65.59	105.729		
6,500.00	6,250.19	3,337.00	3,088.56	30.91	39.41	-99.24	-932.06	-6,022.71	6,981.03	6,915.35	65.68	106.293		
6,600.00	6,348.94	3,337.00	3,088.56	31.30	39.41	-99.77	-932.06	-6,022.71	7,028.15	6,962.41	65.74	106.902		
6,659.67	6,408.00	3,337.00	3,088.56	31.53	39.41	-100.09	-932.06	-6,022.71	7,056.68	6,990.90	65.77	107.286		
6,700.00	6,447.82	3,337.00	3,088.56	31.68	39.41	-115.66	-932.06	-6,022.71	7,077.14	7,011.35	65.80	107.558		
6,750.00	6,496.66	3,337.00	3,088.56	31.90	39.41	-125.57	-932.06	-6,022.71	7,105.44	7,039.60	65.84	107.922		
6,800.00	6,544.65	3,337.00	3,088.56	32.13	39.41	-130.23	-932.06	-6,022.71	7,136.77	7,070.88	65.89	108.318		
6,850.00	6,591.49	3,337.00	3,088.56	32.37	39.41	-132.12	-932.06	-6,022.71	7,170.90	7,104.95	65.94	108.742		
6,900.00	6,636.89	3,337.00	3,088.56	32.62	39.41	-132.21	-932.06	-6,022.71	7,207.58	7,141.57	66.01	109.193		
6,950.00	6,680.57	3,337.00	3,088.56	32.89	39.41	-130.90	-932.06	-6,022.71	7,246.55	7,180.47	66.08	109.667		
7,000.00	6,722.26	3,337.00	3,088.56	33.17	39.41	-128.30	-932.06	-6,022.71	7,287.54	7,221.38	66.15	110.159		
7,050.00	6,761.71	3,337.00	3,088.56	33.45	39.41	-124.32	-932.06	-6,022.71	7,330.26	7,264.02	66.24	110.666		
7,100.00	6,798.67	3,337.00	3,088.56	33.75	39.41	-118.79	-932.06	-6,022.71	7,374.41	7,308.09	66.33	111.184		
7,150.00	6,832.91	3,337.00	3,088.56	34.06	39.41	-111.47	-932.06	-6,022.71	7,419.72	7,353.30	66.42	111.707		
7,200.00	6,864.22	3,337.00	3,088.56	34.37	39.41	-102.24	-932.06	-6,022.71	7,465.87	7,399.34	66.52	112.232		
7,250.00	6,892.42	3,337.00	3,088.56	34.69	39.41	-91.31	-932.06	-6,022.71	7,512.57	7,445.94	66.63	112.753		
7,300.00	6,917.32	3,337.00	3,088.56	35.03	39.41	-79.39	-932.06	-6,022.71	7,559.52	7,492.78	66.74	113.266		
7,350.00	6,938.77	3,337.00	3,088.56	35.37	39.41	-67.63	-932.06	-6,022.71	7,606.44	7,539.58	66.86	113.767		
7,400.00	6,956.64	3,337.00	3,088.56	35.72	39.41	-57.04	-932.06	-6,022.71	7,653.03	7,586.04	66.99	114.249		
7,450.00	6,970.83	3,337.00	3,088.56	36.07	39.41	-48.13	-932.06	-6,022.71	7,699.02	7,631.90	67.12	114.709		
7,500.00	6,981.23	3,337.00	3,088.56	36.44	39.41	-40.90	-932.06	-6,022.71	7,744.14	7,676.89	67.26	115.142		
7,550.00	6,987.80	3,337.00	3,088.56	36.81	39.41	-35.12	-932.06	-6,022.71	7,788.13	7,720.73	67.40	115.543		
7,600.00	6,990.48	3,337.00	3,088.56	37.19	39.41	-30.50	-932.06	-6,022.71	7,830.74	7,763.18	67.56	115.909		
7,609.87	6,990.55	3,337.00	3,088.56	37.26	39.41	-29.70	-932.06	-6,022.71	7,838.96	7,771.37	67.59	115.979		
7,700.00	6,990.49	3,337.00	3,088.56	37.97	39.41	-29.70	-932.06	-6,022.71	7,913.95	7,846.07	67.89	116.576		
7,800.00	6,990.42	3,337.00	3,088.56	38.78	39.41	-29.70	-932.06	-6,022.71	7,997.52	7,929.30	68.21	117.243		
7,900.00	6,990.35	3,337.00	3,088.56	39.64	39.41	-29.70	-932.06	-6,022.71	8,081.45	8,012.92	68.54	117.915		
8,000.00	6,990.28	3,337.00	3,088.56	40.53	39.41	-29.70	-932.06	-6,022.71	8,165.75	8,096.90	68.86	118.592		
8,100.00	6,990.21	3,337.00	3,088.56	41.45	39.41	-29.70	-932.06	-6,022.71	8,250.40	8,181.23	69.17	119.275		
8,200.00	6,990.14	3,337.00	3,088.56	42.40	39.41	-29.70	-932.06	-6,022.71	8,335.40	8,265.91	69.48	119.963		
8,306.37	6,990.06	3,337.00	3,088.56	43.45	39.41	-29.70	-932.06	-6,022.71	8,426.16	8,356.35	69.81	120.701		
8,400.00	6,990.00	3,337.00	3,088.56	44.38	39.41	-23.96	-932.06	-6,022.71	8,507.08	8,437.00	70.08	121.389		
8,500.00	6,989.93	3,337.00	3,088.56	45.36	39.41	-17.01	-932.06	-6,022.71	8,595.10	8,524.76	70.34	122.201		
8,600.00	6,989.85	3,337.00	3,088.56	46.33	39.41	-9.32	-932.06	-6,022.71	8,684.31	8,613.76	70.55	123.090		
8,700.00	6,989.78	3,337.00	3,088.56	47.28	39.41	-1.12	-932.06	-6,022.71	8,774.26	8,703.52	70.73	124.050		
8,800.00	6,989.70	3,337.00	3,088.56	48.21	39.41	7.22	-932.06	-6,022.71	8,864.47	8,793.60	70.87	125.075		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		561-MWD OWSG Rev5						Rule Assigned:					Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,900.00	6,989.63	3,337.00	3,088.56	49.11	39.41	15.34	-932.06	-6,022.71	8,954.52	8,883.54	70.98	126.157		
9,000.00	6,989.55	3,337.00	3,088.56	49.99	39.41	22.90	-932.06	-6,022.71	9,043.97	8,972.92	71.05	127.290		
9,100.00	6,989.48	3,337.00	3,088.56	50.84	39.41	29.70	-932.06	-6,022.71	9,132.41	9,061.33	71.09	128.465		
9,200.00	6,989.40	3,337.00	3,088.56	51.66	39.41	35.65	-932.06	-6,022.71	9,219.46	9,148.36	71.10	129.673		
9,300.00	6,989.33	3,337.00	3,088.56	52.45	39.41	40.78	-932.06	-6,022.71	9,304.72	9,233.64	71.08	130.905		
9,393.87	6,989.27	3,337.00	3,088.56	53.15	39.41	44.91	-932.06	-6,022.71	9,382.81	9,311.77	71.04	132.076		
9,400.00	6,989.26	3,337.00	3,088.56	53.20	39.41	44.91	-932.06	-6,022.71	9,387.84	9,316.81	71.04	132.155		
9,500.00	6,989.19	3,337.00	3,088.56	53.95	39.41	44.91	-932.06	-6,022.71	9,470.12	9,399.13	70.99	133.395		
9,600.00	6,989.12	3,337.00	3,088.56	54.73	39.41	44.91	-932.06	-6,022.71	9,552.74	9,481.78	70.96	134.627		
9,700.00	6,989.05	3,337.00	3,088.56	55.55	39.41	44.91	-932.06	-6,022.71	9,635.68	9,564.75	70.93	135.851		
9,800.00	6,988.98	3,337.00	3,088.56	56.40	39.41	44.91	-932.06	-6,022.71	9,718.95	9,648.04	70.91	137.066		
9,900.00	6,988.91	3,337.00	3,088.56	57.28	39.41	44.91	-932.06	-6,022.71	9,802.52	9,731.63	70.89	138.273		
10,000.00	6,988.84	3,337.00	3,088.56	58.20	39.41	44.91	-932.06	-6,022.71	9,886.41	9,815.52	70.88	139.471		
10,100.00	6,988.77	3,337.00	3,088.56	59.14	39.41	44.91	-932.06	-6,022.71	9,970.59	9,899.71	70.88	140.662		
10,200.00	6,988.70	3,337.00	3,088.56	60.11	39.41	44.91	-932.06	-6,022.71	10,055.06	9,984.17	70.89	141.844		
10,300.00	6,988.63	3,337.00	3,088.56	61.11	39.41	44.91	-932.06	-6,022.71	10,139.81	10,068.91	70.90	143.017		
10,400.00	6,988.56	3,337.00	3,088.56	62.14	39.41	44.91	-932.06	-6,022.71	10,224.84	10,153.93	70.92	144.183		
10,500.00	6,988.49	3,337.00	3,088.56	63.19	39.41	44.91	-932.06	-6,022.71	10,310.14	10,239.20	70.94	145.340		
10,600.00	6,988.42	3,337.00	3,088.56	64.26	39.41	44.91	-932.06	-6,022.71	10,395.70	10,324.73	70.97	146.490		
10,700.00	6,988.35	3,337.00	3,088.56	65.36	39.41	44.91	-932.06	-6,022.71	10,481.51	10,410.51	71.00	147.631		
10,800.00	6,988.28	3,337.00	3,088.56	66.48	39.41	44.91	-932.06	-6,022.71	10,567.58	10,496.54	71.04	148.765		
10,900.00	6,988.21	3,337.00	3,088.56	67.61	39.41	44.91	-932.06	-6,022.71	10,653.88	10,582.81	71.08	149.891		
11,000.00	6,988.14	3,337.00	3,088.56	68.77	39.41	44.91	-932.06	-6,022.71	10,740.43	10,669.31	71.12	151.009		
11,100.00	6,988.07	3,337.00	3,088.56	69.95	39.41	44.91	-932.06	-6,022.71	10,827.21	10,756.03	71.18	152.120		
11,200.00	6,988.01	3,337.00	3,088.56	71.14	39.41	44.91	-932.06	-6,022.71	10,914.21	10,842.98	71.23	153.223		
11,300.00	6,987.94	3,337.00	3,088.56	72.35	39.41	44.91	-932.06	-6,022.71	11,001.43	10,930.14	71.29	154.320		
11,400.00	6,987.87	3,337.00	3,088.56	73.57	39.41	44.91	-932.06	-6,022.71	11,088.87	11,017.52	71.35	155.409		
11,500.00	6,987.80	3,337.00	3,088.56	74.81	39.41	44.91	-932.06	-6,022.71	11,176.53	11,105.11	71.42	156.491		
11,600.00	6,987.73	3,337.00	3,088.56	76.07	39.41	44.91	-932.06	-6,022.71	11,264.38	11,192.89	71.49	157.567		
11,643.87	6,987.70	3,337.00	3,088.56	76.62	39.41	44.91	-932.06	-6,022.71	11,302.98	11,231.46	71.52	158.037		
11,700.00	6,987.66	3,337.00	3,088.56	77.33	39.41	46.35	-932.06	-6,022.71	11,352.25	11,280.69	71.56	158.636		
11,737.27	6,987.63	3,337.00	3,088.56	77.80	39.41	47.27	-932.06	-6,022.71	11,384.79	11,313.20	71.59	159.033		
11,800.00	6,987.59	3,337.00	3,088.56	78.59	39.41	47.27	-932.06	-6,022.71	11,439.47	11,367.84	71.63	159.694		
11,900.00	6,987.52	3,337.00	3,088.56	79.86	39.41	47.27	-932.06	-6,022.71	11,526.81	11,455.10	71.71	160.741		
12,000.00	6,987.46	3,337.00	3,088.56	81.14	39.41	47.27	-932.06	-6,022.71	11,614.35	11,542.56	71.79	161.780		
12,100.00	6,987.39	3,337.00	3,088.56	82.43	39.41	47.27	-932.06	-6,022.71	11,702.10	11,630.22	71.87	162.813		
12,200.00	6,987.32	3,337.00	3,088.56	83.73	39.41	47.27	-932.06	-6,022.71	11,790.04	11,718.08	71.96	163.838		
12,300.00	6,987.26	3,337.00	3,088.56	85.05	39.41	47.27	-932.06	-6,022.71	11,878.17	11,806.12	72.05	164.858		
12,400.00	6,987.19	1,949.00	1,840.98	86.38	36.32	39.99	-1,056.83	-5,434.55	11,962.24	11,894.81	67.43	177.414		
12,500.00	6,987.12	1,949.00	1,840.98	87.71	36.32	39.99	-1,056.83	-5,434.55	12,045.87	11,978.23	67.64	178.099		
12,600.00	6,987.06	1,914.32	1,810.67	89.06	36.26	39.84	-1,060.17	-5,418.02	12,129.60	12,061.84	67.75	179.022		
12,700.00	6,986.99	1,899.28	1,797.46	90.41	36.24	39.78	-1,061.47	-5,410.95	12,213.56	12,145.63	67.93	179.792		
12,800.00	6,986.92	1,856.00	1,759.21	91.77	36.17	39.59	-1,064.69	-5,390.97	12,297.81	12,229.77	68.04	180.734		
12,900.00	6,986.86	1,856.00	1,759.21	93.14	36.17	39.59	-1,064.69	-5,390.97	12,382.06	12,313.79	68.26	181.385		
13,000.00	6,986.79	1,856.00	1,759.21	94.52	36.17	39.59	-1,064.69	-5,390.97	12,466.53	12,398.05	68.48	182.035		
13,100.00	6,986.72	1,826.71	1,733.17	95.90	36.13	39.45	-1,066.52	-5,377.68	12,551.19	12,482.53	68.65	182.815		
13,200.00	6,986.66	1,798.31	1,707.87	97.30	36.10	39.33	-1,068.12	-5,364.88	12,635.96	12,567.13	68.83	183.576		
13,300.00	6,986.59	1,763.00	1,676.34	98.69	36.05	39.17	-1,069.85	-5,349.08	12,720.86	12,651.86	69.00	184.350		
13,400.00	6,986.52	1,743.68	1,659.05	100.10	36.03	39.08	-1,070.70	-5,340.49	12,805.88	12,736.67	69.20	185.043		
13,500.00	6,986.46	1,717.74	1,635.81	101.51	35.99	38.96	-1,071.73	-5,329.02	12,891.02	12,821.62	69.40	185.750		
13,600.00	6,986.39	1,692.11	1,612.80	102.93	35.96	38.84	-1,072.63	-5,317.76	12,976.29	12,906.69	69.60	186.443		
13,700.00	6,986.32	1,670.00	1,592.93	104.35	35.93	38.74	-1,073.31	-5,308.10	13,061.68	12,991.87	69.81	187.116		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171A - OH - OH-SVY												Offset Site Error: 0.00 usft	
Survey Program:		561-MWD OWSG Rev5						Rule Assigned:				Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
13,800.00	6,986.25	1,670.00	1,592.93	105.78	35.93	38.74	-1,073.31	-5,308.10	13,147.24	13,077.21	70.04	187.722	
13,900.00	6,986.19	1,635.84	1,562.15	107.21	35.89	38.59	-1,074.20	-5,293.31	13,232.89	13,162.65	70.24	188.401	
14,000.00	6,986.12	1,620.11	1,547.94	108.65	35.87	38.51	-1,074.54	-5,286.57	13,318.72	13,248.26	70.46	189.032	
14,100.00	6,986.05	1,575.00	1,507.08	110.09	35.82	38.30	-1,075.28	-5,267.48	13,404.79	13,334.13	70.66	189.712	
14,200.00	6,985.99	1,575.00	1,507.08	111.54	35.82	38.30	-1,075.28	-5,267.48	13,490.84	13,419.95	70.89	190.302	
14,300.00	6,985.92	1,575.00	1,507.08	112.99	35.82	38.30	-1,075.28	-5,267.48	13,577.08	13,505.96	71.12	190.894	
14,400.00	6,985.85	1,575.00	1,507.08	114.45	35.82	38.30	-1,075.28	-5,267.48	13,663.51	13,592.16	71.35	191.488	
14,500.00	6,985.79	1,532.48	1,468.44	115.91	35.77	38.11	-1,075.78	-5,249.73	13,749.99	13,678.42	71.57	192.109	
14,600.00	6,985.72	1,512.10	1,449.90	117.38	35.75	38.01	-1,075.99	-5,241.27	13,836.63	13,764.83	71.80	192.708	
14,700.00	6,985.65	1,481.00	1,421.57	118.84	35.72	37.87	-1,076.28	-5,228.43	13,923.40	13,851.37	72.03	193.305	
14,800.00	6,985.59	1,460.55	1,402.94	120.32	35.69	37.78	-1,076.47	-5,220.02	14,010.25	13,938.00	72.25	193.903	
14,900.00	6,985.52	1,415.80	1,362.17	121.79	35.64	37.57	-1,076.93	-5,201.58	14,097.17	14,024.70	72.48	194.510	
15,000.00	6,985.45	1,373.41	1,323.57	123.27	35.58	37.38	-1,077.55	-5,184.05	14,184.13	14,111.44	72.69	195.129	
15,100.00	6,985.39	1,333.48	1,287.40	124.75	35.51	37.22	-1,079.28	-5,167.23	14,271.15	14,198.26	72.89	195.782	
15,200.00	6,985.32	1,297.00	1,254.58	126.24	35.45	37.07	-1,082.09	-5,151.57	14,358.21	14,285.12	73.10	196.421	
15,300.00	6,985.25	1,297.00	1,254.58	127.72	35.45	37.07	-1,082.09	-5,151.57	14,445.40	14,372.07	73.33	196.984	
15,400.00	6,985.19	1,297.00	1,254.58	129.21	35.45	37.07	-1,082.09	-5,151.57	14,532.75	14,459.18	73.56	197.550	
15,500.00	6,985.12	1,297.00	1,254.58	130.71	35.45	37.07	-1,082.09	-5,151.57	14,620.26	14,546.46	73.80	198.118	
15,600.00	6,985.05	1,297.00	1,254.58	132.20	35.45	37.07	-1,082.09	-5,151.57	14,707.93	14,633.90	74.02	198.689	
15,700.00	6,984.99	1,297.00	1,254.58	133.70	35.45	37.07	-1,082.09	-5,151.57	14,795.76	14,721.50	74.25	199.262	
15,800.00	6,984.92	1,297.00	1,254.58	135.20	35.45	37.07	-1,082.09	-5,151.57	14,883.74	14,809.26	74.48	199.839	
15,900.00	6,984.85	1,297.00	1,254.58	136.71	35.45	37.07	-1,082.09	-5,151.57	14,971.87	14,897.16	74.70	200.417	
16,000.00	6,984.79	1,252.16	1,214.14	138.21	35.39	36.90	-1,086.07	-5,132.62	15,059.62	14,984.68	74.94	200.957	
16,100.00	6,984.72	1,246.95	1,209.40	139.72	35.39	36.88	-1,086.51	-5,130.48	15,147.92	15,072.75	75.17	201.529	
16,200.00	6,984.65	1,203.00	1,169.26	141.23	35.33	36.71	-1,089.98	-5,112.94	15,236.74	15,161.33	75.40	202.066	
16,300.00	6,984.59	1,203.00	1,169.26	142.75	35.33	36.71	-1,089.98	-5,112.94	15,325.19	15,249.57	75.63	202.640	
16,400.00	6,984.52	1,203.00	1,169.26	144.26	35.33	36.71	-1,089.98	-5,112.94	15,413.79	15,337.95	75.85	203.217	
16,500.00	6,984.45	1,203.00	1,169.26	145.78	35.33	36.71	-1,089.98	-5,112.94	15,502.53	15,426.46	76.07	203.797	
16,600.00	6,984.39	1,203.00	1,169.26	147.29	35.33	36.71	-1,089.98	-5,112.94	15,591.41	15,515.12	76.29	204.379	
16,700.00	6,984.32	1,203.00	1,169.26	148.82	35.33	36.71	-1,089.98	-5,112.94	15,680.42	15,603.91	76.50	204.964	
16,800.00	6,984.25	1,203.00	1,169.26	150.34	35.33	36.71	-1,089.98	-5,112.94	15,769.56	15,692.84	76.72	205.551	
16,900.00	6,984.19	1,203.00	1,169.26	151.86	35.33	36.71	-1,089.98	-5,112.94	15,858.83	15,781.89	76.93	206.141	
17,000.00	6,984.12	1,203.00	1,169.26	153.39	35.33	36.71	-1,089.98	-5,112.94	15,948.22	15,871.08	77.14	206.733	
17,100.00	6,984.05	1,172.31	1,141.05	154.91	35.30	36.59	-1,092.20	-5,101.05	16,037.71	15,960.32	77.39	207.237	
17,200.00	6,983.99	1,143.82	1,114.84	156.44	35.27	36.47	-1,094.12	-5,090.06	16,127.24	16,049.61	77.63	207.742	
17,300.00	6,983.92	1,109.00	1,082.76	157.97	35.24	36.34	-1,096.29	-5,076.69	16,216.84	16,138.96	77.88	208.224	
17,400.00	6,983.85	1,109.00	1,082.76	159.50	35.24	36.34	-1,096.29	-5,076.69	16,306.50	16,228.41	78.09	208.813	
17,500.00	6,983.79	1,109.00	1,082.76	161.04	35.24	36.34	-1,096.29	-5,076.69	16,396.29	16,317.99	78.30	209.404	
17,600.00	6,983.72	1,109.00	1,082.76	162.57	35.24	36.34	-1,096.29	-5,076.69	16,486.19	16,407.68	78.51	209.998	
17,700.00	6,983.65	1,109.00	1,082.76	164.11	35.24	36.34	-1,096.29	-5,076.69	16,576.21	16,497.49	78.71	210.593	
17,800.00	6,983.59	1,109.00	1,082.76	165.65	35.24	36.34	-1,096.29	-5,076.69	16,666.34	16,587.42	78.92	211.191	
17,900.00	6,983.52	1,109.00	1,082.76	167.18	35.24	36.34	-1,096.29	-5,076.69	16,756.58	16,677.46	79.12	211.791	
18,000.00	6,983.45	1,109.00	1,082.76	168.72	35.24	36.34	-1,096.29	-5,076.69	16,846.93	16,767.61	79.32	212.392	
18,100.00	6,983.39	1,068.61	1,045.41	170.27	35.19	36.18	-1,098.70	-5,061.52	16,937.04	16,857.47	79.57	212.856	
18,200.00	6,983.32	1,063.63	1,040.79	171.81	35.18	36.16	-1,099.00	-5,059.69	17,027.52	16,947.74	79.78	213.440	
18,300.00	6,983.25	1,058.70	1,036.21	173.35	35.18	36.14	-1,099.29	-5,057.88	17,118.09	17,038.10	79.98	214.025	
18,400.00	6,983.19	1,017.00	997.34	174.90	35.13	35.97	-1,101.80	-5,042.98	17,209.05	17,128.81	80.24	214.482	
18,500.00	6,983.12	1,017.00	997.34	176.44	35.13	35.97	-1,101.80	-5,042.98	17,299.73	17,219.30	80.43	215.084	
18,600.00	6,983.05	1,017.00	997.34	177.99	35.13	35.97	-1,101.80	-5,042.98	17,390.52	17,309.89	80.63	215.687	
18,700.00	6,982.99	1,017.00	997.34	179.54	35.13	35.97	-1,101.80	-5,042.98	17,481.41	17,400.58	80.82	216.292	
18,800.00	6,982.92	1,017.00	997.34	181.09	35.13	35.97	-1,101.80	-5,042.98	17,572.39	17,491.38	81.02	216.898	
18,900.00	6,982.85	1,017.00	997.34	182.64	35.13	35.97	-1,101.80	-5,042.98	17,663.48	17,582.27	81.21	217.506	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program: 561-MWD OWSG Rev5													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,000.00	6,982.78	1,017.00	997.34	184.19	35.13	35.97	-1,101.80	-5,042.98	17,754.66	17,673.26	81.40	218.116		
19,100.00	6,982.72	1,017.00	997.34	185.74	35.13	35.97	-1,101.80	-5,042.98	17,845.93	17,764.34	81.59	218.727		
19,200.00	6,982.65	1,017.00	997.34	187.29	35.13	35.97	-1,101.80	-5,042.98	17,937.30	17,855.52	81.78	219.340		
19,300.00	6,982.58	1,017.00	997.34	188.84	35.13	35.97	-1,101.80	-5,042.98	18,028.76	17,946.79	81.97	219.954		
19,400.00	6,982.52	1,017.00	997.34	190.40	35.13	35.97	-1,101.80	-5,042.98	18,120.31	18,038.16	82.15	220.570		
19,500.00	6,982.45	1,017.00	997.34	191.95	35.13	35.97	-1,101.80	-5,042.98	18,211.95	18,129.61	82.34	221.187		
19,600.00	6,982.38	1,017.00	997.34	193.51	35.13	35.97	-1,101.80	-5,042.98	18,303.67	18,221.15	82.52	221.805		
19,700.00	6,982.32	1,017.00	997.34	195.07	35.13	35.97	-1,101.80	-5,042.98	18,395.49	18,312.78	82.70	222.425		
19,800.00	6,982.25	1,017.00	997.34	196.62	35.13	35.97	-1,101.80	-5,042.98	18,487.38	18,404.50	82.89	223.045		
19,900.00	6,982.18	1,017.00	997.34	198.18	35.13	35.97	-1,101.80	-5,042.98	18,579.36	18,496.30	83.07	223.667		
20,000.00	6,982.12	987.25	969.46	199.74	35.11	35.85	-1,103.59	-5,032.77	18,671.20	18,587.89	83.31	224.108		
20,100.00	6,982.05	983.75	966.17	201.30	35.10	35.84	-1,103.80	-5,031.59	18,763.29	18,679.79	83.50	224.709		
20,176.02	6,982.00	955.00	939.07	202.36	35.08	35.73	-1,105.50	-5,022.15	18,833.51	18,747.89	85.63	219.946		

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171B - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 324-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	37.10	37.10	0.00	0.41	-72.41	1,439.51	-4,540.80	4,763.51				
100.00	100.00	132.22	132.22	0.25	1.47	-72.41	1,439.53	-4,540.88	4,763.60	4,761.88	1.72	2,772.187	
200.00	200.00	227.33	227.33	0.61	2.52	-72.41	1,439.59	-4,541.06	4,763.79	4,760.66	3.13	1,520.826	
300.00	300.00	324.00	324.00	0.97	3.60	-72.41	1,439.67	-4,541.33	4,764.09	4,759.53	4.56	1,043.945	
400.00	400.00	413.25	413.24	1.33	3.76	-72.41	1,439.95	-4,541.62	4,764.50	4,759.42	5.08	937.463	
500.00	500.00	497.25	497.25	1.68	3.86	-72.41	1,439.97	-4,542.25	4,765.22	4,759.67	5.55	859.067	
600.00	600.00	565.00	564.97	2.04	3.98	-72.43	1,438.77	-4,543.64	4,766.58	4,760.56	6.01	792.746	
700.00	699.98	602.26	602.16	2.40	4.41	-62.44	1,437.12	-4,545.13	4,768.08	4,761.50	6.58	724.936	
800.00	799.84	655.00	654.64	2.76	5.23	-62.51	1,433.00	-4,548.32	4,769.07	4,761.97	7.10	671.971	
900.00	899.45	718.86	717.87	3.13	6.20	-62.66	1,425.71	-4,553.46	4,769.34	4,761.61	7.73	616.931	
1,000.00	998.70	785.04	783.04	3.49	6.87	-62.89	1,416.16	-4,559.79	4,768.74	4,760.44	8.30	574.514	
1,100.00	1,097.47	851.22	847.94	3.86	7.23	-63.17	1,405.32	-4,566.94	4,767.34	4,758.50	8.84	539.102	
1,200.00	1,195.62	926.00	921.17	4.24	7.44	-63.53	1,392.80	-4,575.48	4,765.07	4,755.66	9.41	506.644	
1,300.00	1,293.06	979.47	973.42	4.64	7.60	-63.84	1,383.53	-4,582.01	4,762.09	4,752.14	9.95	478.568	
1,400.00	1,389.64	1,020.00	1,012.88	5.06	7.73	-64.12	1,375.99	-4,587.37	4,758.67	4,748.19	10.48	454.102	
1,500.00	1,485.27	1,085.83	1,076.74	5.50	8.00	-64.56	1,363.06	-4,596.78	4,754.78	4,743.65	11.13	427.188	
1,515.00	1,499.52	1,093.68	1,084.33	5.57	8.04	-64.62	1,361.47	-4,597.95	4,754.17	4,742.95	11.22	423.587	
1,600.00	1,580.22	1,139.83	1,128.91	5.96	8.22	-64.90	1,351.90	-4,605.07	4,751.10	4,739.32	11.77	403.614	
1,700.00	1,675.17	1,207.00	1,193.48	6.44	8.50	-65.32	1,337.04	-4,616.10	4,748.52	4,736.04	12.48	380.451	
1,800.00	1,770.11	1,270.66	1,254.38	6.92	8.74	-65.73	1,322.04	-4,627.02	4,746.87	4,733.67	13.20	359.519	
1,900.00	1,865.05	1,333.99	1,314.72	7.41	8.98	-66.15	1,306.34	-4,638.13	4,746.03	4,732.09	13.94	340.384	
1,924.95	1,888.74	1,347.22	1,327.28	7.53	9.03	-66.24	1,302.94	-4,640.53	4,745.99	4,731.87	14.12	336.101 CC	
2,000.00	1,959.99	1,393.00	1,370.61	7.90	9.21	-66.55	1,290.89	-4,649.04	4,746.34	4,731.66	14.68	323.307 ES	
2,100.00	2,054.94	1,451.19	1,425.45	8.40	9.44	-66.95	1,274.94	-4,660.21	4,747.73	4,732.29	15.44	307.451	
2,200.00	2,149.88	1,510.14	1,480.76	8.90	9.68	-67.37	1,258.17	-4,671.82	4,750.13	4,733.92	16.22	292.890	
2,300.00	2,244.82	1,578.00	1,544.09	9.41	9.94	-67.85	1,238.17	-4,685.75	4,753.78	4,736.73	17.05	278.811	
2,400.00	2,339.76	1,624.01	1,586.84	9.92	10.11	-68.18	1,224.23	-4,695.48	4,758.50	4,740.71	17.79	267.531	
2,500.00	2,434.71	1,670.00	1,629.48	10.43	10.27	-68.52	1,210.05	-4,705.30	4,764.29	4,745.77	18.52	257.216	
2,600.00	2,529.65	1,721.15	1,676.64	10.94	10.49	-68.89	1,193.79	-4,716.59	4,771.34	4,752.03	19.31	247.031	
2,700.00	2,624.59	1,764.00	1,715.84	11.45	10.67	-69.22	1,179.63	-4,726.54	4,779.90	4,759.84	20.06	238.314	
2,800.00	2,719.53	1,804.37	1,752.58	11.97	10.85	-69.52	1,166.00	-4,736.23	4,789.85	4,769.05	20.80	230.287	
2,900.00	2,814.48	1,858.00	1,801.24	12.49	11.09	-69.93	1,147.72	-4,749.44	4,801.13	4,779.51	21.62	222.034	
3,000.00	2,909.42	1,891.19	1,831.27	13.01	11.22	-70.18	1,136.35	-4,757.84	4,813.75	4,791.42	22.33	215.621	
3,100.00	3,004.36	1,930.16	1,866.45	13.53	11.37	-70.48	1,123.00	-4,767.98	4,827.79	4,804.73	23.06	209.355	
3,200.00	3,099.30	1,983.00	1,914.02	14.05	11.58	-70.88	1,104.92	-4,782.20	4,843.28	4,819.39	23.88	202.783	
3,300.00	3,194.25	2,241.24	2,148.46	14.57	12.68	-72.80	1,019.02	-4,847.97	4,859.24	4,833.13	26.10	186.165	
3,400.00	3,289.19	2,331.43	2,231.07	15.09	13.06	-73.46	989.30	-4,868.58	4,873.08	4,845.90	27.18	179.319	
3,500.00	3,384.13	2,408.52	2,301.65	15.62	13.39	-74.02	963.94	-4,886.42	4,887.95	4,859.80	28.15	173.623	
3,600.00	3,479.07	2,647.84	2,522.98	16.14	14.47	-75.72	889.26	-4,938.39	4,902.68	4,872.49	30.19	162.392	
3,700.00	3,574.02	2,712.62	2,582.90	16.67	14.78	-76.18	868.33	-4,951.35	4,916.45	4,885.35	31.09	158.120	
3,800.00	3,668.96	2,755.93	2,622.87	17.19	14.98	-76.49	854.17	-4,960.18	4,931.30	4,899.45	31.85	154.834	
3,900.00	3,763.90	2,791.90	2,655.99	17.72	15.16	-76.74	842.38	-4,967.82	4,947.54	4,914.99	32.55	152.001	
4,000.00	3,858.84	2,950.78	2,802.71	18.24	15.99	-77.86	791.52	-5,001.33	4,964.46	4,930.38	34.08	145.684	
4,100.00	3,953.79	3,020.92	2,867.84	18.77	16.36	-78.34	769.79	-5,015.67	4,981.31	4,946.32	34.99	142.352	
4,200.00	4,048.73	3,140.62	2,979.50	19.30	17.01	-79.15	733.78	-5,039.44	4,998.17	4,961.95	36.22	138.003	
4,300.00	4,143.67	3,197.00	3,032.10	19.82	17.32	-79.53	716.95	-5,050.75	5,015.92	4,978.89	37.03	135.452	
4,400.00	4,238.61	3,303.33	3,130.79	20.35	17.96	-80.25	683.40	-5,071.73	5,034.24	4,996.04	38.20	131.776	
4,500.00	4,333.56	3,362.39	3,185.65	20.88	18.35	-80.65	664.89	-5,083.39	5,053.23	5,014.16	39.07	129.345	
4,600.00	4,428.50	3,632.56	3,438.81	21.41	19.94	-82.41	585.89	-5,134.68	5,073.03	5,031.76	41.27	122.914	
4,700.00	4,523.44	3,759.00	3,558.99	21.93	20.60	-83.19	552.40	-5,155.26	5,089.60	5,047.11	42.49	119.782	
4,800.00	4,618.38	4,258.42	4,044.03	22.46	23.11	-85.85	460.27	-5,224.16	5,105.19	5,059.34	45.85	111.350	
4,900.00	4,713.33	4,326.96	4,111.79	22.99	23.66	-86.16	453.25	-5,231.62	5,115.82	5,068.98	46.85	109.205	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		324-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,000.00	4,808.27	4,359.00	4,143.48	23.52	24.00	-86.30	450.19	-5,235.25	5,127.33	5,079.72	47.61	107.701		
5,100.00	4,903.21	4,396.01	4,180.07	24.05	24.15	-86.45	447.17	-5,239.94	5,140.12	5,091.85	48.27	106.492		
5,200.00	4,998.16	4,451.00	4,234.30	24.58	24.38	-86.66	444.30	-5,248.55	5,154.79	5,105.79	49.00	105.207		
5,300.00	5,093.10	4,451.00	4,234.30	25.11	24.38	-86.66	444.30	-5,248.55	5,170.24	5,120.75	49.49	104.475		
5,400.00	5,188.04	4,451.00	4,234.30	25.64	24.38	-86.66	444.30	-5,248.55	5,187.57	5,137.60	49.96	103.830		
5,500.00	5,282.98	4,545.81	4,327.48	26.17	25.19	-87.01	441.07	-5,265.74	5,205.26	5,154.12	51.14	101.789		
5,600.00	5,377.93	4,599.53	4,380.17	26.70	25.79	-87.20	439.27	-5,276.05	5,224.13	5,172.12	52.01	100.447		
5,623.25	5,400.00	4,612.00	4,392.39	26.82	25.94	-87.24	438.86	-5,278.50	5,228.65	5,176.44	52.21	100.145		
5,700.00	5,473.03	4,653.23	4,432.76	27.22	26.48	-87.54	437.50	-5,286.77	5,243.91	5,191.04	52.88	99.175		
5,800.00	5,568.64	4,707.11	4,485.44	27.73	27.21	-87.92	435.76	-5,297.93	5,264.63	5,210.90	53.73	97.983		
5,900.00	5,664.75	4,821.00	4,596.51	28.23	28.78	-88.48	432.16	-5,322.88	5,286.86	5,231.80	55.06	96.016		
6,000.00	5,761.33	4,821.00	4,596.51	28.71	28.78	-88.71	432.16	-5,322.88	5,308.80	5,253.35	55.45	95.742		
6,100.00	5,858.34	5,267.89	5,034.80	29.18	30.28	-89.90	434.94	-5,409.00	5,325.34	5,267.10	58.24	91.441		
6,200.00	5,955.76	5,639.84	5,402.62	29.64	31.36	-90.72	446.42	-5,462.62	5,338.82	5,278.45	60.36	88.443		
6,300.00	6,053.57	5,742.29	5,504.35	30.07	31.65	-91.02	448.92	-5,474.54	5,350.25	5,289.00	61.25	87.357		
6,400.00	6,151.72	5,822.05	5,583.52	30.50	31.88	-91.26	450.63	-5,484.02	5,362.00	5,299.99	62.01	86.468		
6,500.00	6,250.19	5,901.90	5,662.76	30.91	32.12	-91.49	452.13	-5,493.75	5,374.09	5,311.33	62.76	85.628		
6,600.00	6,348.94	6,059.06	5,818.74	31.30	32.68	-91.80	455.13	-5,512.78	5,386.26	5,322.36	63.90	84.295		
6,659.67	6,408.00	6,240.36	5,998.95	31.53	33.41	-92.04	461.00	-5,531.62	5,392.24	5,327.24	65.00	82.955		
6,700.00	6,447.82	6,363.07	6,121.07	31.68	33.93	-108.42	466.54	-5,542.34	5,396.59	5,330.85	65.74	82.094		
6,750.00	6,496.66	6,268.54	6,027.09	31.90	33.52	-119.13	463.21	-5,532.87	5,404.33	5,338.80	65.53	82.467		
6,800.00	6,544.65	6,388.00	6,145.89	32.13	33.90	-125.09	467.71	-5,544.33	5,416.23	5,350.03	66.20	81.811		
6,850.00	6,591.49	6,388.00	6,145.89	32.37	33.90	-128.25	467.71	-5,544.33	5,431.43	5,364.97	66.46	81.727		
6,900.00	6,636.89	6,388.00	6,145.89	32.62	33.90	-129.88	467.71	-5,544.33	5,450.07	5,383.35	66.72	81.690 SF		
6,950.00	6,680.57	6,388.00	6,145.89	32.89	33.90	-130.47	467.71	-5,544.33	5,472.01	5,405.03	66.98	81.699		
7,000.00	6,722.26	6,388.00	6,145.89	33.17	33.90	-130.28	467.71	-5,544.33	5,497.08	5,429.84	67.24	81.753		
7,050.00	6,761.71	6,388.00	6,145.89	33.45	33.90	-129.42	467.71	-5,544.33	5,525.07	5,457.57	67.50	81.849		
7,100.00	6,798.67	6,388.00	6,145.89	33.75	33.90	-127.93	467.71	-5,544.33	5,555.77	5,488.01	67.76	81.987		
7,150.00	6,832.91	6,388.00	6,145.89	34.06	33.90	-125.81	467.71	-5,544.33	5,588.96	5,520.94	68.02	82.163		
7,200.00	6,864.22	6,388.00	6,145.89	34.37	33.90	-123.02	467.71	-5,544.33	5,624.38	5,556.10	68.28	82.374		
7,250.00	6,892.42	6,388.00	6,145.89	34.69	33.90	-119.51	467.71	-5,544.33	5,661.77	5,593.24	68.53	82.617		
7,300.00	6,917.32	6,388.00	6,145.89	35.03	33.90	-115.22	467.71	-5,544.33	5,700.88	5,632.10	68.78	82.889		
7,350.00	6,938.77	6,388.00	6,145.89	35.37	33.90	-110.09	467.71	-5,544.33	5,741.41	5,672.39	69.02	83.185		
7,400.00	6,956.64	6,388.00	6,145.89	35.72	33.90	-104.09	467.71	-5,544.33	5,783.11	5,713.85	69.26	83.503		
7,450.00	6,970.83	6,388.00	6,145.89	36.07	33.90	-97.28	467.71	-5,544.33	5,825.69	5,756.20	69.49	83.839		
7,500.00	6,981.23	6,388.00	6,145.89	36.44	33.90	-89.82	467.71	-5,544.33	5,868.86	5,799.15	69.71	84.188		
7,550.00	6,987.80	6,388.00	6,145.89	36.81	33.90	-81.96	467.71	-5,544.33	5,912.36	5,842.43	69.93	84.548		
7,600.00	6,990.48	6,388.00	6,145.89	37.19	33.90	-74.05	467.71	-5,544.33	5,955.91	5,885.77	70.14	84.914		
7,609.87	6,990.55	6,388.00	6,145.89	37.26	33.90	-72.52	467.71	-5,544.33	5,964.49	5,894.31	70.18	84.987		
7,700.00	6,990.49	6,388.00	6,145.89	37.97	33.90	-72.52	467.71	-5,544.33	6,042.96	5,972.41	70.55	85.652		
7,800.00	6,990.42	6,388.00	6,145.89	38.78	33.90	-72.52	467.71	-5,544.33	6,130.40	6,059.45	70.96	86.395		
7,900.00	6,990.35	6,388.00	6,145.89	39.64	33.90	-72.52	467.71	-5,544.33	6,218.22	6,146.87	71.36	87.144		
8,000.00	6,990.28	6,388.00	6,145.89	40.53	33.90	-72.52	467.71	-5,544.33	6,306.40	6,234.66	71.75	87.899		
8,100.00	6,990.21	6,388.00	6,145.89	41.45	33.90	-72.52	467.71	-5,544.33	6,394.93	6,322.80	72.13	88.659		
8,200.00	6,990.14	6,388.00	6,145.89	42.40	33.90	-72.52	467.71	-5,544.33	6,483.79	6,411.29	72.51	89.425		
8,306.37	6,990.06	6,388.00	6,145.89	43.45	33.90	-72.52	467.71	-5,544.33	6,578.66	6,505.77	72.90	90.245		
8,400.00	6,990.00	6,388.00	6,145.89	44.38	33.90	-69.89	467.71	-5,544.33	6,663.70	6,590.48	73.22	91.015		
8,500.00	6,989.93	6,388.00	6,145.89	45.36	33.90	-65.91	467.71	-5,544.33	6,757.18	6,683.68	73.50	91.936		
8,600.00	6,989.85	6,388.00	6,145.89	46.33	33.90	-59.89	467.71	-5,544.33	6,852.87	6,779.15	73.72	92.954		
8,700.00	6,989.78	6,388.00	6,145.89	47.28	33.90	-50.10	467.71	-5,544.33	6,950.22	6,876.33	73.89	94.062		
8,800.00	6,989.70	6,388.00	6,145.89	48.21	33.90	-33.18	467.71	-5,544.33	7,048.69	6,974.69	74.00	95.254		
8,900.00	6,989.63	6,388.00	6,145.89	49.11	33.90	-5.77	467.71	-5,544.33	7,147.77	7,073.72	74.05	96.523		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program:		324-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
9,000.00	6,989.55	6,388.00	6,145.89	49.99	33.90	24.72	467.71	-5,544.33	7,246.96	7,172.91	74.05	97.862	
9,100.00	6,989.48	6,388.00	6,145.89	50.84	33.90	45.77	467.71	-5,544.33	7,345.78	7,271.78	74.00	99.265	
9,200.00	6,989.40	6,388.00	6,145.89	51.66	33.90	57.95	467.71	-5,544.33	7,443.78	7,369.88	73.90	100.724	
9,300.00	6,989.33	6,388.00	6,145.89	52.45	33.90	65.24	467.71	-5,544.33	7,540.53	7,466.77	73.76	102.231	
9,393.87	6,989.27	6,388.00	6,145.89	53.15	33.90	69.69	467.71	-5,544.33	7,629.81	7,556.23	73.59	103.684	
9,400.00	6,989.26	6,388.00	6,145.89	53.20	33.90	69.69	467.71	-5,544.33	7,635.59	7,562.02	73.57	103.782	
9,500.00	6,989.19	6,388.00	6,145.89	53.95	33.90	69.69	467.71	-5,544.33	7,729.90	7,656.52	73.38	105.343	
9,600.00	6,989.12	6,388.00	6,145.89	54.73	33.90	69.69	467.71	-5,544.33	7,824.34	7,751.15	73.19	106.903	
9,700.00	6,989.05	6,388.00	6,145.89	55.55	33.90	69.69	467.71	-5,544.33	7,918.92	7,845.91	73.01	108.463	
9,800.00	6,988.98	6,388.00	6,145.89	56.40	33.90	69.69	467.71	-5,544.33	8,013.64	7,940.80	72.84	110.021	
9,900.00	6,988.91	6,388.00	6,145.89	57.28	33.90	69.69	467.71	-5,544.33	8,108.48	8,035.80	72.67	111.578	
10,000.00	6,988.84	6,388.00	6,145.89	58.20	33.90	69.69	467.71	-5,544.33	8,203.44	8,130.93	72.51	113.134	
10,100.00	6,988.77	6,388.00	6,145.89	59.14	33.90	69.69	467.71	-5,544.33	8,298.52	8,226.16	72.36	114.688	
10,200.00	6,988.70	6,388.00	6,145.89	60.11	33.90	69.69	467.71	-5,544.33	8,393.71	8,321.50	72.21	116.240	
10,300.00	6,988.63	6,388.00	6,145.89	61.11	33.90	69.69	467.71	-5,544.33	8,489.02	8,416.95	72.07	117.791	
10,400.00	6,988.56	6,388.00	6,145.89	62.14	33.90	69.69	467.71	-5,544.33	8,584.43	8,512.50	71.93	119.339	
10,500.00	6,988.49	6,388.00	6,145.89	63.19	33.90	69.69	467.71	-5,544.33	8,679.94	8,608.14	71.80	120.886	
10,600.00	6,988.42	6,388.00	6,145.89	64.26	33.90	69.69	467.71	-5,544.33	8,775.56	8,703.88	71.68	122.430	
10,700.00	6,988.35	6,388.00	6,145.89	65.36	33.90	69.69	467.71	-5,544.33	8,871.27	8,799.71	71.56	123.972	
10,800.00	6,988.28	6,388.00	6,145.89	66.48	33.90	69.69	467.71	-5,544.33	8,967.08	8,895.63	71.44	125.511	
10,900.00	6,988.21	6,388.00	6,145.89	67.61	33.90	69.69	467.71	-5,544.33	9,062.97	8,991.64	71.33	127.048	
11,000.00	6,988.14	6,388.00	6,145.89	68.77	33.90	69.69	467.71	-5,544.33	9,158.96	9,087.73	71.23	128.582	
11,100.00	6,988.07	6,388.00	6,145.89	69.95	33.90	69.69	467.71	-5,544.33	9,255.03	9,183.90	71.13	130.114	
11,200.00	6,988.01	6,388.00	6,145.89	71.14	33.90	69.69	467.71	-5,544.33	9,351.18	9,280.14	71.03	131.643	
11,300.00	6,987.94	6,388.00	6,145.89	72.35	33.90	69.69	467.71	-5,544.33	9,447.41	9,376.47	70.94	133.169	
11,400.00	6,987.87	6,388.00	6,145.89	73.57	33.90	69.69	467.71	-5,544.33	9,543.72	9,472.86	70.86	134.691	
11,500.00	6,987.80	6,388.00	6,145.89	74.81	33.90	69.69	467.71	-5,544.33	9,640.10	9,569.33	70.77	136.211	
11,600.00	6,987.73	6,388.00	6,145.89	76.07	33.90	69.69	467.71	-5,544.33	9,736.56	9,665.86	70.69	137.728	
11,643.87	6,987.70	6,388.00	6,145.89	76.62	33.90	69.69	467.71	-5,544.33	9,778.89	9,708.23	70.66	138.392	
11,700.00	6,987.66	6,388.00	6,145.89	77.33	33.90	71.04	467.71	-5,544.33	9,832.95	9,762.33	70.62	139.245	
11,737.27	6,987.63	6,388.00	6,145.89	77.80	33.90	71.84	467.71	-5,544.33	9,868.69	9,798.11	70.58	139.813	
11,800.00	6,987.59	6,388.00	6,145.89	78.59	33.90	71.84	467.71	-5,544.33	9,928.77	9,858.24	70.53	140.770	
11,900.00	6,987.52	6,388.00	6,145.89	79.86	33.90	71.84	467.71	-5,544.33	10,024.62	9,954.16	70.45	142.290	
12,000.00	6,987.46	6,388.00	6,145.89	81.14	33.90	71.84	467.71	-5,544.33	10,120.54	10,050.16	70.38	143.807	
12,100.00	6,987.39	6,388.00	6,145.89	82.43	33.90	71.84	467.71	-5,544.33	10,216.54	10,146.24	70.30	145.319	
12,200.00	6,987.32	6,388.00	6,145.89	83.73	33.90	71.84	467.71	-5,544.33	10,312.62	10,242.38	70.24	146.829	
12,300.00	6,987.26	6,388.00	6,145.89	85.05	33.90	71.84	467.71	-5,544.33	10,408.77	10,338.60	70.17	148.334	
12,400.00	6,987.19	6,388.00	6,145.89	86.38	33.90	71.84	467.71	-5,544.33	10,504.99	10,434.88	70.11	149.835	
12,500.00	6,987.12	6,388.00	6,145.89	87.71	33.90	71.84	467.71	-5,544.33	10,601.29	10,531.23	70.05	151.333	
12,600.00	6,987.06	6,388.00	6,145.89	89.06	33.90	71.84	467.71	-5,544.33	10,697.65	10,627.65	70.00	152.826	
12,700.00	6,986.99	6,388.00	6,145.89	90.41	33.90	71.84	467.71	-5,544.33	10,794.07	10,724.12	69.95	154.315	
12,800.00	6,986.92	6,388.00	6,145.89	91.77	33.90	71.84	467.71	-5,544.33	10,890.56	10,820.66	69.90	155.801	
12,900.00	6,986.86	6,388.00	6,145.89	93.14	33.90	71.84	467.71	-5,544.33	10,987.12	10,917.26	69.86	157.282	
13,000.00	6,986.79	6,234.53	5,993.29	94.52	33.38	69.02	462.11	-5,529.34	11,083.73	11,014.50	69.22	160.115	
13,100.00	6,986.72	6,224.07	5,982.88	95.90	33.34	68.83	461.77	-5,528.25	11,180.26	11,111.12	69.14	161.707	
13,200.00	6,986.66	6,213.60	5,972.48	97.30	33.30	68.64	461.43	-5,527.16	11,276.85	11,207.79	69.06	163.297	
13,300.00	6,986.59	6,203.13	5,962.07	98.69	33.25	68.45	461.09	-5,526.08	11,373.48	11,304.50	68.98	164.884	
13,400.00	6,986.52	6,192.66	5,951.67	100.10	33.21	68.26	460.75	-5,524.99	11,470.17	11,401.26	68.90	166.467	
13,500.00	6,986.46	6,182.19	5,941.26	101.51	33.17	68.08	460.41	-5,523.91	11,566.90	11,498.06	68.83	168.048	
13,600.00	6,986.39	6,171.73	5,930.86	102.93	33.12	67.89	460.07	-5,522.82	11,663.67	11,594.91	68.76	169.625	
13,700.00	6,986.32	6,161.26	5,920.45	104.35	33.08	67.70	459.73	-5,521.73	11,760.49	11,691.80	68.70	171.198	
13,800.00	6,986.25	6,150.79	5,910.05	105.78	33.04	67.52	459.39	-5,520.65	11,857.36	11,788.72	68.63	172.769	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		324-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:	0.00 usft		
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)	
13,900.00	6,986.19	6,140.32	5,899.64	107.21	33.00	67.33	459.05	-5,519.56	11,954.26	11,885.69	68.57	174.336		
14,000.00	6,986.12	6,129.85	5,889.24	108.65	32.96	67.15	458.71	-5,518.47	12,051.21	11,982.70	68.51	175.899		
14,100.00	6,986.05	6,119.38	5,878.83	110.09	32.92	66.96	458.37	-5,517.39	12,148.20	12,079.74	68.46	177.459		
14,200.00	6,985.99	6,108.92	5,868.43	111.54	32.87	66.78	458.03	-5,516.30	12,245.23	12,176.82	68.40	179.015		
14,300.00	6,985.92	6,098.45	5,858.03	112.99	32.83	66.60	457.69	-5,515.21	12,342.29	12,273.94	68.35	180.568		
14,400.00	6,985.85	5,842.55	5,603.87	114.45	31.95	62.30	451.03	-5,486.50	12,439.35	12,372.04	67.31	184.798		
14,500.00	6,985.79	4,658.80	4,438.21	115.91	26.55	46.50	437.32	-5,287.90	12,534.24	12,471.66	62.58	200.297		
14,600.00	6,985.72	4,651.40	4,430.97	117.38	26.45	46.41	437.56	-5,286.39	12,629.64	12,567.07	62.57	201.843		
14,700.00	6,985.65	4,644.07	4,423.79	118.84	26.36	46.33	437.80	-5,284.91	12,725.10	12,662.53	62.57	203.383		
14,800.00	6,985.59	4,636.82	4,416.70	120.32	26.26	46.25	438.04	-5,283.45	12,820.62	12,758.05	62.57	204.917		
14,900.00	6,985.52	4,629.64	4,409.67	121.79	26.17	46.17	438.28	-5,282.01	12,916.19	12,853.63	62.57	206.444		
15,000.00	6,985.45	4,622.53	4,402.71	123.27	26.08	46.09	438.51	-5,280.59	13,011.82	12,949.25	62.57	207.965		
15,100.00	6,985.39	4,615.50	4,395.82	124.75	25.99	46.02	438.74	-5,279.20	13,107.51	13,044.94	62.57	209.479		
15,200.00	6,985.32	4,608.53	4,388.99	126.24	25.90	45.94	438.97	-5,277.82	13,203.25	13,140.67	62.58	210.988		
15,300.00	6,985.25	4,601.64	4,382.24	127.72	25.82	45.87	439.20	-5,276.47	13,299.04	13,236.45	62.59	212.490		
15,400.00	6,985.19	4,594.81	4,375.54	129.21	25.73	45.79	439.43	-5,275.13	13,394.88	13,332.28	62.60	213.986		
15,500.00	6,985.12	4,588.05	4,368.92	130.71	25.65	45.72	439.65	-5,273.82	13,490.77	13,428.16	62.61	215.476		
15,600.00	6,985.05	4,581.36	4,362.35	132.20	25.57	45.64	439.88	-5,272.52	13,586.71	13,524.09	62.62	216.959		
15,700.00	6,984.99	4,574.73	4,355.85	133.70	25.50	45.57	440.10	-5,271.24	13,682.70	13,620.07	62.64	218.437		
15,800.00	6,984.92	4,451.00	4,234.30	135.20	24.38	44.25	444.30	-5,248.55	13,780.21	13,718.17	62.04	222.132		
15,900.00	6,984.85	4,451.00	4,234.30	136.71	24.38	44.25	444.30	-5,248.55	13,876.13	13,814.04	62.09	223.473		
16,000.00	6,984.79	4,451.00	4,234.30	138.21	24.38	44.25	444.30	-5,248.55	13,972.11	13,909.96	62.15	224.809		
16,100.00	6,984.72	4,451.00	4,234.30	139.72	24.38	44.25	444.30	-5,248.55	14,068.15	14,005.94	62.21	226.140		
16,200.00	6,984.65	4,451.00	4,234.30	141.23	24.38	44.25	444.30	-5,248.55	14,164.24	14,101.98	62.27	227.467		
16,300.00	6,984.59	4,451.00	4,234.30	142.75	24.38	44.25	444.30	-5,248.55	14,260.39	14,198.06	62.33	228.789		
16,400.00	6,984.52	4,451.00	4,234.30	144.26	24.38	44.25	444.30	-5,248.55	14,356.59	14,294.20	62.39	230.106		
16,500.00	6,984.45	4,451.00	4,234.30	145.78	24.38	44.25	444.30	-5,248.55	14,452.84	14,390.39	62.45	231.419		
16,600.00	6,984.39	4,451.00	4,234.30	147.29	24.38	44.25	444.30	-5,248.55	14,549.14	14,486.63	62.52	232.727		
16,700.00	6,984.32	4,451.00	4,234.30	148.82	24.38	44.25	444.30	-5,248.55	14,645.50	14,582.92	62.58	234.031		
16,800.00	6,984.25	4,451.00	4,234.30	150.34	24.38	44.25	444.30	-5,248.55	14,741.90	14,679.25	62.64	235.330		
16,900.00	6,984.19	4,451.00	4,234.30	151.86	24.38	44.25	444.30	-5,248.55	14,838.34	14,775.64	62.71	236.624		
17,000.00	6,984.12	4,451.00	4,234.30	153.39	24.38	44.25	444.30	-5,248.55	14,934.84	14,872.06	62.77	237.914		
17,100.00	6,984.05	4,451.00	4,234.30	154.91	24.38	44.25	444.30	-5,248.55	15,031.38	14,968.54	62.84	239.199		
17,200.00	6,983.99	4,451.00	4,234.30	156.44	24.38	44.25	444.30	-5,248.55	15,127.96	15,065.06	62.91	240.479		
17,300.00	6,983.92	4,451.00	4,234.30	157.97	24.38	44.25	444.30	-5,248.55	15,224.59	15,161.62	62.98	241.755		
17,400.00	6,983.85	4,451.00	4,234.30	159.50	24.38	44.25	444.30	-5,248.55	15,321.26	15,258.22	63.04	243.026		
17,500.00	6,983.79	4,451.00	4,234.30	161.04	24.38	44.25	444.30	-5,248.55	15,417.98	15,354.87	63.11	244.293		
17,600.00	6,983.72	4,451.00	4,234.30	162.57	24.38	44.25	444.30	-5,248.55	15,514.74	15,451.55	63.18	245.555		
17,700.00	6,983.65	4,451.00	4,234.30	164.11	24.38	44.25	444.30	-5,248.55	15,611.53	15,548.28	63.25	246.813		
17,800.00	6,983.59	4,451.00	4,234.30	165.65	24.38	44.25	444.30	-5,248.55	15,708.37	15,645.05	63.32	248.066		
17,900.00	6,983.52	4,451.00	4,234.30	167.18	24.38	44.25	444.30	-5,248.55	15,805.25	15,741.85	63.39	249.315		
18,000.00	6,983.45	4,451.00	4,234.30	168.72	24.38	44.25	444.30	-5,248.55	15,902.16	15,838.70	63.47	250.559		
18,100.00	6,983.39	4,451.00	4,234.30	170.27	24.38	44.25	444.30	-5,248.55	15,999.12	15,935.58	63.54	251.799		
18,200.00	6,983.32	4,451.00	4,234.30	171.81	24.38	44.25	444.30	-5,248.55	16,096.11	16,032.50	63.61	253.034		
18,300.00	6,983.25	4,451.00	4,234.30	173.35	24.38	44.25	444.30	-5,248.55	16,193.14	16,129.45	63.69	254.265		
18,400.00	6,983.19	4,451.00	4,234.30	174.90	24.38	44.25	444.30	-5,248.55	16,290.20	16,226.44	63.76	255.491		
18,500.00	6,983.12	4,451.00	4,234.30	176.44	24.38	44.25	444.30	-5,248.55	16,387.30	16,323.46	63.84	256.712		
18,600.00	6,983.05	4,451.00	4,234.30	177.99	24.38	44.25	444.30	-5,248.55	16,484.43	16,420.52	63.91	257.930		
18,700.00	6,982.99	4,451.00	4,234.30	179.54	24.38	44.25	444.30	-5,248.55	16,581.60	16,517.61	63.99	259.142		
18,800.00	6,982.92	4,451.00	4,234.30	181.09	24.38	44.25	444.30	-5,248.55	16,678.80	16,614.74	64.06	260.351		
18,900.00	6,982.85	4,451.00	4,234.30	182.64	24.38	44.25	444.30	-5,248.55	16,776.03	16,711.89	64.14	261.554		
19,000.00	6,982.78	4,451.00	4,234.30	184.19	24.38	44.25	444.30	-5,248.55	16,873.30	16,809.08	64.22	262.754		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 324-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,100.00	6,982.72	4,451.00	4,234.30	185.74	24.38	44.25	444.30	-5,248.55	16,970.60	16,906.30	64.30	263.949	
19,200.00	6,982.65	1,858.00	1,801.24	187.29	11.09	21.11	1,147.72	-4,749.44	17,066.10	17,007.79	58.31	292.691	
19,300.00	6,982.58	1,858.00	1,801.24	188.84	11.09	21.11	1,147.72	-4,749.44	17,160.57	17,102.16	58.41	293.775	
19,400.00	6,982.52	1,858.00	1,801.24	190.40	11.09	21.11	1,147.72	-4,749.44	17,255.12	17,196.60	58.52	294.858	
19,500.00	6,982.45	1,858.00	1,801.24	191.95	11.09	21.11	1,147.72	-4,749.44	17,349.72	17,291.09	58.63	295.939	
19,600.00	6,982.38	1,858.00	1,801.24	193.51	11.09	21.11	1,147.72	-4,749.44	17,444.38	17,385.65	58.73	297.018	
19,700.00	6,982.32	1,858.00	1,801.24	195.07	11.09	21.11	1,147.72	-4,749.44	17,539.10	17,480.27	58.84	298.096	
19,800.00	6,982.25	1,858.00	1,801.24	196.62	11.09	21.11	1,147.72	-4,749.44	17,633.88	17,574.94	58.94	299.172	
19,900.00	6,982.18	1,821.40	1,768.05	198.18	10.92	20.87	1,160.22	-4,740.38	17,728.58	17,669.58	59.00	300.508	
20,000.00	6,982.12	1,814.91	1,762.16	199.74	10.90	20.83	1,162.43	-4,738.79	17,823.42	17,764.33	59.09	301.624	
20,100.00	6,982.05	1,808.46	1,756.30	201.30	10.87	20.79	1,164.62	-4,737.22	17,918.31	17,859.12	59.19	302.737	
20,176.02	6,982.00	1,803.59	1,751.87	202.36	10.85	20.76	1,166.27	-4,736.04	17,990.47	17,928.87	61.60	292.062	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171C - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 288-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	39.00	39.00	0.00	0.79	-72.56	1,435.36	-4,569.79	4,789.91				
100.00	100.00	139.00	139.00	0.25	2.82	-72.56	1,435.36	-4,569.79	4,789.91	4,786.84	3.07	1,562.270	
200.00	200.00	239.00	239.00	0.61	4.84	-72.56	1,435.36	-4,569.79	4,789.91	4,784.46	5.45	878.956	
210.00	210.00	249.00	249.00	0.65	5.04	-72.56	1,435.36	-4,569.79	4,789.91	4,784.22	5.69	842.123 CC	
300.00	300.00	311.40	311.40	0.97	5.85	-72.56	1,435.41	-4,569.84	4,790.05	4,783.24	6.81	702.885 ES	
400.00	400.00	386.25	386.25	1.33	5.97	-72.56	1,435.55	-4,570.52	4,790.96	4,783.67	7.29	657.362	
500.00	500.00	460.11	460.10	1.68	6.10	-72.57	1,435.06	-4,571.68	4,792.27	4,784.51	7.76	617.422	
600.00	600.00	516.63	516.59	2.04	6.15	-72.59	1,434.36	-4,573.15	4,794.37	4,786.20	8.18	586.437	
700.00	699.98	562.00	561.92	2.40	6.18	-62.57	1,433.36	-4,574.83	4,796.59	4,788.01	8.58	559.345	
800.00	799.84	622.00	621.80	2.76	6.28	-62.61	1,431.36	-4,578.08	4,798.34	4,789.33	9.01	532.765	
900.00	899.45	645.29	645.01	3.13	6.35	-62.62	1,430.39	-4,579.75	4,799.72	4,790.32	9.40	510.521	
1,000.00	998.70	682.00	681.54	3.49	6.45	-62.68	1,428.65	-4,582.92	4,800.94	4,791.12	9.82	488.882	
1,100.00	1,097.47	716.13	715.43	3.86	6.56	-62.75	1,426.74	-4,586.42	4,801.91	4,791.66	10.25	468.329	
1,200.00	1,195.62	742.00	741.07	4.24	6.65	-62.82	1,425.05	-4,589.40	4,802.64	4,791.97	10.67	449.932	
1,300.00	1,293.06	778.14	776.81	4.64	6.78	-62.94	1,422.43	-4,594.15	4,803.21	4,792.07	11.15	430.962	
1,400.00	1,389.64	803.00	801.31	5.06	6.87	-63.03	1,420.50	-4,597.85	4,803.77	4,792.17	11.60	414.064	
1,500.00	1,485.27	834.29	832.07	5.50	7.00	-63.16	1,417.92	-4,602.99	4,804.27	4,792.17	12.10	396.966	
1,515.00	1,499.52	838.58	836.28	5.57	7.01	-63.18	1,417.55	-4,603.73	4,804.35	4,792.17	12.18	394.517	
1,600.00	1,580.22	863.00	860.20	5.96	7.11	-63.30	1,415.38	-4,608.14	4,805.31	4,792.69	12.61	381.016	
1,700.00	1,675.17	887.68	884.30	6.44	7.21	-63.43	1,413.09	-4,612.94	4,807.90	4,794.77	13.13	366.247	
1,800.00	1,770.11	924.00	919.61	6.92	7.36	-63.61	1,409.54	-4,620.67	4,812.15	4,798.45	13.69	351.471	
1,900.00	1,865.05	924.00	919.61	7.41	7.36	-63.61	1,409.54	-4,620.67	4,817.97	4,803.84	14.13	340.980	
2,000.00	1,959.99	986.00	979.46	7.90	7.61	-63.93	1,402.70	-4,635.30	4,825.14	4,810.33	14.81	325.862	
2,100.00	2,054.94	986.00	979.46	8.40	7.61	-63.93	1,402.70	-4,635.30	4,833.93	4,818.68	15.25	317.012	
2,200.00	2,149.88	1,049.00	1,039.66	8.90	7.88	-64.28	1,394.57	-4,652.00	4,844.17	4,828.21	15.96	303.581	
2,300.00	2,244.82	1,049.00	1,039.66	9.41	7.88	-64.28	1,394.57	-4,652.00	4,855.90	4,839.51	16.40	296.155	
2,400.00	2,339.76	1,081.66	1,070.56	9.92	8.03	-64.47	1,389.95	-4,661.50	4,869.27	4,852.28	16.99	286.602	
2,500.00	2,434.71	1,110.00	1,097.21	10.43	8.16	-64.63	1,385.79	-4,670.20	4,884.26	4,866.69	17.56	278.107	
2,600.00	2,529.65	1,110.00	1,097.21	10.94	8.16	-64.63	1,385.79	-4,670.20	4,900.94	4,882.95	17.99	272.411	
2,700.00	2,624.59	1,145.86	1,130.65	11.45	8.34	-64.84	1,380.30	-4,681.94	4,919.03	4,900.41	18.62	264.157	
2,800.00	2,719.53	1,173.00	1,155.72	11.97	8.48	-65.00	1,375.99	-4,691.39	4,938.89	4,919.69	19.20	257.218	
2,900.00	2,814.48	1,173.00	1,155.72	12.49	8.48	-65.00	1,375.99	-4,691.39	4,960.36	4,940.74	19.61	252.903	
3,000.00	2,909.42	1,201.73	1,182.02	13.01	8.64	-65.18	1,371.30	-4,701.96	4,983.36	4,963.14	20.22	246.487	
3,100.00	3,004.36	1,235.00	1,212.15	13.53	8.82	-65.38	1,365.74	-4,714.91	5,008.11	4,987.26	20.85	240.170	
3,200.00	3,099.30	1,235.00	1,212.15	14.05	8.82	-65.38	1,365.74	-4,714.91	5,034.22	5,012.98	21.25	236.954	
3,300.00	3,194.25	1,235.00	1,212.15	14.57	8.82	-65.38	1,365.74	-4,714.91	5,062.17	5,040.54	21.63	234.043	
3,400.00	3,289.19	1,297.00	1,267.29	15.09	9.17	-65.77	1,354.55	-4,740.95	5,091.44	5,068.96	22.48	226.473	
3,500.00	3,384.13	1,297.00	1,267.29	15.62	9.17	-65.77	1,354.55	-4,740.95	5,122.00	5,099.15	22.85	224.128	
3,600.00	3,479.07	1,297.00	1,267.29	16.14	9.17	-65.77	1,354.55	-4,740.95	5,154.32	5,131.11	23.21	222.028	
3,700.00	3,574.02	1,326.60	1,293.12	16.67	9.33	-65.95	1,348.83	-4,754.23	5,187.95	5,164.14	23.81	217.903	
3,800.00	3,668.96	1,359.00	1,321.01	17.19	9.50	-66.16	1,342.47	-4,769.44	5,223.25	5,198.83	24.42	213.869	
3,900.00	3,763.90	1,359.00	1,321.01	17.72	9.50	-66.16	1,342.47	-4,769.44	5,259.73	5,234.97	24.76	212.418	
4,000.00	3,858.84	1,359.00	1,321.01	18.24	9.50	-66.16	1,342.47	-4,769.44	5,297.84	5,272.75	25.09	211.155	
4,100.00	3,953.79	1,395.75	1,352.16	18.77	9.68	-66.40	1,334.95	-4,787.43	5,337.03	5,311.32	25.72	207.522	
4,200.00	4,048.73	1,421.00	1,373.27	19.30	9.81	-66.57	1,329.49	-4,800.17	5,377.68	5,351.44	26.25	204.898	
4,300.00	4,143.67	1,421.00	1,373.27	19.82	9.81	-66.57	1,329.49	-4,800.17	5,419.63	5,393.08	26.55	204.122	
4,400.00	4,238.61	1,421.00	1,373.27	20.35	9.81	-66.57	1,329.49	-4,800.17	5,463.08	5,436.24	26.85	203.494	
4,500.00	4,333.56	1,456.91	1,402.79	20.88	9.99	-66.81	1,321.40	-4,818.93	5,507.37	5,479.91	27.46	200.543	
4,600.00	4,428.50	1,482.00	1,423.04	21.41	10.11	-66.98	1,315.56	-4,832.54	5,553.25	5,525.27	27.98	198.505	
4,700.00	4,523.44	1,482.00	1,423.04	21.93	10.11	-66.98	1,315.56	-4,832.54	5,600.23	5,571.98	28.25	198.246	
4,800.00	4,618.38	1,482.00	1,423.04	22.46	10.11	-66.98	1,315.56	-4,832.54	5,648.58	5,620.07	28.51	198.101	
4,900.00	4,713.33	1,508.82	1,444.34	22.99	10.25	-67.16	1,309.13	-4,847.54	5,697.93	5,668.89	29.04	196.193	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		288-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:	0.00 usft		
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance				Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,000.00	4,808.27	1,543.00	1,470.91	23.52	10.43	-67.39	1,300.67	-4,867.29	5,748.77	5,719.13	29.64	193.930		
5,100.00	4,903.21	1,543.00	1,470.91	24.05	10.43	-67.39	1,300.67	-4,867.29	5,800.33	5,770.44	29.89	194.066		
5,200.00	4,998.16	1,543.00	1,470.91	24.58	10.43	-67.39	1,300.67	-4,867.29	5,853.14	5,823.02	30.13	194.293		
5,300.00	5,093.10	1,543.00	1,470.91	25.11	10.43	-67.39	1,300.67	-4,867.29	5,907.17	5,876.82	30.35	194.604		
5,400.00	5,188.04	1,574.05	1,494.54	25.64	10.58	-67.60	1,292.64	-4,885.77	5,962.00	5,931.11	30.89	192.991		
5,500.00	5,282.98	1,604.00	1,516.87	26.17	10.72	-67.81	1,284.52	-4,903.99	6,018.06	5,986.64	31.42	191.559		
5,600.00	5,377.93	1,604.00	1,516.87	26.70	10.72	-67.81	1,284.52	-4,903.99	6,074.90	6,043.27	31.63	192.069		
5,623.25	5,400.00	1,604.00	1,516.87	26.82	10.72	-67.81	1,284.52	-4,903.99	6,088.27	6,056.59	31.68	192.197		
5,700.00	5,473.03	1,624.82	1,532.20	27.22	10.79	-68.47	1,278.66	-4,916.80	6,132.90	6,100.89	32.02	191.553		
5,800.00	5,568.64	1,667.00	1,562.95	27.73	10.95	-69.44	1,266.30	-4,942.89	6,192.26	6,159.68	32.58	190.060		
5,900.00	5,664.75	1,667.00	1,562.95	28.23	10.95	-70.16	1,266.30	-4,942.89	6,252.79	6,220.04	32.75	190.917		
6,000.00	5,761.33	1,703.29	1,589.09	28.71	11.05	-71.14	1,255.20	-4,965.49	6,314.53	6,281.32	33.21	190.167		
6,100.00	5,858.34	1,729.00	1,607.44	29.18	11.15	-72.08	1,247.13	-4,981.59	6,377.44	6,343.88	33.56	190.038		
6,200.00	5,955.76	1,765.01	1,632.97	29.64	11.36	-73.10	1,235.65	-5,004.24	6,441.39	6,407.41	33.98	189.546		
6,300.00	6,053.57	1,791.00	1,651.31	30.07	11.70	-74.08	1,227.29	-5,020.64	6,506.29	6,471.98	34.30	189.671		
6,400.00	6,151.72	1,828.78	1,677.84	30.50	12.15	-75.14	1,215.03	-5,044.59	6,572.09	6,537.37	34.72	189.308		
6,500.00	6,250.19	2,230.15	1,965.79	30.91	17.24	-78.17	1,084.24	-5,291.58	6,636.10	6,597.73	38.37	172.966		
6,600.00	6,348.94	2,259.00	1,986.92	31.30	17.60	-79.12	1,074.96	-5,308.89	6,699.88	6,661.17	38.71	173.068		
6,659.67	6,408.00	2,297.92	2,015.35	31.53	18.11	-79.80	1,062.42	-5,332.33	6,738.24	6,699.13	39.11	172.294		
6,700.00	6,447.82	2,314.39	2,027.36	31.68	18.32	-94.05	1,057.13	-5,342.29	6,764.96	6,725.67	39.29	172.168		
6,750.00	6,496.66	2,333.14	2,041.01	31.90	18.57	-102.12	1,051.14	-5,353.66	6,799.95	6,760.43	39.52	172.060		
6,800.00	6,544.65	2,354.00	2,056.17	32.13	18.84	-104.75	1,044.49	-5,366.34	6,836.78	6,797.00	39.78	171.855		
6,850.00	6,591.49	2,354.00	2,056.17	32.37	18.84	-104.21	1,044.49	-5,366.34	6,875.23	6,835.36	39.87	172.449		
6,900.00	6,636.89	2,380.67	2,075.54	32.62	19.19	-101.96	1,036.03	-5,382.61	6,915.01	6,874.80	40.21	171.963		
6,950.00	6,680.57	2,392.61	2,084.21	32.89	19.35	-98.13	1,032.26	-5,389.91	6,955.93	6,915.50	40.43	172.032		
7,000.00	6,722.26	2,401.97	2,091.00	33.17	19.47	-93.12	1,029.31	-5,395.64	6,997.72	6,957.08	40.64	172.167		
7,050.00	6,761.71	2,408.69	2,095.87	33.45	19.56	-87.23	1,027.20	-5,399.75	7,040.12	6,999.28	40.84	172.364		
7,100.00	6,798.67	6,990.00	6,107.28	33.75	73.87	-125.19	516.01	-7,119.32	7,079.81	6,987.22	92.60	76.458 SF		
7,150.00	6,832.91	6,990.00	6,107.28	34.06	73.87	-123.24	516.01	-7,119.32	7,110.94	7,018.11	92.83	76.600		
7,200.00	6,864.22	6,990.00	6,107.28	34.37	73.87	-120.70	516.01	-7,119.32	7,144.27	7,051.21	93.06	76.771		
7,250.00	6,892.42	6,990.00	6,107.28	34.69	73.87	-117.54	516.01	-7,119.32	7,179.57	7,086.29	93.28	76.969		
7,300.00	6,917.32	6,990.00	6,107.28	35.03	73.87	-113.73	516.01	-7,119.32	7,216.60	7,123.11	93.49	77.190		
7,350.00	6,938.77	6,990.00	6,107.28	35.37	73.87	-109.23	516.01	-7,119.32	7,255.10	7,161.41	93.70	77.432		
7,400.00	6,956.64	6,990.00	6,107.28	35.72	73.87	-104.05	516.01	-7,119.32	7,294.82	7,200.93	93.89	77.693		
7,450.00	6,970.83	6,990.00	6,107.28	36.07	73.87	-98.22	516.01	-7,119.32	7,335.50	7,241.41	94.08	77.969		
7,500.00	6,981.23	6,990.00	6,107.28	36.44	73.87	-91.85	516.01	-7,119.32	7,376.86	7,282.59	94.26	78.259		
7,550.00	6,987.80	6,990.00	6,107.28	36.81	73.87	-85.10	516.01	-7,119.32	7,418.64	7,324.21	94.44	78.558		
7,600.00	6,990.48	6,990.00	6,107.28	37.19	73.87	-78.20	516.01	-7,119.32	7,460.59	7,365.99	94.60	78.864		
7,609.87	6,990.55	6,990.00	6,107.28	37.26	73.87	-76.84	516.01	-7,119.32	7,468.86	7,374.23	94.63	78.925		
7,700.00	6,990.49	2,259.00	1,986.92	37.97	17.60	-31.40	1,074.96	-5,308.89	7,535.63	7,493.20	42.42	177.637		
7,800.00	6,990.42	2,238.30	1,971.76	38.78	17.34	-31.29	1,081.63	-5,296.47	7,598.00	7,555.18	42.81	177.464		
7,900.00	6,990.35	1,813.79	1,667.33	39.64	11.97	-29.12	1,219.91	-5,035.06	7,659.41	7,619.60	39.81	192.388		
8,000.00	6,990.28	1,791.00	1,651.31	40.53	11.70	-29.01	1,227.29	-5,020.64	7,719.46	7,679.23	40.24	191.855		
8,100.00	6,990.21	1,751.39	1,623.33	41.45	11.24	-28.81	1,240.01	-4,995.66	7,780.06	7,739.52	40.54	191.904		
8,200.00	6,990.14	1,729.00	1,607.44	42.40	11.15	-28.70	1,247.13	-4,981.59	7,841.19	7,800.23	40.97	191.408		
8,306.37	6,990.06	1,699.85	1,586.62	43.45	11.04	-28.55	1,256.26	-4,963.34	7,906.85	7,865.47	41.37	191.108		
8,400.00	6,990.00	1,667.00	1,562.95	44.38	10.95	-25.66	1,266.30	-4,942.89	7,966.35	7,924.68	41.68	191.148		
8,500.00	6,989.93	1,667.00	1,562.95	45.36	10.95	-22.42	1,266.30	-4,942.89	8,032.59	7,990.35	42.24	190.163		
8,600.00	6,989.85	1,639.64	1,543.05	46.33	10.85	-18.78	1,274.39	-4,925.95	8,101.32	8,058.77	42.54	190.433		
8,700.00	6,989.78	1,604.00	1,516.87	47.28	10.72	-14.84	1,284.52	-4,903.99	8,172.17	8,129.42	42.75	191.176		
8,800.00	6,989.70	1,604.00	1,516.87	48.21	10.72	-10.74	1,284.52	-4,903.99	8,244.61	8,201.39	43.21	190.784		
8,900.00	6,989.63	1,604.00	1,516.87	49.11	10.72	-6.40	1,284.52	-4,903.99	8,318.49	8,274.85	43.64	190.596		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171C - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		288-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:	0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,000.00	6,989.55	1,604.00	1,516.87	49.99	10.72	-1.88	1,284.52	-4,903.99	8,393.43	8,349.40	44.04	190.600		
9,100.00	6,989.48	1,573.45	1,494.09	50.84	10.57	2.69	1,292.80	-4,885.41	8,468.65	8,424.55	44.10	192.035		
9,200.00	6,989.40	1,543.00	1,470.91	51.66	10.43	7.22	1,300.67	-4,867.29	8,544.47	8,500.34	44.13	193.602		
9,300.00	6,989.33	1,543.00	1,470.91	52.45	10.43	11.75	1,300.67	-4,867.29	8,619.84	8,575.41	44.42	194.042		
9,393.87	6,989.27	1,543.00	1,470.91	53.15	10.43	15.88	1,300.67	-4,867.29	8,690.19	8,645.53	44.66	194.578		
9,400.00	6,989.26	1,543.00	1,470.91	53.20	10.43	15.88	1,300.67	-4,867.29	8,694.77	8,650.10	44.68	194.619		
9,500.00	6,989.19	1,543.00	1,470.91	53.95	10.43	15.88	1,300.67	-4,867.29	8,769.70	8,724.79	44.92	195.249		
9,600.00	6,989.12	1,543.00	1,470.91	54.73	10.43	15.88	1,300.67	-4,867.29	8,845.13	8,799.98	45.15	195.890		
9,700.00	6,989.05	1,543.00	1,470.91	55.55	10.43	15.88	1,300.67	-4,867.29	8,921.04	8,875.65	45.39	196.540		
9,800.00	6,988.98	1,543.00	1,470.91	56.40	10.43	15.88	1,300.67	-4,867.29	8,997.42	8,951.80	45.63	197.201		
9,900.00	6,988.91	1,512.45	1,447.18	57.28	10.27	15.75	1,308.25	-4,849.60	9,073.81	9,028.23	45.58	199.064		
10,000.00	6,988.84	1,482.00	1,423.04	58.20	10.11	15.62	1,315.56	-4,832.54	9,151.16	9,105.62	45.55	200.914		
10,100.00	6,988.77	1,482.00	1,423.04	59.14	10.11	15.62	1,315.56	-4,832.54	9,228.51	9,182.73	45.79	201.561		
10,200.00	6,988.70	1,482.00	1,423.04	60.11	10.11	15.62	1,315.56	-4,832.54	9,306.29	9,260.27	46.02	202.220		
10,300.00	6,988.63	1,482.00	1,423.04	61.11	10.11	15.62	1,315.56	-4,832.54	9,384.49	9,338.23	46.25	202.890		
10,400.00	6,988.56	1,482.00	1,423.04	62.14	10.11	15.62	1,315.56	-4,832.54	9,463.10	9,416.61	46.49	203.571		
10,500.00	6,988.49	1,482.00	1,423.04	63.19	10.11	15.62	1,315.56	-4,832.54	9,542.11	9,495.39	46.71	204.264		
10,600.00	6,988.42	1,482.00	1,423.04	64.26	10.11	15.62	1,315.56	-4,832.54	9,621.51	9,574.57	46.94	204.968		
10,700.00	6,988.35	1,482.00	1,423.04	65.36	10.11	15.62	1,315.56	-4,832.54	9,701.29	9,654.12	47.17	205.682		
10,800.00	6,988.28	1,482.00	1,423.04	66.48	10.11	15.62	1,315.56	-4,832.54	9,781.44	9,734.05	47.39	206.408		
10,900.00	6,988.21	1,451.05	1,398.01	67.61	9.96	15.49	1,322.74	-4,815.81	9,861.50	9,814.12	47.38	208.123		
11,000.00	6,988.14	1,421.00	1,373.27	68.77	9.81	15.36	1,329.49	-4,800.17	9,942.47	9,895.08	47.39	209.806		
11,100.00	6,988.07	1,421.00	1,373.27	69.95	9.81	15.36	1,329.49	-4,800.17	10,023.36	9,975.75	47.61	210.527		
11,200.00	6,988.01	1,421.00	1,373.27	71.14	9.81	15.36	1,329.49	-4,800.17	10,104.60	10,056.77	47.83	211.258		
11,300.00	6,987.94	1,421.00	1,373.27	72.35	9.81	15.36	1,329.49	-4,800.17	10,186.16	10,138.12	48.05	212.000		
11,400.00	6,987.87	1,421.00	1,373.27	73.57	9.81	15.36	1,329.49	-4,800.17	10,268.06	10,219.79	48.26	212.753		
11,500.00	6,987.80	1,421.00	1,373.27	74.81	9.81	15.36	1,329.49	-4,800.17	10,350.27	10,301.79	48.48	213.516		
11,600.00	6,987.73	1,421.00	1,373.27	76.07	9.81	15.36	1,329.49	-4,800.17	10,432.79	10,384.10	48.69	214.288		
11,643.87	6,987.70	1,421.00	1,373.27	76.62	9.81	15.36	1,329.49	-4,800.17	10,469.08	10,420.31	48.78	214.630		
11,700.00	6,987.66	1,421.00	1,373.27	77.33	9.81	16.95	1,329.49	-4,800.17	10,515.53	10,466.64	48.89	215.076		
11,737.27	6,987.63	1,421.00	1,373.27	77.80	9.81	18.00	1,329.49	-4,800.17	10,546.32	10,497.35	48.97	215.379		
11,800.00	6,987.59	1,421.00	1,373.27	78.59	9.81	18.00	1,329.49	-4,800.17	10,598.17	10,549.08	49.09	215.894		
11,900.00	6,987.52	1,392.42	1,349.36	79.86	9.67	17.87	1,335.65	-4,785.77	10,680.76	10,631.65	49.11	217.477		
12,000.00	6,987.46	1,386.36	1,344.24	81.14	9.64	17.84	1,336.92	-4,782.77	10,763.81	10,714.53	49.27	218.457		
12,100.00	6,987.39	1,359.00	1,321.01	82.43	9.50	17.72	1,342.47	-4,769.44	10,847.28	10,797.98	49.31	220.001		
12,200.00	6,987.32	1,359.00	1,321.01	83.73	9.50	17.72	1,342.47	-4,769.44	10,930.75	10,881.25	49.50	220.821		
12,300.00	6,987.26	1,359.00	1,321.01	85.05	9.50	17.72	1,342.47	-4,769.44	11,014.50	10,964.81	49.69	221.648		
12,400.00	6,987.19	1,359.00	1,321.01	86.38	9.50	17.72	1,342.47	-4,769.44	11,098.52	11,048.64	49.88	222.483		
12,500.00	6,987.12	1,359.00	1,321.01	87.71	9.50	17.72	1,342.47	-4,769.44	11,182.80	11,132.73	50.07	223.326		
12,600.00	6,987.06	1,359.00	1,321.01	89.06	9.50	17.72	1,342.47	-4,769.44	11,267.34	11,217.08	50.26	224.175		
12,700.00	6,986.99	1,359.00	1,321.01	90.41	9.50	17.72	1,342.47	-4,769.44	11,352.13	11,301.68	50.45	225.032		
12,800.00	6,986.92	1,359.00	1,321.01	91.77	9.50	17.72	1,342.47	-4,769.44	11,437.16	11,386.53	50.63	225.895		
12,900.00	6,986.86	1,359.00	1,321.01	93.14	9.50	17.72	1,342.47	-4,769.44	11,522.44	11,471.63	50.81	226.766		
13,000.00	6,986.79	1,359.00	1,321.01	94.52	9.50	17.72	1,342.47	-4,769.44	11,607.95	11,556.96	50.99	227.642		
13,100.00	6,986.72	1,328.92	1,295.13	95.90	9.34	17.59	1,348.38	-4,755.30	11,693.30	11,642.30	51.00	229.261		
13,200.00	6,986.66	1,297.00	1,267.29	97.30	9.17	17.46	1,354.55	-4,740.95	11,779.46	11,728.45	51.01	230.921		
13,300.00	6,986.59	1,297.00	1,267.29	98.69	9.17	17.46	1,354.55	-4,740.95	11,865.41	11,814.22	51.19	231.793		
13,400.00	6,986.52	1,297.00	1,267.29	100.10	9.17	17.46	1,354.55	-4,740.95	11,951.57	11,900.21	51.37	232.672		
13,500.00	6,986.46	1,297.00	1,267.29	101.51	9.17	17.46	1,354.55	-4,740.95	12,037.95	11,986.41	51.54	233.556		
13,600.00	6,986.39	1,297.00	1,267.29	102.93	9.17	17.46	1,354.55	-4,740.95	12,124.54	12,072.83	51.72	234.446		
13,700.00	6,986.32	1,297.00	1,267.29	104.35	9.17	17.46	1,354.55	-4,740.95	12,211.34	12,159.45	51.89	235.342		
13,800.00	6,986.25	1,297.00	1,267.29	105.78	9.17	17.46	1,354.55	-4,740.95	12,298.33	12,246.27	52.06	236.243		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171C - OH - OH-SVY												Offset Site Error: 0.00 usft	
Survey Program: 288-MWD OWSG Rev5				Rule Assigned:				Offset Well Error: 0.00 usft					
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
13,900.00	6,986.19	1,297.00	1,267.29	107.21	9.17	17.46	1,354.55	-4,740.95	12,385.52	12,333.29	52.23	237.149	
14,000.00	6,986.12	1,297.00	1,267.29	108.65	9.17	17.46	1,354.55	-4,740.95	12,472.90	12,420.51	52.39	238.061	
14,100.00	6,986.05	1,297.00	1,267.29	110.09	9.17	17.46	1,354.55	-4,740.95	12,560.47	12,507.92	52.56	238.977	
14,200.00	6,985.99	1,297.00	1,267.29	111.54	9.17	17.46	1,354.55	-4,740.95	12,648.23	12,595.51	52.72	239.899	
14,300.00	6,985.92	1,297.00	1,267.29	112.99	9.17	17.46	1,354.55	-4,740.95	12,736.17	12,683.28	52.89	240.824	
14,400.00	6,985.85	1,297.00	1,267.29	114.45	9.17	17.46	1,354.55	-4,740.95	12,824.28	12,771.23	53.05	241.755	
14,500.00	6,985.79	1,297.00	1,267.29	115.91	9.17	17.46	1,354.55	-4,740.95	12,912.56	12,859.36	53.21	242.689	
14,600.00	6,985.72	1,265.76	1,239.69	117.38	8.99	17.33	1,360.36	-4,727.54	13,000.62	12,947.40	53.22	244.277	
14,700.00	6,985.65	1,235.00	1,212.15	118.84	8.82	17.20	1,365.74	-4,714.91	13,089.43	13,036.19	53.24	245.857	
14,800.00	6,985.59	1,235.00	1,212.15	120.32	8.82	17.20	1,365.74	-4,714.91	13,178.02	13,124.62	53.40	246.786	
14,900.00	6,985.52	1,235.00	1,212.15	121.79	8.82	17.20	1,365.74	-4,714.91	13,266.77	13,213.21	53.56	247.719	
15,000.00	6,985.45	1,235.00	1,212.15	123.27	8.82	17.20	1,365.74	-4,714.91	13,355.68	13,301.97	53.71	248.657	
15,100.00	6,985.39	1,235.00	1,212.15	124.75	8.82	17.20	1,365.74	-4,714.91	13,444.75	13,390.88	53.87	249.598	
15,200.00	6,985.32	1,235.00	1,212.15	126.24	8.82	17.20	1,365.74	-4,714.91	13,533.96	13,479.95	54.02	250.542	
15,300.00	6,985.25	1,235.00	1,212.15	127.72	8.82	17.20	1,365.74	-4,714.91	13,623.33	13,569.16	54.17	251.490	
15,400.00	6,985.19	1,235.00	1,212.15	129.21	8.82	17.20	1,365.74	-4,714.91	13,712.85	13,658.53	54.32	252.441	
15,500.00	6,985.12	1,235.00	1,212.15	130.71	8.82	17.20	1,365.74	-4,714.91	13,802.51	13,748.04	54.47	253.396	
15,600.00	6,985.05	1,235.00	1,212.15	132.20	8.82	17.20	1,365.74	-4,714.91	13,892.31	13,837.69	54.62	254.353	
15,700.00	6,984.99	1,235.00	1,212.15	133.70	8.82	17.20	1,365.74	-4,714.91	13,982.25	13,927.48	54.77	255.313	
15,800.00	6,984.92	1,235.00	1,212.15	135.20	8.82	17.20	1,365.74	-4,714.91	14,072.32	14,017.41	54.91	256.276	
15,900.00	6,984.85	1,235.00	1,212.15	136.71	8.82	17.20	1,365.74	-4,714.91	14,162.53	14,107.47	55.06	257.242	
16,000.00	6,984.79	1,235.00	1,212.15	138.21	8.82	17.20	1,365.74	-4,714.91	14,252.87	14,197.67	55.20	258.210	
16,100.00	6,984.72	1,235.00	1,212.15	139.72	8.82	17.20	1,365.74	-4,714.91	14,343.33	14,287.99	55.34	259.180	
16,200.00	6,984.65	1,235.00	1,212.15	141.23	8.82	17.20	1,365.74	-4,714.91	14,433.92	14,378.44	55.48	260.153	
16,300.00	6,984.59	1,206.39	1,186.26	142.75	8.67	17.08	1,370.53	-4,703.73	14,524.29	14,468.78	55.52	261.620	
16,400.00	6,984.52	1,203.31	1,183.46	144.26	8.65	17.07	1,371.04	-4,702.55	14,615.05	14,559.41	55.65	262.644	
16,500.00	6,984.45	1,173.00	1,155.72	145.78	8.48	16.95	1,375.99	-4,691.39	14,706.24	14,650.56	55.68	264.134	
16,600.00	6,984.39	1,173.00	1,155.72	147.29	8.48	16.95	1,375.99	-4,691.39	14,797.15	14,741.34	55.82	265.103	
16,700.00	6,984.32	1,173.00	1,155.72	148.82	8.48	16.95	1,375.99	-4,691.39	14,888.18	14,832.23	55.96	266.073	
16,800.00	6,984.25	1,173.00	1,155.72	150.34	8.48	16.95	1,375.99	-4,691.39	14,979.33	14,923.24	56.09	267.045	
16,900.00	6,984.19	1,173.00	1,155.72	151.86	8.48	16.95	1,375.99	-4,691.39	15,070.59	15,014.36	56.23	268.019	
17,000.00	6,984.12	1,173.00	1,155.72	153.39	8.48	16.95	1,375.99	-4,691.39	15,161.96	15,105.59	56.37	268.995	
17,100.00	6,984.05	1,173.00	1,155.72	154.91	8.48	16.95	1,375.99	-4,691.39	15,253.43	15,196.93	56.50	269.972	
17,200.00	6,983.99	1,173.00	1,155.72	156.44	8.48	16.95	1,375.99	-4,691.39	15,345.02	15,288.38	56.63	270.950	
17,300.00	6,983.92	1,173.00	1,155.72	157.97	8.48	16.95	1,375.99	-4,691.39	15,436.70	15,379.94	56.77	271.930	
17,400.00	6,983.85	1,173.00	1,155.72	159.50	8.48	16.95	1,375.99	-4,691.39	15,528.49	15,471.59	56.90	272.911	
17,500.00	6,983.79	1,173.00	1,155.72	161.04	8.48	16.95	1,375.99	-4,691.39	15,620.38	15,563.35	57.03	273.894	
17,600.00	6,983.72	1,173.00	1,155.72	162.57	8.48	16.95	1,375.99	-4,691.39	15,712.37	15,655.21	57.16	274.877	
17,700.00	6,983.65	1,173.00	1,155.72	164.11	8.48	16.95	1,375.99	-4,691.39	15,804.46	15,747.17	57.29	275.861	
17,800.00	6,983.59	1,173.00	1,155.72	165.65	8.48	16.95	1,375.99	-4,691.39	15,896.65	15,839.22	57.42	276.846	
17,900.00	6,983.52	1,173.00	1,155.72	167.18	8.48	16.95	1,375.99	-4,691.39	15,988.92	15,931.37	57.55	277.832	
18,000.00	6,983.45	1,173.00	1,155.72	168.72	8.48	16.95	1,375.99	-4,691.39	16,081.29	16,023.61	57.68	278.819	
18,100.00	6,983.39	1,173.00	1,155.72	170.27	8.48	16.95	1,375.99	-4,691.39	16,173.75	16,115.95	57.80	279.806	
18,200.00	6,983.32	1,173.00	1,155.72	171.81	8.48	16.95	1,375.99	-4,691.39	16,266.30	16,208.37	57.93	280.794	
18,300.00	6,983.25	1,173.00	1,155.72	173.35	8.48	16.95	1,375.99	-4,691.39	16,358.94	16,300.88	58.06	281.783	
18,400.00	6,983.19	1,173.00	1,155.72	174.90	8.48	16.95	1,375.99	-4,691.39	16,451.66	16,393.48	58.18	282.772	
18,500.00	6,983.12	1,173.00	1,155.72	176.44	8.48	16.95	1,375.99	-4,691.39	16,544.47	16,486.16	58.30	283.761	
18,600.00	6,983.05	1,142.37	1,127.41	177.99	8.33	16.83	1,380.85	-4,680.75	16,636.98	16,578.62	58.36	285.071	
18,700.00	6,982.99	1,139.88	1,125.09	179.54	8.31	16.82	1,381.24	-4,679.92	16,729.89	16,671.41	58.48	286.082	
18,800.00	6,982.92	1,110.00	1,097.21	181.09	8.16	16.71	1,385.79	-4,670.20	16,823.18	16,764.64	58.54	287.380	
18,900.00	6,982.85	1,110.00	1,097.21	182.64	8.16	16.71	1,385.79	-4,670.20	16,916.19	16,857.52	58.66	288.361	
19,000.00	6,982.78	1,110.00	1,097.21	184.19	8.16	16.71	1,385.79	-4,670.20	17,009.28	16,950.49	58.79	289.343	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #171C - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 288-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
19,100.00	6,982.72	1,110.00	1,097.21	185.74	8.16	16.71	1,385.79	-4,670.20	17,102.44	17,043.53		58.91	290.324
19,200.00	6,982.65	1,110.00	1,097.21	187.29	8.16	16.71	1,385.79	-4,670.20	17,195.69	17,136.66		59.03	291.306
19,300.00	6,982.58	1,110.00	1,097.21	188.84	8.16	16.71	1,385.79	-4,670.20	17,289.00	17,229.85		59.15	292.288
19,400.00	6,982.52	1,110.00	1,097.21	190.40	8.16	16.71	1,385.79	-4,670.20	17,382.40	17,323.13		59.27	293.269
19,500.00	6,982.45	1,110.00	1,097.21	191.95	8.16	16.71	1,385.79	-4,670.20	17,475.86	17,416.47		59.39	294.251
19,600.00	6,982.38	1,110.00	1,097.21	193.51	8.16	16.71	1,385.79	-4,670.20	17,569.40	17,509.89		59.51	295.232
19,700.00	6,982.32	1,110.00	1,097.21	195.07	8.16	16.71	1,385.79	-4,670.20	17,663.01	17,603.38		59.63	296.213
19,800.00	6,982.25	1,110.00	1,097.21	196.62	8.16	16.71	1,385.79	-4,670.20	17,756.69	17,696.94		59.75	297.193
19,900.00	6,982.18	1,110.00	1,097.21	198.18	8.16	16.71	1,385.79	-4,670.20	17,850.44	17,790.57		59.87	298.174
20,000.00	6,982.12	1,110.00	1,097.21	199.74	8.16	16.71	1,385.79	-4,670.20	17,944.25	17,884.27		59.98	299.153
20,100.00	6,982.05	1,110.00	1,097.21	201.30	8.16	16.71	1,385.79	-4,670.20	18,038.13	17,978.03		60.10	300.133
20,176.02	6,982.00	1,110.00	1,097.21	202.36	8.16	16.71	1,385.79	-4,670.20	18,109.54	18,047.29		62.25	290.928

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 406-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-96.93	-1,071.84	-8,818.97	8,884.77				
100.00	100.00	0.00	0.00	0.25	0.00	-96.93	-1,071.84	-8,818.97	8,883.91	8,883.66	0.25	N/A	
145.66	145.66	18.66	18.66	0.41	0.33	-96.93	-1,071.84	-8,818.97	8,883.87	8,883.12	0.75	N/A	
200.00	200.00	73.00	73.00	0.61	1.29	-96.93	-1,071.84	-8,818.97	8,883.87	8,881.96	1.90	4,668.583	
300.00	300.00	173.00	173.00	0.97	3.07	-96.93	-1,071.84	-8,818.97	8,883.87	8,879.83	4.03	2,202.781	
400.00	400.00	273.00	273.00	1.33	4.84	-96.93	-1,071.84	-8,818.97	8,883.87	8,877.70	6.16	1,441.451	
500.00	500.00	373.00	373.00	1.68	6.61	-96.93	-1,071.84	-8,818.97	8,883.87	8,875.57	8.29	1,071.215	
600.00	600.00	473.00	473.00	2.04	8.40	-96.93	-1,071.84	-8,818.97	8,883.87	8,873.42	10.44	850.665	
700.00	699.98	572.98	572.98	2.40	10.20	-86.94	-1,071.84	-8,818.97	8,883.77	8,871.17	12.60	704.928	
800.00	799.84	672.84	672.84	2.76	12.00	-86.98	-1,071.84	-8,818.97	8,883.50	8,868.74	14.76	601.906	
900.00	899.45	771.80	771.80	3.13	13.78	-87.04	-1,071.56	-8,818.97	8,883.00	8,866.10	16.90	525.574	
1,000.00	998.70	870.22	870.22	3.49	15.56	-87.13	-1,071.65	-8,818.97	8,882.39	8,863.35	19.04	466.524	
1,100.00	1,097.47	968.13	968.13	3.86	17.32	-87.25	-1,071.82	-8,818.97	8,881.64	8,860.46	21.18	419.403	
1,200.00	1,195.62	1,068.64	1,068.62	4.24	19.24	-87.39	-1,071.84	-8,818.97	8,880.73	8,857.25	23.48	378.160	
1,300.00	1,293.06	1,166.07	1,166.06	4.64	21.12	-87.55	-1,071.84	-8,818.97	8,879.72	8,853.95	25.76	344.679	
1,400.00	1,389.64	1,261.92	1,261.90	5.06	22.97	-87.73	-1,071.32	-8,818.97	8,878.54	8,850.52	28.03	316.768	
1,500.00	1,485.27	1,355.52	1,355.50	5.50	24.77	-87.93	-1,071.45	-8,818.97	8,877.41	8,847.14	30.27	293.243	
1,515.00	1,499.52	1,369.46	1,369.44	5.57	25.04	-87.96	-1,071.49	-8,818.97	8,877.24	8,846.63	30.61	290.014	
1,600.00	1,580.22	1,448.37	1,448.35	5.96	26.56	-88.12	-1,071.74	-8,818.97	8,876.32	8,843.80	32.52	272.929	
1,700.00	1,675.17	1,548.22	1,548.17	6.44	28.59	-88.33	-1,071.84	-8,818.97	8,875.31	8,840.29	35.02	253.421	
1,800.00	1,770.11	1,643.17	1,643.11	6.92	30.55	-88.52	-1,071.84	-8,818.97	8,874.40	8,836.94	37.46	236.886	
1,900.00	1,865.05	1,738.11	1,738.05	7.41	32.51	-88.71	-1,071.84	-8,818.97	8,873.60	8,833.69	39.91	222.337	
2,000.00	1,959.99	1,829.74	1,829.67	7.90	34.40	-88.89	-1,070.72	-8,818.97	8,872.74	8,830.45	42.30	209.778	
2,100.00	2,054.94	1,920.65	1,920.58	8.40	36.27	-89.08	-1,071.07	-8,818.97	8,872.22	8,827.55	44.67	198.611	
2,200.00	2,149.88	2,011.40	2,011.32	8.90	38.15	-89.27	-1,071.68	-8,818.97	8,871.85	8,824.80	47.05	188.573	
2,300.00	2,244.82	2,117.96	2,117.82	9.41	40.43	-89.48	-1,071.84	-8,818.97	8,871.52	8,821.68	49.84	178.011	
2,400.00	2,339.76	2,212.91	2,212.76	9.92	42.48	-89.67	-1,071.84	-8,818.97	8,871.27	8,818.88	52.40	169.307	
2,500.00	2,434.71	2,307.13	2,306.98	10.43	44.52	-89.86	-1,070.71	-8,818.97	8,870.95	8,816.00	54.94	161.452	
2,545.31	2,477.72	2,348.06	2,347.90	10.66	45.40	-89.94	-1,070.75	-8,818.97	8,870.93	8,814.87	56.06	158.235 CC	
2,600.00	2,529.65	2,397.41	2,397.25	10.94	46.47	-90.04	-1,070.88	-8,818.97	8,870.95	8,813.54	57.41	154.522	
2,700.00	2,624.59	2,487.52	2,487.35	11.45	48.42	-90.23	-1,071.33	-8,818.97	8,871.12	8,811.25	59.87	148.171	
2,800.00	2,719.53	2,592.78	2,592.53	11.97	50.70	-90.44	-1,071.84	-8,818.97	8,871.41	8,808.74	62.67	141.556	
2,900.00	2,814.48	2,687.72	2,687.48	12.49	52.77	-90.64	-1,071.84	-8,818.97	8,871.72	8,806.46	65.26	135.941	
3,000.00	2,909.42	2,782.66	2,782.42	13.01	54.85	-90.83	-1,071.84	-8,818.97	8,872.15	8,804.29	67.85	130.754	
3,100.00	3,004.36	2,877.61	2,877.36	13.53	56.92	-91.02	-1,071.84	-8,818.97	8,872.68	8,802.23	70.45	125.948	
3,200.00	3,099.30	2,972.55	2,972.30	14.05	58.99	-91.21	-1,071.84	-8,818.97	8,873.33	8,800.29	73.04	121.484	
3,300.00	3,194.25	3,067.49	3,067.25	14.57	61.06	-91.41	-1,071.84	-8,818.97	8,874.08	8,798.45	75.64	117.327	
3,400.00	3,289.19	3,135.00	3,134.64	15.09	62.54	-91.54	-1,071.84	-8,818.97	8,874.99	8,797.36	77.63	114.322 ES	
3,500.00	3,384.13	3,135.00	3,134.64	15.62	62.54	-91.54	-1,071.84	-8,818.97	8,876.77	8,798.63	78.15	113.591	
3,600.00	3,479.07	3,135.00	3,134.64	16.14	62.54	-91.54	-1,071.84	-8,818.97	8,879.68	8,801.03	78.65	112.895	
3,700.00	3,574.02	3,135.00	3,134.64	16.67	62.54	-91.54	-1,071.84	-8,818.97	8,883.71	8,804.56	79.15	112.236	
3,800.00	3,668.96	3,135.00	3,134.64	17.19	62.54	-91.54	-1,071.84	-8,818.97	8,888.87	8,809.23	79.64	111.610	
3,900.00	3,763.90	3,135.00	3,134.64	17.72	62.54	-91.54	-1,071.84	-8,818.97	8,895.14	8,815.02	80.12	111.019	
4,000.00	3,858.84	3,135.00	3,134.64	18.24	62.54	-91.54	-1,071.84	-8,818.97	8,902.54	8,821.95	80.59	110.462	
4,100.00	3,953.79	3,135.00	3,134.64	18.77	62.54	-91.54	-1,071.84	-8,818.97	8,911.05	8,829.99	81.06	109.937	
4,200.00	4,048.73	3,135.00	3,134.64	19.30	62.54	-91.54	-1,071.84	-8,818.97	8,920.67	8,839.17	81.51	109.445	
4,300.00	4,143.67	3,135.00	3,134.64	19.82	62.54	-91.54	-1,071.84	-8,818.97	8,931.41	8,849.46	81.95	108.984	
4,400.00	4,238.61	3,135.00	3,134.64	20.35	62.54	-91.54	-1,071.84	-8,818.97	8,943.25	8,860.86	82.39	108.554	
4,500.00	4,333.56	3,135.00	3,134.64	20.88	62.54	-91.54	-1,071.84	-8,818.97	8,956.19	8,873.38	82.81	108.155	
4,600.00	4,428.50	3,135.00	3,134.64	21.41	62.54	-91.54	-1,071.84	-8,818.97	8,970.22	8,887.00	83.22	107.786	
4,700.00	4,523.44	3,135.00	3,134.64	21.93	62.54	-91.54	-1,071.84	-8,818.97	8,985.35	8,901.72	83.63	107.446	
4,800.00	4,618.38	3,135.00	3,134.64	22.46	62.54	-91.54	-1,071.84	-8,818.97	9,001.56	8,917.54	84.02	107.135	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		406-A027Ua_INC-ONLY					Rule Assigned:						Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,900.00	4,713.33	3,135.00	3,134.64	22.99	62.54	-91.54	-1,071.84	-8,818.97	9,018.86	8,934.45	84.40	106.853		
5,000.00	4,808.27	3,135.00	3,134.64	23.52	62.54	-91.54	-1,071.84	-8,818.97	9,037.22	8,952.44	84.78	106.598		
5,100.00	4,903.21	3,135.00	3,134.64	24.05	62.54	-91.54	-1,071.84	-8,818.97	9,056.65	8,971.51	85.14	106.370		
5,200.00	4,998.16	3,135.00	3,134.64	24.58	62.54	-91.54	-1,071.84	-8,818.97	9,077.15	8,991.65	85.50	106.169		
5,300.00	5,093.10	3,135.00	3,134.64	25.11	62.54	-91.54	-1,071.84	-8,818.97	9,098.69	9,012.85	85.84	105.994		
5,400.00	5,188.04	3,135.00	3,134.64	25.64	62.54	-91.54	-1,071.84	-8,818.97	9,121.28	9,035.11	86.18	105.844		
5,500.00	5,282.98	3,135.00	3,134.64	26.17	62.54	-91.54	-1,071.84	-8,818.97	9,144.91	9,058.41	86.50	105.720		
5,600.00	5,377.93	3,135.00	3,134.64	26.70	62.54	-91.54	-1,071.84	-8,818.97	9,169.57	9,082.76	86.82	105.621		
5,623.25	5,400.00	3,135.00	3,134.64	26.82	62.54	-91.54	-1,071.84	-8,818.97	9,175.45	9,088.57	86.89	105.601		
5,700.00	5,473.03	3,135.00	3,134.64	27.22	62.54	-91.75	-1,071.84	-8,818.97	9,195.24	9,108.12	87.12	105.550		
5,800.00	5,568.64	3,135.00	3,134.64	27.73	62.54	-92.02	-1,071.84	-8,818.97	9,221.87	9,134.47	87.39	105.520 SF		
5,900.00	5,664.75	3,135.00	3,134.64	28.23	62.54	-92.31	-1,071.84	-8,818.97	9,249.44	9,161.80	87.65	105.530		
6,000.00	5,761.33	3,135.00	3,134.64	28.71	62.54	-92.61	-1,071.84	-8,818.97	9,277.95	9,190.07	87.88	105.579		
6,100.00	5,858.34	3,135.00	3,134.64	29.18	62.54	-92.92	-1,071.84	-8,818.97	9,307.36	9,219.28	88.08	105.667		
6,200.00	5,955.76	3,135.00	3,134.64	29.64	62.54	-93.23	-1,071.84	-8,818.97	9,337.67	9,249.41	88.26	105.794		
6,300.00	6,053.57	3,135.00	3,134.64	30.07	62.54	-93.56	-1,071.84	-8,818.97	9,368.85	9,280.43	88.42	105.957		
6,400.00	6,151.72	3,135.00	3,134.64	30.50	62.54	-93.90	-1,071.84	-8,818.97	9,400.90	9,312.34	88.56	106.158		
6,500.00	6,250.19	3,135.00	3,134.64	30.91	62.54	-94.25	-1,071.84	-8,818.97	9,433.78	9,345.11	88.67	106.395		
6,600.00	6,348.94	3,135.00	3,134.64	31.30	62.54	-94.60	-1,071.84	-8,818.97	9,467.48	9,378.72	88.76	106.668		
6,659.67	6,408.00	3,135.00	3,134.64	31.53	62.54	-94.82	-1,071.84	-8,818.97	9,487.97	9,399.17	88.80	106.847		
6,700.00	6,447.82	3,135.00	3,134.64	31.68	62.54	-110.56	-1,071.84	-8,818.97	9,503.02	9,414.19	88.83	106.977		
6,750.00	6,496.66	3,135.00	3,134.64	31.90	62.54	-120.72	-1,071.84	-8,818.97	9,524.67	9,435.78	88.89	107.155		
6,800.00	6,544.65	3,135.00	3,134.64	32.13	62.54	-125.69	-1,071.84	-8,818.97	9,549.47	9,460.51	88.96	107.351		
6,850.00	6,591.49	3,135.00	3,134.64	32.37	62.54	-127.97	-1,071.84	-8,818.97	9,577.25	9,488.21	89.04	107.566		
6,900.00	6,636.89	3,135.00	3,134.64	32.62	62.54	-128.60	-1,071.84	-8,818.97	9,607.82	9,518.69	89.13	107.797		
6,950.00	6,680.57	3,135.00	3,134.64	32.89	62.54	-128.04	-1,071.84	-8,818.97	9,640.96	9,551.73	89.23	108.043		
7,000.00	6,722.26	3,135.00	3,134.64	33.17	62.54	-126.48	-1,071.84	-8,818.97	9,676.44	9,587.10	89.35	108.302		
7,050.00	6,761.71	3,135.00	3,134.64	33.45	62.54	-123.98	-1,071.84	-8,818.97	9,714.02	9,624.55	89.47	108.570		
7,100.00	6,798.67	3,135.00	3,134.64	33.75	62.54	-120.53	-1,071.84	-8,818.97	9,753.45	9,663.84	89.61	108.847		
7,150.00	6,832.91	3,135.00	3,134.64	34.06	62.54	-116.05	-1,071.84	-8,818.97	9,794.46	9,704.71	89.75	109.129		
7,200.00	6,864.22	3,135.00	3,134.64	34.37	62.54	-110.49	-1,071.84	-8,818.97	9,836.77	9,746.87	89.91	109.413		
7,250.00	6,892.42	3,135.00	3,134.64	34.69	62.54	-103.83	-1,071.84	-8,818.97	9,880.12	9,790.06	90.07	109.696		
7,300.00	6,917.32	3,135.00	3,134.64	35.03	62.54	-96.14	-1,071.84	-8,818.97	9,924.23	9,833.99	90.24	109.976		
7,350.00	6,938.77	3,135.00	3,134.64	35.37	62.54	-87.67	-1,071.84	-8,818.97	9,968.81	9,878.39	90.42	110.250		
7,400.00	6,956.64	3,135.00	3,134.64	35.72	62.54	-78.83	-1,071.84	-8,818.97	10,013.59	9,922.98	90.61	110.515		
7,450.00	6,970.83	3,135.00	3,134.64	36.07	62.54	-70.13	-1,071.84	-8,818.97	10,058.28	9,967.48	90.81	110.768		
7,500.00	6,981.23	3,135.00	3,134.64	36.44	62.54	-62.00	-1,071.84	-8,818.97	10,102.63	10,011.62	91.01	111.005		
7,550.00	6,987.80	3,135.00	3,134.64	36.81	62.54	-54.73	-1,071.84	-8,818.97	10,146.35	10,055.12	91.22	111.225		
7,600.00	6,990.48	3,135.00	3,134.64	37.19	62.54	-48.41	-1,071.84	-8,818.97	10,189.19	10,097.75	91.45	111.424		
7,609.87	6,990.55	3,135.00	3,134.64	37.26	62.54	-47.27	-1,071.84	-8,818.97	10,197.52	10,106.03	91.49	111.462		
7,700.00	6,990.49	3,135.00	3,134.64	37.97	62.54	-47.27	-1,071.84	-8,818.97	10,273.51	10,181.61	91.90	111.787		
7,800.00	6,990.42	3,135.00	3,134.64	38.78	62.54	-47.27	-1,071.84	-8,818.97	10,358.08	10,265.72	92.36	112.149		
7,900.00	6,990.35	3,135.00	3,134.64	39.64	62.54	-47.27	-1,071.84	-8,818.97	10,442.93	10,350.11	92.82	112.512		
8,000.00	6,990.28	3,135.00	3,134.64	40.53	62.54	-47.27	-1,071.84	-8,818.97	10,528.04	10,434.77	93.27	112.878		
8,100.00	6,990.21	3,135.00	3,134.64	41.45	62.54	-47.27	-1,071.84	-8,818.97	10,613.41	10,519.69	93.72	113.247		
8,200.00	6,990.14	3,135.00	3,134.64	42.40	62.54	-47.27	-1,071.84	-8,818.97	10,699.03	10,604.87	94.17	113.618		
8,306.37	6,990.06	3,135.00	3,134.64	43.45	62.54	-47.27	-1,071.84	-8,818.97	10,790.38	10,695.74	94.64	114.016		
8,400.00	6,990.00	3,135.00	3,134.64	44.38	62.54	-42.52	-1,071.84	-8,818.97	10,872.10	10,777.07	95.03	114.405		
8,500.00	6,989.93	3,135.00	3,134.64	45.36	62.54	-36.29	-1,071.84	-8,818.97	10,961.69	10,866.28	95.40	114.901		
8,600.00	6,989.85	3,135.00	3,134.64	46.33	62.54	-28.63	-1,071.84	-8,818.97	11,053.18	10,957.47	95.71	115.481		
8,700.00	6,989.78	3,135.00	3,134.64	47.28	62.54	-19.45	-1,071.84	-8,818.97	11,146.10	11,050.13	95.97	116.139		
8,800.00	6,989.70	3,135.00	3,134.64	48.21	62.54	-8.91	-1,071.84	-8,818.97	11,239.96	11,143.79	96.17	116.873		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 406-A027Ua_INC-ONLY									Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
8,900.00	6,989.63	3,135.00	3,134.64	49.11	62.54	2.42	-1,071.84	-8,818.97	11,334.29	11,237.97	96.32	117.677		
9,000.00	6,989.55	3,135.00	3,134.64	49.99	62.54	13.66	-1,071.84	-8,818.97	11,428.61	11,332.20	96.41	118.547		
9,100.00	6,989.48	3,135.00	3,134.64	50.84	62.54	23.96	-1,071.84	-8,818.97	11,522.48	11,426.04	96.44	119.477		
9,200.00	6,989.40	3,135.00	3,134.64	51.66	62.54	32.84	-1,071.84	-8,818.97	11,615.46	11,519.03	96.42	120.462		
9,300.00	6,989.33	3,135.00	3,134.64	52.45	62.54	40.21	-1,071.84	-8,818.97	11,707.11	11,610.75	96.36	121.494		
9,393.87	6,989.27	3,135.00	3,134.64	53.15	62.54	45.87	-1,071.84	-8,818.97	11,791.57	11,695.31	96.26	122.500		
9,400.00	6,989.26	3,135.00	3,134.64	53.20	62.54	45.87	-1,071.84	-8,818.97	11,797.04	11,700.79	96.25	122.568		
9,500.00	6,989.19	3,135.00	3,134.64	53.95	62.54	45.87	-1,071.84	-8,818.97	11,886.19	11,790.06	96.13	123.651		
9,600.00	6,989.12	3,135.00	3,134.64	54.73	62.54	45.87	-1,071.84	-8,818.97	11,975.51	11,879.50	96.01	124.730		
9,700.00	6,989.05	3,135.00	3,134.64	55.55	62.54	45.87	-1,071.84	-8,818.97	12,065.00	11,969.09	95.90	125.804		
9,800.00	6,988.98	3,135.00	3,134.64	56.40	62.54	45.87	-1,071.84	-8,818.97	12,154.65	12,058.85	95.80	126.874		
9,900.00	6,988.91	3,135.00	3,134.64	57.28	62.54	45.87	-1,071.84	-8,818.97	12,244.47	12,148.76	95.71	127.939		
10,000.00	6,988.84	3,135.00	3,134.64	58.20	62.54	45.87	-1,071.84	-8,818.97	12,334.44	12,238.82	95.62	129.000		
10,100.00	6,988.77	3,135.00	3,134.64	59.14	62.54	45.87	-1,071.84	-8,818.97	12,424.56	12,329.03	95.53	130.056		
10,200.00	6,988.70	3,135.00	3,134.64	60.11	62.54	45.87	-1,071.84	-8,818.97	12,514.83	12,419.38	95.45	131.108		
10,300.00	6,988.63	3,135.00	3,134.64	61.11	62.54	45.87	-1,071.84	-8,818.97	12,605.25	12,509.87	95.38	132.154		
10,400.00	6,988.56	3,135.00	3,134.64	62.14	62.54	45.87	-1,071.84	-8,818.97	12,695.82	12,600.50	95.32	133.196		
10,500.00	6,988.49	3,135.00	3,134.64	63.19	62.54	45.87	-1,071.84	-8,818.97	12,786.52	12,691.27	95.26	134.233		
10,600.00	6,988.42	3,135.00	3,134.64	64.26	62.54	45.87	-1,071.84	-8,818.97	12,877.37	12,782.17	95.20	135.265		
10,700.00	6,988.35	3,135.00	3,134.64	65.36	62.54	45.87	-1,071.84	-8,818.97	12,968.34	12,873.19	95.15	136.293		
10,800.00	6,988.28	3,135.00	3,134.64	66.48	62.54	45.87	-1,071.84	-8,818.97	13,059.45	12,964.35	95.11	137.315		
10,900.00	6,988.21	3,135.00	3,134.64	67.61	62.54	45.87	-1,071.84	-8,818.97	13,150.69	13,055.63	95.07	138.333		
11,000.00	6,988.14	3,135.00	3,134.64	68.77	62.54	45.87	-1,071.84	-8,818.97	13,242.06	13,147.03	95.03	139.345		
11,100.00	6,988.07	3,135.00	3,134.64	69.95	62.54	45.87	-1,071.84	-8,818.97	13,333.55	13,238.55	95.00	140.353		
11,200.00	6,988.01	3,135.00	3,134.64	71.14	62.54	45.87	-1,071.84	-8,818.97	13,425.16	13,330.18	94.97	141.355		
11,300.00	6,987.94	3,135.00	3,134.64	72.35	62.54	45.87	-1,071.84	-8,818.97	13,516.89	13,421.93	94.95	142.353		
11,400.00	6,987.87	3,135.00	3,134.64	73.57	62.54	45.87	-1,071.84	-8,818.97	13,608.73	13,513.80	94.94	143.346		
11,500.00	6,987.80	3,135.00	3,134.64	74.81	62.54	45.87	-1,071.84	-8,818.97	13,700.69	13,605.77	94.92	144.333		
11,600.00	6,987.73	3,135.00	3,134.64	76.07	62.54	45.87	-1,071.84	-8,818.97	13,792.77	13,697.85	94.92	145.316		
11,643.87	6,987.70	3,135.00	3,134.64	76.62	62.54	45.87	-1,071.84	-8,818.97	13,833.19	13,738.27	94.91	145.746		
11,700.00	6,987.66	3,135.00	3,134.64	77.33	62.54	47.67	-1,071.84	-8,818.97	13,884.79	13,789.88	94.91	146.297		
11,737.27	6,987.63	3,135.00	3,134.64	77.80	62.54	48.80	-1,071.84	-8,818.97	13,918.89	13,823.99	94.90	146.664		
11,800.00	6,987.59	3,135.00	3,134.64	78.59	62.54	48.80	-1,071.84	-8,818.97	13,976.21	13,881.31	94.90	147.280		
11,900.00	6,987.52	3,135.00	3,134.64	79.86	62.54	48.80	-1,071.84	-8,818.97	14,067.67	13,972.78	94.89	148.256		
12,000.00	6,987.46	3,135.00	3,134.64	81.14	62.54	48.80	-1,071.84	-8,818.97	14,159.25	14,064.36	94.88	149.226		
12,100.00	6,987.39	3,135.00	3,134.64	82.43	62.54	48.80	-1,071.84	-8,818.97	14,250.94	14,156.05	94.89	150.191		
12,200.00	6,987.32	3,135.00	3,134.64	83.73	62.54	48.80	-1,071.84	-8,818.97	14,342.74	14,247.85	94.89	151.151		
12,300.00	6,987.26	3,135.00	3,134.64	85.05	62.54	48.80	-1,071.84	-8,818.97	14,434.65	14,339.75	94.90	152.105		
12,400.00	6,987.19	3,135.00	3,134.64	86.38	62.54	48.80	-1,071.84	-8,818.97	14,526.67	14,431.75	94.91	153.053		
12,500.00	6,987.12	3,135.00	3,134.64	87.71	62.54	48.80	-1,071.84	-8,818.97	14,618.79	14,523.86	94.93	153.996		
12,600.00	6,987.06	3,135.00	3,134.64	89.06	62.54	48.80	-1,071.84	-8,818.97	14,711.01	14,616.06	94.95	154.934		
12,700.00	6,986.99	3,135.00	3,134.64	90.41	62.54	48.80	-1,071.84	-8,818.97	14,803.34	14,708.37	94.97	155.867		
12,800.00	6,986.92	3,135.00	3,134.64	91.77	62.54	48.80	-1,071.84	-8,818.97	14,895.76	14,800.76	95.00	156.794		
12,900.00	6,986.86	3,135.00	3,134.64	93.14	62.54	48.80	-1,071.84	-8,818.97	14,988.29	14,893.25	95.03	157.716		
13,000.00	6,986.79	3,135.00	3,134.64	94.52	62.54	48.80	-1,071.84	-8,818.97	15,080.90	14,985.84	95.07	158.633		
13,100.00	6,986.72	3,135.00	3,134.64	95.90	62.54	48.80	-1,071.84	-8,818.97	15,173.62	15,078.51	95.11	159.545		
13,200.00	6,986.66	3,135.00	3,134.64	97.30	62.54	48.80	-1,071.84	-8,818.97	15,266.42	15,171.27	95.15	160.451		
13,300.00	6,986.59	3,135.00	3,134.64	98.69	62.54	48.80	-1,071.84	-8,818.97	15,359.31	15,264.12	95.19	161.353		
13,400.00	6,986.52	3,135.00	3,134.64	100.10	62.54	48.80	-1,071.84	-8,818.97	15,452.30	15,357.06	95.24	162.250		
13,500.00	6,986.46	3,135.00	3,134.64	101.51	62.54	48.80	-1,071.84	-8,818.97	15,545.37	15,450.08	95.29	163.142		
13,600.00	6,986.39	3,135.00	3,134.64	102.93	62.54	48.80	-1,071.84	-8,818.97	15,638.52	15,543.18	95.34	164.029		
13,700.00	6,986.32	3,135.00	3,134.64	104.35	62.54	48.80	-1,071.84	-8,818.97	15,731.76	15,636.36	95.39	164.912		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		406-A027Ua_INC-ONLY						Rule Assigned:		Offset Well Error:		0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
13,800.00	6,986.25	3,135.00	3,134.64	105.78	62.54	48.80	-1,071.84	-8,818.97	15,825.08	15,729.63	95.45	165.790		
13,900.00	6,986.19	3,135.00	3,134.64	107.21	62.54	48.80	-1,071.84	-8,818.97	15,918.48	15,822.97	95.51	166.663		
14,000.00	6,986.12	3,135.00	3,134.64	108.65	62.54	48.80	-1,071.84	-8,818.97	16,011.97	15,916.39	95.58	167.532		
14,100.00	6,986.05	3,135.00	3,134.64	110.09	62.54	48.80	-1,071.84	-8,818.97	16,105.53	16,009.89	95.64	168.396		
14,200.00	6,985.99	3,135.00	3,134.64	111.54	62.54	48.80	-1,071.84	-8,818.97	16,199.17	16,103.46	95.71	169.256		
14,300.00	6,985.92	3,135.00	3,134.64	112.99	62.54	48.80	-1,071.84	-8,818.97	16,292.88	16,197.10	95.78	170.111		
14,400.00	6,985.85	3,135.00	3,134.64	114.45	62.54	48.80	-1,071.84	-8,818.97	16,386.67	16,290.82	95.85	170.962		
14,500.00	6,985.79	3,135.00	3,134.64	115.91	62.54	48.80	-1,071.84	-8,818.97	16,480.53	16,384.60	95.92	171.809		
14,600.00	6,985.72	3,135.00	3,134.64	117.38	62.54	48.80	-1,071.84	-8,818.97	16,574.46	16,478.46	96.00	172.652		
14,700.00	6,985.65	3,135.00	3,134.64	118.84	62.54	48.80	-1,071.84	-8,818.97	16,668.46	16,572.39	96.08	173.491		
14,800.00	6,985.59	3,135.00	3,134.64	120.32	62.54	48.80	-1,071.84	-8,818.97	16,762.54	16,666.38	96.16	174.325		
14,900.00	6,985.52	3,135.00	3,134.64	121.79	62.54	48.80	-1,071.84	-8,818.97	16,856.68	16,760.44	96.24	175.156		
15,000.00	6,985.45	3,135.00	3,134.64	123.27	62.54	48.80	-1,071.84	-8,818.97	16,950.88	16,854.56	96.32	175.983		
15,100.00	6,985.39	3,135.00	3,134.64	124.75	62.54	48.80	-1,071.84	-8,818.97	17,045.16	16,948.75	96.41	176.806		
15,200.00	6,985.32	3,135.00	3,134.64	126.24	62.54	48.80	-1,071.84	-8,818.97	17,139.50	17,043.00	96.49	177.625		
15,300.00	6,985.25	3,135.00	3,134.64	127.72	62.54	48.80	-1,071.84	-8,818.97	17,233.90	17,137.32	96.58	178.440		
15,400.00	6,985.19	3,135.00	3,134.64	129.21	62.54	48.80	-1,071.84	-8,818.97	17,328.37	17,231.70	96.67	179.252		
15,500.00	6,985.12	3,135.00	3,134.64	130.71	62.54	48.80	-1,071.84	-8,818.97	17,422.89	17,326.13	96.76	180.060		
15,600.00	6,985.05	3,135.00	3,134.64	132.20	62.54	48.80	-1,071.84	-8,818.97	17,517.48	17,420.63	96.85	180.864		
15,700.00	6,984.99	3,135.00	3,134.64	133.70	62.54	48.80	-1,071.84	-8,818.97	17,612.13	17,515.18	96.95	181.665		
15,800.00	6,984.92	3,135.00	3,134.64	135.20	62.54	48.80	-1,071.84	-8,818.97	17,706.84	17,609.79	97.04	182.463		
15,900.00	6,984.85	3,135.00	3,134.64	136.71	62.54	48.80	-1,071.84	-8,818.97	17,801.60	17,704.46	97.14	183.257		
16,000.00	6,984.79	3,135.00	3,134.64	138.21	62.54	48.80	-1,071.84	-8,818.97	17,896.42	17,799.18	97.24	184.048		
16,100.00	6,984.72	3,135.00	3,134.64	139.72	62.54	48.80	-1,071.84	-8,818.97	17,991.30	17,893.96	97.34	184.835		
16,200.00	6,984.65	3,135.00	3,134.64	141.23	62.54	48.80	-1,071.84	-8,818.97	18,086.23	17,988.79	97.44	185.619		
16,300.00	6,984.59	3,135.00	3,134.64	142.75	62.54	48.80	-1,071.84	-8,818.97	18,181.22	18,083.68	97.54	186.400		
16,400.00	6,984.52	3,135.00	3,134.64	144.26	62.54	48.80	-1,071.84	-8,818.97	18,276.26	18,178.62	97.64	187.178		
16,500.00	6,984.45	3,135.00	3,134.64	145.78	62.54	48.80	-1,071.84	-8,818.97	18,371.35	18,273.61	97.74	187.953		
16,600.00	6,984.39	3,135.00	3,134.64	147.29	62.54	48.80	-1,071.84	-8,818.97	18,466.50	18,368.65	97.85	188.724		
16,700.00	6,984.32	3,135.00	3,134.64	148.82	62.54	48.80	-1,071.84	-8,818.97	18,561.69	18,463.74	97.95	189.493		
16,800.00	6,984.25	3,135.00	3,134.64	150.34	62.54	48.80	-1,071.84	-8,818.97	18,656.94	18,558.88	98.06	190.259		
16,900.00	6,984.19	3,135.00	3,134.64	151.86	62.54	48.80	-1,071.84	-8,818.97	18,752.24	18,654.07	98.17	191.021		
17,000.00	6,984.12	3,135.00	3,134.64	153.39	62.54	48.80	-1,071.84	-8,818.97	18,847.58	18,749.30	98.28	191.781		
17,100.00	6,984.05	3,135.00	3,134.64	154.91	62.54	48.80	-1,071.84	-8,818.97	18,942.97	18,844.59	98.39	192.538		
17,200.00	6,983.99	3,135.00	3,134.64	156.44	62.54	48.80	-1,071.84	-8,818.97	19,038.41	18,939.92	98.50	193.292		
17,300.00	6,983.92	3,135.00	3,134.64	157.97	62.54	48.80	-1,071.84	-8,818.97	19,133.90	19,035.29	98.61	194.043		
17,400.00	6,983.85	3,135.00	3,134.64	159.50	62.54	48.80	-1,071.84	-8,818.97	19,229.43	19,130.71	98.72	194.792		
17,500.00	6,983.79	3,135.00	3,134.64	161.04	62.54	48.80	-1,071.84	-8,818.97	19,325.01	19,226.18	98.83	195.538		
17,600.00	6,983.72	3,135.00	3,134.64	162.57	62.54	48.80	-1,071.84	-8,818.97	19,420.63	19,321.69	98.94	196.281		
17,700.00	6,983.65	3,135.00	3,134.64	164.11	62.54	48.80	-1,071.84	-8,818.97	19,516.30	19,417.24	99.06	197.022		
17,800.00	6,983.59	3,135.00	3,134.64	165.65	62.54	48.80	-1,071.84	-8,818.97	19,612.01	19,512.84	99.17	197.760		
17,900.00	6,983.52	3,135.00	3,134.64	167.18	62.54	48.80	-1,071.84	-8,818.97	19,707.76	19,608.47	99.29	198.496		
18,000.00	6,983.45	3,135.00	3,134.64	168.72	62.54	48.80	-1,071.84	-8,818.97	19,803.55	19,704.15	99.40	199.229		
18,100.00	6,983.39	3,135.00	3,134.64	170.27	62.54	48.80	-1,071.84	-8,818.97	19,899.39	19,799.87	99.52	199.959		
18,200.00	6,983.32	3,135.00	3,134.64	171.81	62.54	48.80	-1,071.84	-8,818.97	19,995.26	19,895.63	99.63	200.687		
18,300.00	6,983.25	3,135.00	3,134.64	173.35	62.54	48.80	-1,071.84	-8,818.97	20,091.18	19,991.43	99.75	201.413		
18,400.00	6,983.19	3,135.00	3,134.64	174.90	62.54	48.80	-1,071.84	-8,818.97	20,187.14	20,087.27	99.87	202.136		
18,500.00	6,983.12	3,135.00	3,134.64	176.44	62.54	48.80	-1,071.84	-8,818.97	20,283.13	20,183.14	99.99	202.857		
18,600.00	6,983.05	3,135.00	3,134.64	177.99	62.54	48.80	-1,071.84	-8,818.97	20,379.16	20,279.06	100.11	203.576		
18,700.00	6,982.99	3,135.00	3,134.64	179.54	62.54	48.80	-1,071.84	-8,818.97	20,475.24	20,375.01	100.23	204.292		
18,800.00	6,982.92	3,135.00	3,134.64	181.09	62.54	48.80	-1,071.84	-8,818.97	20,571.34	20,471.00	100.34	205.006		
18,900.00	6,982.85	3,135.00	3,134.64	182.64	62.54	48.80	-1,071.84	-8,818.97	20,667.49	20,567.03	100.47	205.718		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 406-A027Ua_INC-ONLY													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,000.00	6,982.78	3,135.00	3,134.64	184.19	62.54	48.80	-1,071.84	-8,818.97	20,763.67	20,663.09	100.59	206.428		
19,100.00	6,982.72	3,135.00	3,134.64	185.74	62.54	48.80	-1,071.84	-8,818.97	20,859.89	20,759.18	100.71	207.135		
19,200.00	6,982.65	3,135.00	3,134.64	187.29	62.54	48.80	-1,071.84	-8,818.97	20,956.14	20,855.32	100.83	207.840		
19,300.00	6,982.58	3,135.00	3,134.64	188.84	62.54	48.80	-1,071.84	-8,818.97	21,052.43	20,951.48	100.95	208.544		
19,400.00	6,982.52	3,135.00	3,134.64	190.40	62.54	48.80	-1,071.84	-8,818.97	21,148.76	21,047.68	101.07	209.245		
19,500.00	6,982.45	3,135.00	3,134.64	191.95	62.54	48.80	-1,071.84	-8,818.97	21,245.11	21,143.92	101.19	209.943		
19,600.00	6,982.38	3,135.00	3,134.64	193.51	62.54	48.80	-1,071.84	-8,818.97	21,341.50	21,240.19	101.32	210.640		
19,700.00	6,982.32	3,135.00	3,134.64	195.07	62.54	48.80	-1,071.84	-8,818.97	21,437.93	21,336.49	101.44	211.335		
19,800.00	6,982.25	3,135.00	3,134.64	196.62	62.54	48.80	-1,071.84	-8,818.97	21,534.38	21,432.82	101.56	212.028		
19,900.00	6,982.18	3,135.00	3,134.64	198.18	62.54	48.80	-1,071.84	-8,818.97	21,630.87	21,529.18	101.69	212.719		
20,000.00	6,982.12	3,135.00	3,134.64	199.74	62.54	48.80	-1,071.84	-8,818.97	21,727.39	21,625.58	101.81	213.407		
20,100.00	6,982.05	3,135.00	3,134.64	201.30	62.54	48.80	-1,071.84	-8,818.97	21,823.94	21,722.01	101.94	214.094		
20,176.02	6,982.00	3,135.00	3,134.64	202.36	62.54	48.80	-1,071.84	-8,818.97	21,897.36	21,792.01	105.34	207.868		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226A - OH - OH-SVY											Offset Site Error: 0.00 usft
Survey Program: 200-MWD OWSG Rev5											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
0.00	0.00	5,392.00	3,078.35	0.00	62.35	-86.47	516.57	-8,367.04	8,943.13		
100.00	100.00	5,392.00	3,078.35	0.25	62.35	-86.47	516.57	-8,367.04	8,908.79	8,877.33	283.210
200.00	200.00	5,392.00	3,078.35	0.61	62.35	-86.47	516.57	-8,367.04	8,875.44	8,843.79	280.429
300.00	300.00	5,392.00	3,078.35	0.97	62.35	-86.47	516.57	-8,367.04	8,843.10	8,811.17	276.959
400.00	400.00	5,392.00	3,078.35	1.33	62.35	-86.47	516.57	-8,367.04	8,811.77	8,779.51	273.178
500.00	500.00	5,392.00	3,078.35	1.68	62.35	-86.47	516.57	-8,367.04	8,781.47	8,748.86	269.291
600.00	600.00	5,392.00	3,078.35	2.04	62.35	-86.47	516.57	-8,367.04	8,752.21	8,719.23	265.399
700.00	699.98	5,392.00	3,078.35	2.40	62.35	-77.05	516.57	-8,367.04	8,723.61	8,690.26	261.603
800.00	799.84	5,392.00	3,078.35	2.76	62.35	-77.62	516.57	-8,367.04	8,695.31	8,661.61	257.993
900.00	899.45	5,392.00	3,078.35	3.13	62.35	-78.19	516.57	-8,367.04	8,667.36	8,633.31	254.578
1,000.00	998.70	5,392.00	3,078.35	3.49	62.35	-78.76	516.57	-8,367.04	8,639.78	8,605.40	251.338
1,100.00	1,097.47	5,392.00	3,078.35	3.86	62.35	-79.31	516.57	-8,367.04	8,612.62	8,577.92	248.248
1,200.00	1,195.62	5,392.00	3,078.35	4.24	62.35	-79.85	516.57	-8,367.04	8,585.91	8,550.91	245.282
1,300.00	1,293.06	5,392.00	3,078.35	4.64	62.35	-80.39	516.57	-8,367.04	8,559.69	8,524.38	242.415
1,400.00	1,389.64	5,392.00	3,078.35	5.06	62.35	-80.91	516.57	-8,367.04	8,534.00	8,498.39	239.626
1,500.00	1,485.27	5,392.00	3,078.35	5.50	62.35	-81.43	516.57	-8,367.04	8,508.87	8,472.95	236.894
1,515.00	1,499.52	5,392.00	3,078.35	5.57	62.35	-81.50	516.57	-8,367.04	8,505.15	8,469.19	236.487
1,600.00	1,580.22	5,392.00	3,078.35	5.96	62.35	-81.50	516.57	-8,367.04	8,484.52	8,448.29	234.196
1,700.00	1,675.17	5,392.00	3,078.35	6.44	62.35	-81.50	516.57	-8,367.04	8,461.28	8,424.73	231.509
1,800.00	1,770.11	5,392.00	3,078.35	6.92	62.35	-81.50	516.57	-8,367.04	8,439.15	8,402.27	228.848
1,900.00	1,865.05	5,392.00	3,078.35	7.41	62.35	-81.50	516.57	-8,367.04	8,418.16	8,380.95	226.227
2,000.00	1,959.99	5,392.00	3,078.35	7.90	62.35	-81.50	516.57	-8,367.04	8,398.30	8,360.75	223.653
2,100.00	2,054.94	5,392.00	3,078.35	8.40	62.35	-81.50	516.57	-8,367.04	8,379.59	8,341.70	221.135
2,200.00	2,149.88	5,392.00	3,078.35	8.90	62.35	-81.50	516.57	-8,367.04	8,362.04	8,323.80	218.677
2,300.00	2,244.82	5,392.00	3,078.35	9.41	62.35	-81.50	516.57	-8,367.04	8,345.64	8,307.05	216.281
2,400.00	2,339.76	5,392.00	3,078.35	9.92	62.35	-81.50	516.57	-8,367.04	8,330.41	8,291.48	213.952
2,500.00	2,434.71	5,392.00	3,078.35	10.43	62.35	-81.50	516.57	-8,367.04	8,316.36	8,277.08	211.690
2,600.00	2,529.65	5,392.00	3,078.35	10.94	62.35	-81.50	516.57	-8,367.04	8,303.49	8,263.86	209.497
2,700.00	2,624.59	5,392.00	3,078.35	11.45	62.35	-81.50	516.57	-8,367.04	8,291.81	8,251.82	207.373
2,800.00	2,719.53	5,392.00	3,078.35	11.97	62.35	-81.50	516.57	-8,367.04	8,281.31	8,240.98	205.318
2,900.00	2,814.48	5,392.00	3,078.35	12.49	62.35	-81.50	516.57	-8,367.04	8,272.02	8,231.33	203.332
3,000.00	2,909.42	5,392.00	3,078.35	13.01	62.35	-81.50	516.57	-8,367.04	8,263.92	8,222.89	201.414
3,100.00	3,004.36	5,392.00	3,078.35	13.53	62.35	-81.50	516.57	-8,367.04	8,257.02	8,215.65	199.565
3,200.00	3,099.30	5,392.00	3,078.35	14.05	62.35	-81.50	516.57	-8,367.04	8,251.33	8,209.62	197.783
3,300.00	3,194.25	5,392.00	3,078.35	14.57	62.35	-81.50	516.57	-8,367.04	8,246.85	8,204.79	196.068
3,400.00	3,289.19	5,392.00	3,078.35	15.09	62.35	-81.50	516.57	-8,367.04	8,243.59	8,201.18	194.418
3,500.00	3,384.13	5,392.00	3,078.35	15.62	62.35	-81.50	516.57	-8,367.04	8,241.53	8,198.79	192.833
3,600.00	3,479.07	5,392.00	3,078.35	16.14	62.35	-81.50	516.57	-8,367.04	8,240.68	8,197.61	191.311
3,619.55	3,497.64	5,392.00	3,078.35	16.24	62.35	-81.50	516.57	-8,367.04	8,240.66	8,197.52	191.021 CC, ES
3,700.00	3,574.02	5,392.00	3,078.35	16.67	62.35	-81.50	516.57	-8,367.04	8,241.05	8,197.65	189.852
3,800.00	3,668.96	5,392.00	3,078.35	17.19	62.35	-81.50	516.57	-8,367.04	8,242.64	8,198.90	188.454
3,900.00	3,763.90	5,392.00	3,078.35	17.72	62.35	-81.50	516.57	-8,367.04	8,245.43	8,201.37	187.116
4,000.00	3,858.84	5,392.00	3,078.35	18.24	62.35	-81.50	516.57	-8,367.04	8,249.44	8,205.05	185.837
4,100.00	3,953.79	5,392.00	3,078.35	18.77	62.35	-81.50	516.57	-8,367.04	8,254.65	8,209.94	184.616
4,200.00	4,048.73	5,392.00	3,078.35	19.30	62.35	-81.50	516.57	-8,367.04	8,261.08	8,216.05	183.451
4,300.00	4,143.67	5,392.00	3,078.35	19.82	62.35	-81.50	516.57	-8,367.04	8,268.71	8,223.36	182.341
4,400.00	4,238.61	5,392.00	3,078.35	20.35	62.35	-81.50	516.57	-8,367.04	8,277.54	8,231.87	181.285
4,500.00	4,333.56	5,392.00	3,078.35	20.88	62.35	-81.50	516.57	-8,367.04	8,287.56	8,241.59	180.281
4,600.00	4,428.50	5,392.00	3,078.35	21.41	62.35	-81.50	516.57	-8,367.04	8,298.78	8,252.50	179.330
4,700.00	4,523.44	5,392.00	3,078.35	21.93	62.35	-81.50	516.57	-8,367.04	8,311.19	8,264.61	178.428
4,800.00	4,618.38	5,392.00	3,078.35	22.46	62.35	-81.50	516.57	-8,367.04	8,324.78	8,277.90	177.575
4,900.00	4,713.33	5,392.00	3,078.35	22.99	62.35	-81.50	516.57	-8,367.04	8,339.55	8,292.37	176.770

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design:		Rosa Unit 34 - (O) Rosa Unit #226A - OH - OH-SVY											Offset Site Error:		0.00 usft				
Survey Program:		200-MWD OWSG Rev5							Rule Assigned:							Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)									
5,000.00	4,808.27	5,392.00	3,078.35	23.52	62.35	-81.50	516.57	-8,367.04	8,355.48	8,308.01	47.47	176.012							
5,100.00	4,903.21	5,392.00	3,078.35	24.05	62.35	-81.50	516.57	-8,367.04	8,372.59	8,324.83	47.76	175.299							
5,200.00	4,998.16	5,392.00	3,078.35	24.58	62.35	-81.50	516.57	-8,367.04	8,390.85	8,342.80	48.05	174.630							
5,300.00	5,093.10	5,392.00	3,078.35	25.11	62.35	-81.50	516.57	-8,367.04	8,410.26	8,361.92	48.33	174.004							
5,400.00	5,188.04	5,392.00	3,078.35	25.64	62.35	-81.50	516.57	-8,367.04	8,430.81	8,382.19	48.62	173.419							
5,500.00	5,282.98	5,392.00	3,078.35	26.17	62.35	-81.50	516.57	-8,367.04	8,452.49	8,403.60	48.89	172.876							
5,600.00	5,377.93	5,392.00	3,078.35	26.70	62.35	-81.50	516.57	-8,367.04	8,475.30	8,426.13	49.17	172.371							
5,623.25	5,400.00	5,392.00	3,078.35	26.82	62.35	-81.50	516.57	-8,367.04	8,480.76	8,431.53	49.23	172.260							
5,700.00	5,473.03	5,392.00	3,078.35	27.22	62.35	-81.69	516.57	-8,367.04	8,499.29	8,449.85	49.44	171.913							
5,800.00	5,568.64	5,392.00	3,078.35	27.73	62.35	-81.95	516.57	-8,367.04	8,524.63	8,474.93	49.70	171.515							
5,900.00	5,664.75	5,392.00	3,078.35	28.23	62.35	-82.23	516.57	-8,367.04	8,551.30	8,501.35	49.96	171.177							
6,000.00	5,761.33	5,392.00	3,078.35	28.71	62.35	-82.51	516.57	-8,367.04	8,579.28	8,529.08	50.20	170.899							
6,100.00	5,858.34	5,392.00	3,078.35	29.18	62.35	-82.82	516.57	-8,367.04	8,608.54	8,558.11	50.44	170.680							
6,200.00	5,955.76	5,392.00	3,078.35	29.64	62.35	-83.14	516.57	-8,367.04	8,639.08	8,588.41	50.66	170.517							
6,300.00	6,053.57	5,392.00	3,078.35	30.07	62.35	-83.47	516.57	-8,367.04	8,670.85	8,619.97	50.88	170.411							
6,400.00	6,151.72	5,392.00	3,078.35	30.50	62.35	-83.82	516.57	-8,367.04	8,703.85	8,652.75	51.09	170.359 SF							
6,500.00	6,250.19	5,392.00	3,078.35	30.91	62.35	-84.18	516.57	-8,367.04	8,738.04	8,686.75	51.29	170.360							
6,600.00	6,348.94	5,392.00	3,078.35	31.30	62.35	-84.55	516.57	-8,367.04	8,773.40	8,721.92	51.48	170.413							
6,659.67	6,408.00	5,392.00	3,078.35	31.53	62.35	-84.79	516.57	-8,367.04	8,795.05	8,743.46	51.59	170.469							
6,700.00	6,447.82	5,392.00	3,078.35	31.68	62.35	-100.26	516.57	-8,367.04	8,810.80	8,759.13	51.67	170.521							
6,750.00	6,496.66	5,392.00	3,078.35	31.90	62.35	-110.06	516.57	-8,367.04	8,832.96	8,781.19	51.77	170.619							
6,800.00	6,544.65	5,392.00	3,078.35	32.13	62.35	-114.64	516.57	-8,367.04	8,857.90	8,806.02	51.87	170.756							
6,850.00	6,591.49	5,392.00	3,078.35	32.37	62.35	-116.49	516.57	-8,367.04	8,885.43	8,833.45	51.98	170.934							
6,900.00	6,636.89	5,392.00	3,078.35	32.62	62.35	-116.67	516.57	-8,367.04	8,915.37	8,863.28	52.09	171.149							
6,950.00	6,680.57	5,392.00	3,078.35	32.89	62.35	-115.67	516.57	-8,367.04	8,947.51	8,895.31	52.20	171.398							
7,000.00	6,722.26	5,392.00	3,078.35	33.17	62.35	-113.70	516.57	-8,367.04	8,981.62	8,929.30	52.32	171.678							
7,050.00	6,761.71	5,392.00	3,078.35	33.45	62.35	-110.89	516.57	-8,367.04	9,017.48	8,965.04	52.43	171.983							
7,100.00	6,798.67	5,392.00	3,078.35	33.75	62.35	-107.29	516.57	-8,367.04	9,054.84	9,002.29	52.55	172.310							
7,150.00	6,832.91	5,392.00	3,078.35	34.06	62.35	-102.96	516.57	-8,367.04	9,093.46	9,040.79	52.67	172.652							
7,200.00	6,864.22	5,392.00	3,078.35	34.37	62.35	-97.95	516.57	-8,367.04	9,133.08	9,080.29	52.79	173.005							
7,250.00	6,892.42	5,392.00	3,078.35	34.69	62.35	-92.38	516.57	-8,367.04	9,173.45	9,120.54	52.91	173.363							
7,300.00	6,917.32	5,392.00	3,078.35	35.03	62.35	-86.39	516.57	-8,367.04	9,214.32	9,161.27	53.04	173.719							
7,350.00	6,938.77	5,392.00	3,078.35	35.37	62.35	-80.17	516.57	-8,367.04	9,255.41	9,202.24	53.17	174.068							
7,400.00	6,956.64	5,392.00	3,078.35	35.72	62.35	-73.93	516.57	-8,367.04	9,296.49	9,243.19	53.30	174.404							
7,450.00	6,970.83	5,392.00	3,078.35	36.07	62.35	-67.88	516.57	-8,367.04	9,337.30	9,283.86	53.44	174.722							
7,500.00	6,981.23	5,392.00	3,078.35	36.44	62.35	-62.18	516.57	-8,367.04	9,377.60	9,324.02	53.58	175.016							
7,550.00	6,987.80	5,392.00	3,078.35	36.81	62.35	-56.94	516.57	-8,367.04	9,417.13	9,363.41	53.73	175.281							
7,600.00	6,990.48	5,392.00	3,078.35	37.19	62.35	-52.20	516.57	-8,367.04	9,455.68	9,401.81	53.87	175.513							
7,609.87	6,990.55	5,392.00	3,078.35	37.26	62.35	-51.32	516.57	-8,367.04	9,463.15	9,409.25	53.90	175.558							
7,700.00	6,990.49	5,392.00	3,078.35	37.97	62.35	-51.32	516.57	-8,367.04	9,531.35	9,477.17	54.19	175.903							
7,800.00	6,990.42	5,392.00	3,078.35	38.78	62.35	-51.32	516.57	-8,367.04	9,607.44	9,552.94	54.50	176.270							
7,900.00	6,990.35	5,392.00	3,078.35	39.64	62.35	-51.32	516.57	-8,367.04	9,683.97	9,629.14	54.83	176.623							
8,000.00	6,990.28	5,392.00	3,078.35	40.53	62.35	-51.32	516.57	-8,367.04	9,760.92	9,705.76	55.16	176.964							
8,100.00	6,990.21	5,392.00	3,078.35	41.45	62.35	-51.32	516.57	-8,367.04	9,838.29	9,782.80	55.49	177.295							
8,200.00	6,990.14	5,392.00	3,078.35	42.40	62.35	-51.32	516.57	-8,367.04	9,916.06	9,860.23	55.83	177.618							
8,306.37	6,990.06	5,392.00	3,078.35	43.45	62.35	-51.32	516.57	-8,367.04	9,999.21	9,943.02	56.19	177.954							
8,400.00	6,990.00	5,392.00	3,078.35	44.38	62.35	-48.08	516.57	-8,367.04	10,074.19	10,017.69	56.50	178.304							
8,500.00	6,989.93	5,392.00	3,078.35	45.36	62.35	-43.89	516.57	-8,367.04	10,157.48	10,100.68	56.81	178.811							
8,600.00	6,989.85	5,392.00	3,078.35	46.33	62.35	-38.79	516.57	-8,367.04	10,243.61	10,186.53	57.08	179.461							
8,700.00	6,989.78	5,392.00	3,078.35	47.28	62.35	-32.62	516.57	-8,367.04	10,332.10	10,274.78	57.32	180.252							
8,800.00	6,989.70	5,392.00	3,078.35	48.21	62.35	-25.23	516.57	-8,367.04	10,422.46	10,364.93	57.52	181.182							
8,900.00	6,989.63	5,392.00	3,078.35	49.11	62.35	-16.62	516.57	-8,367.04	10,514.20	10,456.51	57.69	182.246							

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design:		Rosa Unit 34 - (O) Rosa Unit #226A - OH - OH-SVY											Offset Site Error:		0.00 usft	
Survey Program:		200-MWD OWSG Rev5						Rule Assigned:						Offset Well Error:		0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)						
9,000.00	6,989.55	5,392.00	3,078.35	49.99	62.35	-6.98	516.57	-8,367.04	10,606.86	10,549.04	57.82	183.437				
9,100.00	6,989.48	5,392.00	3,078.35	50.84	62.35	3.21	516.57	-8,367.04	10,699.96	10,642.04	57.92	184.748				
9,200.00	6,989.40	5,392.00	3,078.35	51.66	62.35	13.28	516.57	-8,367.04	10,793.04	10,735.07	57.97	186.169				
9,300.00	6,989.33	5,392.00	3,078.35	52.45	62.35	22.62	516.57	-8,367.04	10,885.66	10,827.66	58.00	187.689				
9,393.87	6,989.27	5,392.00	3,078.35	53.15	62.35	30.37	516.57	-8,367.04	10,971.78	10,913.79	57.99	189.195				
9,400.00	6,989.26	5,392.00	3,078.35	53.20	62.35	30.37	516.57	-8,367.04	10,977.38	10,919.39	57.99	189.298				
9,500.00	6,989.19	5,392.00	3,078.35	53.95	62.35	30.37	516.57	-8,367.04	11,068.67	11,010.70	57.97	190.928				
9,600.00	6,989.12	5,392.00	3,078.35	54.73	62.35	30.37	516.57	-8,367.04	11,160.12	11,102.16	57.96	192.549				
9,700.00	6,989.05	5,392.00	3,078.35	55.55	62.35	30.37	516.57	-8,367.04	11,251.71	11,193.76	57.95	194.161				
9,800.00	6,988.98	5,392.00	3,078.35	56.40	62.35	30.37	516.57	-8,367.04	11,343.44	11,285.49	57.94	195.762				
9,900.00	6,988.91	5,392.00	3,078.35	57.28	62.35	30.37	516.57	-8,367.04	11,435.31	11,377.37	57.94	197.355				
10,000.00	6,988.84	5,392.00	3,078.35	58.20	62.35	30.37	516.57	-8,367.04	11,527.32	11,469.37	57.94	198.938				
10,100.00	6,988.77	5,392.00	3,078.35	59.14	62.35	30.37	516.57	-8,367.04	11,619.45	11,561.50	57.95	200.512				
10,200.00	6,988.70	5,392.00	3,078.35	60.11	62.35	30.37	516.57	-8,367.04	11,711.72	11,653.76	57.96	202.076				
10,300.00	6,988.63	5,392.00	3,078.35	61.11	62.35	30.37	516.57	-8,367.04	11,804.11	11,746.14	57.97	203.632				
10,400.00	6,988.56	5,392.00	3,078.35	62.14	62.35	30.37	516.57	-8,367.04	11,896.63	11,838.65	57.98	205.179				
10,500.00	6,988.49	5,392.00	3,078.35	63.19	62.35	30.37	516.57	-8,367.04	11,989.26	11,931.26	58.00	206.717				
10,600.00	6,988.42	5,392.00	3,078.35	64.26	62.35	30.37	516.57	-8,367.04	12,082.02	12,024.00	58.02	208.246				
10,700.00	6,988.35	5,392.00	3,078.35	65.36	62.35	30.37	516.57	-8,367.04	12,174.88	12,116.84	58.04	209.766				
10,800.00	6,988.28	5,392.00	3,078.35	66.48	62.35	30.37	516.57	-8,367.04	12,267.86	12,209.80	58.07	211.278				
10,900.00	6,988.21	5,392.00	3,078.35	67.61	62.35	30.37	516.57	-8,367.04	12,360.95	12,302.86	58.09	212.781				
11,000.00	6,988.14	5,392.00	3,078.35	68.77	62.35	30.37	516.57	-8,367.04	12,454.15	12,396.03	58.12	214.276				
11,100.00	6,988.07	5,392.00	3,078.35	69.95	62.35	30.37	516.57	-8,367.04	12,547.45	12,489.30	58.15	215.762				
11,200.00	6,988.01	5,392.00	3,078.35	71.14	62.35	30.37	516.57	-8,367.04	12,640.86	12,582.67	58.19	217.241				
11,300.00	6,987.94	5,392.00	3,078.35	72.35	62.35	30.37	516.57	-8,367.04	12,734.36	12,676.14	58.22	218.711				
11,400.00	6,987.87	5,392.00	3,078.35	73.57	62.35	30.37	516.57	-8,367.04	12,827.96	12,769.70	58.26	220.173				
11,500.00	6,987.80	5,392.00	3,078.35	74.81	62.35	30.37	516.57	-8,367.04	12,921.66	12,863.36	58.30	221.627				
11,600.00	6,987.73	5,392.00	3,078.35	76.07	62.35	30.37	516.57	-8,367.04	13,015.45	12,957.11	58.35	223.073				
11,643.87	6,987.70	5,392.00	3,078.35	76.62	62.35	30.37	516.57	-8,367.04	13,056.62	12,998.26	58.37	223.705				
11,700.00	6,987.66	5,392.00	3,078.35	77.33	62.35	32.94	516.57	-8,367.04	13,109.24	13,050.85	58.39	224.516				
11,737.27	6,987.63	5,392.00	3,078.35	77.80	62.35	34.57	516.57	-8,367.04	13,144.07	13,085.66	58.40	225.057				
11,800.00	6,987.59	5,392.00	3,078.35	78.59	62.35	34.57	516.57	-8,367.04	13,202.65	13,144.22	58.43	225.966				
11,900.00	6,987.52	5,392.00	3,078.35	79.86	62.35	34.57	516.57	-8,367.04	13,296.11	13,237.64	58.47	227.406				
12,000.00	6,987.46	5,392.00	3,078.35	81.14	62.35	34.57	516.57	-8,367.04	13,389.66	13,331.15	58.51	228.836				
12,100.00	6,987.39	5,392.00	3,078.35	82.43	62.35	34.57	516.57	-8,367.04	13,483.31	13,424.75	58.56	230.258				
12,200.00	6,987.32	5,392.00	3,078.35	83.73	62.35	34.57	516.57	-8,367.04	13,577.05	13,518.44	58.60	231.671				
12,300.00	6,987.26	5,392.00	3,078.35	85.05	62.35	34.57	516.57	-8,367.04	13,670.87	13,612.22	58.65	233.076				
12,400.00	6,987.19	5,392.00	3,078.35	86.38	62.35	34.57	516.57	-8,367.04	13,764.79	13,706.08	58.71	234.472				
12,500.00	6,987.12	5,392.00	3,078.35	87.71	62.35	34.57	516.57	-8,367.04	13,858.79	13,800.03	58.76	235.859				
12,600.00	6,987.06	5,392.00	3,078.35	89.06	62.35	34.57	516.57	-8,367.04	13,952.87	13,894.05	58.81	237.238				
12,700.00	6,986.99	5,392.00	3,078.35	90.41	62.35	34.57	516.57	-8,367.04	14,047.03	13,988.16	58.87	238.609				
12,800.00	6,986.92	5,392.00	3,078.35	91.77	62.35	34.57	516.57	-8,367.04	14,141.28	14,082.35	58.93	239.972				
12,900.00	6,986.86	5,392.00	3,078.35	93.14	62.35	34.57	516.57	-8,367.04	14,235.60	14,176.61	58.99	241.327				
13,000.00	6,986.79	5,392.00	3,078.35	94.52	62.35	34.57	516.57	-8,367.04	14,330.00	14,270.95	59.05	242.674				
13,100.00	6,986.72	5,392.00	3,078.35	95.90	62.35	34.57	516.57	-8,367.04	14,424.47	14,365.36	59.11	244.013				
13,200.00	6,986.66	5,392.00	3,078.35	97.30	62.35	34.57	516.57	-8,367.04	14,519.02	14,459.84	59.18	245.344				
13,300.00	6,986.59	5,392.00	3,078.35	98.69	62.35	34.57	516.57	-8,367.04	14,613.64	14,554.40	59.24	246.667				
13,400.00	6,986.52	5,392.00	3,078.35	100.10	62.35	34.57	516.57	-8,367.04	14,708.34	14,649.02	59.31	247.983				
13,500.00	6,986.46	5,392.00	3,078.35	101.51	62.35	34.57	516.57	-8,367.04	14,803.10	14,743.72	59.38	249.292				
13,600.00	6,986.39	5,392.00	3,078.35	102.93	62.35	34.57	516.57	-8,367.04	14,897.93	14,838.48	59.45	250.593				
13,700.00	6,986.32	5,392.00	3,078.35	104.35	62.35	34.57	516.57	-8,367.04	14,992.83	14,933.31	59.52	251.887				
13,800.00	6,986.25	5,392.00	3,078.35	105.78	62.35	34.57	516.57	-8,367.04	15,087.79	15,028.20	59.59	253.173				

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		200-MWD OWSG Rev5						Rule Assigned:					Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)			
13,900.00	6,986.19	5,392.00	3,078.35	107.21	62.35	34.57	516.57	-8,367.04	15,182.82	15,123.15	59.67	254.453		
14,000.00	6,986.12	5,392.00	3,078.35	108.65	62.35	34.57	516.57	-8,367.04	15,277.91	15,218.17	59.74	255.725		
14,100.00	6,986.05	5,392.00	3,078.35	110.09	62.35	34.57	516.57	-8,367.04	15,373.07	15,313.25	59.82	256.991		
14,200.00	6,985.99	5,392.00	3,078.35	111.54	62.35	34.57	516.57	-8,367.04	15,468.28	15,408.39	59.90	258.249		
14,300.00	6,985.92	5,392.00	3,078.35	112.99	62.35	34.57	516.57	-8,367.04	15,563.56	15,503.58	59.97	259.501		
14,400.00	6,985.85	5,392.00	3,078.35	114.45	62.35	34.57	516.57	-8,367.04	15,658.89	15,598.84	60.05	260.746		
14,500.00	6,985.79	5,392.00	3,078.35	115.91	62.35	34.57	516.57	-8,367.04	15,754.29	15,694.15	60.13	261.985		
14,600.00	6,985.72	5,392.00	3,078.35	117.38	62.35	34.57	516.57	-8,367.04	15,849.73	15,789.52	60.22	263.217		
14,700.00	6,985.65	5,392.00	3,078.35	118.84	62.35	34.57	516.57	-8,367.04	15,945.24	15,884.94	60.30	264.442		
14,800.00	6,985.59	5,392.00	3,078.35	120.32	62.35	34.57	516.57	-8,367.04	16,040.80	15,980.42	60.38	265.661		
14,900.00	6,985.52	5,392.00	3,078.35	121.79	62.35	34.57	516.57	-8,367.04	16,136.41	16,075.95	60.46	266.873		
15,000.00	6,985.45	5,392.00	3,078.35	123.27	62.35	34.57	516.57	-8,367.04	16,232.08	16,171.53	60.55	268.080		
15,100.00	6,985.39	5,392.00	3,078.35	124.75	62.35	34.57	516.57	-8,367.04	16,327.80	16,267.16	60.64	269.280		
15,200.00	6,985.32	5,392.00	3,078.35	126.24	62.35	34.57	516.57	-8,367.04	16,423.57	16,362.85	60.72	270.474		
15,300.00	6,985.25	5,392.00	3,078.35	127.72	62.35	34.57	516.57	-8,367.04	16,519.39	16,458.58	60.81	271.662		
15,400.00	6,985.19	5,392.00	3,078.35	129.21	62.35	34.57	516.57	-8,367.04	16,615.25	16,554.36	60.90	272.843		
15,500.00	6,985.12	5,392.00	3,078.35	130.71	62.35	34.57	516.57	-8,367.04	16,711.17	16,650.19	60.99	274.019		
15,600.00	6,985.05	5,392.00	3,078.35	132.20	62.35	34.57	516.57	-8,367.04	16,807.14	16,746.06	61.07	275.189		
15,700.00	6,984.99	5,392.00	3,078.35	133.70	62.35	34.57	516.57	-8,367.04	16,903.15	16,841.98	61.16	276.353		
15,800.00	6,984.92	5,392.00	3,078.35	135.20	62.35	34.57	516.57	-8,367.04	16,999.21	16,937.95	61.26	277.512		
15,900.00	6,984.85	5,392.00	3,078.35	136.71	62.35	34.57	516.57	-8,367.04	17,095.31	17,033.96	61.35	278.664		
16,000.00	6,984.79	5,392.00	3,078.35	138.21	62.35	34.57	516.57	-8,367.04	17,191.46	17,130.02	61.44	279.811		
16,100.00	6,984.72	5,392.00	3,078.35	139.72	62.35	34.57	516.57	-8,367.04	17,287.65	17,226.11	61.53	280.952		
16,200.00	6,984.65	5,392.00	3,078.35	141.23	62.35	34.57	516.57	-8,367.04	17,383.88	17,322.25	61.63	282.088		
16,300.00	6,984.59	5,392.00	3,078.35	142.75	62.35	34.57	516.57	-8,367.04	17,480.16	17,418.44	61.72	283.219		
16,400.00	6,984.52	5,392.00	3,078.35	144.26	62.35	34.57	516.57	-8,367.04	17,576.47	17,514.66	61.81	284.343		
16,500.00	6,984.45	5,392.00	3,078.35	145.78	62.35	34.57	516.57	-8,367.04	17,672.83	17,610.92	61.91	285.463		
16,600.00	6,984.39	5,392.00	3,078.35	147.29	62.35	34.57	516.57	-8,367.04	17,769.23	17,707.23	62.01	286.577		
16,700.00	6,984.32	5,392.00	3,078.35	148.82	62.35	34.57	516.57	-8,367.04	17,865.67	17,803.57	62.10	287.686		
16,800.00	6,984.25	5,392.00	3,078.35	150.34	62.35	34.57	516.57	-8,367.04	17,962.15	17,899.95	62.20	288.789		
16,900.00	6,984.19	5,392.00	3,078.35	151.86	62.35	34.57	516.57	-8,367.04	18,058.66	17,996.37	62.30	289.887		
17,000.00	6,984.12	5,392.00	3,078.35	153.39	62.35	34.57	516.57	-8,367.04	18,155.22	18,092.82	62.39	290.980		
17,100.00	6,984.05	5,392.00	3,078.35	154.91	62.35	34.57	516.57	-8,367.04	18,251.81	18,189.32	62.49	292.068		
17,200.00	6,983.99	5,392.00	3,078.35	156.44	62.35	34.57	516.57	-8,367.04	18,348.44	18,285.84	62.59	293.151		
17,300.00	6,983.92	5,392.00	3,078.35	157.97	62.35	34.57	516.57	-8,367.04	18,445.10	18,382.41	62.69	294.229		
17,400.00	6,983.85	5,392.00	3,078.35	159.50	62.35	34.57	516.57	-8,367.04	18,541.80	18,479.01	62.79	295.302		
17,500.00	6,983.79	5,392.00	3,078.35	161.04	62.35	34.57	516.57	-8,367.04	18,638.53	18,575.64	62.89	296.370		
17,600.00	6,983.72	5,392.00	3,078.35	162.57	62.35	34.57	516.57	-8,367.04	18,735.30	18,672.31	62.99	297.433		
17,700.00	6,983.65	5,392.00	3,078.35	164.11	62.35	34.57	516.57	-8,367.04	18,832.10	18,769.01	63.09	298.491		
17,800.00	6,983.59	5,392.00	3,078.35	165.65	62.35	34.57	516.57	-8,367.04	18,928.93	18,865.74	63.19	299.545		
17,900.00	6,983.52	5,392.00	3,078.35	167.18	62.35	34.57	516.57	-8,367.04	19,025.80	18,962.51	63.29	300.593		
18,000.00	6,983.45	5,392.00	3,078.35	168.72	62.35	34.57	516.57	-8,367.04	19,122.70	19,059.30	63.40	301.637		
18,100.00	6,983.39	5,392.00	3,078.35	170.27	62.35	34.57	516.57	-8,367.04	19,219.63	19,156.13	63.50	302.676		
18,200.00	6,983.32	5,392.00	3,078.35	171.81	62.35	34.57	516.57	-8,367.04	19,316.59	19,252.99	63.60	303.711		
18,300.00	6,983.25	5,392.00	3,078.35	173.35	62.35	34.57	516.57	-8,367.04	19,413.59	19,349.88	63.71	304.741		
18,400.00	6,983.19	5,392.00	3,078.35	174.90	62.35	34.57	516.57	-8,367.04	19,510.61	19,446.80	63.81	305.766		
18,500.00	6,983.12	5,392.00	3,078.35	176.44	62.35	34.57	516.57	-8,367.04	19,607.67	19,543.75	63.91	306.786		
18,600.00	6,983.05	5,392.00	3,078.35	177.99	62.35	34.57	516.57	-8,367.04	19,704.75	19,640.73	64.02	307.802		
18,700.00	6,982.99	5,392.00	3,078.35	179.54	62.35	34.57	516.57	-8,367.04	19,801.86	19,737.74	64.12	308.814		
18,800.00	6,982.92	5,392.00	3,078.35	181.09	62.35	34.57	516.57	-8,367.04	19,899.00	19,834.78	64.23	309.821		
18,900.00	6,982.85	5,392.00	3,078.35	182.64	62.35	34.57	516.57	-8,367.04	19,996.17	19,931.84	64.33	310.824		
19,000.00	6,982.78	5,392.00	3,078.35	184.19	62.35	34.57	516.57	-8,367.04	20,093.37	20,028.93	64.44	311.822		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #226A - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 200-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	5,392.00	3,078.35	185.74	62.35	34.57	516.57	-8,367.04	20,190.59	20,126.05	64.54	312.816	
19,200.00	6,982.65	5,392.00	3,078.35	187.29	62.35	34.57	516.57	-8,367.04	20,287.84	20,223.19	64.65	313.806	
19,300.00	6,982.58	5,392.00	3,078.35	188.84	62.35	34.57	516.57	-8,367.04	20,385.12	20,320.36	64.76	314.791	
19,400.00	6,982.52	5,392.00	3,078.35	190.40	62.35	34.57	516.57	-8,367.04	20,482.43	20,417.56	64.86	315.772	
19,500.00	6,982.45	5,392.00	3,078.35	191.95	62.35	34.57	516.57	-8,367.04	20,579.76	20,514.78	64.97	316.749	
19,600.00	6,982.38	5,392.00	3,078.35	193.51	62.35	34.57	516.57	-8,367.04	20,677.11	20,612.03	65.08	317.721	
19,700.00	6,982.32	5,392.00	3,078.35	195.07	62.35	34.57	516.57	-8,367.04	20,774.49	20,709.30	65.19	318.689	
19,800.00	6,982.25	5,392.00	3,078.35	196.62	62.35	34.57	516.57	-8,367.04	20,871.90	20,806.60	65.30	319.653	
19,900.00	6,982.18	5,392.00	3,078.35	198.18	62.35	34.57	516.57	-8,367.04	20,969.33	20,903.92	65.40	320.613	
20,000.00	6,982.12	5,392.00	3,078.35	199.74	62.35	34.57	516.57	-8,367.04	21,066.78	21,001.27	65.51	321.569	
20,100.00	6,982.05	5,392.00	3,078.35	201.30	62.35	34.57	516.57	-8,367.04	21,164.26	21,098.64	65.62	322.521	
20,176.02	6,982.00	5,392.00	3,078.35	202.36	62.35	34.57	516.57	-8,367.04	21,238.37	21,169.39	68.99	307.864	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #228A - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 352-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-105.79	-1,447.73	-5,118.92	5,320.93				
100.00	100.00	0.00	0.00	0.25	0.00	-105.79	-1,447.73	-5,118.92	5,319.72	5,319.47	0.25	N/A	
200.00	200.00	92.37	92.37	0.61	1.10	-105.79	-1,447.82	-5,118.84	5,319.65	5,317.95	1.70	3,126.094	
300.00	300.00	199.78	199.78	0.97	2.37	-105.80	-1,448.16	-5,118.53	5,319.46	5,316.13	3.33	1,597.423	
400.00	400.00	307.18	307.17	1.33	3.64	-105.81	-1,448.75	-5,117.99	5,319.13	5,314.18	4.96	1,072.771	
496.99	496.99	383.00	382.99	1.67	4.21	-105.81	-1,449.27	-5,117.57	5,318.83	5,312.96	5.87	906.852 CC	
500.00	500.00	383.00	382.99	1.68	4.21	-105.81	-1,449.27	-5,117.57	5,318.83	5,312.95	5.88	905.189 ES	
600.00	600.00	435.01	435.00	2.04	4.23	-105.81	-1,449.15	-5,117.85	5,319.31	5,313.05	6.26	850.384	
700.00	699.98	474.00	473.98	2.40	4.25	-95.77	-1,448.43	-5,118.61	5,320.95	5,314.32	6.63	802.653	
800.00	799.84	505.00	504.94	2.76	4.28	-95.71	-1,447.37	-5,119.74	5,324.18	5,317.18	7.00	760.281	
900.00	899.45	550.02	549.84	3.13	4.32	-95.63	-1,445.15	-5,122.11	5,328.88	5,321.50	7.39	721.381	
1,000.00	998.70	580.53	580.19	3.49	4.36	-95.51	-1,443.04	-5,124.34	5,335.20	5,327.43	7.77	686.801	
1,100.00	1,097.47	617.28	616.66	3.86	4.40	-95.38	-1,439.93	-5,127.63	5,343.06	5,334.90	8.16	654.623	
1,200.00	1,195.62	657.00	655.94	4.24	4.46	-95.22	-1,435.83	-5,131.85	5,352.39	5,343.82	8.57	624.519	
1,300.00	1,293.06	698.29	696.61	4.64	4.52	-95.03	-1,430.79	-5,136.89	5,363.10	5,354.10	9.00	595.957	
1,400.00	1,389.64	733.75	731.36	5.06	4.59	-94.82	-1,425.79	-5,141.88	5,375.30	5,365.85	9.44	569.185	
1,500.00	1,485.27	780.00	776.43	5.50	4.68	-94.60	-1,418.44	-5,149.19	5,388.93	5,379.00	9.93	542.873	
1,515.00	1,499.52	780.00	776.43	5.57	4.68	-94.56	-1,418.44	-5,149.19	5,391.08	5,381.09	9.99	539.578	
1,600.00	1,580.22	811.00	806.44	5.96	4.75	-94.59	-1,412.90	-5,154.63	5,403.85	5,393.43	10.41	518.954	
1,700.00	1,675.17	842.00	836.27	6.44	4.83	-94.61	-1,406.84	-5,160.51	5,419.91	5,409.00	10.91	496.615	
1,800.00	1,770.11	874.00	866.86	6.92	4.91	-94.63	-1,400.09	-5,167.04	5,437.11	5,425.68	11.43	475.726	
1,900.00	1,865.05	916.85	907.49	7.41	5.03	-94.65	-1,390.35	-5,176.55	5,455.45	5,443.47	11.98	455.223	
2,000.00	1,959.99	956.61	944.87	7.90	5.13	-94.65	-1,380.70	-5,186.03	5,474.90	5,462.35	12.55	436.402	
2,100.00	2,054.94	999.00	984.45	8.40	5.25	-94.65	-1,369.89	-5,196.70	5,495.33	5,482.20	13.13	418.535	
2,200.00	2,149.88	1,047.19	1,028.94	8.90	5.40	-94.64	-1,356.52	-5,209.53	5,516.64	5,502.88	13.76	400.945	
2,300.00	2,244.82	1,093.00	1,070.71	9.41	5.55	-94.61	-1,342.97	-5,222.53	5,539.02	5,524.62	14.40	384.595	
2,400.00	2,339.76	1,124.00	1,098.63	9.92	5.66	-94.58	-1,333.23	-5,231.86	5,562.46	5,547.47	15.00	370.852	
2,500.00	2,434.71	1,155.00	1,126.30	10.43	5.76	-94.55	-1,323.17	-5,241.56	5,586.99	5,571.38	15.60	358.044	
2,600.00	2,529.65	1,217.00	1,180.74	10.94	6.08	-94.47	-1,301.45	-5,261.76	5,612.31	5,595.86	16.45	341.263	
2,700.00	2,624.59	1,279.00	1,234.28	11.45	6.30	-94.37	-1,278.23	-5,282.68	5,638.25	5,620.96	17.29	326.165	
2,800.00	2,719.53	1,311.00	1,261.52	11.97	6.43	-94.31	-1,265.70	-5,293.86	5,665.06	5,647.11	17.95	315.607	
2,900.00	2,814.48	1,346.12	1,291.10	12.49	6.66	-94.24	-1,251.64	-5,306.54	5,692.91	5,674.26	18.65	305.293	
3,000.00	2,909.42	1,379.40	1,318.88	13.01	6.96	-94.17	-1,238.18	-5,318.99	5,721.88	5,702.52	19.37	295.472	
3,100.00	3,004.36	1,423.79	1,355.59	13.53	7.33	-94.07	-1,219.91	-5,335.97	5,751.72	5,731.56	20.16	285.336	
3,200.00	3,099.30	1,436.00	1,365.60	14.05	7.43	-94.04	-1,214.80	-5,340.75	5,782.69	5,762.01	20.68	279.636	
3,300.00	3,194.25	1,498.00	1,416.09	14.57	8.03	-93.90	-1,189.12	-5,365.96	5,814.81	5,793.13	21.68	268.247	
3,400.00	3,289.19	1,498.00	1,416.09	15.09	8.03	-93.90	-1,189.12	-5,365.96	5,847.85	5,825.77	22.08	264.824	
3,500.00	3,384.13	1,541.06	1,450.86	15.62	8.44	-93.80	-1,171.53	-5,384.25	5,882.05	5,859.16	22.89	256.973	
3,600.00	3,479.07	1,592.00	1,491.75	16.14	8.94	-93.68	-1,150.58	-5,406.27	5,917.01	5,893.23	23.78	248.851	
3,700.00	3,574.02	1,677.18	1,559.17	16.67	9.84	-93.47	-1,114.35	-5,443.65	5,952.45	5,927.40	25.05	237.605	
3,800.00	3,668.96	1,747.00	1,613.85	17.19	10.60	-93.28	-1,083.86	-5,474.55	5,988.19	5,962.01	26.18	228.724	
3,900.00	3,763.90	3,253.00	2,925.31	17.72	22.92	-91.85	-590.34	-5,946.14	6,018.51	5,979.59	38.92	154.639	
4,000.00	3,858.84	3,253.00	2,925.31	18.24	22.92	-91.85	-590.34	-5,946.14	6,033.06	5,993.63	39.43	153.004	
4,100.00	3,953.79	3,253.00	2,925.31	18.77	22.92	-91.85	-590.34	-5,946.14	6,049.23	6,009.30	39.93	151.497	
4,200.00	4,048.73	3,253.00	2,925.31	19.30	22.92	-91.85	-590.34	-5,946.14	6,067.01	6,026.59	40.42	150.111	
4,300.00	4,143.67	3,253.00	2,925.31	19.82	22.92	-91.85	-590.34	-5,946.14	6,086.38	6,045.49	40.89	148.841	
4,400.00	4,238.61	3,253.00	2,925.31	20.35	22.92	-91.85	-590.34	-5,946.14	6,107.32	6,065.97	41.35	147.682	
4,500.00	4,333.56	3,253.00	2,925.31	20.88	22.92	-91.85	-590.34	-5,946.14	6,129.83	6,088.02	41.80	146.629	
4,600.00	4,428.50	3,253.00	2,925.31	21.41	22.92	-91.85	-590.34	-5,946.14	6,153.87	6,111.63	42.24	145.679	
4,700.00	4,523.44	3,253.00	2,925.31	21.93	22.92	-91.85	-590.34	-5,946.14	6,179.44	6,136.78	42.67	144.826	
4,800.00	4,618.38	3,253.00	2,925.31	22.46	22.92	-91.85	-590.34	-5,946.14	6,206.52	6,163.44	43.08	144.066	
4,900.00	4,713.33	3,253.00	2,925.31	22.99	22.92	-91.85	-590.34	-5,946.14	6,235.09	6,191.60	43.48	143.396	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #228A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		352-MWD OWSG Rev5						Rule Assigned:					Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)			
5,000.00	4,808.27	3,253.00	2,925.31	23.52	22.92	-91.85	-590.34	-5,946.14	6,265.12	6,221.25	43.87	142.812		
5,100.00	4,903.21	3,253.00	2,925.31	24.05	22.92	-91.85	-590.34	-5,946.14	6,296.59	6,252.35	44.25	142.310		
5,200.00	4,998.16	3,253.00	2,925.31	24.58	22.92	-91.85	-590.34	-5,946.14	6,329.49	6,284.88	44.61	141.887		
5,300.00	5,093.10	3,253.00	2,925.31	25.11	22.92	-91.85	-590.34	-5,946.14	6,363.79	6,318.83	44.96	141.540		
5,400.00	5,188.04	3,253.00	2,925.31	25.64	22.92	-91.85	-590.34	-5,946.14	6,399.47	6,354.17	45.30	141.266		
5,500.00	5,282.98	3,253.00	2,925.31	26.17	22.92	-91.85	-590.34	-5,946.14	6,436.50	6,390.88	45.63	141.061		
5,600.00	5,377.93	3,253.00	2,925.31	26.70	22.92	-91.85	-590.34	-5,946.14	6,474.87	6,428.93	45.95	140.923		
5,623.25	5,400.00	3,253.00	2,925.31	26.82	22.92	-91.85	-590.34	-5,946.14	6,483.98	6,437.96	46.02	140.900		
5,700.00	5,473.03	3,253.00	2,925.31	27.22	22.92	-92.19	-590.34	-5,946.14	6,514.53	6,468.29	46.25	140.862	SF	
5,800.00	5,568.64	3,253.00	2,925.31	27.73	22.92	-92.63	-590.34	-5,946.14	6,555.42	6,508.90	46.52	140.902		
5,900.00	5,664.75	3,253.00	2,925.31	28.23	22.92	-93.10	-590.34	-5,946.14	6,597.50	6,550.72	46.78	141.041		
6,000.00	5,761.33	3,253.00	2,925.31	28.71	22.92	-93.57	-590.34	-5,946.14	6,640.73	6,593.72	47.01	141.275		
6,100.00	5,858.34	3,253.00	2,925.31	29.18	22.92	-94.07	-590.34	-5,946.14	6,685.08	6,637.87	47.21	141.600		
6,200.00	5,955.76	3,253.00	2,925.31	29.64	22.92	-94.58	-590.34	-5,946.14	6,730.52	6,683.12	47.39	142.014		
6,300.00	6,053.57	3,253.00	2,925.31	30.07	22.92	-95.10	-590.34	-5,946.14	6,777.00	6,729.45	47.55	142.513		
6,400.00	6,151.72	3,253.00	2,925.31	30.50	22.92	-95.64	-590.34	-5,946.14	6,824.49	6,776.80	47.69	143.093		
6,500.00	6,250.19	3,253.00	2,925.31	30.91	22.92	-96.19	-590.34	-5,946.14	6,872.97	6,825.16	47.81	143.753		
6,600.00	6,348.94	3,253.00	2,925.31	31.30	22.92	-96.75	-590.34	-5,946.14	6,922.38	6,874.47	47.91	144.488		
6,659.67	6,408.00	3,253.00	2,925.31	31.53	22.92	-97.10	-590.34	-5,946.14	6,952.30	6,904.35	47.96	144.962		
6,700.00	6,447.82	3,253.00	2,925.31	31.68	22.92	-112.50	-590.34	-5,946.14	6,973.68	6,925.68	48.00	145.294		
6,750.00	6,496.66	3,253.00	2,925.31	31.90	22.92	-122.17	-590.34	-5,946.14	7,002.98	6,954.92	48.06	145.722		
6,800.00	6,544.65	3,253.00	2,925.31	32.13	22.92	-126.56	-590.34	-5,946.14	7,035.17	6,987.04	48.13	146.173		
6,850.00	6,591.49	3,253.00	2,925.31	32.37	22.92	-128.11	-590.34	-5,946.14	7,070.02	7,021.80	48.21	146.648		
6,900.00	6,636.89	3,253.00	2,925.31	32.62	22.92	-127.81	-590.34	-5,946.14	7,107.26	7,058.96	48.30	147.141		
6,950.00	6,680.57	3,253.00	2,925.31	32.89	22.92	-126.04	-590.34	-5,946.14	7,146.65	7,098.24	48.40	147.649		
7,000.00	6,722.26	3,253.00	2,925.31	33.17	22.92	-122.92	-590.34	-5,946.14	7,187.89	7,139.38	48.51	148.169		
7,050.00	6,761.71	3,253.00	2,925.31	33.45	22.92	-118.38	-590.34	-5,946.14	7,230.71	7,182.08	48.63	148.694		
7,100.00	6,798.67	3,253.00	2,925.31	33.75	22.92	-112.32	-590.34	-5,946.14	7,274.82	7,226.07	48.75	149.220		
7,150.00	6,832.91	3,253.00	2,925.31	34.06	22.92	-104.63	-590.34	-5,946.14	7,319.93	7,271.04	48.88	149.742		
7,200.00	6,864.22	3,253.00	2,925.31	34.37	22.92	-95.41	-590.34	-5,946.14	7,365.73	7,316.71	49.02	150.254		
7,250.00	6,892.42	3,253.00	2,925.31	34.69	22.92	-85.06	-590.34	-5,946.14	7,411.95	7,362.78	49.17	150.751		
7,300.00	6,917.32	3,253.00	2,925.31	35.03	22.92	-74.34	-590.34	-5,946.14	7,458.29	7,408.97	49.32	151.227		
7,350.00	6,938.77	3,253.00	2,925.31	35.37	22.92	-64.10	-590.34	-5,946.14	7,504.46	7,454.98	49.48	151.676		
7,400.00	6,956.64	3,253.00	2,925.31	35.72	22.92	-54.99	-590.34	-5,946.14	7,550.18	7,500.54	49.64	152.091		
7,450.00	6,970.83	3,253.00	2,925.31	36.07	22.92	-47.27	-590.34	-5,946.14	7,595.19	7,545.37	49.81	152.469		
7,500.00	6,981.23	3,253.00	2,925.31	36.44	22.92	-40.91	-590.34	-5,946.14	7,639.22	7,589.23	49.99	152.802		
7,550.00	6,987.80	3,253.00	2,925.31	36.81	22.92	-35.72	-590.34	-5,946.14	7,682.02	7,631.84	50.18	153.085		
7,600.00	6,990.48	3,253.00	2,925.31	37.19	22.92	-31.48	-590.34	-5,946.14	7,723.35	7,672.97	50.38	153.314		
7,609.87	6,990.55	3,253.00	2,925.31	37.26	22.92	-30.74	-590.34	-5,946.14	7,731.31	7,680.90	50.41	153.359		
7,700.00	6,990.49	3,253.00	2,925.31	37.97	22.92	-30.74	-590.34	-5,946.14	7,803.92	7,753.14	50.78	153.678		
7,800.00	6,990.42	3,253.00	2,925.31	38.78	22.92	-30.74	-590.34	-5,946.14	7,884.90	7,833.71	51.19	154.044		
7,900.00	6,990.35	3,253.00	2,925.31	39.64	22.92	-30.74	-590.34	-5,946.14	7,966.31	7,914.72	51.59	154.423		
8,000.00	6,990.28	3,253.00	2,925.31	40.53	22.92	-30.74	-590.34	-5,946.14	8,048.14	7,996.15	51.98	154.817		
8,100.00	6,990.21	3,253.00	2,925.31	41.45	22.92	-30.74	-590.34	-5,946.14	8,130.37	8,078.00	52.38	155.225		
8,200.00	6,990.14	3,253.00	2,925.31	42.40	22.92	-30.74	-590.34	-5,946.14	8,213.00	8,160.24	52.77	155.647		
8,306.37	6,990.06	3,253.00	2,925.31	43.45	22.92	-30.74	-590.34	-5,946.14	8,301.31	8,248.14	53.18	156.112		
8,400.00	6,990.00	3,253.00	2,925.31	44.38	22.92	-25.58	-590.34	-5,946.14	8,380.20	8,326.69	53.51	156.598		
8,500.00	6,989.93	3,253.00	2,925.31	45.36	22.92	-19.32	-590.34	-5,946.14	8,466.29	8,412.46	53.83	157.271		
8,600.00	6,989.85	3,253.00	2,925.31	46.33	22.92	-12.36	-590.34	-5,946.14	8,553.81	8,499.71	54.10	158.099		
8,700.00	6,989.78	3,253.00	2,925.31	47.28	22.92	-4.84	-590.34	-5,946.14	8,642.30	8,587.97	54.33	159.075		
8,800.00	6,989.70	3,253.00	2,925.31	48.21	22.92	2.96	-590.34	-5,946.14	8,731.31	8,676.80	54.51	160.189		
8,900.00	6,989.63	3,253.00	2,925.31	49.11	22.92	10.74	-590.34	-5,946.14	8,820.38	8,765.75	54.64	161.432		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #228A - OH - OH-SVY													Offset Site Error: 0.00 usft	
Survey Program:		352-MWD OWSG Rev5					Rule Assigned:				Offset Well Error: 0.00 usft			
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,000.00	6,989.55	3,253.00	2,925.31	49.99	22.92	18.19	-590.34	-5,946.14	8,909.11	8,854.38	54.73	162.793		
9,100.00	6,989.48	3,253.00	2,925.31	50.84	22.92	25.06	-590.34	-5,946.14	8,997.06	8,942.28	54.77	164.262		
9,200.00	6,989.40	3,253.00	2,925.31	51.66	22.92	31.22	-590.34	-5,946.14	9,083.83	9,029.05	54.78	165.826		
9,300.00	6,989.33	3,253.00	2,925.31	52.45	22.92	36.63	-590.34	-5,946.14	9,169.06	9,114.31	54.75	167.471		
9,393.87	6,989.27	3,253.00	2,925.31	53.15	22.92	41.05	-590.34	-5,946.14	9,247.31	9,192.62	54.69	169.078		
9,400.00	6,989.26	3,253.00	2,925.31	53.20	22.92	41.05	-590.34	-5,946.14	9,252.36	9,197.68	54.69	169.189		
9,500.00	6,989.19	3,253.00	2,925.31	53.95	22.92	41.05	-590.34	-5,946.14	9,334.92	9,280.30	54.62	170.911		
9,600.00	6,989.12	3,253.00	2,925.31	54.73	22.92	41.05	-590.34	-5,946.14	9,417.81	9,363.25	54.56	172.621		
9,700.00	6,989.05	3,253.00	2,925.31	55.55	22.92	41.05	-590.34	-5,946.14	9,501.03	9,446.53	54.50	174.317		
9,800.00	6,988.98	3,253.00	2,925.31	56.40	22.92	41.05	-590.34	-5,946.14	9,584.57	9,530.12	54.46	175.999		
9,900.00	6,988.91	3,253.00	2,925.31	57.28	22.92	41.05	-590.34	-5,946.14	9,668.43	9,614.01	54.42	177.668		
10,000.00	6,988.84	3,253.00	2,925.31	58.20	22.92	41.05	-590.34	-5,946.14	9,752.59	9,698.20	54.39	179.324		
10,100.00	6,988.77	3,253.00	2,925.31	59.14	22.92	41.05	-590.34	-5,946.14	9,837.04	9,782.68	54.36	180.966		
10,200.00	6,988.70	3,253.00	2,925.31	60.11	22.92	41.05	-590.34	-5,946.14	9,921.79	9,867.45	54.34	182.595		
10,300.00	6,988.63	3,253.00	2,925.31	61.11	22.92	41.05	-590.34	-5,946.14	10,006.81	9,952.49	54.32	184.210		
10,400.00	6,988.56	3,253.00	2,925.31	62.14	22.92	41.05	-590.34	-5,946.14	10,092.12	10,037.80	54.31	185.812		
10,500.00	6,988.49	3,253.00	2,925.31	63.19	22.92	41.05	-590.34	-5,946.14	10,177.68	10,123.37	54.31	187.401		
10,600.00	6,988.42	3,253.00	2,925.31	64.26	22.92	41.05	-590.34	-5,946.14	10,263.51	10,209.20	54.31	188.977		
10,700.00	6,988.35	3,253.00	2,925.31	65.36	22.92	41.05	-590.34	-5,946.14	10,349.60	10,295.28	54.32	190.540		
10,800.00	6,988.28	3,253.00	2,925.31	66.48	22.92	41.05	-590.34	-5,946.14	10,435.93	10,381.60	54.33	192.090		
10,900.00	6,988.21	3,253.00	2,925.31	67.61	22.92	41.05	-590.34	-5,946.14	10,522.50	10,468.16	54.34	193.628		
11,000.00	6,988.14	3,253.00	2,925.31	68.77	22.92	41.05	-590.34	-5,946.14	10,609.31	10,554.95	54.36	195.153		
11,100.00	6,988.07	3,253.00	2,925.31	69.95	22.92	41.05	-590.34	-5,946.14	10,696.35	10,641.97	54.39	196.667		
11,200.00	6,988.01	3,253.00	2,925.31	71.14	22.92	41.05	-590.34	-5,946.14	10,783.62	10,729.20	54.42	198.168		
11,300.00	6,987.94	3,253.00	2,925.31	72.35	22.92	41.05	-590.34	-5,946.14	10,871.10	10,816.66	54.45	199.657		
11,400.00	6,987.87	3,253.00	2,925.31	73.57	22.92	41.05	-590.34	-5,946.14	10,958.80	10,904.32	54.48	201.135		
11,500.00	6,987.80	3,253.00	2,925.31	74.81	22.92	41.05	-590.34	-5,946.14	11,046.71	10,992.19	54.52	202.601		
11,600.00	6,987.73	3,253.00	2,925.31	76.07	22.92	41.05	-590.34	-5,946.14	11,134.82	11,080.26	54.57	204.056		
11,643.87	6,987.70	3,253.00	2,925.31	76.62	22.92	41.05	-590.34	-5,946.14	11,173.54	11,118.95	54.59	204.692		
11,700.00	6,987.66	3,253.00	2,925.31	77.33	22.92	42.61	-590.34	-5,946.14	11,222.96	11,168.35	54.61	205.505		
11,737.27	6,987.63	3,253.00	2,925.31	77.80	22.92	43.60	-590.34	-5,946.14	11,255.62	11,200.99	54.63	206.047		
11,800.00	6,987.59	3,253.00	2,925.31	78.59	22.92	43.60	-590.34	-5,946.14	11,310.51	11,255.86	54.65	206.952		
11,900.00	6,987.52	3,253.00	2,925.31	79.86	22.92	43.60	-590.34	-5,946.14	11,398.19	11,343.49	54.70	208.382		
12,000.00	6,987.46	3,253.00	2,925.31	81.14	22.92	43.60	-590.34	-5,946.14	11,486.06	11,431.31	54.75	209.800		
12,100.00	6,987.39	3,253.00	2,925.31	82.43	22.92	43.60	-590.34	-5,946.14	11,574.13	11,519.33	54.80	211.206		
12,200.00	6,987.32	3,253.00	2,925.31	83.73	22.92	43.60	-590.34	-5,946.14	11,662.40	11,607.54	54.86	212.601		
12,300.00	6,987.26	3,253.00	2,925.31	85.05	22.92	43.60	-590.34	-5,946.14	11,750.85	11,695.94	54.91	213.985		
12,400.00	6,987.19	3,253.00	2,925.31	86.38	22.92	43.60	-590.34	-5,946.14	11,839.49	11,784.51	54.98	215.358		
12,500.00	6,987.12	3,253.00	2,925.31	87.71	22.92	43.60	-590.34	-5,946.14	11,928.31	11,873.27	55.04	216.721		
12,600.00	6,987.06	3,253.00	2,925.31	89.06	22.92	43.60	-590.34	-5,946.14	12,017.30	11,962.19	55.11	218.073		
12,700.00	6,986.99	3,253.00	2,925.31	90.41	22.92	43.60	-590.34	-5,946.14	12,106.46	12,051.29	55.18	219.415		
12,800.00	6,986.92	3,253.00	2,925.31	91.77	22.92	43.60	-590.34	-5,946.14	12,195.80	12,140.55	55.25	220.747		
12,900.00	6,986.86	3,253.00	2,925.31	93.14	22.92	43.60	-590.34	-5,946.14	12,285.29	12,229.97	55.32	222.069		
13,000.00	6,986.79	3,253.00	2,925.31	94.52	22.92	43.60	-590.34	-5,946.14	12,374.95	12,319.55	55.40	223.382		
13,100.00	6,986.72	3,253.00	2,925.31	95.90	22.92	43.60	-590.34	-5,946.14	12,464.76	12,409.29	55.48	224.686		
13,200.00	6,986.66	3,253.00	2,925.31	97.30	22.92	43.60	-590.34	-5,946.14	12,554.73	12,499.18	55.56	225.981		
13,300.00	6,986.59	3,253.00	2,925.31	98.69	22.92	43.60	-590.34	-5,946.14	12,644.85	12,589.21	55.64	227.267		
13,400.00	6,986.52	3,253.00	2,925.31	100.10	22.92	43.60	-590.34	-5,946.14	12,735.12	12,679.40	55.72	228.545		
13,500.00	6,986.46	3,253.00	2,925.31	101.51	22.92	43.60	-590.34	-5,946.14	12,825.53	12,769.72	55.81	229.814		
13,600.00	6,986.39	3,253.00	2,925.31	102.93	22.92	43.60	-590.34	-5,946.14	12,916.08	12,860.19	55.90	231.075		
13,700.00	6,986.32	3,253.00	2,925.31	104.35	22.92	43.60	-590.34	-5,946.14	13,006.78	12,950.79	55.98	232.329		
13,800.00	6,986.25	3,253.00	2,925.31	105.78	22.92	43.60	-590.34	-5,946.14	13,097.60	13,041.53	56.07	233.574		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #228A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		352-MWD OWSG Rev5							Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
13,900.00	6,986.19	3,253.00	2,925.31	107.21	22.92	43.60	-590.34	-5,946.14	13,188.56	13,132.39	56.17	234.812		
14,000.00	6,986.12	3,253.00	2,925.31	108.65	22.92	43.60	-590.34	-5,946.14	13,279.65	13,223.39	56.26	236.043		
14,100.00	6,986.05	3,253.00	2,925.31	110.09	22.92	43.60	-590.34	-5,946.14	13,370.87	13,314.51	56.35	237.267		
14,200.00	6,985.99	3,253.00	2,925.31	111.54	22.92	43.60	-590.34	-5,946.14	13,462.21	13,405.76	56.45	238.483		
14,300.00	6,985.92	3,253.00	2,925.31	112.99	22.92	43.60	-590.34	-5,946.14	13,553.67	13,497.13	56.55	239.693		
14,400.00	6,985.85	3,253.00	2,925.31	114.45	22.92	43.60	-590.34	-5,946.14	13,645.26	13,588.61	56.64	240.896		
14,500.00	6,985.79	3,253.00	2,925.31	115.91	22.92	43.60	-590.34	-5,946.14	13,736.96	13,680.22	56.74	242.093		
14,600.00	6,985.72	3,253.00	2,925.31	117.38	22.92	43.60	-590.34	-5,946.14	13,828.77	13,771.93	56.84	243.283		
14,700.00	6,985.65	3,253.00	2,925.31	118.84	22.92	43.60	-590.34	-5,946.14	13,920.70	13,863.76	56.94	244.468		
14,800.00	6,985.59	3,253.00	2,925.31	120.32	22.92	43.60	-590.34	-5,946.14	14,012.74	13,955.70	57.04	245.646		
14,900.00	6,985.52	3,253.00	2,925.31	121.79	22.92	43.60	-590.34	-5,946.14	14,104.89	14,047.74	57.15	246.818		
15,000.00	6,985.45	3,253.00	2,925.31	123.27	22.92	43.60	-590.34	-5,946.14	14,197.14	14,139.89	57.25	247.984		
15,100.00	6,985.39	3,253.00	2,925.31	124.75	22.92	43.60	-590.34	-5,946.14	14,289.50	14,232.15	57.35	249.145		
15,200.00	6,985.32	3,253.00	2,925.31	126.24	22.92	43.60	-590.34	-5,946.14	14,381.96	14,324.50	57.46	250.300		
15,300.00	6,985.25	3,253.00	2,925.31	127.72	22.92	43.60	-590.34	-5,946.14	14,474.52	14,416.96	57.56	251.450		
15,400.00	6,985.19	3,253.00	2,925.31	129.21	22.92	43.60	-590.34	-5,946.14	14,567.18	14,509.51	57.67	252.594		
15,500.00	6,985.12	3,253.00	2,925.31	130.71	22.92	43.60	-590.34	-5,946.14	14,659.94	14,602.16	57.78	253.733		
15,600.00	6,985.05	3,253.00	2,925.31	132.20	22.92	43.60	-590.34	-5,946.14	14,752.79	14,694.90	57.88	254.868		
15,700.00	6,984.99	3,253.00	2,925.31	133.70	22.92	43.60	-590.34	-5,946.14	14,845.73	14,787.74	57.99	255.997		
15,800.00	6,984.92	3,253.00	2,925.31	135.20	22.92	43.60	-590.34	-5,946.14	14,938.76	14,880.66	58.10	257.121		
15,900.00	6,984.85	3,253.00	2,925.31	136.71	22.92	43.60	-590.34	-5,946.14	15,031.89	14,973.68	58.21	258.240		
16,000.00	6,984.79	3,253.00	2,925.31	138.21	22.92	43.60	-590.34	-5,946.14	15,125.10	15,066.78	58.32	259.355		
16,100.00	6,984.72	3,253.00	2,925.31	139.72	22.92	43.60	-590.34	-5,946.14	15,218.40	15,159.97	58.43	260.465		
16,200.00	6,984.65	3,253.00	2,925.31	141.23	22.92	43.60	-590.34	-5,946.14	15,311.78	15,253.24	58.54	261.570		
16,300.00	6,984.59	3,253.00	2,925.31	142.75	22.92	43.60	-590.34	-5,946.14	15,405.24	15,346.60	58.65	262.671		
16,400.00	6,984.52	3,253.00	2,925.31	144.26	22.92	43.60	-590.34	-5,946.14	15,498.79	15,440.03	58.76	263.768		
16,500.00	6,984.45	3,253.00	2,925.31	145.78	22.92	43.60	-590.34	-5,946.14	15,592.42	15,533.55	58.87	264.860		
16,600.00	6,984.39	3,253.00	2,925.31	147.29	22.92	43.60	-590.34	-5,946.14	15,686.12	15,627.14	58.98	265.948		
16,700.00	6,984.32	3,253.00	2,925.31	148.82	22.92	43.60	-590.34	-5,946.14	15,779.91	15,720.81	59.09	267.032		
16,800.00	6,984.25	3,253.00	2,925.31	150.34	22.92	43.60	-590.34	-5,946.14	15,873.77	15,814.56	59.21	268.111		
16,900.00	6,984.19	3,253.00	2,925.31	151.86	22.92	43.60	-590.34	-5,946.14	15,967.70	15,908.38	59.32	269.187		
17,000.00	6,984.12	3,253.00	2,925.31	153.39	22.92	43.60	-590.34	-5,946.14	16,061.71	16,002.27	59.43	270.259		
17,100.00	6,984.05	3,253.00	2,925.31	154.91	22.92	43.60	-590.34	-5,946.14	16,155.78	16,096.24	59.54	271.326		
17,200.00	6,983.99	3,253.00	2,925.31	156.44	22.92	43.60	-590.34	-5,946.14	16,249.93	16,190.28	59.66	272.390		
17,300.00	6,983.92	3,253.00	2,925.31	157.97	22.92	43.60	-590.34	-5,946.14	16,344.15	16,284.38	59.77	273.450		
17,400.00	6,983.85	3,253.00	2,925.31	159.50	22.92	43.60	-590.34	-5,946.14	16,438.44	16,378.56	59.88	274.506		
17,500.00	6,983.79	3,253.00	2,925.31	161.04	22.92	43.60	-590.34	-5,946.14	16,532.79	16,472.80	60.00	275.558		
17,600.00	6,983.72	3,253.00	2,925.31	162.57	22.92	43.60	-590.34	-5,946.14	16,627.21	16,567.10	60.11	276.606		
17,700.00	6,983.65	3,253.00	2,925.31	164.11	22.92	43.60	-590.34	-5,946.14	16,721.70	16,661.47	60.23	277.651		
17,800.00	6,983.59	3,253.00	2,925.31	165.65	22.92	43.60	-590.34	-5,946.14	16,816.25	16,755.91	60.34	278.692		
17,900.00	6,983.52	3,253.00	2,925.31	167.18	22.92	43.60	-590.34	-5,946.14	16,910.86	16,850.41	60.45	279.730		
18,000.00	6,983.45	3,253.00	2,925.31	168.72	22.92	43.60	-590.34	-5,946.14	17,005.53	16,944.96	60.57	280.764		
18,100.00	6,983.39	3,253.00	2,925.31	170.27	22.92	43.60	-590.34	-5,946.14	17,100.27	17,039.58	60.68	281.795		
18,200.00	6,983.32	3,253.00	2,925.31	171.81	22.92	43.60	-590.34	-5,946.14	17,195.06	17,134.26	60.80	282.822		
18,300.00	6,983.25	3,253.00	2,925.31	173.35	22.92	43.60	-590.34	-5,946.14	17,289.91	17,229.00	60.91	283.846		
18,400.00	6,983.19	3,253.00	2,925.31	174.90	22.92	43.60	-590.34	-5,946.14	17,384.82	17,323.79	61.03	284.866		
18,500.00	6,983.12	1,436.00	1,365.60	176.44	7.43	38.50	-1,214.80	-5,340.75	17,477.62	17,425.84	51.78	337.550		
18,600.00	6,983.05	1,436.00	1,365.60	177.99	7.43	38.50	-1,214.80	-5,340.75	17,569.18	17,517.23	51.95	338.186		
18,700.00	6,982.99	1,436.00	1,365.60	179.54	7.43	38.50	-1,214.80	-5,340.75	17,660.83	17,608.71	52.12	338.824		
18,800.00	6,982.92	1,419.42	1,352.00	181.09	7.29	38.48	-1,221.73	-5,334.27	17,752.51	17,700.29	52.22	339.944		
18,900.00	6,982.85	1,405.00	1,340.10	182.64	7.17	38.45	-1,227.70	-5,328.73	17,844.32	17,791.99	52.33	340.989		
19,000.00	6,982.78	1,405.00	1,340.10	184.19	7.17	38.45	-1,227.70	-5,328.73	17,936.17	17,883.67	52.50	341.626		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #228A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program: 352-MWD OWSG Rev5													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,100.00	6,982.72	1,405.00	1,340.10	185.74	7.17	38.45	-1,227.70	-5,328.73	18,028.11	17,975.44	52.67	342.264		
19,200.00	6,982.65	1,391.19	1,328.66	187.29	7.05	38.43	-1,233.37	-5,323.46	18,120.12	18,067.33	52.79	343.273		
19,300.00	6,982.58	1,374.00	1,314.38	188.84	6.92	38.40	-1,240.38	-5,316.94	18,212.18	18,159.30	52.89	344.355		
19,400.00	6,982.52	1,374.00	1,314.38	190.40	6.92	38.40	-1,240.38	-5,316.94	18,304.31	18,251.25	53.06	344.993		
19,500.00	6,982.45	1,374.00	1,314.38	191.95	6.92	38.40	-1,240.38	-5,316.94	18,396.52	18,343.29	53.23	345.632		
19,600.00	6,982.38	1,374.00	1,314.38	193.51	6.92	38.40	-1,240.38	-5,316.94	18,488.80	18,435.41	53.39	346.274		
19,700.00	6,982.32	1,374.00	1,314.38	195.07	6.92	38.40	-1,240.38	-5,316.94	18,581.17	18,527.61	53.56	346.918		
19,800.00	6,982.25	1,374.00	1,314.38	196.62	6.92	38.40	-1,240.38	-5,316.94	18,673.62	18,619.89	53.73	347.565		
19,900.00	6,982.18	1,374.00	1,314.38	198.18	6.92	38.40	-1,240.38	-5,316.94	18,766.14	18,712.25	53.89	348.213		
20,000.00	6,982.12	1,343.23	1,288.68	199.74	6.64	38.35	-1,252.80	-5,305.48	18,858.53	18,804.61	53.93	349.717		
20,100.00	6,982.05	1,338.86	1,285.01	201.30	6.61	38.35	-1,254.56	-5,303.88	18,951.14	18,897.07	54.07	350.467		
20,176.02	6,982.00	1,311.00	1,261.52	202.36	6.43	38.30	-1,265.70	-5,293.86	19,021.72	18,965.56	56.17	338.658		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 359-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-159.99	-149.27	-54.37	161.31				
100.00	100.00	72.00	72.00	0.25	1.33	-159.99	-149.27	-54.37	158.86	157.28	1.58	100.417	
200.00	200.00	172.00	172.00	0.61	3.18	-159.99	-149.27	-54.37	158.86	155.07	3.79	41.928	
300.00	300.00	272.00	272.00	0.97	5.03	-159.99	-149.27	-54.37	158.86	152.87	6.00	26.495	
400.00	400.00	372.00	372.00	1.33	6.88	-159.99	-149.27	-54.37	158.86	150.65	8.21	19.350	
500.00	500.00	472.00	472.00	1.68	8.79	-159.99	-149.27	-54.37	158.86	148.39	10.47	15.173	
600.00	600.00	572.00	572.00	2.04	10.69	-159.99	-149.27	-54.37	158.86	146.13	12.73	12.479	
635.99	635.99	607.99	607.99	2.17	11.37	-149.96	-148.73	-54.37	158.55	145.00	13.54	11.706 CC	
700.00	699.98	671.82	671.81	2.40	12.59	-150.22	-148.76	-54.37	159.90	144.91	14.99	10.669 ES	
800.00	799.84	771.40	771.40	2.76	14.48	-151.10	-148.96	-54.37	164.65	147.41	17.24	9.549	
900.00	899.45	871.49	871.45	3.13	16.40	-152.46	-149.27	-54.37	172.63	153.10	19.53	8.841	
1,000.00	998.70	970.74	970.70	3.49	18.41	-154.12	-149.27	-54.37	183.54	161.63	21.90	8.379	
1,100.00	1,097.47	1,069.50	1,069.47	3.86	20.42	-155.98	-149.27	-54.37	197.75	173.48	24.27	8.147	
1,200.00	1,195.62	1,167.50	1,167.46	4.24	22.40	-157.86	-148.37	-54.37	214.48	187.85	26.63	8.054 SF	
1,300.00	1,293.06	1,264.39	1,264.35	4.64	24.37	-159.76	-148.56	-54.37	235.71	206.75	28.97	8.138	
1,400.00	1,389.64	1,360.33	1,360.28	5.06	26.32	-161.57	-148.96	-54.37	260.63	229.35	31.28	8.331	
1,500.00	1,485.27	1,457.37	1,457.27	5.50	28.42	-163.26	-149.27	-54.37	288.92	255.15	33.77	8.555	
1,515.00	1,499.52	1,471.62	1,471.52	5.57	28.76	-163.49	-149.27	-54.37	293.41	259.25	34.16	8.588	
1,600.00	1,580.22	1,552.32	1,552.22	5.96	30.65	-164.85	-149.27	-54.37	319.18	282.82	36.37	8.777	
1,700.00	1,675.17	1,647.27	1,647.17	6.44	32.87	-166.19	-149.27	-54.37	349.68	310.72	38.96	8.975	
1,800.00	1,770.11	1,741.79	1,741.68	6.92	35.08	-167.31	-148.01	-54.37	379.07	337.52	41.55	9.123	
1,900.00	1,865.05	1,835.57	1,835.45	7.41	37.27	-168.26	-148.25	-54.37	410.07	365.95	44.12	9.294	
2,000.00	1,959.99	1,929.18	1,929.06	7.90	39.46	-169.08	-148.75	-54.37	441.42	394.73	46.69	9.455	
2,100.00	2,054.94	2,027.21	2,026.94	8.40	41.87	-169.82	-149.27	-54.37	472.86	423.37	49.48	9.556	
2,200.00	2,149.88	2,121.51	2,121.23	8.90	44.43	-170.45	-148.40	-54.37	502.97	450.54	52.43	9.594	
2,300.00	2,244.82	2,210.19	2,209.89	9.41	46.84	-170.97	-149.03	-54.37	534.67	479.47	55.20	9.686	
2,400.00	2,339.76	2,312.16	2,311.76	9.92	49.82	-171.50	-149.27	-54.37	565.94	507.34	58.59	9.659	
2,500.00	2,434.71	2,407.10	2,406.71	10.43	52.64	-171.95	-149.27	-54.37	597.04	535.24	61.80	9.661	
2,600.00	2,529.65	2,502.04	2,501.65	10.94	55.45	-172.35	-149.27	-54.37	628.17	563.17	65.00	9.663	
2,700.00	2,624.59	2,594.49	2,594.04	11.45	58.20	-172.72	-146.77	-54.37	656.85	588.71	68.13	9.641	
2,800.00	2,719.53	2,685.75	2,685.28	11.97	60.91	-173.03	-147.37	-54.37	688.64	617.42	71.22	9.669	
2,900.00	2,814.48	2,776.72	2,776.22	12.49	63.61	-173.32	-148.44	-54.37	720.96	646.66	74.30	9.704	
3,000.00	2,909.42	2,882.23	2,881.42	13.01	66.87	-173.62	-149.27	-54.37	752.93	674.94	77.99	9.654	
3,100.00	3,004.36	2,977.00	2,976.06	13.53	69.93	-173.88	-149.27	-54.37	784.16	702.72	81.44	9.629	
3,200.00	3,099.30	2,977.00	2,976.06	14.05	69.93	-173.88	-149.27	-54.37	820.95	739.92	81.03	10.131	
3,300.00	3,194.25	2,977.00	2,976.06	14.57	69.93	-173.88	-149.27	-54.37	867.76	787.99	79.77	10.878	
3,400.00	3,289.19	2,977.00	2,976.06	15.09	69.93	-173.88	-149.27	-54.37	923.06	845.11	77.95	11.841	
3,500.00	3,384.13	2,977.00	2,976.06	15.62	69.93	-173.88	-149.27	-54.37	985.44	909.61	75.83	12.996	
3,600.00	3,479.07	2,977.00	2,976.06	16.14	69.93	-173.88	-149.27	-54.37	1,053.63	980.05	73.58	14.320	
3,700.00	3,574.02	2,977.00	2,976.06	16.67	69.93	-173.88	-149.27	-54.37	1,126.58	1,055.25	71.33	15.793	
3,800.00	3,668.96	2,977.00	2,976.06	17.19	69.93	-173.88	-149.27	-54.37	1,203.43	1,134.27	69.16	17.400	
3,900.00	3,763.90	2,977.00	2,976.06	17.72	69.93	-173.88	-149.27	-54.37	1,283.47	1,216.35	67.11	19.124	
4,000.00	3,858.84	2,977.00	2,976.06	18.24	69.93	-173.88	-149.27	-54.37	1,366.14	1,300.94	65.20	20.953	
4,100.00	3,953.79	2,977.00	2,976.06	18.77	69.93	-173.88	-149.27	-54.37	1,450.99	1,387.56	63.44	22.873	
4,200.00	4,048.73	2,977.00	2,976.06	19.30	69.93	-173.88	-149.27	-54.37	1,537.67	1,475.85	61.82	24.875	
4,300.00	4,143.67	2,977.00	2,976.06	19.82	69.93	-173.88	-149.27	-54.37	1,625.88	1,565.54	60.33	26.948	
4,400.00	4,238.61	2,977.00	2,976.06	20.35	69.93	-173.88	-149.27	-54.37	1,715.38	1,656.40	58.98	29.084	
4,500.00	4,333.56	2,977.00	2,976.06	20.88	69.93	-173.88	-149.27	-54.37	1,805.98	1,748.24	57.74	31.275	
4,600.00	4,428.50	2,977.00	2,976.06	21.41	69.93	-173.88	-149.27	-54.37	1,897.53	1,840.91	56.62	33.514	
4,700.00	4,523.44	2,977.00	2,976.06	21.93	69.93	-173.88	-149.27	-54.37	1,989.89	1,934.30	55.59	35.794	
4,800.00	4,618.38	2,977.00	2,976.06	22.46	69.93	-173.88	-149.27	-54.37	2,082.96	2,028.30	54.66	38.110	
4,900.00	4,713.33	2,977.00	2,976.06	22.99	69.93	-173.88	-149.27	-54.37	2,176.64	2,122.84	53.80	40.455	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		359-A027Ua_INC-ONLY					Rule Assigned:			Offset Well Error:			0.00 usft	
Reference		Offset		Semi Major Axis		Offset Wellbore Centre			Distance			Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,000.00	4,808.27	2,977.00	2,976.06	23.52	69.93	-173.88	-149.27	-54.37	2,270.86	2,217.83	53.03	42.826		
5,100.00	4,903.21	2,977.00	2,976.06	24.05	69.93	-173.88	-149.27	-54.37	2,365.56	2,313.24	52.32	45.217		
5,200.00	4,998.16	2,977.00	2,976.06	24.58	69.93	-173.88	-149.27	-54.37	2,460.67	2,409.00	51.67	47.624		
5,300.00	5,093.10	2,977.00	2,976.06	25.11	69.93	-173.88	-149.27	-54.37	2,556.16	2,505.08	51.08	50.044		
5,400.00	5,188.04	2,977.00	2,976.06	25.64	69.93	-173.88	-149.27	-54.37	2,651.98	2,601.44	50.54	52.474		
5,500.00	5,282.98	2,977.00	2,976.06	26.17	69.93	-173.88	-149.27	-54.37	2,748.10	2,698.05	50.05	54.909		
5,600.00	5,377.93	2,977.00	2,976.06	26.70	69.93	-173.88	-149.27	-54.37	2,844.48	2,794.88	49.60	57.348		
5,623.25	5,400.00	2,977.00	2,976.06	26.82	69.93	-173.88	-149.27	-54.37	2,866.93	2,817.43	49.50	57.915		
5,700.00	5,473.03	2,977.00	2,976.06	27.22	69.93	-174.17	-149.27	-54.37	2,940.98	2,891.80	49.18	59.798		
5,800.00	5,568.64	2,977.00	2,976.06	27.73	69.93	-174.52	-149.27	-54.37	3,037.27	2,988.50	48.77	62.282		
5,900.00	5,664.75	2,977.00	2,976.06	28.23	69.93	-174.84	-149.27	-54.37	3,133.32	3,084.97	48.35	64.801		
6,000.00	5,761.33	2,977.00	2,976.06	28.71	69.93	-175.13	-149.27	-54.37	3,229.15	3,181.20	47.94	67.355		
6,100.00	5,858.34	2,977.00	2,976.06	29.18	69.93	-175.40	-149.27	-54.37	3,324.72	3,277.19	47.53	69.943		
6,200.00	5,955.76	2,977.00	2,976.06	29.64	69.93	-175.65	-149.27	-54.37	3,420.05	3,372.92	47.13	72.567		
6,300.00	6,053.57	2,977.00	2,976.06	30.07	69.93	-175.87	-149.27	-54.37	3,515.12	3,468.39	46.73	75.227		
6,400.00	6,151.72	2,977.00	2,976.06	30.50	69.93	-176.08	-149.27	-54.37	3,609.92	3,563.59	46.33	77.922		
6,500.00	6,250.19	2,977.00	2,976.06	30.91	69.93	-176.28	-149.27	-54.37	3,704.45	3,658.52	45.93	80.654		
6,600.00	6,348.94	2,977.00	2,976.06	31.30	69.93	-176.45	-149.27	-54.37	3,798.69	3,753.16	45.54	83.422		
6,659.67	6,408.00	2,977.00	2,976.06	31.53	69.93	-176.55	-149.27	-54.37	3,854.80	3,809.50	45.30	85.092		
6,700.00	6,447.82	2,977.00	2,976.06	31.68	69.93	158.17	-149.27	-54.37	3,892.95	3,847.78	45.16	86.201		
6,750.00	6,496.66	2,977.00	2,976.06	31.90	69.93	133.15	-149.27	-54.37	3,940.81	3,895.78	45.03	87.514		
6,800.00	6,544.65	2,977.00	2,976.06	32.13	69.93	110.65	-149.27	-54.37	3,989.02	3,944.08	44.94	88.759		
6,850.00	6,591.49	2,977.00	2,976.06	32.37	69.93	90.42	-149.27	-54.37	4,037.26	3,992.36	44.89	89.929		
6,900.00	6,636.89	2,977.00	2,976.06	32.62	69.93	73.74	-149.27	-54.37	4,085.24	4,040.36	44.88	91.017		
6,950.00	6,680.57	2,977.00	2,976.06	32.89	69.93	60.94	-149.27	-54.37	4,132.68	4,087.77	44.91	92.015		
7,000.00	6,722.26	2,977.00	2,976.06	33.17	69.93	51.42	-149.27	-54.37	4,179.31	4,134.33	44.98	92.918		
7,050.00	6,761.71	2,977.00	2,976.06	33.45	69.93	44.33	-149.27	-54.37	4,224.88	4,179.80	45.08	93.719		
7,100.00	6,798.67	2,977.00	2,976.06	33.75	69.93	38.96	-149.27	-54.37	4,269.14	4,223.92	45.22	94.412		
7,150.00	6,832.91	2,977.00	2,976.06	34.06	69.93	34.84	-149.27	-54.37	4,311.86	4,266.47	45.39	94.994		
7,200.00	6,864.22	2,977.00	2,976.06	34.37	69.93	31.60	-149.27	-54.37	4,352.84	4,307.24	45.60	95.459		
7,250.00	6,892.42	2,977.00	2,976.06	34.69	69.93	29.04	-149.27	-54.37	4,391.86	4,346.02	45.84	95.803		
7,300.00	6,917.32	2,977.00	2,976.06	35.03	69.93	26.98	-149.27	-54.37	4,428.75	4,382.63	46.12	96.025		
7,350.00	6,938.77	2,977.00	2,976.06	35.37	69.93	25.31	-149.27	-54.37	4,463.33	4,416.89	46.43	96.121		
7,400.00	6,956.64	2,977.00	2,976.06	35.72	69.93	23.96	-149.27	-54.37	4,495.44	4,448.66	46.78	96.091		
7,450.00	6,970.83	2,977.00	2,976.06	36.07	69.93	22.86	-149.27	-54.37	4,524.95	4,477.78	47.17	95.933		
7,500.00	6,981.23	2,977.00	2,976.06	36.44	69.93	21.97	-149.27	-54.37	4,551.71	4,504.13	47.59	95.650		
7,550.00	6,987.80	2,977.00	2,976.06	36.81	69.93	21.27	-149.27	-54.37	4,575.63	4,527.59	48.04	95.243		
7,600.00	6,990.48	2,977.00	2,976.06	37.19	69.93	20.72	-149.27	-54.37	4,596.59	4,548.06	48.53	94.716		
7,609.87	6,990.55	2,977.00	2,976.06	37.26	69.93	20.63	-149.27	-54.37	4,600.36	4,551.74	48.63	94.607		
7,700.00	6,990.49	2,977.00	2,976.06	37.97	69.93	20.63	-149.27	-54.37	4,635.09	4,585.51	49.58	93.486		
7,800.00	6,990.42	2,977.00	2,976.06	38.78	69.93	20.63	-149.27	-54.37	4,675.36	4,624.69	50.67	92.275		
7,900.00	6,990.35	2,977.00	2,976.06	39.64	69.93	20.63	-149.27	-54.37	4,717.39	4,665.62	51.78	91.113		
8,000.00	6,990.28	2,977.00	2,976.06	40.53	69.93	20.63	-149.27	-54.37	4,761.16	4,708.26	52.90	90.006		
8,100.00	6,990.21	2,977.00	2,976.06	41.45	69.93	20.63	-149.27	-54.37	4,806.61	4,752.58	54.03	88.961		
8,200.00	6,990.14	2,977.00	2,976.06	42.40	69.93	20.63	-149.27	-54.37	4,853.70	4,798.53	55.17	87.982		
8,306.37	6,990.06	2,977.00	2,976.06	43.45	69.93	20.63	-149.27	-54.37	4,905.52	4,849.15	56.38	87.016		
8,400.00	6,990.00	2,977.00	2,976.06	44.38	69.93	22.60	-149.27	-54.37	4,951.62	4,894.20	57.42	86.236		
8,500.00	6,989.93	2,977.00	2,976.06	45.36	69.93	24.64	-149.27	-54.37	5,000.07	4,941.58	58.50	85.473		
8,600.00	6,989.85	2,977.00	2,976.06	46.33	69.93	26.58	-149.27	-54.37	5,047.51	4,987.97	59.54	84.770		
8,700.00	6,989.78	2,977.00	2,976.06	47.28	69.93	28.44	-149.27	-54.37	5,093.74	5,033.18	60.56	84.115		
8,800.00	6,989.70	2,977.00	2,976.06	48.21	69.93	30.19	-149.27	-54.37	5,138.56	5,077.02	61.54	83.501		
8,900.00	6,989.63	2,977.00	2,976.06	49.11	69.93	31.83	-149.27	-54.37	5,181.80	5,119.31	62.49	82.919		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 359-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
9,000.00	6,989.55	2,977.00	2,976.06	49.99	69.93	33.37	-149.27	-54.37	5,223.29	5,159.87	63.42	82.361	
9,100.00	6,989.48	2,977.00	2,976.06	50.84	69.93	34.80	-149.27	-54.37	5,262.87	5,198.55	64.32	81.821	
9,200.00	6,989.40	2,977.00	2,976.06	51.66	69.93	36.13	-149.27	-54.37	5,300.39	5,235.19	65.20	81.293	
9,300.00	6,989.33	2,977.00	2,976.06	52.45	69.93	37.34	-149.27	-54.37	5,335.71	5,269.66	66.06	80.773	
9,393.87	6,989.27	2,977.00	2,976.06	53.15	69.93	38.38	-149.27	-54.37	5,366.76	5,299.92	66.84	80.287	
9,400.00	6,989.26	2,977.00	2,976.06	53.20	69.93	38.38	-149.27	-54.37	5,368.73	5,301.83	66.89	80.257	
9,500.00	6,989.19	2,977.00	2,976.06	53.95	69.93	38.38	-149.27	-54.37	5,401.61	5,333.88	67.74	79.744	
9,600.00	6,989.12	2,977.00	2,976.06	54.73	69.93	38.38	-149.27	-54.37	5,436.14	5,367.54	68.60	79.248	
9,700.00	6,989.05	2,977.00	2,976.06	55.55	69.93	38.38	-149.27	-54.37	5,472.28	5,402.81	69.47	78.772	
9,800.00	6,988.98	2,977.00	2,976.06	56.40	69.93	38.38	-149.27	-54.37	5,509.99	5,439.64	70.35	78.320	
9,900.00	6,988.91	2,977.00	2,976.06	57.28	69.93	38.38	-149.27	-54.37	5,549.25	5,478.01	71.24	77.893	
10,000.00	6,988.84	2,977.00	2,976.06	58.20	69.93	38.38	-149.27	-54.37	5,590.03	5,517.89	72.14	77.493	
10,100.00	6,988.77	2,977.00	2,976.06	59.14	69.93	38.38	-149.27	-54.37	5,632.28	5,559.25	73.03	77.122	
10,200.00	6,988.70	2,977.00	2,976.06	60.11	69.93	38.38	-149.27	-54.37	5,675.98	5,602.06	73.93	76.779	
10,300.00	6,988.63	2,977.00	2,976.06	61.11	69.93	38.38	-149.27	-54.37	5,721.10	5,646.28	74.82	76.467	
10,400.00	6,988.56	2,977.00	2,976.06	62.14	69.93	38.38	-149.27	-54.37	5,767.60	5,691.89	75.71	76.185	
10,500.00	6,988.49	2,977.00	2,976.06	63.19	69.93	38.38	-149.27	-54.37	5,815.44	5,738.85	76.59	75.933	
10,600.00	6,988.42	2,977.00	2,976.06	64.26	69.93	38.38	-149.27	-54.37	5,864.60	5,787.14	77.46	75.711	
10,700.00	6,988.35	2,977.00	2,976.06	65.36	69.93	38.38	-149.27	-54.37	5,915.04	5,836.72	78.33	75.518	
10,800.00	6,988.28	2,977.00	2,976.06	66.48	69.93	38.38	-149.27	-54.37	5,966.74	5,887.56	79.18	75.356	
10,900.00	6,988.21	2,977.00	2,976.06	67.61	69.93	38.38	-149.27	-54.37	6,019.65	5,939.62	80.03	75.222	
11,000.00	6,988.14	2,977.00	2,976.06	68.77	69.93	38.38	-149.27	-54.37	6,073.74	5,992.88	80.86	75.116	
11,100.00	6,988.07	2,977.00	2,976.06	69.95	69.93	38.38	-149.27	-54.37	6,128.99	6,047.31	81.68	75.039	
11,200.00	6,988.01	2,977.00	2,976.06	71.14	69.93	38.38	-149.27	-54.37	6,185.36	6,102.88	82.49	74.988	
11,300.00	6,987.94	2,977.00	2,976.06	72.35	69.93	38.38	-149.27	-54.37	6,242.83	6,159.55	83.28	74.963	
11,400.00	6,987.87	2,977.00	2,976.06	73.57	69.93	38.38	-149.27	-54.37	6,301.36	6,217.30	84.06	74.964	
11,500.00	6,987.80	2,977.00	2,976.06	74.81	69.93	38.38	-149.27	-54.37	6,360.92	6,276.10	84.82	74.990	
11,600.00	6,987.73	2,977.00	2,976.06	76.07	69.93	38.38	-149.27	-54.37	6,421.49	6,335.91	85.58	75.039	
11,643.87	6,987.70	2,977.00	2,976.06	76.62	69.93	38.38	-149.27	-54.37	6,448.36	6,362.46	85.90	75.069	
11,700.00	6,987.66	2,977.00	2,976.06	77.33	69.93	39.06	-149.27	-54.37	6,482.76	6,396.45	86.31	75.110	
11,737.27	6,987.63	2,977.00	2,976.06	77.80	69.93	39.51	-149.27	-54.37	6,505.46	6,418.88	86.58	75.138	
11,800.00	6,987.59	2,977.00	2,976.06	78.59	69.93	39.51	-149.27	-54.37	6,543.77	6,456.74	87.03	75.189	
11,900.00	6,987.52	2,977.00	2,976.06	79.86	69.93	39.51	-149.27	-54.37	6,605.62	6,517.88	87.74	75.286	
12,000.00	6,987.46	2,977.00	2,976.06	81.14	69.93	39.51	-149.27	-54.37	6,668.39	6,579.95	88.43	75.405	
12,100.00	6,987.39	2,977.00	2,976.06	82.43	69.93	39.51	-149.27	-54.37	6,732.06	6,642.94	89.12	75.543	
12,200.00	6,987.32	2,977.00	2,976.06	83.73	69.93	39.51	-149.27	-54.37	6,796.60	6,706.82	89.78	75.701	
12,300.00	6,987.26	2,977.00	2,976.06	85.05	69.93	39.51	-149.27	-54.37	6,862.00	6,771.56	90.43	75.878	
12,400.00	6,987.19	2,977.00	2,976.06	86.38	69.93	39.51	-149.27	-54.37	6,928.22	6,837.15	91.07	76.073	
12,500.00	6,987.12	2,977.00	2,976.06	87.71	69.93	39.51	-149.27	-54.37	6,995.24	6,903.55	91.70	76.286	
12,600.00	6,987.06	2,977.00	2,976.06	89.06	69.93	39.51	-149.27	-54.37	7,063.05	6,970.74	92.31	76.516	
12,700.00	6,986.99	2,977.00	2,976.06	90.41	69.93	39.51	-149.27	-54.37	7,131.61	7,038.70	92.91	76.761	
12,800.00	6,986.92	2,977.00	2,976.06	91.77	69.93	39.51	-149.27	-54.37	7,200.91	7,107.42	93.49	77.023	
12,900.00	6,986.86	2,977.00	2,976.06	93.14	69.93	39.51	-149.27	-54.37	7,270.92	7,176.86	94.06	77.299	
13,000.00	6,986.79	2,977.00	2,976.06	94.52	69.93	39.51	-149.27	-54.37	7,341.63	7,247.01	94.62	77.591	
13,100.00	6,986.72	2,977.00	2,976.06	95.90	69.93	39.51	-149.27	-54.37	7,413.01	7,317.84	95.17	77.896	
13,200.00	6,986.66	2,977.00	2,976.06	97.30	69.93	39.51	-149.27	-54.37	7,485.04	7,389.35	95.70	78.214	
13,300.00	6,986.59	2,977.00	2,976.06	98.69	69.93	39.51	-149.27	-54.37	7,557.72	7,461.50	96.22	78.546	
13,400.00	6,986.52	2,977.00	2,976.06	100.10	69.93	39.51	-149.27	-54.37	7,631.01	7,534.28	96.73	78.890	
13,500.00	6,986.46	2,977.00	2,976.06	101.51	69.93	39.51	-149.27	-54.37	7,704.90	7,607.67	97.23	79.247	
13,600.00	6,986.39	2,977.00	2,976.06	102.93	69.93	39.51	-149.27	-54.37	7,779.38	7,681.66	97.71	79.615	
13,700.00	6,986.32	2,977.00	2,976.06	104.35	69.93	39.51	-149.27	-54.37	7,854.42	7,756.23	98.19	79.994	
13,800.00	6,986.25	2,977.00	2,976.06	105.78	69.93	39.51	-149.27	-54.37	7,930.01	7,831.36	98.65	80.384	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		359-A027Ua_INC-ONLY							Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)			
13,900.00	6,986.19	2,977.00	2,976.06	107.21	69.93	39.51	-149.27	-54.37	8,006.14	7,907.04	99.11	80.784		
14,000.00	6,986.12	2,977.00	2,976.06	108.65	69.93	39.51	-149.27	-54.37	8,082.79	7,983.24	99.55	81.194		
14,100.00	6,986.05	2,977.00	2,976.06	110.09	69.93	39.51	-149.27	-54.37	8,159.95	8,059.97	99.98	81.614		
14,200.00	6,985.99	2,977.00	2,976.06	111.54	69.93	39.51	-149.27	-54.37	8,237.59	8,137.19	100.41	82.043		
14,300.00	6,985.92	2,977.00	2,976.06	112.99	69.93	39.51	-149.27	-54.37	8,315.72	8,214.90	100.82	82.481		
14,400.00	6,985.85	2,977.00	2,976.06	114.45	69.93	39.51	-149.27	-54.37	8,394.31	8,293.08	101.22	82.928		
14,500.00	6,985.79	2,977.00	2,976.06	115.91	69.93	39.51	-149.27	-54.37	8,473.35	8,371.73	101.62	83.383		
14,600.00	6,985.72	2,977.00	2,976.06	117.38	69.93	39.51	-149.27	-54.37	8,552.82	8,450.82	102.01	83.846		
14,700.00	6,985.65	2,977.00	2,976.06	118.84	69.93	39.51	-149.27	-54.37	8,632.73	8,530.34	102.39	84.316		
14,800.00	6,985.59	2,977.00	2,976.06	120.32	69.93	39.51	-149.27	-54.37	8,713.05	8,610.29	102.76	84.794		
14,900.00	6,985.52	2,977.00	2,976.06	121.79	69.93	39.51	-149.27	-54.37	8,793.77	8,690.65	103.12	85.279		
15,000.00	6,985.45	2,977.00	2,976.06	123.27	69.93	39.51	-149.27	-54.37	8,874.89	8,771.42	103.47	85.771		
15,100.00	6,985.39	2,977.00	2,976.06	124.75	69.93	39.51	-149.27	-54.37	8,956.39	8,852.57	103.82	86.270		
15,200.00	6,985.32	2,977.00	2,976.06	126.24	69.93	39.51	-149.27	-54.37	9,038.25	8,934.10	104.16	86.775		
15,300.00	6,985.25	2,977.00	2,976.06	127.72	69.93	39.51	-149.27	-54.37	9,120.49	9,016.00	104.49	87.286		
15,400.00	6,985.19	2,977.00	2,976.06	129.21	69.93	39.51	-149.27	-54.37	9,203.07	9,098.25	104.81	87.803		
15,500.00	6,985.12	2,977.00	2,976.06	130.71	69.93	39.51	-149.27	-54.37	9,285.99	9,180.86	105.13	88.326		
15,600.00	6,985.05	2,977.00	2,976.06	132.20	69.93	39.51	-149.27	-54.37	9,369.25	9,263.81	105.45	88.854		
15,700.00	6,984.99	2,977.00	2,976.06	133.70	69.93	39.51	-149.27	-54.37	9,452.83	9,347.08	105.75	89.388		
15,800.00	6,984.92	2,977.00	2,976.06	135.20	69.93	39.51	-149.27	-54.37	9,536.73	9,430.68	106.05	89.927		
15,900.00	6,984.85	2,977.00	2,976.06	136.71	69.93	39.51	-149.27	-54.37	9,620.94	9,514.60	106.34	90.470		
16,000.00	6,984.79	2,977.00	2,976.06	138.21	69.93	39.51	-149.27	-54.37	9,705.45	9,598.82	106.63	91.019		
16,100.00	6,984.72	2,977.00	2,976.06	139.72	69.93	39.51	-149.27	-54.37	9,790.25	9,683.33	106.91	91.572		
16,200.00	6,984.65	2,977.00	2,976.06	141.23	69.93	39.51	-149.27	-54.37	9,875.33	9,768.14	107.19	92.129		
16,300.00	6,984.59	2,977.00	2,976.06	142.75	69.93	39.51	-149.27	-54.37	9,960.69	9,853.23	107.46	92.691		
16,400.00	6,984.52	2,977.00	2,976.06	144.26	69.93	39.51	-149.27	-54.37	10,046.32	9,938.59	107.73	93.256		
16,500.00	6,984.45	2,977.00	2,976.06	145.78	69.93	39.51	-149.27	-54.37	10,132.21	10,024.22	107.99	93.826		
16,600.00	6,984.39	2,977.00	2,976.06	147.29	69.93	39.51	-149.27	-54.37	10,218.36	10,110.12	108.25	94.400		
16,700.00	6,984.32	2,977.00	2,976.06	148.82	69.93	39.51	-149.27	-54.37	10,304.76	10,196.27	108.50	94.977		
16,800.00	6,984.25	2,977.00	2,976.06	150.34	69.93	39.51	-149.27	-54.37	10,391.41	10,282.66	108.75	95.558		
16,900.00	6,984.19	2,977.00	2,976.06	151.86	69.93	39.51	-149.27	-54.37	10,478.29	10,369.30	108.99	96.142		
17,000.00	6,984.12	2,977.00	2,976.06	153.39	69.93	39.51	-149.27	-54.37	10,565.41	10,456.18	109.23	96.729		
17,100.00	6,984.05	2,977.00	2,976.06	154.91	69.93	39.51	-149.27	-54.37	10,652.75	10,543.28	109.46	97.320		
17,200.00	6,983.99	2,977.00	2,976.06	156.44	69.93	39.51	-149.27	-54.37	10,740.31	10,630.62	109.69	97.913		
17,300.00	6,983.92	2,977.00	2,976.06	157.97	69.93	39.51	-149.27	-54.37	10,828.08	10,718.17	109.92	98.510		
17,400.00	6,983.85	2,977.00	2,976.06	159.50	69.93	39.51	-149.27	-54.37	10,916.07	10,805.93	110.14	99.109		
17,500.00	6,983.79	2,977.00	2,976.06	161.04	69.93	39.51	-149.27	-54.37	11,004.26	10,893.90	110.36	99.711		
17,600.00	6,983.72	2,977.00	2,976.06	162.57	69.93	39.51	-149.27	-54.37	11,092.66	10,982.08	110.58	100.316		
17,700.00	6,983.65	2,977.00	2,976.06	164.11	69.93	39.51	-149.27	-54.37	11,181.24	11,070.46	110.79	100.923		
17,800.00	6,983.59	2,977.00	2,976.06	165.65	69.93	39.51	-149.27	-54.37	11,270.02	11,159.03	111.00	101.533		
17,900.00	6,983.52	2,977.00	2,976.06	167.18	69.93	39.51	-149.27	-54.37	11,358.99	11,247.78	111.21	102.145		
18,000.00	6,983.45	2,977.00	2,976.06	168.72	69.93	39.51	-149.27	-54.37	11,448.14	11,336.73	111.41	102.759		
18,100.00	6,983.39	2,977.00	2,976.06	170.27	69.93	39.51	-149.27	-54.37	11,537.46	11,425.86	111.61	103.375		
18,200.00	6,983.32	2,977.00	2,976.06	171.81	69.93	39.51	-149.27	-54.37	11,626.96	11,515.16	111.80	103.993		
18,300.00	6,983.25	2,977.00	2,976.06	173.35	69.93	39.51	-149.27	-54.37	11,716.63	11,604.63	112.00	104.614		
18,400.00	6,983.19	2,977.00	2,976.06	174.90	69.93	39.51	-149.27	-54.37	11,806.47	11,694.28	112.19	105.236		
18,500.00	6,983.12	2,977.00	2,976.06	176.44	69.93	39.51	-149.27	-54.37	11,896.47	11,784.09	112.38	105.860		
18,600.00	6,983.05	2,977.00	2,976.06	177.99	69.93	39.51	-149.27	-54.37	11,986.62	11,874.06	112.57	106.486		
18,700.00	6,982.99	2,977.00	2,976.06	179.54	69.93	39.51	-149.27	-54.37	12,076.93	11,964.18	112.75	107.114		
18,800.00	6,982.92	2,977.00	2,976.06	181.09	69.93	39.51	-149.27	-54.37	12,167.40	12,054.47	112.93	107.743		
18,900.00	6,982.85	2,977.00	2,976.06	182.64	69.93	39.51	-149.27	-54.37	12,258.01	12,144.90	113.11	108.373		
19,000.00	6,982.78	2,977.00	2,976.06	184.19	69.93	39.51	-149.27	-54.37	12,348.76	12,235.48	113.29	109.006		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 359-A027Ua_INC-ONLY													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,100.00	6,982.72	2,977.00	2,976.06	185.74	69.93	39.51	-149.27	-54.37	12,439.66	12,326.20	113.46	109.639		
19,200.00	6,982.65	2,977.00	2,976.06	187.29	69.93	39.51	-149.27	-54.37	12,530.70	12,417.06	113.63	110.274		
19,300.00	6,982.58	2,977.00	2,976.06	188.84	69.93	39.51	-149.27	-54.37	12,621.87	12,508.07	113.80	110.910		
19,400.00	6,982.52	2,977.00	2,976.06	190.40	69.93	39.51	-149.27	-54.37	12,713.17	12,599.20	113.97	111.548		
19,500.00	6,982.45	2,977.00	2,976.06	191.95	69.93	39.51	-149.27	-54.37	12,804.61	12,690.47	114.14	112.186		
19,600.00	6,982.38	2,977.00	2,976.06	193.51	69.93	39.51	-149.27	-54.37	12,896.17	12,781.87	114.30	112.826		
19,700.00	6,982.32	2,977.00	2,976.06	195.07	69.93	39.51	-149.27	-54.37	12,987.86	12,873.39	114.46	113.467		
19,800.00	6,982.25	2,977.00	2,976.06	196.62	69.93	39.51	-149.27	-54.37	13,079.66	12,965.04	114.62	114.109		
19,900.00	6,982.18	2,977.00	2,976.06	198.18	69.93	39.51	-149.27	-54.37	13,171.59	13,056.81	114.78	114.752		
20,000.00	6,982.12	2,977.00	2,976.06	199.74	69.93	39.51	-149.27	-54.37	13,263.64	13,148.69	114.94	115.395		
20,100.00	6,982.05	2,977.00	2,976.06	201.30	69.93	39.51	-149.27	-54.37	13,355.79	13,240.70	115.10	116.040		
20,176.02	6,982.00	2,977.00	2,976.06	202.36	69.93	39.51	-149.27	-54.37	13,425.92	13,308.72	117.20	114.552		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336A - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 343-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-110.02	-870.35	-2,388.91	2,543.71				
100.00	100.00	22.00	22.00	0.25	0.41	-110.02	-870.35	-2,388.91	2,542.52	2,541.86	0.66	3,865.201	
200.00	200.00	122.00	122.00	0.61	2.26	-110.02	-870.35	-2,388.91	2,542.52	2,539.65	2.86	887.517	
300.00	300.00	222.00	222.00	0.97	4.10	-110.02	-870.35	-2,388.91	2,542.52	2,537.44	5.07	501.314	
400.00	400.00	322.00	322.00	1.33	5.95	-110.02	-870.35	-2,388.91	2,542.52	2,535.24	7.28	349.311	
500.00	500.00	422.00	422.00	1.68	7.94	-110.02	-870.35	-2,388.91	2,542.52	2,532.89	9.63	264.105	
600.00	600.00	522.00	522.00	2.04	9.97	-110.02	-870.35	-2,388.91	2,542.52	2,530.50	12.01	211.654	
669.48	669.47	591.48	591.47	2.29	11.38	-100.02	-869.81	-2,388.91	2,542.48	2,528.81	13.67	185.994 CC	
700.00	699.98	621.52	621.52	2.40	11.99	-100.04	-869.82	-2,388.91	2,542.64	2,528.25	14.39	176.719	
800.00	799.84	719.87	719.86	2.76	13.98	-100.14	-869.96	-2,388.91	2,543.60	2,526.86	16.74	151.951	
900.00	899.45	817.95	817.94	3.13	15.97	-100.30	-870.26	-2,388.91	2,545.26	2,526.17	19.09	133.344	
1,000.00	998.70	920.77	920.70	3.49	18.32	-100.53	-870.35	-2,388.91	2,547.51	2,525.71	21.80	116.841 ES	
1,100.00	1,097.47	1,019.53	1,019.47	3.86	20.65	-100.82	-870.35	-2,388.91	2,550.45	2,525.94	24.50	104.084	
1,200.00	1,195.62	1,116.16	1,116.08	4.24	22.92	-101.13	-869.07	-2,388.91	2,553.68	2,526.52	27.17	94.004	
1,300.00	1,293.06	1,209.54	1,209.45	4.64	25.12	-101.50	-869.43	-2,388.91	2,558.35	2,528.59	29.77	85.950	
1,400.00	1,389.64	1,301.91	1,301.81	5.06	27.30	-101.93	-870.16	-2,388.91	2,564.10	2,531.74	32.36	79.239	
1,500.00	1,485.27	1,407.47	1,407.27	5.50	29.66	-102.48	-870.35	-2,388.91	2,570.62	2,535.46	35.16	73.110	
1,515.00	1,499.52	1,421.73	1,421.52	5.57	29.98	-102.55	-870.35	-2,388.91	2,571.68	2,536.14	35.54	72.352	
1,600.00	1,580.22	1,502.43	1,502.22	5.96	31.76	-103.10	-870.35	-2,388.91	2,577.91	2,540.19	37.72	68.345	
1,700.00	1,675.17	1,595.92	1,595.70	6.44	33.83	-103.71	-868.74	-2,388.91	2,584.89	2,544.64	40.25	64.213	
1,800.00	1,770.11	1,685.69	1,685.45	6.92	35.82	-104.32	-869.07	-2,388.91	2,593.04	2,550.32	42.72	60.705	
1,900.00	1,865.05	1,775.20	1,774.95	7.41	37.80	-104.94	-869.82	-2,388.91	2,601.74	2,556.57	45.18	57.592	
2,000.00	1,959.99	1,882.30	1,881.99	7.90	39.96	-105.66	-870.35	-2,388.91	2,610.67	2,562.85	47.82	54.594	
2,100.00	2,054.94	1,977.24	1,976.94	8.40	41.74	-106.29	-870.35	-2,388.91	2,619.73	2,569.65	50.09	52.305	
2,200.00	2,149.88	2,072.18	2,071.88	8.90	43.52	-106.92	-870.35	-2,388.91	2,629.14	2,576.79	52.35	50.219	
2,300.00	2,244.82	2,165.56	2,165.24	9.41	45.27	-107.52	-869.44	-2,388.91	2,638.46	2,583.87	54.59	48.329	
2,400.00	2,339.76	2,257.79	2,257.48	9.92	47.00	-108.12	-869.65	-2,388.91	2,648.64	2,591.83	56.81	46.620	
2,500.00	2,434.71	2,349.91	2,349.59	10.43	48.73	-108.72	-870.05	-2,388.91	2,659.26	2,600.23	59.03	45.048	
2,600.00	2,529.65	2,451.99	2,451.65	10.94	50.69	-109.38	-870.35	-2,388.91	2,670.15	2,608.66	61.49	43.427	
2,700.00	2,624.59	2,545.31	2,544.97	11.45	52.52	-109.97	-870.12	-2,388.91	2,681.10	2,617.29	63.81	42.017	
2,800.00	2,719.53	2,641.89	2,641.53	11.97	54.46	-110.59	-870.35	-2,388.91	2,692.61	2,626.37	66.24	40.649	
2,900.00	2,814.48	2,736.84	2,736.48	12.49	56.63	-111.18	-870.35	-2,388.91	2,704.32	2,635.42	68.91	39.247	
3,000.00	2,909.42	2,809.00	2,808.60	13.01	58.29	-111.63	-870.35	-2,388.91	2,716.44	2,645.40	71.04	38.238	
3,100.00	3,004.36	2,809.00	2,808.60	13.53	58.29	-111.63	-870.35	-2,388.91	2,731.22	2,659.78	71.44	38.230 SF	
3,200.00	3,099.30	2,809.00	2,808.60	14.05	58.29	-111.63	-870.35	-2,388.91	2,749.55	2,677.80	71.76	38.318	
3,300.00	3,194.25	2,809.00	2,808.60	14.57	58.29	-111.63	-870.35	-2,388.91	2,771.38	2,699.39	71.99	38.498	
3,400.00	3,289.19	2,809.00	2,808.60	15.09	58.29	-111.63	-870.35	-2,388.91	2,796.61	2,724.47	72.14	38.768	
3,500.00	3,384.13	2,809.00	2,808.60	15.62	58.29	-111.63	-870.35	-2,388.91	2,825.16	2,752.95	72.21	39.124	
3,600.00	3,479.07	2,809.00	2,808.60	16.14	58.29	-111.63	-870.35	-2,388.91	2,856.92	2,784.71	72.21	39.564	
3,700.00	3,574.02	2,809.00	2,808.60	16.67	58.29	-111.63	-870.35	-2,388.91	2,891.80	2,819.65	72.14	40.084	
3,800.00	3,668.96	2,809.00	2,808.60	17.19	58.29	-111.63	-870.35	-2,388.91	2,929.67	2,857.66	72.02	40.681	
3,900.00	3,763.90	2,809.00	2,808.60	17.72	58.29	-111.63	-870.35	-2,388.91	2,970.43	2,898.60	71.83	41.353	
4,000.00	3,858.84	2,809.00	2,808.60	18.24	58.29	-111.63	-870.35	-2,388.91	3,013.96	2,942.37	71.59	42.097	
4,100.00	3,953.79	2,809.00	2,808.60	18.77	58.29	-111.63	-870.35	-2,388.91	3,060.14	2,988.83	71.31	42.911	
4,200.00	4,048.73	2,809.00	2,808.60	19.30	58.29	-111.63	-870.35	-2,388.91	3,108.85	3,037.86	70.99	43.791	
4,300.00	4,143.67	2,809.00	2,808.60	19.82	58.29	-111.63	-870.35	-2,388.91	3,159.97	3,089.33	70.64	44.735	
4,400.00	4,238.61	2,809.00	2,808.60	20.35	58.29	-111.63	-870.35	-2,388.91	3,213.40	3,143.14	70.25	45.740	
4,500.00	4,333.56	2,809.00	2,808.60	20.88	58.29	-111.63	-870.35	-2,388.91	3,269.01	3,199.16	69.85	46.804	
4,600.00	4,428.50	2,809.00	2,808.60	21.41	58.29	-111.63	-870.35	-2,388.91	3,326.69	3,257.28	69.42	47.924	
4,700.00	4,523.44	2,809.00	2,808.60	21.93	58.29	-111.63	-870.35	-2,388.91	3,386.35	3,317.38	68.97	49.098	
4,800.00	4,618.38	2,809.00	2,808.60	22.46	58.29	-111.63	-870.35	-2,388.91	3,447.88	3,379.37	68.51	50.324	
4,900.00	4,713.33	2,809.00	2,808.60	22.99	58.29	-111.63	-870.35	-2,388.91	3,511.18	3,443.13	68.05	51.599	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336A - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		343-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
5,000.00	4,808.27	2,809.00	2,808.60	23.52	58.29	-111.63	-870.35	-2,388.91	3,576.15	3,508.58	67.57	52.921	
5,100.00	4,903.21	2,809.00	2,808.60	24.05	58.29	-111.63	-870.35	-2,388.91	3,642.71	3,575.61	67.10	54.288	
5,200.00	4,998.16	2,809.00	2,808.60	24.58	58.29	-111.63	-870.35	-2,388.91	3,710.77	3,644.15	66.62	55.698	
5,300.00	5,093.10	2,809.00	2,808.60	25.11	58.29	-111.63	-870.35	-2,388.91	3,780.25	3,714.11	66.15	57.148	
5,400.00	5,188.04	2,809.00	2,808.60	25.64	58.29	-111.63	-870.35	-2,388.91	3,851.08	3,785.40	65.68	58.636	
5,500.00	5,282.98	2,809.00	2,808.60	26.17	58.29	-111.63	-870.35	-2,388.91	3,923.18	3,857.96	65.21	60.161	
5,600.00	5,377.93	2,809.00	2,808.60	26.70	58.29	-111.63	-870.35	-2,388.91	3,996.47	3,931.72	64.75	61.720	
5,623.25	5,400.00	2,809.00	2,808.60	26.82	58.29	-111.63	-870.35	-2,388.91	4,013.68	3,949.03	64.65	62.087	
5,700.00	5,473.03	2,809.00	2,808.60	27.22	58.29	-112.43	-870.35	-2,388.91	4,070.78	4,006.49	64.29	63.315	
5,800.00	5,568.64	2,809.00	2,808.60	27.73	58.29	-113.47	-870.35	-2,388.91	4,145.74	4,081.91	63.83	64.951	
5,900.00	5,664.75	2,809.00	2,808.60	28.23	58.29	-114.52	-870.35	-2,388.91	4,221.30	4,157.94	63.36	66.628	
6,000.00	5,761.33	2,809.00	2,808.60	28.71	58.29	-115.58	-870.35	-2,388.91	4,297.38	4,234.50	62.88	68.345	
6,100.00	5,858.34	2,809.00	2,808.60	29.18	58.29	-116.65	-870.35	-2,388.91	4,373.95	4,311.56	62.39	70.102	
6,200.00	5,955.76	2,809.00	2,808.60	29.64	58.29	-117.73	-870.35	-2,388.91	4,450.96	4,389.05	61.91	71.898	
6,300.00	6,053.57	2,809.00	2,808.60	30.07	58.29	-118.80	-870.35	-2,388.91	4,528.36	4,466.95	61.42	73.733	
6,400.00	6,151.72	2,809.00	2,808.60	30.50	58.29	-119.88	-870.35	-2,388.91	4,606.11	4,545.19	60.92	75.607	
6,500.00	6,250.19	2,809.00	2,808.60	30.91	58.29	-120.96	-870.35	-2,388.91	4,684.16	4,623.74	60.43	77.518	
6,600.00	6,348.94	2,809.00	2,808.60	31.30	58.29	-122.03	-870.35	-2,388.91	4,762.49	4,702.56	59.93	79.467	
6,659.67	6,408.00	2,809.00	2,808.60	31.53	58.29	-122.67	-870.35	-2,388.91	4,809.34	4,749.71	59.63	80.648	
6,700.00	6,447.82	2,809.00	2,808.60	31.68	58.29	-138.96	-870.35	-2,388.91	4,841.86	4,782.41	59.45	81.445	
6,750.00	6,496.66	2,809.00	2,808.60	31.90	58.29	-149.93	-870.35	-2,388.91	4,884.30	4,825.04	59.26	82.422	
6,800.00	6,544.65	2,809.00	2,808.60	32.13	58.29	-155.86	-870.35	-2,388.91	4,928.80	4,869.69	59.11	83.387	
6,850.00	6,591.49	2,809.00	2,808.60	32.37	58.29	-159.19	-870.35	-2,388.91	4,975.02	4,916.03	58.99	84.333	
6,900.00	6,636.89	2,809.00	2,808.60	32.62	58.29	-160.84	-870.35	-2,388.91	5,022.65	4,963.74	58.91	85.255	
6,950.00	6,680.57	2,809.00	2,808.60	32.89	58.29	-160.85	-870.35	-2,388.91	5,071.34	5,012.47	58.87	86.145	
7,000.00	6,722.26	2,809.00	2,808.60	33.17	58.29	-157.59	-870.35	-2,388.91	5,120.79	5,061.92	58.86	86.998	
7,050.00	6,761.71	2,809.00	2,808.60	33.45	58.29	-132.51	-870.35	-2,388.91	5,170.65	5,111.76	58.89	87.808	
7,100.00	6,798.67	2,809.00	2,808.60	33.75	58.29	-12.67	-870.35	-2,388.91	5,220.62	5,161.68	58.94	88.570	
7,150.00	6,832.91	2,809.00	2,808.60	34.06	58.29	-0.39	-870.35	-2,388.91	5,270.40	5,211.36	59.03	89.278	
7,200.00	6,864.22	2,809.00	2,808.60	34.37	58.29	2.46	-870.35	-2,388.91	5,319.68	5,260.52	59.15	89.930	
7,250.00	6,892.42	2,809.00	2,808.60	34.69	58.29	3.57	-870.35	-2,388.91	5,368.18	5,308.87	59.30	90.520	
7,300.00	6,917.32	2,809.00	2,808.60	35.03	58.29	4.11	-870.35	-2,388.91	5,415.62	5,356.14	59.48	91.046	
7,350.00	6,938.77	2,809.00	2,808.60	35.37	58.29	4.40	-870.35	-2,388.91	5,461.75	5,402.06	59.69	91.502	
7,400.00	6,956.64	2,809.00	2,808.60	35.72	58.29	4.57	-870.35	-2,388.91	5,506.31	5,446.38	59.92	91.887	
7,450.00	6,970.83	2,809.00	2,808.60	36.07	58.29	4.70	-870.35	-2,388.91	5,549.07	5,488.89	60.19	92.198	
7,500.00	6,981.23	2,809.00	2,808.60	36.44	58.29	4.80	-870.35	-2,388.91	5,589.82	5,529.35	60.48	92.431	
7,550.00	6,987.80	2,809.00	2,808.60	36.81	58.29	4.89	-870.35	-2,388.91	5,628.35	5,567.56	60.79	92.586	
7,600.00	6,990.48	2,809.00	2,808.60	37.19	58.29	5.00	-870.35	-2,388.91	5,664.47	5,603.34	61.13	92.661	
7,609.87	6,990.55	2,809.00	2,808.60	37.26	58.29	5.02	-870.35	-2,388.91	5,671.29	5,610.10	61.20	92.672	
7,700.00	6,990.49	2,809.00	2,808.60	37.97	58.29	5.02	-870.35	-2,388.91	5,733.57	5,671.71	61.85	92.694	
7,800.00	6,990.42	2,809.00	2,808.60	38.78	58.29	5.02	-870.35	-2,388.91	5,803.51	5,740.94	62.57	92.751	
7,900.00	6,990.35	2,809.00	2,808.60	39.64	58.29	5.02	-870.35	-2,388.91	5,874.33	5,811.05	63.27	92.841	
8,000.00	6,990.28	2,809.00	2,808.60	40.53	58.29	5.02	-870.35	-2,388.91	5,945.98	5,882.02	63.96	92.964	
8,100.00	6,990.21	2,809.00	2,808.60	41.45	58.29	5.02	-870.35	-2,388.91	6,018.44	5,953.81	64.63	93.118	
8,200.00	6,990.14	2,809.00	2,808.60	42.40	58.29	5.02	-870.35	-2,388.91	6,091.69	6,026.40	65.29	93.301	
8,306.37	6,990.06	2,809.00	2,808.60	43.45	58.29	5.02	-870.35	-2,388.91	6,170.41	6,104.44	65.97	93.528	
8,400.00	6,990.00	2,809.00	2,808.60	44.38	58.29	9.17	-870.35	-2,388.91	6,240.17	6,173.62	66.55	93.760	
8,500.00	6,989.93	2,809.00	2,808.60	45.36	58.29	13.55	-870.35	-2,388.91	6,314.64	6,247.49	67.14	94.046	
8,600.00	6,989.85	2,809.00	2,808.60	46.33	58.29	17.80	-870.35	-2,388.91	6,388.71	6,321.01	67.70	94.364	
8,700.00	6,989.78	2,809.00	2,808.60	47.28	58.29	21.86	-870.35	-2,388.91	6,462.07	6,393.83	68.23	94.708	
8,800.00	6,989.70	2,809.00	2,808.60	48.21	58.29	25.69	-870.35	-2,388.91	6,534.37	6,465.63	68.73	95.071	
8,900.00	6,989.63	2,809.00	2,808.60	49.11	58.29	29.27	-870.35	-2,388.91	6,605.30	6,536.09	69.21	95.445	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336A - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 343-A027Ua_INC-ONLY				Offset				Rule Assigned:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,000.00	6,989.55	2,809.00	2,808.60	49.99	58.29	32.56	-870.35	-2,388.91	6,674.57	6,604.92	69.66	95.823	
9,100.00	6,989.48	2,809.00	2,808.60	50.84	58.29	35.58	-870.35	-2,388.91	6,741.90	6,671.82	70.08	96.198	
9,200.00	6,989.40	2,809.00	2,808.60	51.66	58.29	38.33	-870.35	-2,388.91	6,807.02	6,736.53	70.49	96.561	
9,300.00	6,989.33	2,809.00	2,808.60	52.45	58.29	40.81	-870.35	-2,388.91	6,869.68	6,798.79	70.89	96.905	
9,393.87	6,989.27	2,809.00	2,808.60	53.15	58.29	42.92	-870.35	-2,388.91	6,926.05	6,854.80	71.25	97.206	
9,400.00	6,989.26	2,809.00	2,808.60	53.20	58.29	42.92	-870.35	-2,388.91	6,929.66	6,858.38	71.27	97.228	
9,500.00	6,989.19	2,809.00	2,808.60	53.95	58.29	42.92	-870.35	-2,388.91	6,988.91	6,917.25	71.66	97.525	
9,600.00	6,989.12	2,809.00	2,808.60	54.73	58.29	42.92	-870.35	-2,388.91	7,049.08	6,977.02	72.06	97.819	
9,700.00	6,989.05	2,809.00	2,808.60	55.55	58.29	42.92	-870.35	-2,388.91	7,110.15	7,037.68	72.47	98.111	
9,800.00	6,988.98	2,809.00	2,808.60	56.40	58.29	42.92	-870.35	-2,388.91	7,172.09	7,099.21	72.89	98.401	
9,900.00	6,988.91	2,809.00	2,808.60	57.28	58.29	42.92	-870.35	-2,388.91	7,234.89	7,161.58	73.31	98.692	
10,000.00	6,988.84	2,809.00	2,808.60	58.20	58.29	42.92	-870.35	-2,388.91	7,298.52	7,224.78	73.73	98.984	
10,100.00	6,988.77	2,809.00	2,808.60	59.14	58.29	42.92	-870.35	-2,388.91	7,362.95	7,288.79	74.16	99.279	
10,200.00	6,988.70	2,809.00	2,808.60	60.11	58.29	42.92	-870.35	-2,388.91	7,428.17	7,353.57	74.60	99.576	
10,300.00	6,988.63	2,809.00	2,808.60	61.11	58.29	42.92	-870.35	-2,388.91	7,494.16	7,419.13	75.03	99.877	
10,400.00	6,988.56	2,809.00	2,808.60	62.14	58.29	42.92	-870.35	-2,388.91	7,560.89	7,485.42	75.47	100.183	
10,500.00	6,988.49	2,809.00	2,808.60	63.19	58.29	42.92	-870.35	-2,388.91	7,628.36	7,552.45	75.91	100.494	
10,600.00	6,988.42	2,809.00	2,808.60	64.26	58.29	42.92	-870.35	-2,388.91	7,696.53	7,620.18	76.35	100.810	
10,700.00	6,988.35	2,809.00	2,808.60	65.36	58.29	42.92	-870.35	-2,388.91	7,765.39	7,688.60	76.78	101.133	
10,800.00	6,988.28	2,809.00	2,808.60	66.48	58.29	42.92	-870.35	-2,388.91	7,834.92	7,757.70	77.22	101.461	
10,900.00	6,988.21	2,809.00	2,808.60	67.61	58.29	42.92	-870.35	-2,388.91	7,905.10	7,827.45	77.66	101.797	
11,000.00	6,988.14	2,809.00	2,808.60	68.77	58.29	42.92	-870.35	-2,388.91	7,975.92	7,897.83	78.09	102.139	
11,100.00	6,988.07	2,809.00	2,808.60	69.95	58.29	42.92	-870.35	-2,388.91	8,047.36	7,968.84	78.52	102.489	
11,200.00	6,988.01	2,809.00	2,808.60	71.14	58.29	42.92	-870.35	-2,388.91	8,119.40	8,040.46	78.95	102.846	
11,300.00	6,987.94	2,809.00	2,808.60	72.35	58.29	42.92	-870.35	-2,388.91	8,192.03	8,112.66	79.37	103.211	
11,400.00	6,987.87	2,809.00	2,808.60	73.57	58.29	42.92	-870.35	-2,388.91	8,265.24	8,185.44	79.79	103.583	
11,500.00	6,987.80	2,809.00	2,808.60	74.81	58.29	42.92	-870.35	-2,388.91	8,338.99	8,258.78	80.21	103.963	
11,600.00	6,987.73	2,809.00	2,808.60	76.07	58.29	42.92	-870.35	-2,388.91	8,413.29	8,332.67	80.63	104.350	
11,643.87	6,987.70	2,809.00	2,808.60	76.62	58.29	42.92	-870.35	-2,388.91	8,446.05	8,365.25	80.81	104.523	
11,700.00	6,987.66	2,809.00	2,808.60	77.33	58.29	43.83	-870.35	-2,388.91	8,487.87	8,406.84	81.03	104.743	
11,737.27	6,987.63	2,809.00	2,808.60	77.80	58.29	44.42	-870.35	-2,388.91	8,515.45	8,434.26	81.19	104.887	
11,800.00	6,987.59	2,809.00	2,808.60	78.59	58.29	44.42	-870.35	-2,388.91	8,561.84	8,480.40	81.44	105.127	
11,900.00	6,987.52	2,809.00	2,808.60	79.86	58.29	44.42	-870.35	-2,388.91	8,636.22	8,554.37	81.85	105.515	
12,000.00	6,987.46	2,809.00	2,808.60	81.14	58.29	44.42	-870.35	-2,388.91	8,711.11	8,628.86	82.25	105.909	
12,100.00	6,987.39	2,809.00	2,808.60	82.43	58.29	44.42	-870.35	-2,388.91	8,786.50	8,703.85	82.65	106.312	
12,200.00	6,987.32	2,809.00	2,808.60	83.73	58.29	44.42	-870.35	-2,388.91	8,862.38	8,779.33	83.04	106.721	
12,300.00	6,987.26	2,809.00	2,808.60	85.05	58.29	44.42	-870.35	-2,388.91	8,938.73	8,855.30	83.43	107.138	
12,400.00	6,987.19	2,809.00	2,808.60	86.38	58.29	44.42	-870.35	-2,388.91	9,015.54	8,931.73	83.82	107.562	
12,500.00	6,987.12	2,809.00	2,808.60	87.71	58.29	44.42	-870.35	-2,388.91	9,092.81	9,008.61	84.20	107.993	
12,600.00	6,987.06	2,809.00	2,808.60	89.06	58.29	44.42	-870.35	-2,388.91	9,170.52	9,085.94	84.57	108.431	
12,700.00	6,986.99	2,809.00	2,808.60	90.41	58.29	44.42	-870.35	-2,388.91	9,248.65	9,163.70	84.95	108.876	
12,800.00	6,986.92	2,809.00	2,808.60	91.77	58.29	44.42	-870.35	-2,388.91	9,327.20	9,241.89	85.31	109.328	
12,900.00	6,986.86	2,809.00	2,808.60	93.14	58.29	44.42	-870.35	-2,388.91	9,406.16	9,320.48	85.68	109.787	
13,000.00	6,986.79	2,809.00	2,808.60	94.52	58.29	44.42	-870.35	-2,388.91	9,485.52	9,399.48	86.03	110.252	
13,100.00	6,986.72	2,809.00	2,808.60	95.90	58.29	44.42	-870.35	-2,388.91	9,565.26	9,478.87	86.39	110.724	
13,200.00	6,986.66	2,809.00	2,808.60	97.30	58.29	44.42	-870.35	-2,388.91	9,645.38	9,558.64	86.74	111.202	
13,300.00	6,986.59	2,809.00	2,808.60	98.69	58.29	44.42	-870.35	-2,388.91	9,725.87	9,638.79	87.08	111.686	
13,400.00	6,986.52	2,809.00	2,808.60	100.10	58.29	44.42	-870.35	-2,388.91	9,806.72	9,719.29	87.42	112.176	
13,500.00	6,986.46	2,809.00	2,808.60	101.51	58.29	44.42	-870.35	-2,388.91	9,887.91	9,800.16	87.76	112.672	
13,600.00	6,986.39	2,809.00	2,808.60	102.93	58.29	44.42	-870.35	-2,388.91	9,969.45	9,881.36	88.09	113.174	
13,700.00	6,986.32	2,809.00	2,808.60	104.35	58.29	44.42	-870.35	-2,388.91	10,051.33	9,962.91	88.42	113.681	
13,800.00	6,986.25	2,809.00	2,808.60	105.78	58.29	44.42	-870.35	-2,388.91	10,133.52	10,044.79	88.74	114.194	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336A - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		343-A027Ua_INC-ONLY					Rule Assigned:						Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Distance Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,900.00	6,986.19	2,809.00	2,808.60	107.21	58.29	44.42	-870.35	-2,388.91	10,216.04	10,126.98	89.06	114.712		
14,000.00	6,986.12	2,809.00	2,808.60	108.65	58.29	44.42	-870.35	-2,388.91	10,298.87	10,209.49	89.37	115.236		
14,100.00	6,986.05	2,809.00	2,808.60	110.09	58.29	44.42	-870.35	-2,388.91	10,381.99	10,292.31	89.68	115.764		
14,200.00	6,985.99	2,809.00	2,808.60	111.54	58.29	44.42	-870.35	-2,388.91	10,465.42	10,375.43	89.99	116.298		
14,300.00	6,985.92	2,809.00	2,808.60	112.99	58.29	44.42	-870.35	-2,388.91	10,549.13	10,458.84	90.29	116.836		
14,400.00	6,985.85	2,809.00	2,808.60	114.45	58.29	44.42	-870.35	-2,388.91	10,633.12	10,542.54	90.59	117.379		
14,500.00	6,985.79	2,809.00	2,808.60	115.91	58.29	44.42	-870.35	-2,388.91	10,717.39	10,626.51	90.88	117.927		
14,600.00	6,985.72	2,809.00	2,808.60	117.38	58.29	44.42	-870.35	-2,388.91	10,801.93	10,710.76	91.17	118.479		
14,700.00	6,985.65	2,809.00	2,808.60	118.84	58.29	44.42	-870.35	-2,388.91	10,886.73	10,795.27	91.46	119.035		
14,800.00	6,985.59	2,809.00	2,808.60	120.32	58.29	44.42	-870.35	-2,388.91	10,971.78	10,880.04	91.74	119.595		
14,900.00	6,985.52	2,809.00	2,808.60	121.79	58.29	44.42	-870.35	-2,388.91	11,057.08	10,965.06	92.02	120.160		
15,000.00	6,985.45	2,809.00	2,808.60	123.27	58.29	44.42	-870.35	-2,388.91	11,142.63	11,050.34	92.30	120.728		
15,100.00	6,985.39	2,809.00	2,808.60	124.75	58.29	44.42	-870.35	-2,388.91	11,228.42	11,135.85	92.57	121.300		
15,200.00	6,985.32	2,809.00	2,808.60	126.24	58.29	44.42	-870.35	-2,388.91	11,314.44	11,221.61	92.84	121.876		
15,300.00	6,985.25	2,809.00	2,808.60	127.72	58.29	44.42	-870.35	-2,388.91	11,400.69	11,307.59	93.10	122.456		
15,400.00	6,985.19	2,809.00	2,808.60	129.21	58.29	44.42	-870.35	-2,388.91	11,487.16	11,393.80	93.36	123.039		
15,500.00	6,985.12	2,809.00	2,808.60	130.71	58.29	44.42	-870.35	-2,388.91	11,573.85	11,480.23	93.62	123.626		
15,600.00	6,985.05	2,809.00	2,808.60	132.20	58.29	44.42	-870.35	-2,388.91	11,660.76	11,566.88	93.88	124.215		
15,700.00	6,984.99	2,809.00	2,808.60	133.70	58.29	44.42	-870.35	-2,388.91	11,747.87	11,653.74	94.13	124.808		
15,800.00	6,984.92	2,809.00	2,808.60	135.20	58.29	44.42	-870.35	-2,388.91	11,835.18	11,740.81	94.38	125.404		
15,900.00	6,984.85	2,809.00	2,808.60	136.71	58.29	44.42	-870.35	-2,388.91	11,922.70	11,828.08	94.62	126.003		
16,000.00	6,984.79	2,809.00	2,808.60	138.21	58.29	44.42	-870.35	-2,388.91	12,010.41	11,915.54	94.86	126.605		
16,100.00	6,984.72	2,809.00	2,808.60	139.72	58.29	44.42	-870.35	-2,388.91	12,098.31	12,003.20	95.10	127.210		
16,200.00	6,984.65	2,809.00	2,808.60	141.23	58.29	44.42	-870.35	-2,388.91	12,186.40	12,091.05	95.34	127.818		
16,300.00	6,984.59	2,809.00	2,808.60	142.75	58.29	44.42	-870.35	-2,388.91	12,274.66	12,179.09	95.58	128.428		
16,400.00	6,984.52	2,809.00	2,808.60	144.26	58.29	44.42	-870.35	-2,388.91	12,363.11	12,267.30	95.81	129.040		
16,500.00	6,984.45	2,809.00	2,808.60	145.78	58.29	44.42	-870.35	-2,388.91	12,451.74	12,355.70	96.04	129.655		
16,600.00	6,984.39	2,809.00	2,808.60	147.29	58.29	44.42	-870.35	-2,388.91	12,540.53	12,444.27	96.26	130.273		
16,700.00	6,984.32	2,809.00	2,808.60	148.82	58.29	44.42	-870.35	-2,388.91	12,629.49	12,533.00	96.49	130.893		
16,800.00	6,984.25	2,809.00	2,808.60	150.34	58.29	44.42	-870.35	-2,388.91	12,718.62	12,621.91	96.71	131.515		
16,900.00	6,984.19	2,809.00	2,808.60	151.86	58.29	44.42	-870.35	-2,388.91	12,807.90	12,710.97	96.93	132.139		
17,000.00	6,984.12	2,809.00	2,808.60	153.39	58.29	44.42	-870.35	-2,388.91	12,897.35	12,800.20	97.14	132.765		
17,100.00	6,984.05	2,809.00	2,808.60	154.91	58.29	44.42	-870.35	-2,388.91	12,986.94	12,889.58	97.36	133.393		
17,200.00	6,983.99	2,809.00	2,808.60	156.44	58.29	44.42	-870.35	-2,388.91	13,076.69	12,979.12	97.57	134.023		
17,300.00	6,983.92	2,809.00	2,808.60	157.97	58.29	44.42	-870.35	-2,388.91	13,166.59	13,068.81	97.78	134.655		
17,400.00	6,983.85	2,809.00	2,808.60	159.50	58.29	44.42	-870.35	-2,388.91	13,256.63	13,158.64	97.99	135.289		
17,500.00	6,983.79	2,809.00	2,808.60	161.04	58.29	44.42	-870.35	-2,388.91	13,346.81	13,248.62	98.19	135.924		
17,600.00	6,983.72	2,809.00	2,808.60	162.57	58.29	44.42	-870.35	-2,388.91	13,437.13	13,338.74	98.40	136.562		
17,700.00	6,983.65	2,809.00	2,808.60	164.11	58.29	44.42	-870.35	-2,388.91	13,527.59	13,428.99	98.60	137.200		
17,800.00	6,983.59	2,809.00	2,808.60	165.65	58.29	44.42	-870.35	-2,388.91	13,618.18	13,519.38	98.80	137.841		
17,900.00	6,983.52	2,809.00	2,808.60	167.18	58.29	44.42	-870.35	-2,388.91	13,708.90	13,609.91	98.99	138.482		
18,000.00	6,983.45	2,809.00	2,808.60	168.72	58.29	44.42	-870.35	-2,388.91	13,799.75	13,700.56	99.19	139.125		
18,100.00	6,983.39	2,809.00	2,808.60	170.27	58.29	44.42	-870.35	-2,388.91	13,890.73	13,791.35	99.38	139.770		
18,200.00	6,983.32	2,809.00	2,808.60	171.81	58.29	44.42	-870.35	-2,388.91	13,981.83	13,882.25	99.57	140.416		
18,300.00	6,983.25	2,809.00	2,808.60	173.35	58.29	44.42	-870.35	-2,388.91	14,073.05	13,973.28	99.76	141.063		
18,400.00	6,983.19	2,809.00	2,808.60	174.90	58.29	44.42	-870.35	-2,388.91	14,164.39	14,064.43	99.95	141.711		
18,500.00	6,983.12	2,809.00	2,808.60	176.44	58.29	44.42	-870.35	-2,388.91	14,255.84	14,155.70	100.14	142.361		
18,600.00	6,983.05	2,809.00	2,808.60	177.99	58.29	44.42	-870.35	-2,388.91	14,347.41	14,247.08	100.32	143.011		
18,700.00	6,982.99	2,809.00	2,808.60	179.54	58.29	44.42	-870.35	-2,388.91	14,439.09	14,338.58	100.51	143.663		
18,800.00	6,982.92	2,809.00	2,808.60	181.09	58.29	44.42	-870.35	-2,388.91	14,530.88	14,430.19	100.69	144.315		
18,900.00	6,982.85	2,809.00	2,808.60	182.64	58.29	44.42	-870.35	-2,388.91	14,622.78	14,521.91	100.87	144.969		
19,000.00	6,982.78	2,809.00	2,808.60	184.19	58.29	44.42	-870.35	-2,388.91	14,714.78	14,613.73	101.05	145.623		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #336A - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 343-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,100.00	6,982.72	2,809.00	2,808.60	185.74	58.29	44.42	-870.35	-2,388.91	14,806.89	14,705.66	101.22	146.278	
19,200.00	6,982.65	2,809.00	2,808.60	187.29	58.29	44.42	-870.35	-2,388.91	14,899.10	14,797.70	101.40	146.935	
19,300.00	6,982.58	2,809.00	2,808.60	188.84	58.29	44.42	-870.35	-2,388.91	14,991.41	14,889.83	101.57	147.591	
19,400.00	6,982.52	2,809.00	2,808.60	190.40	58.29	44.42	-870.35	-2,388.91	15,083.81	14,982.07	101.75	148.249	
19,500.00	6,982.45	2,809.00	2,808.60	191.95	58.29	44.42	-870.35	-2,388.91	15,176.32	15,074.40	101.92	148.907	
19,600.00	6,982.38	2,809.00	2,808.60	193.51	58.29	44.42	-870.35	-2,388.91	15,268.91	15,166.83	102.09	149.566	
19,700.00	6,982.32	2,809.00	2,808.60	195.07	58.29	44.42	-870.35	-2,388.91	15,361.61	15,259.35	102.26	150.226	
19,800.00	6,982.25	2,809.00	2,808.60	196.62	58.29	44.42	-870.35	-2,388.91	15,454.39	15,351.96	102.42	150.886	
19,900.00	6,982.18	2,809.00	2,808.60	198.18	58.29	44.42	-870.35	-2,388.91	15,547.26	15,444.67	102.59	151.547	
20,000.00	6,982.12	2,809.00	2,808.60	199.74	58.29	44.42	-870.35	-2,388.91	15,640.22	15,537.46	102.76	152.208	
20,100.00	6,982.05	2,809.00	2,808.60	201.30	58.29	44.42	-870.35	-2,388.91	15,733.26	15,630.34	102.92	152.870	
20,176.02	6,982.00	2,809.00	2,808.60	202.36	58.29	44.42	-870.35	-2,388.91	15,804.05	15,698.78	105.27	150.126	

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #350A - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 100-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	284.11	284.10	0.00	1.81	89.28	90.70	7,259.39	7,259.99				
100.00	100.00	365.31	365.30	0.25	2.14	89.28	91.11	7,259.73	7,260.42	7,258.11	2.31	3,142.968	
200.00	200.00	428.26	428.25	0.61	2.37	89.28	91.25	7,260.19	7,261.18	7,258.29	2.89	2,508.913	
300.00	300.00	500.00	499.98	0.97	2.61	89.28	91.18	7,261.33	7,262.67	7,259.17	3.50	2,075.698	
400.00	400.00	542.05	542.02	1.33	2.74	89.28	91.11	7,262.24	7,264.66	7,260.67	4.00	1,817.071	
500.00	500.00	600.00	599.95	1.68	2.93	89.28	91.17	7,263.62	7,267.11	7,262.56	4.55	1,597.187	
600.00	600.00	669.41	669.33	2.04	3.16	89.28	91.29	7,265.61	7,270.03	7,264.90	5.14	1,414.918	
700.00	699.98	700.00	699.91	2.40	3.26	99.20	91.31	7,266.65	7,273.95	7,268.36	5.60	1,299.714	
800.00	799.84	765.54	765.39	2.76	3.47	99.13	91.19	7,269.37	7,279.03	7,272.86	6.17	1,179.079	
900.00	899.45	800.00	799.81	3.13	3.59	99.02	91.02	7,271.08	7,285.50	7,278.85	6.65	1,096.075	
1,000.00	998.70	844.32	844.05	3.49	3.77	98.91	90.70	7,273.64	7,293.32	7,286.11	7.21	1,011.207	
1,100.00	1,097.47	900.00	899.59	3.86	4.02	98.80	90.13	7,277.54	7,302.65	7,294.82	7.84	931.601	
1,200.00	1,195.62	929.70	929.20	4.24	4.15	98.64	89.76	7,279.84	7,313.20	7,304.85	8.35	875.696	
1,300.00	1,293.06	1,000.00	999.27	4.64	4.45	98.54	88.76	7,285.48	7,324.86	7,315.80	9.06	808.269	
1,400.00	1,389.64	1,040.60	1,039.71	5.06	4.59	98.38	88.15	7,288.97	7,337.64	7,328.03	9.62	763.124	
1,500.00	1,485.27	1,100.00	1,098.84	5.50	4.80	98.24	87.36	7,294.58	7,351.79	7,341.53	10.26	716.878	
1,515.00	1,499.52	1,100.00	1,098.84	5.57	4.80	98.19	87.36	7,294.58	7,353.98	7,343.66	10.32	712.531	
1,600.00	1,580.22	1,100.00	1,098.84	5.96	4.80	98.19	87.36	7,294.58	7,367.03	7,356.33	10.70	688.696	
1,700.00	1,675.17	1,158.39	1,156.90	6.44	5.05	98.34	86.53	7,300.75	7,383.03	7,371.62	11.40	647.427	
1,800.00	1,770.11	1,200.00	1,198.22	6.92	5.22	98.45	85.79	7,305.55	7,399.94	7,387.90	12.04	614.425	
1,900.00	1,865.05	1,259.35	1,257.12	7.41	5.47	98.60	84.63	7,312.75	7,417.55	7,404.78	12.77	580.883	
2,000.00	1,959.99	1,300.00	1,297.45	7.90	5.64	98.71	83.81	7,317.78	7,435.69	7,422.28	13.42	554.246	
2,100.00	2,054.94	1,352.71	1,349.71	8.40	5.87	98.84	82.71	7,324.63	7,454.52	7,440.40	14.12	528.023	
2,200.00	2,149.88	1,400.00	1,396.52	8.90	6.07	98.97	81.69	7,331.23	7,474.22	7,459.43	14.80	505.095	
2,300.00	2,244.82	1,436.31	1,432.43	9.41	6.22	99.06	80.96	7,336.54	7,494.68	7,479.24	15.43	485.655	
2,400.00	2,339.76	1,500.00	1,495.37	9.92	6.50	99.22	79.94	7,346.25	7,515.85	7,499.66	16.19	464.116	
2,500.00	2,434.71	1,500.00	1,495.37	10.43	6.50	99.22	79.94	7,346.25	7,537.79	7,521.13	16.66	452.461	
2,600.00	2,529.65	1,563.68	1,558.19	10.94	6.78	99.38	79.11	7,356.60	7,560.32	7,542.89	17.43	433.842	
2,700.00	2,624.59	1,600.00	1,593.97	11.45	6.94	99.47	78.65	7,362.85	7,583.76	7,565.69	18.06	419.861	
2,800.00	2,719.53	1,648.66	1,641.85	11.97	7.15	99.59	77.90	7,371.52	7,607.92	7,589.16	18.76	405.526	
2,900.00	2,814.48	1,700.00	1,692.30	12.49	7.38	99.72	76.83	7,380.97	7,632.75	7,613.28	19.47	392.005	
3,000.00	2,909.42	1,747.20	1,738.63	13.01	7.58	99.84	75.62	7,389.90	7,658.22	7,638.07	20.15	380.120	
3,100.00	3,004.36	1,800.00	1,790.40	13.53	7.80	99.97	74.06	7,400.13	7,684.29	7,663.44	20.85	368.598	
3,200.00	3,099.30	1,833.31	1,823.03	14.05	7.95	100.06	72.97	7,406.78	7,711.06	7,689.58	21.47	359.099	
3,300.00	3,194.25	1,866.99	1,855.96	14.57	8.11	100.14	71.81	7,413.75	7,738.63	7,716.53	22.10	350.188	
3,400.00	3,289.19	1,900.00	1,888.18	15.09	8.26	100.23	70.61	7,420.80	7,767.00	7,744.28	22.72	341.894	
3,500.00	3,384.13	1,952.51	1,939.37	15.62	8.51	100.36	68.68	7,432.34	7,796.05	7,772.61	23.44	332.561	
3,600.00	3,479.07	2,000.00	1,985.62	16.14	8.74	100.48	67.02	7,443.00	7,825.68	7,801.54	24.14	324.202	
3,700.00	3,574.02	2,000.00	1,985.62	16.67	8.74	100.48	67.02	7,443.00	7,856.22	7,831.65	24.57	319.747	
3,800.00	3,668.96	2,062.44	2,046.28	17.19	9.04	100.64	64.67	7,457.62	7,887.17	7,861.81	25.36	311.040	
3,900.00	3,763.90	2,100.00	2,082.65	17.72	9.23	100.74	63.05	7,466.86	7,919.13	7,893.13	26.00	304.600	
4,000.00	3,858.84	2,137.93	2,119.31	18.24	9.42	100.83	61.46	7,476.43	7,951.80	7,925.16	26.64	298.482	
4,100.00	3,953.79	2,200.00	2,179.25	18.77	9.72	100.99	59.28	7,492.43	7,985.05	7,957.62	27.42	291.162	
4,200.00	4,048.73	2,200.00	2,179.25	19.30	9.72	100.99	59.28	7,492.43	8,018.99	7,991.15	27.84	288.070	
4,300.00	4,143.67	2,260.80	2,237.81	19.82	10.02	101.14	57.37	7,508.65	8,053.42	8,024.82	28.60	281.591	
4,400.00	4,238.61	2,300.00	2,275.46	20.35	10.21	101.23	56.10	7,519.49	8,088.70	8,059.46	29.23	276.688	
4,500.00	4,333.56	2,343.50	2,317.17	20.88	10.42	101.33	54.78	7,531.78	8,124.61	8,094.71	29.89	271.785	
4,600.00	4,428.50	2,400.00	2,371.27	21.41	10.69	101.47	53.40	7,548.02	8,161.02	8,130.39	30.63	266.447	
4,700.00	4,523.44	2,448.43	2,417.58	21.93	10.92	101.58	52.42	7,562.17	8,197.93	8,166.62	31.30	261.891	
4,800.00	4,618.38	2,500.00	2,466.82	22.46	11.16	101.69	51.47	7,577.46	8,235.32	8,203.33	31.99	257.410	
4,900.00	4,713.33	2,541.80	2,506.66	22.99	11.36	101.79	50.65	7,590.05	8,273.25	8,240.63	32.63	253.573	
5,000.00	4,808.27	2,600.00	2,562.03	23.52	11.63	101.92	49.23	7,607.93	8,311.82	8,278.46	33.36	249.186	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #350A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		100-MWD OWSG Rev5					Rule Assigned:			Offset Well Error:		0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,100.00	4,903.21	2,600.00	2,562.03	24.05	11.63	101.92	49.23	7,607.93	8,350.97	8,317.24	33.73	247.565		
5,200.00	4,998.16	2,664.53	2,623.26	24.58	11.94	102.07	47.02	7,628.18	8,390.60	8,356.10	34.50	243.202		
5,300.00	5,093.10	2,700.00	2,656.85	25.11	12.11	102.15	45.42	7,639.48	8,430.88	8,395.80	35.09	240.282		
5,400.00	5,188.04	2,736.23	2,691.08	25.64	12.29	102.24	43.49	7,651.19	8,471.79	8,436.10	35.69	237.389		
5,500.00	5,282.98	2,768.13	2,721.15	26.17	12.45	102.32	41.53	7,661.66	8,513.35	8,477.10	36.26	234.813		
5,600.00	5,377.93	2,800.00	2,751.12	26.70	12.61	102.40	39.33	7,672.27	8,555.56	8,518.74	36.82	232.357		
5,623.25	5,400.00	2,800.00	2,751.12	26.82	12.61	102.40	39.33	7,672.27	8,565.48	8,528.58	36.90	232.111		
5,700.00	5,473.03	2,800.00	2,751.12	27.22	12.61	102.76	39.33	7,672.27	8,598.47	8,561.31	37.17	231.349		
5,800.00	5,568.64	2,845.87	2,794.09	27.73	12.87	103.33	35.89	7,687.95	8,641.54	8,603.69	37.84	228.359		
5,900.00	5,664.75	2,900.00	2,844.49	28.23	13.18	103.92	31.56	7,707.21	8,685.27	8,646.70	38.57	225.204		
6,000.00	5,761.33	2,900.00	2,844.49	28.71	13.18	104.39	31.56	7,707.21	8,728.92	8,690.06	38.86	224.596		
6,100.00	5,858.34	2,900.00	2,844.49	29.18	13.18	104.87	31.56	7,707.21	8,773.12	8,733.97	39.15	224.110		
6,200.00	5,955.76	2,956.25	2,896.58	29.64	13.49	105.44	27.26	7,727.98	8,817.37	8,777.54	39.82	221.417		
6,300.00	6,053.57	3,645.00	3,540.64	30.07	17.80	106.84	-6.40	7,966.60	8,858.54	8,812.84	45.70	193.845		
6,400.00	6,151.72	3,645.00	3,540.64	30.50	17.80	107.24	-6.40	7,966.60	8,896.73	8,850.76	45.97	193.541		
6,500.00	6,250.19	3,645.00	3,540.64	30.91	17.80	107.64	-6.40	7,966.60	8,935.40	8,889.18	46.22	193.325		
6,600.00	6,348.94	3,645.00	3,540.64	31.30	17.80	108.04	-6.40	7,966.60	8,974.54	8,928.08	46.45	193.194		
6,659.67	6,408.00	3,645.00	3,540.64	31.53	17.80	108.28	-6.40	7,966.60	8,998.10	8,951.52	46.58	193.155		
6,700.00	6,447.82	3,645.00	3,540.64	31.68	17.80	90.62	-6.40	7,966.60	9,013.44	8,966.77	46.68	193.102		
6,750.00	6,496.66	3,645.00	3,540.64	31.90	17.80	78.06	-6.40	7,966.60	9,030.64	8,983.83	46.81	192.928		
6,800.00	6,544.65	3,645.00	3,540.64	32.13	17.80	70.62	-6.40	7,966.60	9,045.72	8,998.76	46.96	192.635		
6,850.00	6,591.49	3,645.00	3,540.64	32.37	17.80	65.75	-6.40	7,966.60	9,058.61	9,011.48	47.12	192.228		
6,900.00	6,636.89	3,645.00	3,540.64	32.62	17.80	62.35	-6.40	7,966.60	9,069.23	9,021.92	47.31	191.712		
6,950.00	6,680.57	3,645.00	3,540.64	32.89	17.80	59.90	-6.40	7,966.60	9,077.53	9,030.03	47.50	191.092		
7,000.00	6,722.26	3,645.00	3,540.64	33.17	17.80	58.10	-6.40	7,966.60	9,083.47	9,035.76	47.71	190.372		
7,050.00	6,761.71	3,645.00	3,540.64	33.45	17.80	56.79	-6.40	7,966.60	9,087.01	9,039.07	47.94	189.556		
7,100.00	6,798.67	3,645.00	3,540.64	33.75	17.80	55.88	-6.40	7,966.60	9,088.13	9,039.96	48.17	188.650		
7,150.00	6,832.91	3,645.00	3,540.64	34.06	17.80	55.31	-6.40	7,966.60	9,086.84	9,038.41	48.42	187.657		
7,200.00	6,864.22	3,645.00	3,540.64	34.37	17.80	55.03	-6.40	7,966.60	9,083.12	9,034.44	48.68	186.581		
7,250.00	6,892.42	3,645.00	3,540.64	34.69	17.80	55.01	-6.40	7,966.60	9,077.01	9,028.06	48.95	185.427		
7,300.00	6,917.32	3,645.00	3,540.64	35.03	17.80	55.24	-6.40	7,966.60	9,068.54	9,019.31	49.23	184.200		
7,350.00	6,938.77	3,645.00	3,540.64	35.37	17.80	55.71	-6.40	7,966.60	9,057.75	9,008.23	49.52	182.903		
7,400.00	6,956.64	3,645.00	3,540.64	35.72	17.80	56.42	-6.40	7,966.60	9,044.70	8,994.88	49.82	181.544		
7,450.00	6,970.83	3,645.00	3,540.64	36.07	17.80	57.37	-6.40	7,966.60	9,029.46	8,979.34	50.13	180.127		
7,500.00	6,981.23	3,645.00	3,540.64	36.44	17.80	58.56	-6.40	7,966.60	9,012.12	8,961.68	50.44	178.658		
7,550.00	6,987.80	3,645.00	3,540.64	36.81	17.80	59.99	-6.40	7,966.60	8,992.77	8,942.01	50.76	177.146		
7,600.00	6,990.48	3,645.00	3,540.64	37.19	17.80	61.68	-6.40	7,966.60	8,971.52	8,920.42	51.09	175.596		
7,609.87	6,990.55	3,645.00	3,540.64	37.26	17.80	62.05	-6.40	7,966.60	8,967.11	8,915.95	51.16	175.283		
7,700.00	6,990.49	3,645.00	3,540.64	37.97	17.80	62.05	-6.40	7,966.60	8,926.88	8,875.12	51.76	172.466		
7,800.00	6,990.42	3,645.00	3,540.64	38.78	17.80	62.05	-6.40	7,966.60	8,883.10	8,830.65	52.45	169.352		
7,900.00	6,990.35	3,645.00	3,540.64	39.64	17.80	62.05	-6.40	7,966.60	8,840.24	8,787.07	53.17	166.258		
8,000.00	6,990.28	3,645.00	3,540.64	40.53	17.80	62.05	-6.40	7,966.60	8,798.31	8,744.39	53.91	163.191		
8,100.00	6,990.21	3,645.00	3,540.64	41.45	17.80	62.05	-6.40	7,966.60	8,757.31	8,702.63	54.68	160.157		
8,200.00	6,990.14	3,645.00	3,540.64	42.40	17.80	62.05	-6.40	7,966.60	8,717.28	8,661.81	55.47	157.161		
8,306.37	6,990.06	3,645.00	3,540.64	43.45	17.80	62.05	-6.40	7,966.60	8,675.75	8,619.42	56.33	154.021		
8,400.00	6,990.00	3,645.00	3,540.64	44.38	17.80	61.26	-6.40	7,966.60	8,637.64	8,580.54	57.09	151.297		
8,500.00	6,989.93	3,645.00	3,540.64	45.36	17.80	60.27	-6.40	7,966.60	8,592.49	8,534.60	57.89	148.429		
8,600.00	6,989.85	3,645.00	3,540.64	46.33	17.80	59.12	-6.40	7,966.60	8,542.92	8,484.25	58.67	145.617		
8,700.00	6,989.78	3,645.00	3,540.64	47.28	17.80	57.79	-6.40	7,966.60	8,489.07	8,429.65	59.42	142.871		
8,800.00	6,989.70	3,645.00	3,540.64	48.21	17.80	56.24	-6.40	7,966.60	8,431.14	8,371.00	60.14	140.198		
8,900.00	6,989.63	3,645.00	3,540.64	49.11	17.80	54.46	-6.40	7,966.60	8,369.32	8,308.50	60.82	137.606		
9,000.00	6,989.55	3,645.00	3,540.64	49.99	17.80	52.39	-6.40	7,966.60	8,303.83	8,242.37	61.46	135.102		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #350A - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program:		100-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		Separation Factor
9,100.00	6,989.48	3,645.00	3,540.64	50.84	17.80	50.01	-6.40	7,966.60	8,234.92	8,172.86	62.06	132.693	
9,200.00	6,989.40	3,645.00	3,540.64	51.66	17.80	47.26	-6.40	7,966.60	8,162.82	8,100.22	62.61	130.386	
9,300.00	6,989.33	3,645.00	3,540.64	52.45	17.80	44.10	-6.40	7,966.60	8,087.82	8,024.72	63.09	128.185	
9,393.87	6,989.27	3,645.00	3,540.64	53.15	17.80	40.69	-6.40	7,966.60	8,015.03	7,951.53	63.50	126.221	
9,400.00	6,989.26	3,645.00	3,540.64	53.20	17.80	40.69	-6.40	7,966.60	8,010.20	7,946.67	63.53	126.094	
9,500.00	6,989.19	3,645.00	3,540.64	53.95	17.80	40.69	-6.40	7,966.60	7,931.78	7,867.85	63.93	124.067	
9,600.00	6,989.12	3,645.00	3,540.64	54.73	17.80	40.69	-6.40	7,966.60	7,853.85	7,789.50	64.35	122.049	
9,700.00	6,989.05	3,645.00	3,540.64	55.55	17.80	40.69	-6.40	7,966.60	7,776.42	7,711.64	64.78	120.042	
9,800.00	6,988.98	3,645.00	3,540.64	56.40	17.80	40.69	-6.40	7,966.60	7,699.52	7,634.30	65.22	118.046	
9,900.00	6,988.91	3,645.00	3,540.64	57.28	17.80	40.69	-6.40	7,966.60	7,623.15	7,557.47	65.68	116.063	
10,000.00	6,988.84	3,645.00	3,540.64	58.20	17.80	40.69	-6.40	7,966.60	7,547.34	7,481.19	66.15	114.093	
10,100.00	6,988.77	3,645.00	3,540.64	59.14	17.80	40.69	-6.40	7,966.60	7,472.09	7,405.46	66.63	112.137	
10,200.00	6,988.70	3,645.00	3,540.64	60.11	17.80	40.69	-6.40	7,966.60	7,397.43	7,330.30	67.13	110.196	
10,300.00	6,988.63	3,645.00	3,540.64	61.11	17.80	40.69	-6.40	7,966.60	7,323.37	7,255.73	67.64	108.271	
10,400.00	6,988.56	3,645.00	3,540.64	62.14	17.80	40.69	-6.40	7,966.60	7,249.94	7,181.78	68.16	106.362	
10,500.00	6,988.49	3,645.00	3,540.64	63.19	17.80	40.69	-6.40	7,966.60	7,177.15	7,108.45	68.70	104.472	
10,600.00	6,988.42	3,645.00	3,540.64	64.26	17.80	40.69	-6.40	7,966.60	7,105.02	7,035.77	69.25	102.600	
10,700.00	6,988.35	3,645.00	3,540.64	65.36	17.80	40.69	-6.40	7,966.60	7,033.57	6,963.76	69.81	100.748	
10,800.00	6,988.28	3,645.00	3,540.64	66.48	17.80	40.69	-6.40	7,966.60	6,962.83	6,892.44	70.39	98.916	
10,900.00	6,988.21	3,645.00	3,540.64	67.61	17.80	40.69	-6.40	7,966.60	6,892.81	6,821.82	70.98	97.106	
11,000.00	6,988.14	3,645.00	3,540.64	68.77	17.80	40.69	-6.40	7,966.60	6,823.53	6,751.95	71.59	95.317	
11,100.00	6,988.07	3,645.00	3,540.64	69.95	17.80	40.69	-6.40	7,966.60	6,755.03	6,682.83	72.21	93.552	
11,200.00	6,988.01	3,645.00	3,540.64	71.14	17.80	40.69	-6.40	7,966.60	6,687.32	6,614.48	72.84	91.810	
11,300.00	6,987.94	3,645.00	3,540.64	72.35	17.80	40.69	-6.40	7,966.60	6,620.43	6,546.95	73.48	90.093	
11,400.00	6,987.87	3,645.00	3,540.64	73.57	17.80	40.69	-6.40	7,966.60	6,554.38	6,480.24	74.14	88.401	
11,500.00	6,987.80	3,645.00	3,540.64	74.81	17.80	40.69	-6.40	7,966.60	6,489.21	6,414.39	74.82	86.736	
11,600.00	6,987.73	3,645.00	3,540.64	76.07	17.80	40.69	-6.40	7,966.60	6,424.92	6,349.42	75.50	85.097	
11,643.87	6,987.70	3,645.00	3,540.64	76.62	17.80	40.69	-6.40	7,966.60	6,397.01	6,321.21	75.81	84.387	
11,700.00	6,987.66	3,645.00	3,540.64	77.33	17.80	39.99	-6.40	7,966.60	6,361.28	6,285.09	76.19	83.491	
11,737.27	6,987.63	3,645.00	3,540.64	77.80	17.80	39.51	-6.40	7,966.60	6,337.43	6,260.98	76.44	82.904	
11,800.00	6,987.59	3,645.00	3,540.64	78.59	17.80	39.51	-6.40	7,966.60	6,297.36	6,220.49	76.86	81.930	
11,900.00	6,987.52	3,645.00	3,540.64	79.86	17.80	39.51	-6.40	7,966.60	6,234.26	6,156.72	77.54	80.398	
12,000.00	6,987.46	3,645.00	3,540.64	81.14	17.80	39.51	-6.40	7,966.60	6,172.13	6,093.90	78.23	78.893	
12,100.00	6,987.39	3,645.00	3,540.64	82.43	17.80	39.51	-6.40	7,966.60	6,111.01	6,032.08	78.94	77.416	
12,200.00	6,987.32	3,645.00	3,540.64	83.73	17.80	39.51	-6.40	7,966.60	6,050.93	5,971.28	79.65	75.969	
12,300.00	6,987.26	3,645.00	3,540.64	85.05	17.80	39.51	-6.40	7,966.60	5,991.91	5,911.54	80.37	74.550	
12,400.00	6,987.19	3,645.00	3,540.64	86.38	17.80	39.51	-6.40	7,966.60	5,933.99	5,852.88	81.11	73.161	
12,500.00	6,987.12	3,645.00	3,540.64	87.71	17.80	39.51	-6.40	7,966.60	5,877.20	5,795.35	81.85	71.803	
12,600.00	6,987.06	3,645.00	3,540.64	89.06	17.80	39.51	-6.40	7,966.60	5,821.58	5,738.98	82.60	70.476	
12,700.00	6,986.99	3,645.00	3,540.64	90.41	17.80	39.51	-6.40	7,966.60	5,767.15	5,683.79	83.36	69.181	
12,800.00	6,986.92	3,645.00	3,540.64	91.77	17.80	39.51	-6.40	7,966.60	5,713.96	5,629.83	84.13	67.918	
12,900.00	6,986.86	3,645.00	3,540.64	93.14	17.80	39.51	-6.40	7,966.60	5,662.03	5,577.13	84.90	66.687	
13,000.00	6,986.79	3,645.00	3,540.64	94.52	17.80	39.51	-6.40	7,966.60	5,611.40	5,525.72	85.68	65.490	
13,100.00	6,986.72	3,645.00	3,540.64	95.90	17.80	39.51	-6.40	7,966.60	5,562.11	5,475.64	86.47	64.325	
13,200.00	6,986.66	3,645.00	3,540.64	97.30	17.80	39.51	-6.40	7,966.60	5,514.20	5,426.94	87.26	63.195	
13,300.00	6,986.59	3,645.00	3,540.64	98.69	17.80	39.51	-6.40	7,966.60	5,467.69	5,379.64	88.05	62.099	
13,400.00	6,986.52	3,645.00	3,540.64	100.10	17.80	39.51	-6.40	7,966.60	5,422.63	5,333.79	88.84	61.038	
13,500.00	6,986.46	3,645.00	3,540.64	101.51	17.80	39.51	-6.40	7,966.60	5,379.05	5,289.41	89.63	60.011	
13,600.00	6,986.39	3,645.00	3,540.64	102.93	17.80	39.51	-6.40	7,966.60	5,336.98	5,246.56	90.43	59.020	
13,700.00	6,986.32	3,645.00	3,540.64	104.35	17.80	39.51	-6.40	7,966.60	5,296.48	5,205.26	91.22	58.064	
13,800.00	6,986.25	3,645.00	3,540.64	105.78	17.80	39.51	-6.40	7,966.60	5,257.56	5,165.55	92.01	57.143	
13,900.00	6,986.19	3,645.00	3,540.64	107.21	17.80	39.51	-6.40	7,966.60	5,220.27	5,127.48	92.79	56.259	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #350A - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		100-MWD OWSG Rev5					Rule Assigned:				Offset Well Error:	0.00 usft		
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
14,000.00	6,986.12	3,645.00	3,540.64	108.65	17.80	39.51	-6.40	7,966.60	5,184.64	5,091.07	93.57	55.410		
14,100.00	6,986.05	3,645.00	3,540.64	110.09	17.80	39.51	-6.40	7,966.60	5,150.70	5,056.36	94.34	54.597		
14,200.00	6,985.99	3,645.00	3,540.64	111.54	17.80	39.51	-6.40	7,966.60	5,118.49	5,023.39	95.10	53.820		
14,300.00	6,985.92	3,645.00	3,540.64	112.99	17.80	39.51	-6.40	7,966.60	5,088.05	4,992.19	95.86	53.080		
14,400.00	6,985.85	3,645.00	3,540.64	114.45	17.80	39.51	-6.40	7,966.60	5,059.40	4,962.80	96.60	52.375		
14,500.00	6,985.79	3,645.00	3,540.64	115.91	17.80	39.51	-6.40	7,966.60	5,032.57	4,935.24	97.33	51.707		
14,600.00	6,985.72	3,645.00	3,540.64	117.38	17.80	39.51	-6.40	7,966.60	5,007.60	4,909.55	98.05	51.074		
14,700.00	6,985.65	3,645.00	3,540.64	118.84	17.80	39.51	-6.40	7,966.60	4,984.50	4,885.76	98.75	50.478		
14,800.00	6,985.59	3,645.00	3,540.64	120.32	17.80	39.51	-6.40	7,966.60	4,963.32	4,863.89	99.43	49.918		
14,900.00	6,985.52	3,645.00	3,540.64	121.79	17.80	39.51	-6.40	7,966.60	4,944.07	4,843.97	100.10	49.393		
15,000.00	6,985.45	3,645.00	3,540.64	123.27	17.80	39.51	-6.40	7,966.60	4,926.77	4,826.03	100.74	48.904		
15,100.00	6,985.39	3,645.00	3,540.64	124.75	17.80	39.51	-6.40	7,966.60	4,911.45	4,810.08	101.37	48.450		
15,200.00	6,985.32	3,645.00	3,540.64	126.24	17.80	39.51	-6.40	7,966.60	4,898.12	4,796.14	101.98	48.031		
15,300.00	6,985.25	3,645.00	3,540.64	127.72	17.80	39.51	-6.40	7,966.60	4,886.80	4,784.24	102.56	47.647		
15,400.00	6,985.19	3,645.00	3,540.64	129.21	17.80	39.51	-6.40	7,966.60	4,877.51	4,774.39	103.12	47.297		
15,500.00	6,985.12	3,645.00	3,540.64	130.71	17.80	39.51	-6.40	7,966.60	4,870.25	4,766.59	103.66	46.982		
15,600.00	6,985.05	3,645.00	3,540.64	132.20	17.80	39.51	-6.40	7,966.60	4,865.04	4,760.87	104.18	46.700		
15,700.00	6,984.99	3,645.00	3,540.64	133.70	17.80	39.51	-6.40	7,966.60	4,861.88	4,757.22	104.66	46.452		
15,800.00	6,984.92	3,645.00	3,540.64	135.20	17.80	39.51	-6.40	7,966.60	4,860.78	4,755.65	105.13	46.238		
15,804.45	6,984.92	3,645.00	3,540.64	135.27	17.80	39.51	-6.40	7,966.60	4,860.78	4,755.63	105.15	46.229	CC, ES	
15,900.00	6,984.85	3,645.00	3,540.64	136.71	17.80	39.51	-6.40	7,966.60	4,861.73	4,756.17	105.56	46.055		
16,000.00	6,984.79	3,645.00	3,540.64	138.21	17.80	39.51	-6.40	7,966.60	4,864.74	4,758.77	105.97	45.906		
16,100.00	6,984.72	3,645.00	3,540.64	139.72	17.80	39.51	-6.40	7,966.60	4,869.80	4,763.44	106.36	45.788		
16,200.00	6,984.65	3,645.00	3,540.64	141.23	17.80	39.51	-6.40	7,966.60	4,876.90	4,770.19	106.71	45.701		
16,300.00	6,984.59	3,645.00	3,540.64	142.75	17.80	39.51	-6.40	7,966.60	4,886.05	4,779.00	107.04	45.645		
16,400.00	6,984.52	3,645.00	3,540.64	144.26	17.80	39.51	-6.40	7,966.60	4,897.22	4,789.87	107.35	45.620	SF	
16,500.00	6,984.45	3,645.00	3,540.64	145.78	17.80	39.51	-6.40	7,966.60	4,910.40	4,802.77	107.63	45.625		
16,600.00	6,984.39	3,645.00	3,540.64	147.29	17.80	39.51	-6.40	7,966.60	4,925.57	4,817.69	107.88	45.659		
16,700.00	6,984.32	3,645.00	3,540.64	148.82	17.80	39.51	-6.40	7,966.60	4,942.72	4,834.62	108.10	45.722		
16,800.00	6,984.25	3,645.00	3,540.64	150.34	17.80	39.51	-6.40	7,966.60	4,961.83	4,853.53	108.30	45.814		
16,900.00	6,984.19	3,645.00	3,540.64	151.86	17.80	39.51	-6.40	7,966.60	4,982.87	4,874.39	108.48	45.934		
17,000.00	6,984.12	3,645.00	3,540.64	153.39	17.80	39.51	-6.40	7,966.60	5,005.83	4,897.20	108.63	46.082		
17,100.00	6,984.05	3,645.00	3,540.64	154.91	17.80	39.51	-6.40	7,966.60	5,030.66	4,921.90	108.76	46.256		
17,200.00	6,983.99	3,645.00	3,540.64	156.44	17.80	39.51	-6.40	7,966.60	5,057.35	4,948.49	108.86	46.457		
17,300.00	6,983.92	3,645.00	3,540.64	157.97	17.80	39.51	-6.40	7,966.60	5,085.87	4,976.93	108.94	46.684		
17,400.00	6,983.85	3,645.00	3,540.64	159.50	17.80	39.51	-6.40	7,966.60	5,116.18	5,007.18	109.00	46.937		
17,500.00	6,983.79	3,645.00	3,540.64	161.04	17.80	39.51	-6.40	7,966.60	5,148.26	5,039.22	109.04	47.215		
17,600.00	6,983.72	3,645.00	3,540.64	162.57	17.80	39.51	-6.40	7,966.60	5,182.07	5,073.01	109.06	47.518		
17,700.00	6,983.65	3,645.00	3,540.64	164.11	17.80	39.51	-6.40	7,966.60	5,217.58	5,108.52	109.05	47.844		
17,800.00	6,983.59	3,645.00	3,540.64	165.65	17.80	39.51	-6.40	7,966.60	5,254.75	5,145.72	109.03	48.195		
17,900.00	6,983.52	3,645.00	3,540.64	167.18	17.80	39.51	-6.40	7,966.60	5,293.55	5,184.56	108.99	48.569		
18,000.00	6,983.45	3,645.00	3,540.64	168.72	17.80	39.51	-6.40	7,966.60	5,333.94	5,225.00	108.93	48.965		
18,100.00	6,983.39	3,645.00	3,540.64	170.27	17.80	39.51	-6.40	7,966.60	5,375.89	5,267.03	108.86	49.384		
18,200.00	6,983.32	3,645.00	3,540.64	171.81	17.80	39.51	-6.40	7,966.60	5,419.36	5,310.59	108.77	49.824		
18,300.00	6,983.25	3,645.00	3,540.64	173.35	17.80	39.51	-6.40	7,966.60	5,464.31	5,355.65	108.66	50.286		
18,400.00	6,983.19	3,645.00	3,540.64	174.90	17.80	39.51	-6.40	7,966.60	5,510.71	5,402.17	108.54	50.769		
18,500.00	6,983.12	3,645.00	3,540.64	176.44	17.80	39.51	-6.40	7,966.60	5,558.53	5,450.11	108.41	51.272		
18,600.00	6,983.05	3,645.00	3,540.64	177.99	17.80	39.51	-6.40	7,966.60	5,607.71	5,499.45	108.27	51.796		
18,700.00	6,982.99	3,645.00	3,540.64	179.54	17.80	39.51	-6.40	7,966.60	5,658.24	5,550.14	108.11	52.338		
18,800.00	6,982.92	3,645.00	3,540.64	181.09	17.80	39.51	-6.40	7,966.60	5,710.08	5,602.14	107.94	52.900		
18,900.00	6,982.85	3,645.00	3,540.64	182.64	17.80	39.51	-6.40	7,966.60	5,763.18	5,655.42	107.76	53.481		
19,000.00	6,982.78	3,645.00	3,540.64	184.19	17.80	39.51	-6.40	7,966.60	5,817.52	5,709.94	107.57	54.080		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #350A - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program: 100-MWD OWSG Rev5												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	3,645.00	3,540.64	185.74	17.80	39.51	-6.40	7,966.60	5,873.05	5,765.68	107.38	54.696	
19,200.00	6,982.65	3,645.00	3,540.64	187.29	17.80	39.51	-6.40	7,966.60	5,929.76	5,822.59	107.17	55.330	
19,300.00	6,982.58	3,645.00	3,540.64	188.84	17.80	39.51	-6.40	7,966.60	5,987.59	5,880.64	106.96	55.981	
19,400.00	6,982.52	3,645.00	3,540.64	190.40	17.80	39.51	-6.40	7,966.60	6,046.53	5,939.79	106.74	56.649	
19,500.00	6,982.45	3,645.00	3,540.64	191.95	17.80	39.51	-6.40	7,966.60	6,106.54	6,000.03	106.51	57.332	
19,600.00	6,982.38	3,645.00	3,540.64	193.51	17.80	39.51	-6.40	7,966.60	6,167.58	6,061.30	106.28	58.031	
19,700.00	6,982.32	3,645.00	3,540.64	195.07	17.80	39.51	-6.40	7,966.60	6,229.63	6,123.59	106.04	58.746	
19,800.00	6,982.25	3,645.00	3,540.64	196.62	17.80	39.51	-6.40	7,966.60	6,292.66	6,186.86	105.80	59.475	
19,900.00	6,982.18	3,645.00	3,540.64	198.18	17.80	39.51	-6.40	7,966.60	6,356.64	6,251.08	105.56	60.219	
20,000.00	6,982.12	3,645.00	3,540.64	199.74	17.80	39.51	-6.40	7,966.60	6,421.54	6,316.22	105.31	60.977	
20,100.00	6,982.05	3,645.00	3,540.64	201.30	17.80	39.51	-6.40	7,966.60	6,487.32	6,382.26	105.06	61.748	
20,176.02	6,982.00	3,645.00	3,540.64	202.36	17.80	39.51	-6.40	7,966.60	6,537.92	6,433.29	104.62	62.491	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #46 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 60-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	147.30	-134.34	86.24	163.65				
100.00	100.00	64.00	64.00	0.25	1.14	147.30	-134.34	86.24	159.64	158.25	1.39	115.174	
197.64	197.64	161.64	161.64	0.60	2.90	147.28	-134.23	86.24	159.55	156.05	3.50	45.634	
200.00	200.00	163.99	163.99	0.61	2.94	147.28	-134.23	86.24	159.55	156.00	3.55	44.979	
300.00	300.00	264.00	264.00	0.97	4.74	147.30	-134.34	86.24	159.64	153.93	5.71	27.958	
400.00	400.00	364.00	364.00	1.33	6.69	147.30	-134.34	86.24	159.64	151.62	8.02	19.910	
500.00	500.00	464.00	464.00	1.68	8.64	147.30	-134.34	86.24	159.64	149.31	10.33	15.460	
539.74	539.74	503.71	503.70	1.83	9.42	147.21	-133.85	86.24	159.23	147.98	11.24	14.163 CC	
600.00	600.00	563.81	563.81	2.04	10.59	147.22	-133.90	86.24	159.27	146.64	12.63	12.610	
700.00	699.98	663.54	663.53	2.40	12.53	157.49	-134.14	86.24	161.08	146.15	14.93	10.787 ES	
800.00	799.84	763.88	763.84	2.76	14.56	158.18	-134.34	86.24	166.10	148.78	17.32	9.589	
900.00	899.45	863.50	863.45	3.13	16.65	159.19	-134.34	86.24	174.22	154.45	19.77	8.811	
1,000.00	998.70	962.14	962.09	3.49	18.72	160.35	-133.74	86.24	185.14	162.94	22.20	8.338	
1,100.00	1,097.47	1,061.56	1,061.47	3.86	20.80	161.85	-134.34	86.24	200.49	175.84	24.65	8.133	
1,200.00	1,195.62	1,159.72	1,159.62	4.24	22.73	163.30	-134.34	86.24	218.73	191.78	26.95	8.116 SF	
1,300.00	1,293.06	1,257.15	1,257.06	4.64	24.65	164.72	-134.34	86.24	240.40	211.16	29.24	8.222	
1,400.00	1,389.64	1,353.74	1,353.64	5.06	26.56	166.06	-134.34	86.24	265.50	233.98	31.51	8.425	
1,500.00	1,485.27	1,449.17	1,449.06	5.50	28.43	167.18	-132.78	86.24	292.57	258.80	33.77	8.665	
1,515.00	1,499.52	1,463.33	1,463.22	5.57	28.71	167.36	-132.79	86.24	297.15	263.04	34.10	8.713	
1,600.00	1,580.22	1,543.43	1,543.32	5.96	30.29	168.40	-132.96	86.24	323.45	287.46	35.99	8.986	
1,700.00	1,675.17	1,637.55	1,637.42	6.44	32.15	169.43	-133.34	86.24	354.69	316.47	38.22	9.281	
1,800.00	1,770.11	1,731.52	1,731.39	6.92	34.00	170.31	-133.95	86.24	386.22	345.78	40.44	9.550	
1,900.00	1,865.05	1,829.21	1,829.05	7.41	35.85	171.07	-134.34	86.24	417.62	374.93	42.68	9.785	
2,000.00	1,959.99	1,924.15	1,923.99	7.90	37.60	171.69	-134.34	86.24	448.70	403.89	44.80	10.015	
2,100.00	2,054.94	2,018.92	2,018.75	8.40	39.33	172.22	-133.87	86.24	479.36	432.44	46.92	10.216	
2,200.00	2,149.88	2,112.94	2,112.77	8.90	41.06	172.69	-133.99	86.24	510.64	461.61	49.03	10.415	
2,300.00	2,244.82	2,206.84	2,206.68	9.41	42.78	173.12	-134.29	86.24	542.11	490.98	51.13	10.602	
2,400.00	2,339.76	2,303.94	2,303.76	9.92	44.51	173.51	-134.34	86.24	573.36	520.10	53.26	10.766	
2,500.00	2,434.71	2,398.88	2,398.71	10.43	46.20	173.84	-134.34	86.24	604.59	549.25	55.34	10.926	
2,600.00	2,529.65	2,493.83	2,493.65	10.94	47.89	174.15	-134.34	86.24	635.83	578.42	57.41	11.075	
2,700.00	2,624.59	2,588.73	2,588.55	11.45	49.58	174.40	-133.54	86.24	666.32	606.83	59.49	11.200	
2,800.00	2,719.53	2,682.92	2,682.74	11.97	51.25	174.65	-133.60	86.24	697.65	636.09	61.56	11.333	
2,900.00	2,814.48	2,777.04	2,776.86	12.49	52.92	174.88	-133.77	86.24	729.09	665.47	63.62	11.460	
3,000.00	2,909.42	2,871.09	2,870.91	13.01	54.60	175.10	-134.03	86.24	760.64	694.96	65.68	11.580	
3,100.00	3,004.36	2,968.56	2,968.36	13.53	56.33	175.30	-134.34	86.24	792.24	724.42	67.82	11.681	
3,200.00	3,099.30	3,063.50	3,063.30	14.05	58.03	175.48	-134.34	86.24	823.55	753.63	69.91	11.780	
3,300.00	3,194.25	3,158.44	3,158.25	14.57	59.73	175.65	-134.34	86.24	854.86	782.86	72.00	11.872	
3,400.00	3,289.19	3,252.98	3,252.78	15.09	61.41	175.80	-134.08	86.24	885.93	811.84	74.09	11.958	
3,500.00	3,384.13	3,347.17	3,346.98	15.62	63.10	175.94	-134.17	86.24	917.34	841.17	76.16	12.044	
3,600.00	3,479.07	3,441.32	3,441.12	16.14	64.78	176.08	-134.33	86.24	948.82	870.58	78.24	12.127	
3,700.00	3,574.02	3,538.22	3,538.02	16.67	66.78	176.21	-134.34	86.24	980.17	899.53	80.65	12.154	
3,800.00	3,668.96	3,633.16	3,632.96	17.19	68.76	176.32	-134.34	86.24	1,011.51	928.49	83.02	12.184	
3,900.00	3,763.90	3,728.11	3,727.90	17.72	70.74	176.43	-134.34	86.24	1,042.85	957.45	85.40	12.211	
4,000.00	3,858.84	3,823.05	3,822.84	18.24	72.72	176.54	-134.34	86.24	1,074.20	986.42	87.78	12.238	
4,100.00	3,953.79	3,917.13	3,916.92	18.77	74.68	176.63	-133.51	86.24	1,104.74	1,014.60	90.14	12.256	
4,200.00	4,048.73	4,010.91	4,010.69	19.30	76.64	176.72	-133.63	86.24	1,136.21	1,043.72	92.49	12.285	
4,300.00	4,143.67	4,104.62	4,104.41	19.82	78.59	176.81	-133.85	86.24	1,167.78	1,072.95	94.84	12.314	
4,400.00	4,238.61	4,198.28	4,198.06	20.35	80.55	176.89	-134.17	86.24	1,199.45	1,102.27	97.18	12.342	
4,500.00	4,333.56	4,297.89	4,297.56	20.88	82.78	176.98	-134.34	86.24	1,230.97	1,131.14	99.84	12.330	
4,600.00	4,428.50	4,386.48	4,386.13	21.41	84.87	177.04	-133.76	86.24	1,261.78	1,159.48	102.30	12.334	
4,700.00	4,523.44	4,487.85	4,487.44	21.93	87.35	177.13	-134.34	86.24	1,293.69	1,188.49	105.20	12.297	
4,800.00	4,618.38	4,582.79	4,582.38	22.46	89.81	177.19	-134.34	86.24	1,325.06	1,216.99	108.07	12.262	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #46 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 60-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				(usft)	(usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
4,900.00	4,713.33	4,667.39	4,666.97	22.99	92.00	177.25	-133.77	86.24	1,355.91	1,245.28	110.62	12.257	
5,000.00	4,808.27	4,772.83	4,772.27	23.52	94.76	177.32	-134.34	86.24	1,387.79	1,273.98	113.81	12.194	
5,100.00	4,903.21	4,858.00	4,857.41	24.05	97.00	177.37	-133.49	86.24	1,418.36	1,301.94	116.42	12.183	
5,200.00	4,998.16	4,962.82	4,962.16	24.58	99.70	177.44	-134.34	86.24	1,450.53	1,330.97	119.56	12.133	
5,300.00	5,093.10	5,050.65	5,049.97	25.11	101.89	177.48	-133.82	86.24	1,481.41	1,359.28	122.13	12.130	
5,400.00	5,188.04	5,152.78	5,152.04	25.64	104.42	177.54	-134.34	86.24	1,513.28	1,388.20	125.08	12.098	
5,500.00	5,282.98	5,240.60	5,239.84	26.17	106.56	177.58	-133.65	86.24	1,543.99	1,416.39	127.60	12.101	
5,600.00	5,377.93	5,342.73	5,341.93	26.70	108.97	177.64	-134.34	86.24	1,576.02	1,445.59	130.43	12.083	
5,623.25	5,400.00	5,364.81	5,364.00	26.82	109.45	177.65	-134.34	86.24	1,583.32	1,452.31	131.01	12.085	
5,700.00	5,473.03	5,437.84	5,437.03	27.22	111.06	177.70	-134.34	86.24	1,606.91	1,473.98	132.93	12.089	
5,800.00	5,568.64	5,494.00	5,493.16	27.73	112.30	177.73	-134.34	86.24	1,636.66	1,502.26	134.40	12.178	
5,900.00	5,664.75	5,494.00	5,493.16	28.23	112.30	177.75	-134.34	86.24	1,669.30	1,535.20	134.09	12.449	
6,000.00	5,761.33	5,494.00	5,493.16	28.71	112.30	177.76	-134.34	86.24	1,705.58	1,572.17	133.40	12.785	
6,100.00	5,858.34	5,494.00	5,493.16	29.18	112.30	177.78	-134.34	86.24	1,745.26	1,612.89	132.37	13.185	
6,200.00	5,955.76	5,494.00	5,493.16	29.64	112.30	177.80	-134.34	86.24	1,788.10	1,657.06	131.04	13.645	
6,300.00	6,053.57	5,494.00	5,493.16	30.07	112.30	177.82	-134.34	86.24	1,833.88	1,704.42	129.46	14.165	
6,400.00	6,151.72	5,494.00	5,493.16	30.50	112.30	177.84	-134.34	86.24	1,882.36	1,754.68	127.67	14.744	
6,500.00	6,250.19	5,494.00	5,493.16	30.91	112.30	177.86	-134.34	86.24	1,933.32	1,807.61	125.71	15.379	
6,600.00	6,348.94	5,494.00	5,493.16	31.30	112.30	177.88	-134.34	86.24	1,986.56	1,862.94	123.62	16.070	
6,659.67	6,408.00	5,494.00	5,493.16	31.53	112.30	177.90	-134.34	86.24	2,019.34	1,897.02	122.31	16.509	
6,700.00	6,447.82	5,494.00	5,493.16	31.68	112.30	159.24	-134.34	86.24	2,042.56	1,921.13	121.43	16.820	
6,750.00	6,496.66	5,494.00	5,493.16	31.90	112.30	144.86	-134.34	86.24	2,073.49	1,953.11	120.38	17.225	
6,800.00	6,544.65	5,494.00	5,493.16	32.13	112.30	134.94	-134.34	86.24	2,106.51	1,987.14	119.37	17.646	
6,850.00	6,591.49	5,494.00	5,493.16	32.37	112.30	126.92	-134.34	86.24	2,141.34	2,022.91	118.43	18.081	
6,900.00	6,636.89	5,494.00	5,493.16	32.62	112.30	119.71	-134.34	86.24	2,177.67	2,060.11	117.56	18.524	
6,950.00	6,680.57	5,494.00	5,493.16	32.89	112.30	112.83	-134.34	86.24	2,215.22	2,098.44	116.77	18.970	
7,000.00	6,722.26	5,494.00	5,493.16	33.17	112.30	106.05	-134.34	86.24	2,253.69	2,137.61	116.07	19.416	
7,050.00	6,761.71	5,494.00	5,493.16	33.45	112.30	99.33	-134.34	86.24	2,292.81	2,177.34	115.47	19.856	
7,100.00	6,798.67	5,494.00	5,493.16	33.75	112.30	92.71	-134.34	86.24	2,332.31	2,217.34	114.97	20.287	
7,150.00	6,832.91	5,494.00	5,493.16	34.06	112.30	86.29	-134.34	86.24	2,371.94	2,257.37	114.56	20.704	
7,200.00	6,864.22	5,494.00	5,493.16	34.37	112.30	80.16	-134.34	86.24	2,411.44	2,297.18	114.26	21.105	
7,250.00	6,892.42	5,494.00	5,493.16	34.69	112.30	74.44	-134.34	86.24	2,450.60	2,336.54	114.06	21.485	
7,300.00	6,917.32	5,494.00	5,493.16	35.03	112.30	69.18	-134.34	86.24	2,489.19	2,375.22	113.97	21.841	
7,350.00	6,938.77	5,494.00	5,493.16	35.37	112.30	64.43	-134.34	86.24	2,527.00	2,413.03	113.97	22.173	
7,400.00	6,956.64	5,494.00	5,493.16	35.72	112.30	60.19	-134.34	86.24	2,563.84	2,449.77	114.07	22.476	
7,450.00	6,970.83	5,494.00	5,493.16	36.07	112.30	56.44	-134.34	86.24	2,599.53	2,485.26	114.26	22.751	
7,500.00	6,981.23	5,494.00	5,493.16	36.44	112.30	53.16	-134.34	86.24	2,633.90	2,519.35	114.54	22.994	
7,550.00	6,987.80	5,494.00	5,493.16	36.81	112.30	50.31	-134.34	86.24	2,666.79	2,551.88	114.91	23.207	
7,600.00	6,990.48	5,494.00	5,493.16	37.19	112.30	47.84	-134.34	86.24	2,698.06	2,582.70	115.36	23.388	
7,609.87	6,990.55	5,494.00	5,493.16	37.26	112.30	47.40	-134.34	86.24	2,704.02	2,588.57	115.45	23.421	
7,700.00	6,990.49	5,494.00	5,493.16	37.97	112.30	47.40	-134.34	86.24	2,759.16	2,642.80	116.36	23.712	
7,800.00	6,990.42	5,494.00	5,493.16	38.78	112.30	47.40	-134.34	86.24	2,822.44	2,705.10	117.34	24.053	
7,900.00	6,990.35	5,494.00	5,493.16	39.64	112.30	47.40	-134.34	86.24	2,887.80	2,769.51	118.29	24.412	
8,000.00	6,990.28	5,494.00	5,493.16	40.53	112.30	47.40	-134.34	86.24	2,955.10	2,835.89	119.21	24.788	
8,100.00	6,990.21	5,494.00	5,493.16	41.45	112.30	47.40	-134.34	86.24	3,024.21	2,904.11	120.10	25.181	
8,200.00	6,990.14	5,494.00	5,493.16	42.40	112.30	47.40	-134.34	86.24	3,095.00	2,974.05	120.95	25.589	
8,306.37	6,990.06	5,494.00	5,493.16	43.45	112.30	47.40	-134.34	86.24	3,172.03	3,050.21	121.82	26.039	
8,400.00	6,990.00	5,494.00	5,493.16	44.38	112.30	49.98	-134.34	86.24	3,239.66	3,117.13	122.53	26.439	
8,500.00	6,989.93	5,494.00	5,493.16	45.36	112.30	52.44	-134.34	86.24	3,309.73	3,186.49	123.24	26.856	
8,600.00	6,989.85	5,494.00	5,493.16	46.33	112.30	54.63	-134.34	86.24	3,377.37	3,253.48	123.89	27.261	
8,700.00	6,989.78	5,494.00	5,493.16	47.28	112.30	56.57	-134.34	86.24	3,442.41	3,317.91	124.50	27.650	
8,800.00	6,989.70	5,494.00	5,493.16	48.21	112.30	58.28	-134.34	86.24	3,504.69	3,379.62	125.07	28.021	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #46 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program:		60-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance				Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
8,900.00	6,989.63	5,494.00	5,493.16	49.11	112.30	59.81	-134.34	86.24	3,564.05	3,438.44	125.61	28.374		
9,000.00	6,989.55	5,494.00	5,493.16	49.99	112.30	61.15	-134.34	86.24	3,620.36	3,494.24	126.12	28.705		
9,100.00	6,989.48	5,494.00	5,493.16	50.84	112.30	62.34	-134.34	86.24	3,673.49	3,546.88	126.61	29.014		
9,200.00	6,989.40	5,494.00	5,493.16	51.66	112.30	63.39	-134.34	86.24	3,723.32	3,596.24	127.08	29.299		
9,300.00	6,989.33	5,494.00	5,493.16	52.45	112.30	64.32	-134.34	86.24	3,769.74	3,642.21	127.53	29.560		
9,393.87	6,989.27	5,494.00	5,493.16	53.15	112.30	65.09	-134.34	86.24	3,810.12	3,682.18	127.94	29.781		
9,400.00	6,989.26	5,494.00	5,493.16	53.20	112.30	65.09	-134.34	86.24	3,812.66	3,684.70	127.96	29.795		
9,500.00	6,989.19	5,494.00	5,493.16	53.95	112.30	65.09	-134.34	86.24	3,855.22	3,726.82	128.41	30.023		
9,600.00	6,989.12	5,494.00	5,493.16	54.73	112.30	65.09	-134.34	86.24	3,899.89	3,771.02	128.86	30.264		
9,700.00	6,989.05	5,494.00	5,493.16	55.55	112.30	65.09	-134.34	86.24	3,946.58	3,817.25	129.33	30.515		
9,800.00	6,988.98	5,494.00	5,493.16	56.40	112.30	65.09	-134.34	86.24	3,995.23	3,865.42	129.80	30.779		
9,900.00	6,988.91	5,494.00	5,493.16	57.28	112.30	65.09	-134.34	86.24	4,045.76	3,915.48	130.28	31.054		
10,000.00	6,988.84	5,494.00	5,493.16	58.20	112.30	65.09	-134.34	86.24	4,098.11	3,967.35	130.76	31.340		
10,100.00	6,988.77	5,494.00	5,493.16	59.14	112.30	65.09	-134.34	86.24	4,152.22	4,020.97	131.24	31.637		
10,200.00	6,988.70	5,494.00	5,493.16	60.11	112.30	65.09	-134.34	86.24	4,208.00	4,076.27	131.72	31.946		
10,300.00	6,988.63	5,494.00	5,493.16	61.11	112.30	65.09	-134.34	86.24	4,265.40	4,133.20	132.20	32.265		
10,400.00	6,988.56	5,494.00	5,493.16	62.14	112.30	65.09	-134.34	86.24	4,324.35	4,191.67	132.67	32.594		
10,500.00	6,988.49	5,494.00	5,493.16	63.19	112.30	65.09	-134.34	86.24	4,384.78	4,251.65	133.14	32.934		
10,600.00	6,988.42	5,494.00	5,493.16	64.26	112.30	65.09	-134.34	86.24	4,446.65	4,313.05	133.60	33.284		
10,700.00	6,988.35	5,494.00	5,493.16	65.36	112.30	65.09	-134.34	86.24	4,509.88	4,375.83	134.05	33.644		
10,800.00	6,988.28	5,494.00	5,493.16	66.48	112.30	65.09	-134.34	86.24	4,574.43	4,439.94	134.49	34.013		
10,900.00	6,988.21	5,494.00	5,493.16	67.61	112.30	65.09	-134.34	86.24	4,640.23	4,505.30	134.93	34.391		
11,000.00	6,988.14	5,494.00	5,493.16	68.77	112.30	65.09	-134.34	86.24	4,707.24	4,571.89	135.35	34.777		
11,100.00	6,988.07	5,494.00	5,493.16	69.95	112.30	65.09	-134.34	86.24	4,775.40	4,639.63	135.77	35.173		
11,200.00	6,988.01	5,494.00	5,493.16	71.14	112.30	65.09	-134.34	86.24	4,844.67	4,708.49	136.18	35.576		
11,300.00	6,987.94	5,494.00	5,493.16	72.35	112.30	65.09	-134.34	86.24	4,914.99	4,778.42	136.57	35.988		
11,400.00	6,987.87	5,494.00	5,493.16	73.57	112.30	65.09	-134.34	86.24	4,986.33	4,849.37	136.96	36.407		
11,500.00	6,987.80	5,494.00	5,493.16	74.81	112.30	65.09	-134.34	86.24	5,058.64	4,921.31	137.34	36.833		
11,600.00	6,987.73	5,494.00	5,493.16	76.07	112.30	65.09	-134.34	86.24	5,131.88	4,994.18	137.71	37.267		
11,643.87	6,987.70	5,494.00	5,493.16	76.62	112.30	65.09	-134.34	86.24	5,164.29	5,026.43	137.86	37.459		
11,700.00	6,987.66	5,494.00	5,493.16	77.33	112.30	65.60	-134.34	86.24	5,205.68	5,067.62	138.06	37.705		
11,737.27	6,987.63	5,494.00	5,493.16	77.80	112.30	65.93	-134.34	86.24	5,232.93	5,094.74	138.19	37.866		
11,800.00	6,987.59	5,494.00	5,493.16	78.59	112.30	65.93	-134.34	86.24	5,278.84	5,140.42	138.41	38.138		
11,900.00	6,987.52	5,494.00	5,493.16	79.86	112.30	65.93	-134.34	86.24	5,352.72	5,213.96	138.76	38.576		
12,000.00	6,987.46	5,494.00	5,493.16	81.14	112.30	65.93	-134.34	86.24	5,427.43	5,288.34	139.09	39.021		
12,100.00	6,987.39	5,494.00	5,493.16	82.43	112.30	65.93	-134.34	86.24	5,502.95	5,363.53	139.42	39.471		
12,200.00	6,987.32	5,494.00	5,493.16	83.73	112.30	65.93	-134.34	86.24	5,579.24	5,439.50	139.73	39.928		
12,300.00	6,987.26	5,494.00	5,493.16	85.05	112.30	65.93	-134.34	86.24	5,656.27	5,516.22	140.04	40.390		
12,400.00	6,987.19	5,494.00	5,493.16	86.38	112.30	65.93	-134.34	86.24	5,734.00	5,593.66	140.34	40.857		
12,500.00	6,987.12	5,494.00	5,493.16	87.71	112.30	65.93	-134.34	86.24	5,812.42	5,671.78	140.64	41.329		
12,600.00	6,987.06	5,494.00	5,493.16	89.06	112.30	65.93	-134.34	86.24	5,891.49	5,750.57	140.92	41.807		
12,700.00	6,986.99	5,494.00	5,493.16	90.41	112.30	65.93	-134.34	86.24	5,971.19	5,829.99	141.20	42.289		
12,800.00	6,986.92	5,494.00	5,493.16	91.77	112.30	65.93	-134.34	86.24	6,051.49	5,910.02	141.47	42.775		
12,900.00	6,986.86	5,494.00	5,493.16	93.14	112.30	65.93	-134.34	86.24	6,132.37	5,990.64	141.73	43.267		
13,000.00	6,986.79	5,494.00	5,493.16	94.52	112.30	65.93	-134.34	86.24	6,213.81	6,071.82	141.99	43.762		
13,100.00	6,986.72	5,494.00	5,493.16	95.90	112.30	65.93	-134.34	86.24	6,295.78	6,153.54	142.24	44.261		
13,200.00	6,986.66	5,494.00	5,493.16	97.30	112.30	65.93	-134.34	86.24	6,378.27	6,235.78	142.49	44.764		
13,300.00	6,986.59	5,494.00	5,493.16	98.69	112.30	65.93	-134.34	86.24	6,461.25	6,318.53	142.72	45.271		
13,400.00	6,986.52	5,494.00	5,493.16	100.10	112.30	65.93	-134.34	86.24	6,544.71	6,401.75	142.96	45.781		
13,500.00	6,986.46	5,494.00	5,493.16	101.51	112.30	65.93	-134.34	86.24	6,628.62	6,485.44	143.18	46.295		
13,600.00	6,986.39	5,494.00	5,493.16	102.93	112.30	65.93	-134.34	86.24	6,712.98	6,569.58	143.40	46.811		
13,700.00	6,986.32	5,494.00	5,493.16	104.35	112.30	65.93	-134.34	86.24	6,797.76	6,654.14	143.62	47.331		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #46 - OH - OH-INC												Offset Site Error: 0.00 usft	
Survey Program: Reference		60-A027Ua_INC-ONLY Offset				Rule Assigned:				Offset Well Error: 0.00 usft			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,800.00	6,986.25	5,494.00	5,493.16	105.78	112.30	65.93	-134.34	86.24	6,882.95	6,739.12	143.83	47.854	
13,900.00	6,986.19	5,494.00	5,493.16	107.21	112.30	65.93	-134.34	86.24	6,968.53	6,824.49	144.04	48.380	
14,000.00	6,986.12	5,494.00	5,493.16	108.65	112.30	65.93	-134.34	86.24	7,054.49	6,910.25	144.24	48.908	
14,100.00	6,986.05	5,494.00	5,493.16	110.09	112.30	65.93	-134.34	86.24	7,140.82	6,996.38	144.44	49.439	
14,200.00	6,985.99	5,494.00	5,493.16	111.54	112.30	65.93	-134.34	86.24	7,227.50	7,082.87	144.63	49.973	
14,300.00	6,985.92	5,494.00	5,493.16	112.99	112.30	65.93	-134.34	86.24	7,314.52	7,169.70	144.82	50.508	
14,400.00	6,985.85	5,494.00	5,493.16	114.45	112.30	65.93	-134.34	86.24	7,401.87	7,256.87	145.00	51.047	
14,500.00	6,985.79	5,494.00	5,493.16	115.91	112.30	65.93	-134.34	86.24	7,489.53	7,344.35	145.18	51.587	
14,600.00	6,985.72	5,494.00	5,493.16	117.38	112.30	65.93	-134.34	86.24	7,577.50	7,432.14	145.36	52.129	
14,700.00	6,985.65	5,494.00	5,493.16	118.84	112.30	65.93	-134.34	86.24	7,665.77	7,520.23	145.53	52.673	
14,800.00	6,985.59	5,494.00	5,493.16	120.32	112.30	65.93	-134.34	86.24	7,754.32	7,608.61	145.70	53.219	
14,900.00	6,985.52	5,494.00	5,493.16	121.79	112.30	65.93	-134.34	86.24	7,843.14	7,697.27	145.87	53.767	
15,000.00	6,985.45	5,494.00	5,493.16	123.27	112.30	65.93	-134.34	86.24	7,932.23	7,786.20	146.04	54.317	
15,100.00	6,985.39	5,494.00	5,493.16	124.75	112.30	65.93	-134.34	86.24	8,021.58	7,875.38	146.20	54.868	
15,200.00	6,985.32	5,494.00	5,493.16	126.24	112.30	65.93	-134.34	86.24	8,111.18	7,964.82	146.36	55.421	
15,300.00	6,985.25	5,494.00	5,493.16	127.72	112.30	65.93	-134.34	86.24	8,201.01	8,054.50	146.51	55.975	
15,400.00	6,985.19	5,494.00	5,493.16	129.21	112.30	65.93	-134.34	86.24	8,291.08	8,144.42	146.66	56.531	
15,500.00	6,985.12	5,494.00	5,493.16	130.71	112.30	65.93	-134.34	86.24	8,381.38	8,234.56	146.81	57.088	
15,600.00	6,985.05	5,494.00	5,493.16	132.20	112.30	65.93	-134.34	86.24	8,471.89	8,324.93	146.96	57.646	
15,700.00	6,984.99	5,494.00	5,493.16	133.70	112.30	65.93	-134.34	86.24	8,562.62	8,415.51	147.11	58.206	
15,800.00	6,984.92	5,494.00	5,493.16	135.20	112.30	65.93	-134.34	86.24	8,653.55	8,506.29	147.25	58.767	
15,900.00	6,984.85	5,494.00	5,493.16	136.71	112.30	65.93	-134.34	86.24	8,744.67	8,597.28	147.39	59.329	
16,000.00	6,984.79	5,494.00	5,493.16	138.21	112.30	65.93	-134.34	86.24	8,835.99	8,688.46	147.53	59.891	
16,100.00	6,984.72	5,494.00	5,493.16	139.72	112.30	65.93	-134.34	86.24	8,927.50	8,779.82	147.67	60.455	
16,200.00	6,984.65	5,494.00	5,493.16	141.23	112.30	65.93	-134.34	86.24	9,019.18	8,871.37	147.81	61.020	
16,300.00	6,984.59	5,494.00	5,493.16	142.75	112.30	65.93	-134.34	86.24	9,111.04	8,963.10	147.94	61.586	
16,400.00	6,984.52	5,494.00	5,493.16	144.26	112.30	65.93	-134.34	86.24	9,203.07	9,055.00	148.07	62.152	
16,500.00	6,984.45	5,494.00	5,493.16	145.78	112.30	65.93	-134.34	86.24	9,295.27	9,147.06	148.20	62.719	
16,600.00	6,984.39	5,494.00	5,493.16	147.29	112.30	65.93	-134.34	86.24	9,387.62	9,239.29	148.33	63.287	
16,700.00	6,984.32	5,494.00	5,493.16	148.82	112.30	65.93	-134.34	86.24	9,480.13	9,331.67	148.46	63.856	
16,800.00	6,984.25	5,494.00	5,493.16	150.34	112.30	65.93	-134.34	86.24	9,572.79	9,424.20	148.59	64.425	
16,900.00	6,984.19	5,494.00	5,493.16	151.86	112.30	65.93	-134.34	86.24	9,665.59	9,516.88	148.71	64.995	
17,000.00	6,984.12	5,494.00	5,493.16	153.39	112.30	65.93	-134.34	86.24	9,758.54	9,609.71	148.84	65.565	
17,100.00	6,984.05	5,494.00	5,493.16	154.91	112.30	65.93	-134.34	86.24	9,851.63	9,702.67	148.96	66.136	
17,200.00	6,983.99	5,494.00	5,493.16	156.44	112.30	65.93	-134.34	86.24	9,944.85	9,795.77	149.08	66.708	
17,300.00	6,983.92	5,494.00	5,493.16	157.97	112.30	65.93	-134.34	86.24	10,038.20	9,889.00	149.20	67.280	
17,400.00	6,983.85	5,494.00	5,493.16	159.50	112.30	65.93	-134.34	86.24	10,131.68	9,982.36	149.32	67.852	
17,500.00	6,983.79	5,494.00	5,493.16	161.04	112.30	65.93	-134.34	86.24	10,225.28	10,075.84	149.44	68.425	
17,600.00	6,983.72	5,494.00	5,493.16	162.57	112.30	65.93	-134.34	86.24	10,319.00	10,169.45	149.55	68.998	
17,700.00	6,983.65	5,494.00	5,493.16	164.11	112.30	65.93	-134.34	86.24	10,412.84	10,263.17	149.67	69.572	
17,800.00	6,983.59	5,494.00	5,493.16	165.65	112.30	65.93	-134.34	86.24	10,506.79	10,357.01	149.79	70.145	
17,900.00	6,983.52	5,494.00	5,493.16	167.18	112.30	65.93	-134.34	86.24	10,600.86	10,450.96	149.90	70.719	
18,000.00	6,983.45	5,494.00	5,493.16	168.72	112.30	65.93	-134.34	86.24	10,695.03	10,545.01	150.01	71.293	
18,100.00	6,983.39	5,494.00	5,493.16	170.27	112.30	65.93	-134.34	86.24	10,789.30	10,639.18	150.13	71.868	
18,200.00	6,983.32	5,494.00	5,493.16	171.81	112.30	65.93	-134.34	86.24	10,883.68	10,733.44	150.24	72.442	
18,300.00	6,983.25	5,494.00	5,493.16	173.35	112.30	65.93	-134.34	86.24	10,978.16	10,827.81	150.35	73.017	
18,400.00	6,983.19	5,494.00	5,493.16	174.90	112.30	65.93	-134.34	86.24	11,072.73	10,922.27	150.46	73.592	
18,500.00	6,983.12	5,494.00	5,493.16	176.44	112.30	65.93	-134.34	86.24	11,167.40	11,016.83	150.57	74.167	
18,600.00	6,983.05	5,494.00	5,493.16	177.99	112.30	65.93	-134.34	86.24	11,262.16	11,111.48	150.68	74.742	
18,700.00	6,982.99	5,494.00	5,493.16	179.54	112.30	65.93	-134.34	86.24	11,357.01	11,206.22	150.79	75.317	
18,800.00	6,982.92	5,494.00	5,493.16	181.09	112.30	65.93	-134.34	86.24	11,451.95	11,301.05	150.90	75.892	
18,900.00	6,982.85	5,494.00	5,493.16	182.64	112.30	65.93	-134.34	86.24	11,546.97	11,395.97	151.01	76.467	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #46 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 60-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,000.00	6,982.78	5,494.00	5,493.16	184.19	112.30	65.93	-134.34	86.24	11,642.08	11,490.97	151.11	77.042	
19,100.00	6,982.72	5,494.00	5,493.16	185.74	112.30	65.93	-134.34	86.24	11,737.27	11,586.05	151.22	77.617	
19,200.00	6,982.65	5,494.00	5,493.16	187.29	112.30	65.93	-134.34	86.24	11,832.54	11,681.21	151.33	78.192	
19,300.00	6,982.58	5,494.00	5,493.16	188.84	112.30	65.93	-134.34	86.24	11,927.88	11,776.45	151.43	78.767	
19,400.00	6,982.52	5,494.00	5,493.16	190.40	112.30	65.93	-134.34	86.24	12,023.30	11,871.76	151.54	79.342	
19,500.00	6,982.45	5,494.00	5,493.16	191.95	112.30	65.93	-134.34	86.24	12,118.80	11,967.15	151.64	79.917	
19,600.00	6,982.38	5,494.00	5,493.16	193.51	112.30	65.93	-134.34	86.24	12,214.36	12,062.62	151.75	80.491	
19,700.00	6,982.32	5,494.00	5,493.16	195.07	112.30	65.93	-134.34	86.24	12,310.00	12,158.15	151.85	81.065	
19,800.00	6,982.25	5,494.00	5,493.16	196.62	112.30	65.93	-134.34	86.24	12,405.71	12,253.75	151.96	81.640	
19,900.00	6,982.18	5,494.00	5,493.16	198.18	112.30	65.93	-134.34	86.24	12,501.48	12,349.42	152.06	82.214	
20,000.00	6,982.12	5,494.00	5,493.16	199.74	112.30	65.93	-134.34	86.24	12,597.32	12,445.16	152.16	82.788	
20,100.00	6,982.05	5,494.00	5,493.16	201.30	112.30	65.93	-134.34	86.24	12,693.22	12,540.95	152.27	83.361	
20,176.02	6,982.00	5,494.00	5,493.16	202.36	112.30	65.93	-134.34	86.24	12,766.17	12,610.49	155.68	82.003	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #80B - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 300-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-109.11	-855.46	-2,469.62	2,614.37				
100.00	100.00	34.47	34.47	0.25	0.36	-109.11	-855.47	-2,469.62	2,613.59	2,612.98	0.61	4,271.621	
200.00	200.00	130.22	130.22	0.61	1.37	-109.11	-855.61	-2,469.72	2,613.73	2,611.76	1.97	1,325.199	
300.00	300.00	225.98	225.97	0.97	2.37	-109.11	-855.92	-2,469.92	2,614.03	2,610.70	3.33	784.334	
400.00	400.00	321.68	321.68	1.33	3.19	-109.12	-856.39	-2,470.22	2,614.50	2,609.99	4.51	579.652	
500.00	500.00	641.06	639.79	1.68	3.59	-108.70	-834.57	-2,465.27	2,610.67	2,605.51	5.16	505.552	
600.00	600.00	779.24	775.53	2.04	3.86	-108.20	-809.16	-2,461.15	2,601.81	2,596.13	5.67	458.574	
700.00	699.98	861.40	855.39	2.40	4.05	-98.01	-789.93	-2,459.81	2,593.07	2,586.91	6.16	420.936	
800.00	799.84	941.07	932.15	2.76	4.28	-97.79	-768.65	-2,460.07	2,585.72	2,579.04	6.68	386.917	
900.00	899.45	1,014.65	1,002.24	3.13	4.52	-97.56	-746.32	-2,461.92	2,579.87	2,572.64	7.23	356.586	
1,000.00	998.70	1,094.59	1,077.45	3.49	4.80	-97.26	-719.46	-2,465.35	2,575.34	2,567.49	7.85	328.126	
1,100.00	1,097.47	1,163.77	1,141.77	3.86	5.06	-96.99	-694.34	-2,469.57	2,572.29	2,563.81	8.48	303.339	
1,194.61	1,190.35	1,214.75	1,188.91	4.22	5.24	-96.78	-675.37	-2,473.56	2,571.24	2,562.19	9.06	283.849	
1,200.00	1,195.62	1,217.26	1,191.23	4.24	5.25	-96.77	-674.44	-2,473.78	2,571.25	2,562.16	9.09	282.858	
1,300.00	1,293.06	1,397.50	1,358.40	4.64	5.95	-96.17	-608.44	-2,487.12	2,570.68	2,560.36	10.32	249.181	
1,400.00	1,389.64	1,475.07	1,429.44	5.06	6.29	-95.95	-577.76	-2,492.35	2,568.83	2,557.69	11.14	230.495	
1,500.00	1,485.27	1,603.46	1,547.10	5.50	6.88	-95.65	-527.11	-2,501.03	2,567.54	2,555.25	12.29	208.919	
1,515.00	1,499.52	1,643.04	1,582.89	5.57	7.08	-95.55	-510.39	-2,503.47	2,567.15	2,554.56	12.59	203.840	
1,600.00	1,580.22	1,716.31	1,648.44	5.96	7.50	-95.32	-478.02	-2,508.21	2,564.89	2,551.43	13.46	190.588	
1,700.00	1,675.17	1,795.15	1,717.98	6.44	8.04	-95.02	-441.37	-2,514.35	2,562.93	2,548.45	14.48	177.053	
1,800.00	1,770.11	1,916.62	1,826.75	6.92	8.85	-94.64	-387.99	-2,522.77	2,560.89	2,545.12	15.77	162.398	
1,900.00	1,865.05	2,007.13	1,907.83	7.41	9.47	-94.36	-348.26	-2,529.04	2,558.96	2,542.08	16.87	151.661	
2,000.00	1,959.99	2,187.54	2,072.18	7.90	10.63	-93.95	-274.28	-2,535.81	2,554.16	2,535.65	18.51	137.970	
2,100.00	2,054.94	2,253.49	2,133.00	8.40	11.03	-93.84	-248.82	-2,537.81	2,549.90	2,530.48	19.42	131.313	
2,200.00	2,149.88	2,340.24	2,213.63	8.90	11.53	-93.74	-216.98	-2,540.78	2,546.52	2,526.09	20.43	124.659	
2,300.00	2,244.82	2,450.51	2,317.03	9.41	12.14	-93.66	-178.82	-2,543.99	2,543.16	2,521.62	21.54	118.068	
2,400.00	2,339.76	2,555.82	2,416.60	9.92	12.69	-93.64	-144.61	-2,546.36	2,539.68	2,517.09	22.59	112.404	
2,500.00	2,434.71	2,644.75	2,501.30	10.43	13.12	-93.67	-117.56	-2,547.86	2,536.14	2,512.60	23.54	107.734	
2,600.00	2,529.65	2,741.77	2,594.40	10.94	13.56	-93.75	-90.31	-2,549.05	2,532.72	2,508.22	24.49	103.403	
2,700.00	2,624.59	2,829.37	2,679.01	11.45	13.92	-93.87	-67.64	-2,549.97	2,529.67	2,504.30	25.38	99.680	
2,800.00	2,719.53	2,921.19	2,768.19	11.97	14.28	-94.04	-45.84	-2,551.36	2,527.56	2,501.31	26.25	96.276	
2,900.00	2,814.48	2,991.77	2,837.22	12.49	14.52	-94.22	-31.10	-2,551.92	2,525.58	2,498.57	27.02	93.483	
3,000.00	2,909.42	3,086.84	2,930.67	13.01	14.81	-94.52	-13.74	-2,552.97	2,524.54	2,496.71	27.83	90.728	
3,100.00	3,004.36	3,165.13	3,030.05	13.53	15.01	-94.82	-1.87	-2,553.59	2,524.05	2,495.50	28.55	88.421	
3,200.00	3,099.30	3,292.58	3,134.47	14.05	15.29	-95.38	14.34	-2,554.04	2,524.00	2,494.65	29.35	85.993	
3,300.00	3,194.25	3,376.50	3,217.84	14.57	15.47	-95.77	23.88	-2,553.68	2,523.55	2,493.51	30.04	83.999	
3,326.52	3,219.43	3,395.13	3,236.36	14.71	15.51	-95.86	25.93	-2,553.60	2,523.50	2,493.28	30.22	83.512 CC	
3,400.00	3,289.19	3,445.00	3,285.95	15.09	15.62	-96.11	31.11	-2,553.71	2,523.95	2,493.26	30.69	82.236	
3,500.00	3,384.13	3,517.43	3,358.05	15.62	15.79	-96.47	38.01	-2,554.27	2,525.53	2,494.20	31.33	80.604	
3,600.00	3,479.07	3,603.00	3,443.42	16.14	16.02	-96.95	43.78	-2,554.95	2,528.12	2,496.15	31.96	79.094	
3,700.00	3,574.02	3,674.75	3,515.10	16.67	16.22	-97.39	46.83	-2,555.66	2,531.78	2,499.24	32.54	77.815	
3,800.00	3,668.96	3,767.92	3,608.24	17.19	16.46	-97.99	49.17	-2,556.31	2,536.08	2,502.97	33.11	76.596	
3,900.00	3,763.90	3,863.59	3,703.89	17.72	21.39	-98.62	51.09	-2,556.82	2,540.70	2,502.22	38.49	66.014	
4,000.00	3,858.84	3,959.30	3,799.58	18.24	28.67	-99.25	52.98	-2,557.31	2,545.66	2,499.37	46.29	54.994	
4,100.00	3,953.79	4,054.99	3,895.25	18.77	35.96	-99.88	54.85	-2,557.79	2,550.93	2,496.84	54.09	47.159	
4,200.00	4,048.73	4,150.67	3,990.91	19.30	43.24	-100.50	56.70	-2,558.25	2,556.53	2,494.64	61.89	41.305	
4,300.00	4,143.67	4,246.33	4,086.55	19.82	50.52	-101.12	58.52	-2,558.70	2,562.46	2,492.76	69.69	36.767	
4,400.00	4,238.61	4,341.97	4,182.17	20.35	57.80	-101.74	60.31	-2,559.13	2,568.70	2,491.21	77.49	33.148	
4,500.00	4,333.56	4,437.60	4,277.79	20.88	65.08	-102.36	62.08	-2,559.55	2,575.27	2,489.98	85.29	30.196	
4,600.00	4,428.50	4,533.21	4,373.38	21.41	72.36	-102.97	63.83	-2,559.96	2,582.16	2,489.08	93.08	27.742	
4,700.00	4,523.44	4,628.81	4,468.96	21.93	79.63	-103.59	65.55	-2,560.35	2,589.36	2,488.49	100.87	25.671	
4,800.00	4,618.38	4,724.39	4,564.52	22.46	86.91	-104.20	67.25	-2,560.73	2,596.88	2,488.23	108.65	23.901 ES	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #80B - OH - OH-SVY											Offset Site Error: 0.00 usft
Survey Program: 300-MWD OWSG Rev5											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
4,900.00	4,713.33	4,819.95	4,660.07	22.99	94.18	-104.80	68.92	-2,561.09	2,604.71	2,488.28	
5,000.00	4,808.27	4,915.49	4,755.60	23.52	101.46	-105.41	70.57	-2,561.44	2,612.85	2,488.64	
5,100.00	4,903.21	5,011.02	4,851.12	24.05	108.73	-106.01	72.19	-2,561.77	2,621.31	2,489.32	
5,200.00	4,998.16	5,106.54	4,946.62	24.58	116.00	-106.61	73.79	-2,562.09	2,630.07	2,490.31	
5,300.00	5,093.10	5,202.04	5,042.10	25.11	123.27	-107.20	75.37	-2,562.39	2,639.13	2,491.61	
5,400.00	5,188.04	5,297.52	5,137.57	25.64	130.54	-107.79	76.92	-2,562.68	2,648.50	2,493.21	
5,500.00	5,282.98	5,392.98	5,233.02	26.17	137.80	-108.38	78.45	-2,562.96	2,658.18	2,495.12	
5,600.00	5,377.93	5,488.43	5,328.46	26.70	145.07	-108.96	79.95	-2,563.22	2,668.15	2,497.33	
5,623.25	5,400.00	5,510.62	5,350.64	26.82	146.76	-109.10	80.29	-2,563.28	2,670.51	2,497.89	
5,700.00	5,473.03	5,584.01	5,424.03	27.22	152.35	-109.61	81.43	-2,563.47	2,678.24	2,499.66	
5,800.00	5,568.64	5,680.07	5,520.07	27.73	159.66	-110.24	82.89	-2,563.70	2,688.04	2,501.67	
5,900.00	5,664.75	5,776.57	5,616.57	28.23	167.00	-110.83	84.34	-2,563.92	2,697.47	2,503.30	
6,000.00	5,761.33	5,873.51	5,713.49	28.71	174.38	-111.39	85.76	-2,564.13	2,706.49	2,504.49	
6,100.00	5,858.34	5,970.85	5,810.82	29.18	181.79	-111.91	87.17	-2,564.32	2,715.06	2,505.21	
6,200.00	5,955.76	6,068.56	5,908.52	29.64	189.23	-112.39	88.56	-2,564.50	2,723.13	2,505.43	
6,300.00	6,053.57	6,166.61	6,006.56	30.07	196.70	-112.83	89.93	-2,564.67	2,730.66	2,505.09	
6,400.00	6,151.72	6,264.97	6,104.92	30.50	204.18	-113.23	91.28	-2,564.82	2,737.64	2,504.18	
6,500.00	6,250.19	6,363.62	6,203.56	30.91	211.69	-113.60	92.60	-2,564.95	2,744.01	2,502.66	
6,600.00	6,348.94	6,462.54	6,302.46	31.30	219.21	-113.92	93.90	-2,565.07	2,749.76	2,500.53	
6,659.67	6,408.00	6,521.88	6,361.80	31.53	222.43	-114.10	94.68	-2,565.14	2,752.89	2,500.22	
6,700.00	6,447.82	6,561.90	6,401.82	31.68	224.60	-130.62	95.21	-2,565.19	2,756.17	2,501.19	
6,750.00	6,496.66	6,611.03	6,450.94	31.90	227.26	-141.91	95.87	-2,565.25	2,763.71	2,505.88	
6,800.00	6,544.65	6,659.33	6,499.24	32.13	229.88	-148.22	96.52	-2,565.31	2,775.06	2,514.41	
6,850.00	6,591.49	6,706.52	6,546.42	32.37	232.44	-152.09	97.16	-2,565.36	2,790.14	2,526.73	
6,900.00	6,636.89	6,752.29	6,592.19	32.62	234.92	-154.59	97.79	-2,565.42	2,808.87	2,542.78	
6,950.00	6,680.57	6,796.38	6,636.27	32.89	237.31	-156.25	98.40	-2,565.48	2,831.14	2,562.46	
7,000.00	6,722.26	6,838.50	6,678.39	33.17	239.60	-157.33	98.99	-2,565.53	2,856.80	2,585.65	
7,050.00	6,761.71	6,878.40	6,718.29	33.45	241.76	-157.97	99.55	-2,565.58	2,885.72	2,612.21	
7,100.00	6,798.67	6,915.83	6,755.71	33.75	243.79	-158.25	100.08	-2,565.63	2,917.70	2,641.98	
7,150.00	6,832.91	6,950.56	6,790.44	34.06	245.67	-158.18	100.57	-2,565.68	2,952.57	2,674.79	
7,200.00	6,864.22	6,982.38	6,822.26	34.37	247.40	-157.76	101.03	-2,565.72	2,990.09	2,710.42	
7,250.00	6,892.42	7,011.09	6,850.96	34.69	248.95	-156.94	101.45	-2,565.76	3,030.04	2,748.66	
7,300.00	6,917.32	7,036.52	6,876.39	35.03	250.33	-155.61	101.81	-2,565.80	3,072.17	2,789.28	
7,350.00	6,938.77	7,058.50	6,898.36	35.37	251.52	-153.58	102.13	-2,565.83	3,116.23	2,832.02	
7,400.00	6,956.64	7,076.90	6,916.76	35.72	252.52	-150.50	102.40	-2,565.85	3,161.94	2,876.62	
7,450.00	6,970.83	7,091.60	6,931.47	36.07	253.32	-145.71	102.62	-2,565.87	3,209.01	2,922.79	
7,500.00	6,981.23	7,102.52	6,942.39	36.44	253.91	-137.82	102.78	-2,565.89	3,257.15	2,970.26	
7,550.00	6,987.80	7,109.59	6,949.45	36.81	254.29	-123.92	102.88	-2,565.90	3,306.07	3,018.73	
7,600.00	6,990.48	7,112.76	6,952.62	37.19	254.46	-99.28	102.93	-2,565.90	3,355.45	3,067.89	
7,609.87	6,990.55	7,112.92	6,952.78	37.26	254.47	-93.02	102.93	-2,565.90	3,365.22	3,077.64	
7,700.00	6,990.49	7,113.71	6,953.57	37.97	254.52	-93.12	102.94	-2,565.90	3,454.56	3,166.86	
7,800.00	6,990.42	7,114.59	6,954.45	38.78	254.56	-93.23	102.96	-2,565.90	3,553.72	3,265.88	
7,900.00	6,990.35	7,115.46	6,955.33	39.64	254.61	-93.34	102.97	-2,565.91	3,652.92	3,364.96	
8,000.00	6,990.28	7,116.34	6,956.20	40.53	254.66	-93.45	102.98	-2,565.91	3,752.17	3,464.08	
8,100.00	6,990.21	7,117.22	6,957.08	41.45	254.71	-93.56	102.99	-2,565.91	3,851.45	3,563.24	
8,200.00	6,990.14	7,118.09	6,957.95	42.40	254.75	-93.67	103.01	-2,565.91	3,950.77	3,662.44	
8,306.37	6,990.06	7,119.03	6,958.89	43.45	254.80	-93.79	103.02	-2,565.91	4,056.45	3,768.00	
8,400.00	6,990.00	7,119.81	6,959.67	44.38	254.85	-99.40	103.03	-2,565.91	4,149.78	3,861.23	
8,500.00	6,989.93	7,120.57	6,960.43	45.36	254.89	-106.28	103.04	-2,565.91	4,249.76	3,961.14	
8,600.00	6,989.85	7,121.23	6,961.09	46.33	254.92	-94.50	103.05	-2,565.91	4,349.56	4,060.91	
8,700.00	6,989.78	7,121.81	6,961.67	47.28	254.95	-92.62	103.06	-2,565.91	4,448.72	4,160.09	
8,800.00	6,989.70	7,122.28	6,962.14	48.21	254.98	-91.86	103.07	-2,565.91	4,546.84	4,258.24	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #80B - OH - OH-SVY											Offset Site Error: 0.00 usft			
Survey Program: Reference		300-MWD OWSG Rev5 Offset				Semi Major Axis		Offset Wellbore Centre		Rule Assigned: Distance			Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,900.00	6,989.63	7,122.66	6,962.52	49.11	255.00	91.45	103.07	-2,565.92	4,643.50	4,354.96	288.54	16.093		
9,000.00	6,989.55	7,122.94	6,962.80	49.99	255.02	91.18	103.08	-2,565.92	4,738.34	4,449.89	288.45	16.427		
9,100.00	6,989.48	7,123.12	6,962.98	50.84	255.03	91.01	103.08	-2,565.92	4,831.01	4,542.68	288.33	16.755		
9,200.00	6,989.40	7,123.20	6,963.06	51.66	255.03	90.87	103.08	-2,565.92	4,921.21	4,633.01	288.20	17.076		
9,300.00	6,989.33	7,123.17	6,963.03	52.45	255.03	90.77	103.08	-2,565.92	5,008.64	4,720.59	288.05	17.388		
9,393.87	6,989.27	7,123.05	6,962.91	53.15	255.02	90.70	103.08	-2,565.92	5,087.94	4,800.04	287.89	17.673		
9,400.00	6,989.26	7,123.04	6,962.90	53.20	255.02	90.70	103.08	-2,565.92	5,093.03	4,805.15	287.88	17.691		
9,500.00	6,989.19	7,122.87	6,962.73	53.95	255.01	90.70	103.08	-2,565.92	5,176.34	4,888.62	287.72	17.991		
9,600.00	6,989.12	7,122.70	6,962.56	54.73	255.00	90.69	103.07	-2,565.92	5,260.24	4,972.67	287.57	18.292		
9,700.00	6,989.05	7,122.52	6,962.38	55.55	254.99	90.69	103.07	-2,565.92	5,344.68	5,057.25	287.43	18.595		
9,800.00	6,988.98	7,122.35	6,962.21	56.40	254.98	90.69	103.07	-2,565.92	5,429.66	5,142.36	287.30	18.899		
9,900.00	6,988.91	7,122.18	6,962.04	57.28	254.97	90.68	103.07	-2,565.91	5,515.14	5,227.96	287.18	19.205		
10,000.00	6,988.84	7,122.00	6,961.87	58.20	254.96	90.68	103.06	-2,565.91	5,601.10	5,314.04	287.07	19.512		
10,100.00	6,988.77	7,121.83	6,961.69	59.14	254.96	90.68	103.06	-2,565.91	5,687.52	5,400.56	286.96	19.820		
10,200.00	6,988.70	7,121.66	6,961.52	60.11	254.95	90.67	103.06	-2,565.91	5,774.38	5,487.52	286.86	20.129		
10,300.00	6,988.63	7,121.49	6,961.35	61.11	254.94	90.67	103.06	-2,565.91	5,861.66	5,574.89	286.77	20.440		
10,400.00	6,988.56	7,121.31	6,961.17	62.14	254.93	90.67	103.05	-2,565.91	5,949.34	5,662.65	286.69	20.752		
10,500.00	6,988.49	7,121.14	6,961.00	63.19	254.92	90.66	103.05	-2,565.91	6,037.40	5,750.79	286.62	21.064		
10,600.00	6,988.42	7,120.97	6,960.83	64.26	254.91	90.66	103.05	-2,565.91	6,125.83	5,839.28	286.55	21.378		
10,700.00	6,988.35	7,120.79	6,960.65	65.36	254.90	90.65	103.05	-2,565.91	6,214.61	5,928.13	286.48	21.693		
10,800.00	6,988.28	7,120.62	6,960.48	66.48	254.89	90.65	103.04	-2,565.91	6,303.72	6,017.30	286.42	22.008		
10,900.00	6,988.21	7,120.45	6,960.31	67.61	254.88	90.65	103.04	-2,565.91	6,393.16	6,106.79	286.37	22.325		
11,000.00	6,988.14	7,120.27	6,960.14	68.77	254.87	90.64	103.04	-2,565.91	6,482.91	6,196.58	286.32	22.642		
11,100.00	6,988.07	7,120.10	6,959.96	69.95	254.86	90.64	103.04	-2,565.91	6,572.95	6,286.66	286.28	22.960		
11,200.00	6,988.01	7,119.93	6,959.79	71.14	254.85	90.64	103.03	-2,565.91	6,663.27	6,377.03	286.24	23.278		
11,300.00	6,987.94	7,119.76	6,959.62	72.35	254.84	90.63	103.03	-2,565.91	6,753.87	6,467.66	286.21	23.598		
11,400.00	6,987.87	7,119.58	6,959.44	73.57	254.83	90.63	103.03	-2,565.91	6,844.73	6,558.55	286.18	23.917		
11,500.00	6,987.80	7,119.41	6,959.27	74.81	254.82	90.63	103.03	-2,565.91	6,935.84	6,649.69	286.16	24.238		
11,600.00	6,987.73	7,119.24	6,959.10	76.07	254.81	90.62	103.02	-2,565.91	7,027.20	6,741.06	286.14	24.559		
11,643.87	6,987.70	7,119.16	6,959.02	76.62	254.81	90.62	103.02	-2,565.91	7,067.34	6,781.21	286.13	24.700		
11,700.00	6,987.66	7,119.06	6,958.92	77.33	254.80	90.60	103.02	-2,565.91	7,118.56	6,832.44	286.12	24.880		
11,737.27	6,987.63	7,118.98	6,958.84	77.80	254.80	90.58	103.02	-2,565.91	7,152.35	6,866.24	286.11	24.999		
11,800.00	6,987.59	7,118.84	6,958.70	78.59	254.79	90.58	103.02	-2,565.91	7,209.14	6,923.05	286.10	25.198		
11,900.00	6,987.52	7,118.62	6,958.48	79.86	254.78	90.57	103.01	-2,565.91	7,299.87	7,013.79	286.08	25.517		
12,000.00	6,987.46	7,118.41	6,958.27	81.14	254.77	90.57	103.01	-2,565.91	7,390.83	7,104.77	286.07	25.836		
12,100.00	6,987.39	7,118.19	6,958.05	82.43	254.76	90.57	103.01	-2,565.91	7,482.03	7,195.97	286.06	26.155		
12,200.00	6,987.32	7,117.97	6,957.83	83.73	254.75	90.56	103.01	-2,565.91	7,573.45	7,287.40	286.05	26.476		
12,300.00	6,987.26	7,117.75	6,957.61	85.05	254.73	90.56	103.00	-2,565.91	7,665.09	7,379.03	286.05	26.796		
12,400.00	6,987.19	7,117.53	6,957.39	86.38	254.72	90.55	103.00	-2,565.91	7,756.93	7,470.87	286.05	27.117		
12,500.00	6,987.12	7,117.32	6,957.18	87.71	254.71	90.55	103.00	-2,565.91	7,848.97	7,562.91	286.06	27.439		
12,600.00	6,987.06	7,117.10	6,956.96	89.06	254.70	90.54	102.99	-2,565.91	7,941.20	7,655.14	286.06	27.760		
12,700.00	6,986.99	7,116.88	6,956.74	90.41	254.69	90.54	102.99	-2,565.91	8,033.62	7,747.55	286.07	28.083		
12,800.00	6,986.92	7,116.66	6,956.52	91.77	254.68	90.54	102.99	-2,565.91	8,126.21	7,840.13	286.08	28.405		
12,900.00	6,986.86	7,116.44	6,956.31	93.14	254.66	90.53	102.98	-2,565.91	8,218.99	7,932.89	286.09	28.728		
13,000.00	6,986.79	7,116.23	6,956.09	94.52	254.65	90.53	102.98	-2,565.91	8,311.92	8,025.81	286.11	29.051		
13,100.00	6,986.72	7,116.01	6,955.87	95.90	254.64	90.52	102.98	-2,565.91	8,405.03	8,118.90	286.13	29.375		
13,200.00	6,986.66	7,115.79	6,955.65	97.30	254.63	90.52	102.97	-2,565.91	8,498.28	8,212.14	286.15	29.699		
13,300.00	6,986.59	7,115.57	6,955.43	98.69	254.62	90.52	102.97	-2,565.91	8,591.69	8,305.52	286.17	30.023		
13,400.00	6,986.52	7,115.35	6,955.22	100.10	254.60	90.51	102.97	-2,565.91	8,685.25	8,399.06	286.19	30.348		
13,500.00	6,986.46	7,115.14	6,955.00	101.51	254.59	90.51	102.96	-2,565.90	8,778.95	8,492.73	286.22	30.672		
13,600.00	6,986.39	7,114.92	6,954.78	102.93	254.58	90.50	102.96	-2,565.90	8,872.78	8,586.54	286.24	30.997		
13,700.00	6,986.32	7,114.70	6,954.56	104.35	254.57	90.50	102.96	-2,565.90	8,966.75	8,680.48	286.27	31.323		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #80B - OH - OH-SVY												Offset Site Error:	0.00 usft
Survey Program:		300-MWD OWSG Rev5						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
13,800.00	6,986.25	7,114.48	6,954.35	105.78	254.56	90.50	102.95	-2,565.90	9,060.85	8,774.55	286.30	31.648	
13,900.00	6,986.19	7,114.27	6,954.13	107.21	254.55	90.49	102.95	-2,565.90	9,155.07	8,868.74	286.33	31.974	
14,000.00	6,986.12	7,114.05	6,953.91	108.65	254.53	90.49	102.95	-2,565.90	9,249.42	8,963.05	286.37	32.299	
14,100.00	6,986.05	7,113.83	6,953.69	110.09	254.52	90.48	102.94	-2,565.90	9,343.88	9,057.48	286.40	32.625	
14,200.00	6,985.99	7,113.61	6,953.47	111.54	254.51	90.48	102.94	-2,565.90	9,438.46	9,152.02	286.44	32.951	
14,300.00	6,985.92	7,113.40	6,953.26	112.99	254.50	90.48	102.94	-2,565.90	9,533.14	9,246.67	286.47	33.278	
14,400.00	6,985.85	7,113.18	6,953.04	114.45	254.49	90.47	102.93	-2,565.90	9,627.94	9,341.43	286.51	33.604	
14,500.00	6,985.79	7,112.96	6,952.82	115.91	254.47	90.47	102.93	-2,565.90	9,722.84	9,436.29	286.55	33.931	
14,600.00	6,985.72	7,112.74	6,952.60	117.38	254.46	90.46	102.93	-2,565.90	9,817.84	9,531.24	286.59	34.257	
14,700.00	6,985.65	7,112.52	6,952.39	118.84	254.45	90.46	102.93	-2,565.90	9,912.93	9,626.30	286.63	34.584	
14,800.00	6,985.59	7,112.31	6,952.17	120.32	254.44	90.45	102.92	-2,565.90	10,008.13	9,721.45	286.68	34.911	
14,900.00	6,985.52	7,112.09	6,951.95	121.79	254.43	90.45	102.92	-2,565.90	10,103.41	9,816.69	286.72	35.238	
15,000.00	6,985.45	7,111.87	6,951.73	123.27	254.42	90.45	102.92	-2,565.90	10,198.79	9,912.03	286.77	35.565	
15,100.00	6,985.39	7,111.65	6,951.52	124.75	254.40	90.44	102.91	-2,565.90	10,294.26	10,007.44	286.81	35.892	
15,200.00	6,985.32	7,111.44	6,951.30	126.24	254.39	90.44	102.91	-2,565.90	10,389.81	10,102.95	286.86	36.219	
15,300.00	6,985.25	7,111.22	6,951.08	127.72	254.38	90.43	102.91	-2,565.90	10,485.44	10,198.53	286.91	36.546	
15,400.00	6,985.19	7,111.00	6,950.86	129.21	254.37	90.43	102.90	-2,565.90	10,581.15	10,294.20	286.96	36.874	
15,500.00	6,985.12	7,110.78	6,950.65	130.71	254.36	90.43	102.90	-2,565.90	10,676.95	10,389.94	287.01	37.201	
15,600.00	6,985.05	7,110.57	6,950.43	132.20	254.34	90.42	102.90	-2,565.90	10,772.81	10,485.76	287.06	37.529	
15,700.00	6,984.99	7,110.35	6,950.21	133.70	254.33	90.42	102.89	-2,565.90	10,868.76	10,581.65	287.11	37.856	
15,800.00	6,984.92	7,110.13	6,949.99	135.20	254.32	90.41	102.89	-2,565.90	10,964.77	10,677.61	287.16	38.183	
15,900.00	6,984.85	7,109.92	6,949.78	136.71	254.31	90.41	102.89	-2,565.90	11,060.86	10,773.64	287.21	38.511	
16,000.00	6,984.79	7,109.70	6,949.56	138.21	254.30	90.41	102.88	-2,565.90	11,157.01	10,869.75	287.27	38.838	
16,100.00	6,984.72	7,109.48	6,949.34	139.72	254.29	90.40	102.88	-2,565.90	11,253.24	10,965.91	287.32	39.166	
16,200.00	6,984.65	7,109.26	6,949.13	141.23	254.27	90.40	102.88	-2,565.90	11,349.52	11,062.14	287.38	39.493	
16,300.00	6,984.59	7,109.05	6,948.91	142.75	254.26	90.39	102.87	-2,565.90	11,445.87	11,158.44	287.44	39.821	
16,400.00	6,984.52	7,108.83	6,948.69	144.26	254.25	90.39	102.87	-2,565.90	11,542.29	11,254.80	287.49	40.148	
16,500.00	6,984.45	7,108.61	6,948.47	145.78	254.24	90.39	102.87	-2,565.90	11,638.76	11,351.21	287.55	40.476	
16,600.00	6,984.39	7,108.39	6,948.26	147.29	254.23	90.38	102.86	-2,565.90	11,735.29	11,447.69	287.61	40.803	
16,700.00	6,984.32	7,108.18	6,948.04	148.82	254.22	90.38	102.86	-2,565.90	11,831.88	11,544.22	287.67	41.130	
16,800.00	6,984.25	7,107.96	6,947.82	150.34	254.20	90.37	102.86	-2,565.89	11,928.53	11,640.80	287.73	41.458	
16,900.00	6,984.19	7,107.74	6,947.61	151.86	254.19	90.37	102.85	-2,565.89	12,025.23	11,737.44	287.79	41.785	
17,000.00	6,984.12	7,107.53	6,947.39	153.39	254.18	90.37	102.85	-2,565.89	12,121.99	11,834.14	287.85	42.112	
17,100.00	6,984.05	7,107.31	6,947.17	154.91	254.17	90.36	102.85	-2,565.89	12,218.79	11,930.88	287.91	42.439	
17,200.00	6,983.99	7,107.09	6,946.95	156.44	254.16	90.36	102.85	-2,565.89	12,315.65	12,027.68	287.97	42.766	
17,300.00	6,983.92	7,106.87	6,946.74	157.97	254.14	90.35	102.84	-2,565.89	12,412.56	12,124.52	288.04	43.094	
17,400.00	6,983.85	7,106.66	6,946.52	159.50	254.13	90.35	102.84	-2,565.89	12,509.52	12,221.42	288.10	43.421	
17,500.00	6,983.79	7,106.44	6,946.30	161.04	254.12	90.34	102.84	-2,565.89	12,606.52	12,318.36	288.17	43.747	
17,600.00	6,983.72	7,106.22	6,946.09	162.57	254.11	90.34	102.83	-2,565.89	12,703.57	12,415.34	288.23	44.074	
17,700.00	6,983.65	7,106.01	6,945.87	164.11	254.10	90.34	102.83	-2,565.89	12,800.67	12,512.37	288.30	44.401	
17,800.00	6,983.59	7,105.79	6,945.65	165.65	254.09	90.33	102.83	-2,565.89	12,897.81	12,609.45	288.36	44.728	
17,900.00	6,983.52	7,105.57	6,945.43	167.18	254.07	90.33	102.82	-2,565.89	12,994.99	12,706.56	288.43	45.054	
18,000.00	6,983.45	7,105.36	6,945.22	168.72	254.06	90.32	102.82	-2,565.89	13,092.22	12,803.72	288.50	45.381	
18,100.00	6,983.39	7,105.14	6,945.00	170.27	254.05	90.32	102.82	-2,565.89	13,189.49	12,900.92	288.56	45.707	
18,200.00	6,983.32	7,104.92	6,944.78	171.81	254.04	90.32	102.81	-2,565.89	13,286.79	12,998.16	288.63	46.034	
18,300.00	6,983.25	7,104.70	6,944.57	173.35	254.03	90.31	102.81	-2,565.89	13,384.14	13,095.44	288.70	46.360	
18,400.00	6,983.19	7,104.49	6,944.35	174.90	254.02	90.31	102.81	-2,565.89	13,481.53	13,192.76	288.77	46.686	
18,500.00	6,983.12	7,104.27	6,944.13	176.44	254.00	90.30	102.80	-2,565.89	13,578.95	13,290.11	288.84	47.012	
18,600.00	6,983.05	7,104.05	6,943.92	177.99	253.99	90.30	102.80	-2,565.89	13,676.42	13,387.51	288.91	47.338	
18,700.00	6,982.99	7,103.84	6,943.70	179.54	253.98	90.30	102.80	-2,565.89	13,773.91	13,484.93	288.98	47.664	
18,800.00	6,982.92	7,103.62	6,943.48	181.09	253.97	90.29	102.79	-2,565.89	13,871.45	13,582.40	289.05	47.990	
18,900.00	6,982.85	7,103.40	6,943.27	182.64	253.96	90.29	102.79	-2,565.89	13,969.02	13,679.89	289.12	48.315	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #80B - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 300-MWD OWSG Rev5													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,000.00	6,982.78	7,103.19	6,943.05	184.19	253.94	90.28	102.79	-2,565.89	14,066.62	13,777.43	289.19	48.641	
19,100.00	6,982.72	7,102.97	6,942.83	185.74	253.93	90.28	102.78	-2,565.89	14,164.26	13,874.99	289.27	48.966	
19,200.00	6,982.65	7,102.75	6,942.62	187.29	253.92	90.28	102.78	-2,565.89	14,261.92	13,972.59	289.34	49.291	
19,300.00	6,982.58	7,102.54	6,942.40	188.84	253.91	90.27	102.78	-2,565.89	14,359.63	14,070.21	289.41	49.616	
19,400.00	6,982.52	7,102.32	6,942.18	190.40	253.90	90.27	102.77	-2,565.89	14,457.36	14,167.87	289.49	49.941	
19,500.00	6,982.45	7,102.10	6,941.97	191.95	253.89	90.26	102.77	-2,565.89	14,555.12	14,265.56	289.56	50.266	
19,600.00	6,982.38	7,101.89	6,941.75	193.51	253.87	90.26	102.77	-2,565.89	14,652.92	14,363.28	289.64	50.591	
19,700.00	6,982.32	7,101.67	6,941.53	195.07	253.86	90.26	102.77	-2,565.89	14,750.74	14,461.03	289.71	50.915	
19,800.00	6,982.25	7,101.45	6,941.32	196.62	253.85	90.25	102.76	-2,565.89	14,848.59	14,558.80	289.79	51.240	
19,900.00	6,982.18	7,101.24	6,941.10	198.18	253.84	90.25	102.76	-2,565.89	14,946.47	14,656.61	289.86	51.564	
20,000.00	6,982.12	7,101.02	6,940.88	199.74	253.83	90.24	102.76	-2,565.89	15,044.38	14,754.44	289.94	51.888	
20,100.00	6,982.05	7,100.80	6,940.67	201.30	253.82	90.24	102.75	-2,565.88	15,142.32	14,852.30	290.02	52.212	
20,176.02	6,982.00	7,100.64	6,940.50	202.36	253.81	90.24	102.75	-2,565.88	15,216.78	14,922.26	294.52	51.666	

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #95 - OH - OH-INC											Offset Site Error: 0.00 usft
Survey Program: 235-A027Ua_INC-ONLY											Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	
0.00	0.00	429.01	429.00	0.00	9.13	93.87	-415.64	6,146.41	6,160.45		
100.00	100.00	528.51	528.49	0.25	11.25	93.86	-414.54	6,146.41	6,160.38	6,148.88	535.717
200.00	200.00	627.14	627.11	0.61	13.35	93.86	-414.82	6,146.41	6,160.40	6,146.44	441.387
300.00	300.00	725.77	725.74	0.97	15.45	93.87	-415.44	6,146.41	6,160.44	6,144.02	375.301
400.00	400.00	829.09	829.00	1.33	17.65	93.87	-415.64	6,146.41	6,160.45	6,141.48	324.711
500.00	500.00	929.09	929.00	1.68	19.77	93.87	-415.64	6,146.41	6,160.45	6,138.99	287.082
572.94	572.94	1,002.01	1,001.91	1.95	21.33	93.86	-414.55	6,146.41	6,160.38	6,137.11	264.709
600.00	600.00	1,028.68	1,028.58	2.04	21.89	93.86	-414.56	6,146.41	6,160.38	6,136.44	257.359
700.00	699.98	1,127.24	1,127.13	2.40	23.99	103.87	-414.83	6,146.41	6,160.82	6,134.42	233.432
800.00	799.84	1,225.64	1,225.53	2.76	26.09	103.90	-415.44	6,146.41	6,162.11	6,133.27	213.633
900.00	899.45	1,328.62	1,328.45	3.13	28.35	103.94	-415.64	6,146.41	6,164.23	6,132.77	195.908
1,000.00	998.70	1,427.87	1,427.70	3.49	30.55	103.99	-415.64	6,146.41	6,167.19	6,133.16	181.232
1,100.00	1,097.47	1,526.09	1,525.91	3.86	32.72	104.04	-414.60	6,146.41	6,170.95	6,134.37	168.704
1,200.00	1,195.62	1,622.59	1,622.41	4.24	34.86	104.12	-414.88	6,146.41	6,175.70	6,136.60	157.942
1,300.00	1,293.06	1,718.23	1,718.04	4.64	36.98	104.21	-415.49	6,146.41	6,181.39	6,139.77	148.524
1,400.00	1,389.64	1,818.90	1,818.64	5.06	39.29	104.31	-415.64	6,146.41	6,187.99	6,143.65	139.552
1,500.00	1,485.27	1,914.53	1,914.27	5.50	41.50	104.42	-415.64	6,146.41	6,195.56	6,148.57	131.863
1,515.00	1,499.52	1,928.78	1,928.52	5.57	41.83	104.43	-415.64	6,146.41	6,196.78	6,149.40	130.786
1,600.00	1,580.22	2,008.90	2,008.63	5.96	43.68	104.65	-414.29	6,146.41	6,203.69	6,154.07	125.034
1,700.00	1,675.17	2,101.36	2,101.07	6.44	45.81	104.91	-414.57	6,146.41	6,212.12	6,159.91	118.975
1,800.00	1,770.11	2,193.58	2,193.28	6.92	47.94	105.18	-415.22	6,146.41	6,220.75	6,165.94	113.489
1,900.00	1,865.05	2,294.43	2,294.05	7.41	50.32	105.46	-415.64	6,146.41	6,229.50	6,171.83	108.008
2,000.00	1,959.99	2,389.37	2,388.99	7.90	52.61	105.73	-415.64	6,146.41	6,238.36	6,177.91	103.211
2,100.00	2,054.94	2,484.32	2,483.94	8.40	54.89	105.99	-415.64	6,146.41	6,247.36	6,184.14	98.830
2,200.00	2,149.88	2,576.31	2,575.91	8.90	57.11	106.24	-414.44	6,146.41	6,256.36	6,190.44	94.914
2,300.00	2,244.82	2,667.98	2,667.57	9.41	59.31	106.49	-414.98	6,146.41	6,265.71	6,197.10	91.319
2,400.00	2,339.76	2,769.29	2,768.76	9.92	61.78	106.78	-415.64	6,146.41	6,275.23	6,203.65	87.672
2,500.00	2,434.71	2,864.23	2,863.71	10.43	64.16	107.04	-415.64	6,146.41	6,284.80	6,210.35	84.414
2,600.00	2,529.65	2,959.17	2,958.65	10.94	66.54	107.30	-415.64	6,146.41	6,294.52	6,217.19	81.398
2,700.00	2,624.59	3,051.12	3,050.57	11.45	68.84	107.54	-414.11	6,146.41	6,304.15	6,224.02	78.670
2,800.00	2,719.53	3,141.49	3,140.93	11.97	71.11	107.79	-414.61	6,146.41	6,314.23	6,231.33	76.169
2,900.00	2,814.48	3,244.17	3,243.48	12.49	73.69	108.08	-415.64	6,146.41	6,324.52	6,238.53	73.555
3,000.00	2,909.42	3,339.12	3,338.42	13.01	76.26	108.34	-415.64	6,146.41	6,334.79	6,245.74	71.133
3,100.00	3,004.36	3,427.36	3,426.65	13.53	78.66	108.57	-415.01	6,146.41	6,345.11	6,253.16	69.008
3,200.00	3,099.30	3,529.12	3,528.30	14.05	81.49	108.85	-415.64	6,146.41	6,355.77	6,260.48	66.702
3,300.00	3,194.25	3,624.06	3,623.25	14.57	84.27	109.11	-415.64	6,146.41	6,366.46	6,267.90	64.592
3,400.00	3,289.19	3,719.00	3,718.19	15.09	87.05	109.36	-415.64	6,146.41	6,377.29	6,275.45	62.620
3,500.00	3,384.13	3,808.53	3,807.67	15.62	89.66	109.58	-413.62	6,146.41	6,387.89	6,282.93	60.860
3,600.00	3,479.07	3,896.06	3,895.17	16.14	92.22	109.82	-414.29	6,146.41	6,399.12	6,291.10	59.240
3,700.00	3,574.02	4,004.14	4,003.02	16.67	95.35	110.12	-415.64	6,146.41	6,410.59	6,298.95	57.418
3,800.00	3,668.96	4,099.08	4,097.96	17.19	97.84	110.37	-415.64	6,146.41	6,421.96	6,307.32	56.018
3,900.00	3,763.90	4,194.02	4,192.90	17.72	100.34	110.62	-415.64	6,146.41	6,433.47	6,315.83	54.689
4,000.00	3,858.84	4,285.00	4,283.83	18.24	102.73	110.84	-413.52	6,146.41	6,444.67	6,324.14	53.471
4,100.00	3,953.79	4,371.70	4,370.52	18.77	105.01	111.07	-414.05	6,146.41	6,456.54	6,333.24	52.364
4,200.00	4,048.73	4,458.09	4,456.88	19.30	107.27	111.31	-415.09	6,146.41	6,468.68	6,342.61	51.311
4,300.00	4,143.67	4,574.00	4,572.67	19.82	110.06	111.61	-415.64	6,146.41	6,480.79	6,351.44	50.100
4,400.00	4,238.61	4,668.94	4,667.61	20.35	112.26	111.86	-415.64	6,146.41	6,492.95	6,360.90	49.169
4,500.00	4,333.56	4,762.49	4,761.15	20.88	114.43	112.09	-414.29	6,146.41	6,504.93	6,370.22	48.286
4,600.00	4,428.50	4,851.53	4,850.18	21.41	116.49	112.32	-414.55	6,146.41	6,517.40	6,380.13	47.478
4,700.00	4,523.44	4,940.35	4,938.99	21.93	118.54	112.56	-415.15	6,146.41	6,530.09	6,390.27	46.703
4,800.00	4,618.38	5,048.83	5,047.38	22.46	121.05	112.84	-415.64	6,146.41	6,542.86	6,400.03	45.809
4,900.00	4,713.33	5,143.77	5,142.33	22.99	123.25	113.08	-415.64	6,146.41	6,555.66	6,410.14	45.049

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #95 - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program: 235-A027Ua_INC-ONLY												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,000.00	4,808.27	5,238.71	5,237.27	23.52	125.45	113.32	-415.64	6,146.41	6,568.58	6,420.36	148.21	44.318	
5,100.00	4,903.21	5,327.32	5,325.86	24.05	127.50	113.54	-414.44	6,146.41	6,581.32	6,430.56	150.76	43.655	
5,200.00	4,998.16	5,415.63	5,414.16	24.58	129.54	113.76	-414.95	6,146.41	6,594.62	6,441.33	153.29	43.020	
5,300.00	5,093.10	5,523.66	5,522.10	25.11	132.08	114.04	-415.64	6,146.41	6,608.08	6,451.76	156.32	42.272	
5,400.00	5,188.04	5,618.60	5,617.04	25.64	134.37	114.28	-415.64	6,146.41	6,621.49	6,462.38	159.11	41.616	
5,500.00	5,282.98	5,713.54	5,711.98	26.17	136.67	114.51	-415.64	6,146.41	6,635.03	6,473.13	161.90	40.983	
5,600.00	5,377.93	5,808.49	5,806.93	26.70	138.97	114.75	-415.64	6,146.41	6,648.68	6,484.00	164.68	40.372	
5,623.25	5,400.00	5,830.56	5,829.00	26.82	139.50	114.81	-415.64	6,146.41	6,651.87	6,486.54	165.33	40.233	
5,700.00	5,473.03	5,903.59	5,902.03	27.22	141.27	115.08	-415.64	6,146.41	6,662.24	6,494.77	167.47	39.781	
5,800.00	5,568.64	5,990.00	5,988.29	27.73	143.36	115.39	-415.64	6,146.41	6,675.21	6,505.17	170.03	39.258	
5,900.00	5,664.75	5,990.00	5,988.29	28.23	143.36	115.51	-415.64	6,146.41	6,688.34	6,517.90	170.45	39.240	
6,000.00	5,761.33	5,990.00	5,988.29	28.71	143.36	115.64	-415.64	6,146.41	6,702.20	6,531.39	170.81	39.238	
6,100.00	5,858.34	5,990.00	5,988.29	29.18	143.36	115.77	-415.64	6,146.41	6,716.77	6,545.64	171.13	39.250	
6,200.00	5,955.76	5,990.00	5,988.29	29.64	143.36	115.91	-415.64	6,146.41	6,732.05	6,560.65	171.40	39.277	
6,300.00	6,053.57	5,990.00	5,988.29	30.07	143.36	116.06	-415.64	6,146.41	6,748.02	6,576.40	171.62	39.319	
6,400.00	6,151.72	5,990.00	5,988.29	30.50	143.36	116.21	-415.64	6,146.41	6,764.68	6,592.89	171.80	39.376	
6,500.00	6,250.19	5,990.00	5,988.29	30.91	143.36	116.37	-415.64	6,146.41	6,782.02	6,610.10	171.92	39.448	
6,600.00	6,348.94	5,990.00	5,988.29	31.30	143.36	116.53	-415.64	6,146.41	6,800.02	6,628.02	172.00	39.534	
6,659.67	6,408.00	5,990.00	5,988.29	31.53	143.36	116.63	-415.64	6,146.41	6,811.07	6,639.05	172.03	39.593	
6,700.00	6,447.82	5,990.00	5,988.29	31.68	143.36	99.59	-415.64	6,146.41	6,818.13	6,646.09	172.04	39.630	
6,750.00	6,496.66	5,990.00	5,988.29	31.90	143.36	87.73	-415.64	6,146.41	6,825.50	6,653.42	172.08	39.665	
6,800.00	6,544.65	5,990.00	5,988.29	32.13	143.36	80.92	-415.64	6,146.41	6,831.29	6,659.17	172.12	39.688	
6,850.00	6,591.49	5,990.00	5,988.29	32.37	143.36	76.63	-415.64	6,146.41	6,835.48	6,663.30	172.18	39.698	
6,900.00	6,636.89	5,990.00	5,988.29	32.62	143.36	73.77	-415.64	6,146.41	6,838.05	6,665.79	172.26	39.696	
6,950.00	6,680.57	5,990.00	5,988.29	32.89	143.36	71.80	-415.64	6,146.41	6,838.97	6,666.62	172.35	39.681	
7,000.00	6,722.26	5,990.00	5,988.29	33.17	143.36	70.45	-415.64	6,146.41	6,838.25	6,665.80	172.45	39.653	
7,050.00	6,761.71	5,990.00	5,988.29	33.45	143.36	69.56	-415.64	6,146.41	6,835.89	6,663.32	172.57	39.612	
7,100.00	6,798.67	5,990.00	5,988.29	33.75	143.36	69.03	-415.64	6,146.41	6,831.90	6,659.19	172.71	39.557	
7,150.00	6,832.91	5,990.00	5,988.29	34.06	143.36	68.81	-415.64	6,146.41	6,826.30	6,653.43	172.86	39.489	
7,200.00	6,864.22	5,990.00	5,988.29	34.37	143.36	68.85	-415.64	6,146.41	6,819.13	6,646.09	173.04	39.408	
7,250.00	6,892.42	5,990.00	5,988.29	34.69	143.36	69.13	-415.64	6,146.41	6,810.41	6,637.18	173.23	39.314	
7,300.00	6,917.32	5,990.00	5,988.29	35.03	143.36	69.61	-415.64	6,146.41	6,800.21	6,626.77	173.45	39.206	
7,350.00	6,938.77	5,990.00	5,988.29	35.37	143.36	70.30	-415.64	6,146.41	6,788.58	6,614.90	173.68	39.086	
7,400.00	6,956.64	5,990.00	5,988.29	35.72	143.36	71.18	-415.64	6,146.41	6,775.58	6,601.64	173.94	38.953	
7,450.00	6,970.83	5,990.00	5,988.29	36.07	143.36	72.24	-415.64	6,146.41	6,761.28	6,587.06	174.23	38.807	
7,500.00	6,981.23	5,990.00	5,988.29	36.44	143.36	73.47	-415.64	6,146.41	6,745.77	6,571.24	174.53	38.651	
7,550.00	6,987.80	5,990.00	5,988.29	36.81	143.36	74.87	-415.64	6,146.41	6,729.13	6,554.27	174.86	38.483	
7,600.00	6,990.48	5,990.00	5,988.29	37.19	143.36	76.43	-415.64	6,146.41	6,711.46	6,536.25	175.21	38.305	
7,609.87	6,990.55	5,990.00	5,988.29	37.26	143.36	76.76	-415.64	6,146.41	6,707.86	6,532.57	175.28	38.269	
7,700.00	6,990.49	5,990.00	5,988.29	37.97	143.36	76.76	-415.64	6,146.41	6,675.32	6,499.37	175.95	37.938	
7,800.00	6,990.42	5,990.00	5,988.29	38.78	143.36	76.76	-415.64	6,146.41	6,640.48	6,463.75	176.72	37.575	
7,900.00	6,990.35	5,990.00	5,988.29	39.64	143.36	76.76	-415.64	6,146.41	6,606.96	6,429.43	177.52	37.217	
8,000.00	6,990.28	5,990.00	5,988.29	40.53	143.36	76.76	-415.64	6,146.41	6,574.79	6,396.44	178.35	36.865	
8,100.00	6,990.21	5,990.00	5,988.29	41.45	143.36	76.76	-415.64	6,146.41	6,543.99	6,364.79	179.20	36.518	
8,200.00	6,990.14	5,990.00	5,988.29	42.40	143.36	76.76	-415.64	6,146.41	6,514.58	6,334.51	180.07	36.178	
8,306.37	6,990.06	5,990.00	5,988.29	43.45	143.36	76.76	-415.64	6,146.41	6,484.85	6,303.83	181.02	35.824	
8,400.00	6,990.00	5,990.00	5,988.29	44.38	143.36	76.49	-415.64	6,146.41	6,457.15	6,275.28	181.86	35.505	
8,500.00	6,989.93	5,990.00	5,988.29	45.36	143.36	76.15	-415.64	6,146.41	6,422.69	6,239.93	182.76	35.143	
8,600.00	6,989.85	5,990.00	5,988.29	46.33	143.36	75.73	-415.64	6,146.41	6,383.27	6,199.63	183.64	34.760	
8,700.00	6,989.78	5,990.00	5,988.29	47.28	143.36	75.24	-415.64	6,146.41	6,339.00	6,154.50	184.50	34.357	
8,800.00	6,989.70	5,990.00	5,988.29	48.21	143.36	74.66	-415.64	6,146.41	6,290.00	6,104.66	185.34	33.937	
8,900.00	6,989.63	5,990.00	5,988.29	49.11	143.36	73.98	-415.64	6,146.41	6,236.39	6,050.24	186.16	33.501	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #95 - OH - OH-INC													Offset Site Error: 0.00 usft
Survey Program: 235-A027Ua_INC-ONLY													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
9,000.00	6,989.55	5,990.00	5,988.29	49.99	143.36	73.17	-415.64	6,146.41	6,178.33	5,991.39	186.94	33.050	
9,100.00	6,989.48	5,990.00	5,988.29	50.84	143.36	72.23	-415.64	6,146.41	6,115.96	5,928.27	187.69	32.586	
9,200.00	6,989.40	5,990.00	5,988.29	51.66	143.36	71.11	-415.64	6,146.41	6,049.46	5,861.07	188.39	32.111	
9,300.00	6,989.33	5,990.00	5,988.29	52.45	143.36	69.78	-415.64	6,146.41	5,979.03	5,789.98	189.05	31.627	
9,393.87	6,989.27	5,990.00	5,988.29	53.15	143.36	68.30	-415.64	6,146.41	5,909.53	5,719.92	189.62	31.166	
9,400.00	6,989.26	5,990.00	5,988.29	53.20	143.36	68.30	-415.64	6,146.41	5,904.89	5,715.23	189.65	31.135	
9,500.00	6,989.19	5,990.00	5,988.29	53.95	143.36	68.30	-415.64	6,146.41	5,829.57	5,639.33	190.24	30.644	
9,600.00	6,989.12	5,990.00	5,988.29	54.73	143.36	68.30	-415.64	6,146.41	5,755.01	5,564.17	190.84	30.156	
9,700.00	6,989.05	5,990.00	5,988.29	55.55	143.36	68.30	-415.64	6,146.41	5,681.23	5,489.76	191.46	29.673	
9,800.00	6,988.98	5,990.00	5,988.29	56.40	143.36	68.30	-415.64	6,146.41	5,608.26	5,416.15	192.10	29.194	
9,900.00	6,988.91	5,990.00	5,988.29	57.28	143.36	68.30	-415.64	6,146.41	5,536.13	5,343.37	192.76	28.720	
10,000.00	6,988.84	5,990.00	5,988.29	58.20	143.36	68.30	-415.64	6,146.41	5,464.89	5,271.45	193.44	28.252	
10,100.00	6,988.77	5,990.00	5,988.29	59.14	143.36	68.30	-415.64	6,146.41	5,394.55	5,200.42	194.13	27.788	
10,200.00	6,988.70	5,990.00	5,988.29	60.11	143.36	68.30	-415.64	6,146.41	5,325.17	5,130.32	194.84	27.330	
10,300.00	6,988.63	5,990.00	5,988.29	61.11	143.36	68.30	-415.64	6,146.41	5,256.77	5,061.19	195.58	26.878	
10,400.00	6,988.56	5,990.00	5,988.29	62.14	143.36	68.30	-415.64	6,146.41	5,189.40	4,993.07	196.33	26.433	
10,500.00	6,988.49	5,990.00	5,988.29	63.19	143.36	68.30	-415.64	6,146.41	5,123.09	4,925.99	197.09	25.993	
10,600.00	6,988.42	5,990.00	5,988.29	64.26	143.36	68.30	-415.64	6,146.41	5,057.89	4,860.01	197.88	25.560	
10,700.00	6,988.35	5,990.00	5,988.29	65.36	143.36	68.30	-415.64	6,146.41	4,993.84	4,795.16	198.68	25.135	
10,800.00	6,988.28	5,990.00	5,988.29	66.48	143.36	68.30	-415.64	6,146.41	4,930.99	4,731.49	199.50	24.716	
10,900.00	6,988.21	5,990.00	5,988.29	67.61	143.36	68.30	-415.64	6,146.41	4,869.38	4,669.04	200.34	24.306	
11,000.00	6,988.14	5,990.00	5,988.29	68.77	143.36	68.30	-415.64	6,146.41	4,809.06	4,607.87	201.19	23.903	
11,100.00	6,988.07	5,990.00	5,988.29	69.95	143.36	68.30	-415.64	6,146.41	4,750.09	4,548.02	202.06	23.508	
11,200.00	6,988.01	5,990.00	5,988.29	71.14	143.36	68.30	-415.64	6,146.41	4,692.50	4,489.55	202.94	23.122	
11,300.00	6,987.94	5,990.00	5,988.29	72.35	143.36	68.30	-415.64	6,146.41	4,636.35	4,432.51	203.84	22.745	
11,400.00	6,987.87	5,990.00	5,988.29	73.57	143.36	68.30	-415.64	6,146.41	4,581.70	4,376.95	204.75	22.377	
11,500.00	6,987.80	5,990.00	5,988.29	74.81	143.36	68.30	-415.64	6,146.41	4,528.59	4,322.92	205.67	22.019	
11,600.00	6,987.73	5,990.00	5,988.29	76.07	143.36	68.30	-415.64	6,146.41	4,477.10	4,270.49	206.60	21.670	
11,643.87	6,987.70	5,990.00	5,988.29	76.62	143.36	68.30	-415.64	6,146.41	4,455.03	4,248.01	207.01	21.521	
11,700.00	6,987.66	5,990.00	5,988.29	77.33	143.36	68.06	-415.64	6,146.41	4,426.81	4,219.28	207.54	21.330	
11,737.27	6,987.63	5,990.00	5,988.29	77.80	143.36	67.90	-415.64	6,146.41	4,407.89	4,200.01	207.88	21.204	
11,800.00	6,987.59	5,990.00	5,988.29	78.59	143.36	67.90	-415.64	6,146.41	4,376.24	4,167.79	208.45	20.994	
11,900.00	6,987.52	5,990.00	5,988.29	79.86	143.36	67.90	-415.64	6,146.41	4,327.18	4,117.82	209.36	20.668	
12,000.00	6,987.46	5,990.00	5,988.29	81.14	143.36	67.90	-415.64	6,146.41	4,279.91	4,069.62	210.28	20.353	
12,100.00	6,987.39	5,990.00	5,988.29	82.43	143.36	67.90	-415.64	6,146.41	4,234.46	4,023.26	211.21	20.049	
12,200.00	6,987.32	5,990.00	5,988.29	83.73	143.36	67.90	-415.64	6,146.41	4,190.91	3,978.78	212.13	19.756	
12,300.00	6,987.26	5,990.00	5,988.29	85.05	143.36	67.90	-415.64	6,146.41	4,149.32	3,936.26	213.06	19.475	
12,400.00	6,987.19	5,990.00	5,988.29	86.38	143.36	67.90	-415.64	6,146.41	4,109.73	3,895.75	213.98	19.206	
12,500.00	6,987.12	5,990.00	5,988.29	87.71	143.36	67.90	-415.64	6,146.41	4,072.22	3,857.33	214.89	18.950	
12,600.00	6,987.06	5,990.00	5,988.29	89.06	143.36	67.90	-415.64	6,146.41	4,036.84	3,821.03	215.80	18.706	
12,700.00	6,986.99	5,990.00	5,988.29	90.41	143.36	67.90	-415.64	6,146.41	4,003.64	3,786.94	216.70	18.475	
12,800.00	6,986.92	5,990.00	5,988.29	91.77	143.36	67.90	-415.64	6,146.41	3,972.68	3,755.09	217.59	18.258	
12,900.00	6,986.86	5,990.00	5,988.29	93.14	143.36	67.90	-415.64	6,146.41	3,944.02	3,725.56	218.46	18.054	
13,000.00	6,986.79	5,990.00	5,988.29	94.52	143.36	67.90	-415.64	6,146.41	3,917.70	3,698.38	219.32	17.863	
13,100.00	6,986.72	5,990.00	5,988.29	95.90	143.36	67.90	-415.64	6,146.41	3,893.77	3,673.62	220.15	17.687	
13,200.00	6,986.66	5,990.00	5,988.29	97.30	143.36	67.90	-415.64	6,146.41	3,872.27	3,651.31	220.97	17.524	
13,300.00	6,986.59	5,990.00	5,988.29	98.69	143.36	67.90	-415.64	6,146.41	3,853.26	3,631.50	221.75	17.376	
13,400.00	6,986.52	5,990.00	5,988.29	100.10	143.36	67.90	-415.64	6,146.41	3,836.75	3,614.24	222.51	17.243	
13,500.00	6,986.46	5,990.00	5,988.29	101.51	143.36	67.90	-415.64	6,146.41	3,822.79	3,599.55	223.24	17.124	
13,600.00	6,986.39	5,990.00	5,988.29	102.93	143.36	67.90	-415.64	6,146.41	3,811.40	3,587.46	223.94	17.019	
13,700.00	6,986.32	5,990.00	5,988.29	104.35	143.36	67.90	-415.64	6,146.41	3,802.61	3,578.01	224.61	16.930	
13,800.00	6,986.25	5,990.00	5,988.29	105.78	143.36	67.90	-415.64	6,146.41	3,796.44	3,571.20	225.24	16.855	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #95 - OH - OH-INC											Offset Site Error: 0.00 usft		
Survey Program: Reference		235-A027Ua_INC-ONLY Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance			Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,900.00	6,986.19	5,990.00	5,988.29	107.21	143.36	67.90	-415.64	6,146.41	3,792.89	3,567.06	225.83	16.795	
13,984.62	6,986.13	5,990.00	5,988.29	108.43	143.36	67.90	-415.64	6,146.41	3,791.95	3,565.65	226.30	16.756	CC
14,000.00	6,986.12	5,990.00	5,988.29	108.65	143.36	67.90	-415.64	6,146.41	3,791.98	3,565.60	226.38	16.750	ES
14,100.00	6,986.05	5,990.00	5,988.29	110.09	143.36	67.90	-415.64	6,146.41	3,793.70	3,566.81	226.89	16.720	
14,200.00	6,985.99	5,990.00	5,988.29	111.54	143.36	67.90	-415.64	6,146.41	3,798.06	3,570.70	227.36	16.705	
14,300.00	6,985.92	5,990.00	5,988.29	112.99	143.36	67.90	-415.64	6,146.41	3,805.04	3,577.25	227.79	16.704	SF
14,400.00	6,985.85	5,990.00	5,988.29	114.45	143.36	67.90	-415.64	6,146.41	3,814.63	3,586.46	228.17	16.718	
14,500.00	6,985.79	5,990.00	5,988.29	115.91	143.36	67.90	-415.64	6,146.41	3,826.81	3,598.30	228.52	16.746	
14,600.00	6,985.72	5,990.00	5,988.29	117.38	143.36	67.90	-415.64	6,146.41	3,841.56	3,612.74	228.81	16.789	
14,700.00	6,985.65	5,990.00	5,988.29	118.84	143.36	67.90	-415.64	6,146.41	3,858.84	3,629.77	229.07	16.846	
14,800.00	6,985.59	5,990.00	5,988.29	120.32	143.36	67.90	-415.64	6,146.41	3,878.62	3,649.34	229.28	16.916	
14,900.00	6,985.52	5,990.00	5,988.29	121.79	143.36	67.90	-415.64	6,146.41	3,900.87	3,671.42	229.45	17.001	
15,000.00	6,985.45	5,990.00	5,988.29	123.27	143.36	67.90	-415.64	6,146.41	3,925.54	3,695.96	229.58	17.099	
15,100.00	6,985.39	5,990.00	5,988.29	124.75	143.36	67.90	-415.64	6,146.41	3,952.59	3,722.92	229.67	17.210	
15,200.00	6,985.32	5,990.00	5,988.29	126.24	143.36	67.90	-415.64	6,146.41	3,981.96	3,752.24	229.72	17.334	
15,300.00	6,985.25	5,990.00	5,988.29	127.72	143.36	67.90	-415.64	6,146.41	4,013.61	3,783.88	229.73	17.471	
15,400.00	6,985.19	5,990.00	5,988.29	129.21	143.36	67.90	-415.64	6,146.41	4,047.49	3,817.78	229.71	17.620	
15,500.00	6,985.12	5,990.00	5,988.29	130.71	143.36	67.90	-415.64	6,146.41	4,083.53	3,853.88	229.65	17.781	
15,600.00	6,985.05	5,990.00	5,988.29	132.20	143.36	67.90	-415.64	6,146.41	4,121.69	3,892.13	229.56	17.955	
15,700.00	6,984.99	5,990.00	5,988.29	133.70	143.36	67.90	-415.64	6,146.41	4,161.90	3,932.45	229.44	18.139	
15,800.00	6,984.92	5,990.00	5,988.29	135.20	143.36	67.90	-415.64	6,146.41	4,204.10	3,974.81	229.29	18.335	
15,900.00	6,984.85	5,990.00	5,988.29	136.71	143.36	67.90	-415.64	6,146.41	4,248.24	4,019.12	229.12	18.542	
16,000.00	6,984.79	5,990.00	5,988.29	138.21	143.36	67.90	-415.64	6,146.41	4,294.25	4,065.34	228.92	18.759	
16,100.00	6,984.72	5,990.00	5,988.29	139.72	143.36	67.90	-415.64	6,146.41	4,342.08	4,113.39	228.69	18.987	
16,200.00	6,984.65	5,990.00	5,988.29	141.23	143.36	67.90	-415.64	6,146.41	4,391.67	4,163.22	228.45	19.224	
16,300.00	6,984.59	5,990.00	5,988.29	142.75	143.36	67.90	-415.64	6,146.41	4,442.95	4,214.77	228.18	19.471	
16,400.00	6,984.52	5,990.00	5,988.29	144.26	143.36	67.90	-415.64	6,146.41	4,495.88	4,267.98	227.90	19.728	
16,500.00	6,984.45	5,990.00	5,988.29	145.78	143.36	67.90	-415.64	6,146.41	4,550.38	4,322.78	227.60	19.993	
16,600.00	6,984.39	5,990.00	5,988.29	147.29	143.36	67.90	-415.64	6,146.41	4,606.42	4,379.13	227.29	20.267	
16,700.00	6,984.32	5,990.00	5,988.29	148.82	143.36	67.90	-415.64	6,146.41	4,663.92	4,436.96	226.96	20.549	
16,800.00	6,984.25	5,990.00	5,988.29	150.34	143.36	67.90	-415.64	6,146.41	4,722.84	4,496.22	226.62	20.840	
16,900.00	6,984.19	5,990.00	5,988.29	151.86	143.36	67.90	-415.64	6,146.41	4,783.13	4,556.85	226.28	21.138	
17,000.00	6,984.12	5,990.00	5,988.29	153.39	143.36	67.90	-415.64	6,146.41	4,844.73	4,618.80	225.92	21.444	
17,100.00	6,984.05	5,990.00	5,988.29	154.91	143.36	67.90	-415.64	6,146.41	4,907.59	4,682.03	225.56	21.758	
17,200.00	6,983.99	5,990.00	5,988.29	156.44	143.36	67.90	-415.64	6,146.41	4,971.67	4,746.48	225.19	22.078	
17,300.00	6,983.92	5,990.00	5,988.29	157.97	143.36	67.90	-415.64	6,146.41	5,036.92	4,812.11	224.82	22.405	
17,400.00	6,983.85	5,990.00	5,988.29	159.50	143.36	67.90	-415.64	6,146.41	5,103.30	4,878.86	224.44	22.738	
17,500.00	6,983.79	5,990.00	5,988.29	161.04	143.36	67.90	-415.64	6,146.41	5,170.76	4,946.70	224.06	23.078	
17,600.00	6,983.72	5,990.00	5,988.29	162.57	143.36	67.90	-415.64	6,146.41	5,239.26	5,015.58	223.68	23.423	
17,700.00	6,983.65	5,990.00	5,988.29	164.11	143.36	67.90	-415.64	6,146.41	5,308.76	5,085.46	223.29	23.775	
17,800.00	6,983.59	5,990.00	5,988.29	165.65	143.36	67.90	-415.64	6,146.41	5,379.22	5,156.31	222.91	24.132	
17,900.00	6,983.52	5,990.00	5,988.29	167.18	143.36	67.90	-415.64	6,146.41	5,450.60	5,228.07	222.53	24.494	
18,000.00	6,983.45	5,990.00	5,988.29	168.72	143.36	67.90	-415.64	6,146.41	5,522.87	5,300.73	222.15	24.861	
18,100.00	6,983.39	5,990.00	5,988.29	170.27	143.36	67.90	-415.64	6,146.41	5,596.00	5,374.23	221.77	25.234	
18,200.00	6,983.32	5,990.00	5,988.29	171.81	143.36	67.90	-415.64	6,146.41	5,669.94	5,448.56	221.39	25.611	
18,300.00	6,983.25	5,990.00	5,988.29	173.35	143.36	67.90	-415.64	6,146.41	5,744.68	5,523.67	221.01	25.993	
18,400.00	6,983.19	5,990.00	5,988.29	174.90	143.36	67.90	-415.64	6,146.41	5,820.17	5,599.53	220.64	26.379	
18,500.00	6,983.12	5,990.00	5,988.29	176.44	143.36	67.90	-415.64	6,146.41	5,896.40	5,676.13	220.27	26.769	
18,600.00	6,983.05	5,990.00	5,988.29	177.99	143.36	67.90	-415.64	6,146.41	5,973.32	5,753.42	219.90	27.163	
18,700.00	6,982.99	5,990.00	5,988.29	179.54	143.36	67.90	-415.64	6,146.41	6,050.92	5,831.38	219.54	27.561	
18,800.00	6,982.92	5,990.00	5,988.29	181.09	143.36	67.90	-415.64	6,146.41	6,129.17	5,909.98	219.19	27.963	
18,900.00	6,982.85	5,990.00	5,988.29	182.64	143.36	67.90	-415.64	6,146.41	6,208.04	5,989.21	218.83	28.369	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit #95 - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 235-A027Ua_INC-ONLY													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,000.00	6,982.78	5,990.00	5,988.29	184.19	143.36	67.90	-415.64	6,146.41	6,287.52	6,069.03	218.49	28.778		
19,100.00	6,982.72	5,990.00	5,988.29	185.74	143.36	67.90	-415.64	6,146.41	6,367.57	6,149.43	218.14	29.190		
19,200.00	6,982.65	5,990.00	5,988.29	187.29	143.36	67.90	-415.64	6,146.41	6,448.18	6,230.37	217.81	29.605		
19,300.00	6,982.58	5,990.00	5,988.29	188.84	143.36	67.90	-415.64	6,146.41	6,529.33	6,311.85	217.47	30.023		
19,400.00	6,982.52	5,990.00	5,988.29	190.40	143.36	67.90	-415.64	6,146.41	6,610.99	6,393.84	217.15	30.445		
19,500.00	6,982.45	5,990.00	5,988.29	191.95	143.36	67.90	-415.64	6,146.41	6,693.15	6,476.32	216.83	30.869		
19,600.00	6,982.38	5,990.00	5,988.29	193.51	143.36	67.90	-415.64	6,146.41	6,775.79	6,559.28	216.51	31.295		
19,700.00	6,982.32	5,990.00	5,988.29	195.07	143.36	67.90	-415.64	6,146.41	6,858.89	6,642.69	216.20	31.725		
19,800.00	6,982.25	5,990.00	5,988.29	196.62	143.36	67.90	-415.64	6,146.41	6,942.44	6,726.54	215.90	32.156		
19,900.00	6,982.18	5,990.00	5,988.29	198.18	143.36	67.90	-415.64	6,146.41	7,026.42	6,810.82	215.60	32.590		
20,000.00	6,982.12	5,990.00	5,988.29	199.74	143.36	67.90	-415.64	6,146.41	7,110.81	6,895.51	215.30	33.027		
20,100.00	6,982.05	5,990.00	5,988.29	201.30	143.36	67.90	-415.64	6,146.41	7,195.60	6,980.59	215.02	33.465		
20,176.02	6,982.00	5,990.00	5,988.29	202.36	143.36	67.90	-415.64	6,146.41	7,260.32	7,044.56	215.76	33.650		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 072B - OH - OH-SVY													Offset Site Error: 0.00 usft
Survey Program: 358-APC_ISCWSA REV 2 MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-52.34	3,015.43	-3,907.46	4,935.78				
100.00	100.00	77.18	77.18	0.25	0.08	-52.34	3,015.35	-3,907.46	4,935.65	4,935.31	0.33	N/A	
200.00	200.00	185.89	185.89	0.61	0.20	-52.35	3,014.96	-3,907.47	4,935.44	4,934.62	0.81	6,085.707	
300.00	300.00	294.60	294.60	0.97	0.32	-52.35	3,014.26	-3,907.47	4,935.05	4,933.76	1.29	3,833.645	
400.00	400.00	375.45	375.44	1.33	0.43	-52.36	3,013.52	-3,907.55	4,934.60	4,932.84	1.75	2,815.707	
407.60	407.60	378.63	378.63	1.35	0.43	-52.36	3,013.48	-3,907.58	4,934.59	4,932.81	1.79	2,761.855	
500.00	500.00	419.00	418.98	1.68	0.52	-52.37	3,012.91	-3,908.38	4,935.16	4,932.95	2.20	2,240.140	
600.00	600.00	438.02	437.99	2.04	0.57	-52.38	3,012.65	-3,909.09	4,937.08	4,934.48	2.60	1,896.527	
700.00	699.98	462.19	462.11	2.40	0.62	-42.37	3,012.30	-3,910.41	4,939.25	4,936.23	3.01	1,639.082	
800.00	799.84	480.00	479.88	2.76	0.67	-42.37	3,012.06	-3,911.67	4,940.40	4,936.99	3.41	1,449.238	
900.00	899.45	510.00	509.75	3.13	0.75	-42.41	3,011.76	-3,914.42	4,940.57	4,936.74	3.83	1,288.495	
1,000.00	998.70	523.57	523.24	3.49	0.78	-42.44	3,011.68	-3,915.91	4,939.78	4,935.55	4.22	1,169.217	
1,100.00	1,097.47	541.00	540.54	3.86	0.83	-42.50	3,011.70	-3,918.03	4,938.07	4,933.44	4.63	1,066.764	
1,200.00	1,195.62	572.00	571.23	4.24	0.92	-42.61	3,012.01	-3,922.41	4,935.50	4,930.43	5.07	972.747	
1,300.00	1,293.06	572.00	571.23	4.64	0.92	-42.66	3,012.01	-3,922.41	4,931.93	4,926.48	5.45	904.910	
1,400.00	1,389.64	602.00	600.79	5.06	1.01	-42.81	3,012.60	-3,927.43	4,927.50	4,921.59	5.91	833.107	
1,500.00	1,485.27	602.00	600.79	5.50	1.01	-42.88	3,012.60	-3,927.43	4,922.27	4,915.96	6.31	779.652	
1,515.00	1,499.52	616.85	615.38	5.57	1.05	-42.95	3,013.00	-3,930.22	4,921.33	4,914.91	6.42	767.104	
1,600.00	1,580.22	633.00	631.19	5.96	1.11	-43.01	3,013.50	-3,933.45	4,916.94	4,910.14	6.81	722.309	
1,700.00	1,675.17	664.00	661.42	6.44	1.21	-43.12	3,014.61	-3,940.21	4,913.36	4,906.05	7.31	671.791	
1,800.00	1,770.11	676.39	673.46	6.92	1.26	-43.17	3,015.07	-3,943.12	4,911.30	4,903.53	7.77	631.834	
1,876.71	1,842.94	694.00	690.52	7.29	1.33	-43.23	3,015.73	-3,947.43	4,910.82	4,902.67	8.15	602.270 CC	
1,900.00	1,865.05	694.00	690.52	7.41	1.33	-43.23	3,015.73	-3,947.43	4,910.88	4,902.62	8.25	595.075 ES	
2,000.00	1,959.99	725.00	720.44	7.90	1.47	-43.36	3,016.80	-3,955.47	4,911.88	4,903.10	8.78	559.273	
2,100.00	2,054.94	771.70	765.25	8.40	1.71	-43.55	3,018.24	-3,968.56	4,914.30	4,904.92	9.38	524.068	
2,200.00	2,149.88	818.00	809.43	8.90	1.97	-43.75	3,019.18	-3,982.36	4,917.89	4,907.90	9.98	492.569	
2,300.00	2,244.82	848.00	837.89	9.41	2.15	-43.88	3,019.67	-3,991.81	4,922.86	4,912.33	10.54	467.272	
2,400.00	2,339.76	864.30	853.27	9.92	2.25	-43.95	3,019.95	-3,997.22	4,929.43	4,918.40	11.03	446.816	
2,500.00	2,434.71	879.00	867.07	10.43	2.35	-44.02	3,020.21	-4,002.27	4,937.67	4,926.15	11.52	428.618	
2,600.00	2,529.65	910.00	895.96	10.94	2.57	-44.17	3,020.75	-4,013.49	4,947.53	4,935.45	12.08	409.428	
2,700.00	2,624.59	926.63	911.34	11.45	2.69	-44.25	3,021.00	-4,019.82	4,958.99	4,946.41	12.58	394.096	
2,800.00	2,719.53	940.00	923.64	11.97	2.80	-44.31	3,021.16	-4,025.06	4,972.07	4,959.01	13.06	380.660	
2,900.00	2,814.48	971.00	951.95	12.49	3.05	-44.47	3,021.44	-4,037.68	4,986.65	4,973.02	13.63	365.806	
3,000.00	2,909.42	1,000.00	978.17	13.01	3.29	-44.62	3,021.68	-4,050.08	5,002.87	4,988.68	14.19	352.467	
3,100.00	3,004.36	1,014.02	990.75	13.53	3.42	-44.69	3,021.82	-4,056.26	5,020.61	5,005.94	14.67	342.219	
3,200.00	3,099.30	1,031.00	1,005.93	14.05	3.57	-44.78	3,022.01	-4,063.87	5,039.91	5,024.76	15.16	332.485	
3,300.00	3,194.25	1,062.00	1,033.44	14.57	3.86	-44.95	3,022.36	-4,078.15	5,060.65	5,044.92	15.73	321.793	
3,400.00	3,289.19	1,091.00	1,058.95	15.09	4.15	-45.10	3,022.73	-4,091.93	5,082.88	5,066.60	16.28	312.193	
3,500.00	3,384.13	1,104.58	1,070.81	15.62	4.29	-45.17	3,022.94	-4,098.55	5,106.60	5,089.86	16.74	305.086	
3,600.00	3,479.07	1,122.00	1,085.90	16.14	4.46	-45.27	3,023.21	-4,107.25	5,131.89	5,114.68	17.21	298.161	
3,700.00	3,574.02	1,135.69	1,097.66	16.67	4.61	-45.34	3,023.45	-4,114.25	5,158.74	5,141.08	17.66	292.145	
3,800.00	3,668.96	1,152.00	1,111.56	17.19	4.79	-45.43	3,023.83	-4,122.77	5,187.14	5,169.03	18.11	286.368	
3,900.00	3,763.90	1,169.11	1,126.03	17.72	4.98	-45.53	3,024.27	-4,131.90	5,217.04	5,198.47	18.57	280.932	
4,000.00	3,858.84	1,182.00	1,136.86	18.24	5.13	-45.60	3,024.62	-4,138.88	5,248.38	5,229.39	18.99	276.371	
4,100.00	3,953.79	1,214.00	1,163.51	18.77	5.51	-45.77	3,025.45	-4,156.57	5,281.01	5,261.47	19.54	270.281	
4,200.00	4,048.73	1,256.87	1,198.87	19.30	6.03	-46.02	3,026.20	-4,180.79	5,314.79	5,294.63	20.17	263.541	
4,300.00	4,143.67	1,294.47	1,229.63	19.82	6.50	-46.23	3,026.69	-4,202.42	5,349.69	5,328.95	20.74	257.931	
4,400.00	4,238.61	1,372.00	1,292.79	20.35	7.45	-46.68	3,027.42	-4,247.38	5,385.35	5,363.73	21.62	249.119	
4,500.00	4,333.56	1,435.00	1,344.17	20.88	8.20	-47.03	3,028.16	-4,283.82	5,421.39	5,399.03	22.36	242.417	
4,600.00	4,428.50	1,467.00	1,370.00	21.41	8.62	-47.22	3,028.48	-4,302.70	5,458.62	5,435.72	22.90	238.376	
4,700.00	4,523.44	1,486.09	1,385.30	21.93	8.87	-47.32	3,028.72	-4,314.12	5,496.99	5,473.66	23.32	235.673	
4,800.00	4,618.38	1,531.00	1,421.25	22.46	9.46	-47.58	3,029.58	-4,341.03	5,536.32	5,512.38	23.94	231.271	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design:		Rosa Unit 34 - (O) Rosa Unit 072B - OH - OH-SVY											Offset Site Error:		0.00 usft	
Survey Program:		358-APC_ISCWSA REV 2 MWD											Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned:				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor				
4,900.00	4,713.33	1,578.00	1,458.70	22.99	10.09	-47.84	3,030.59	-4,369.40	5,576.52	5,551.95	24.57	226.988				
5,000.00	4,808.27	1,626.00	1,496.79	23.52	10.73	-48.10	3,031.93	-4,398.58	5,617.60	5,592.41	25.19	222.987				
5,100.00	4,903.21	1,690.00	1,547.37	24.05	11.58	-48.46	3,032.84	-4,437.78	5,659.18	5,633.24	25.94	218.150				
5,200.00	4,998.16	1,742.56	1,588.83	24.58	12.29	-48.75	3,034.06	-4,470.07	5,701.51	5,674.92	26.59	214.390				
5,300.00	5,093.10	1,768.84	1,609.47	25.11	12.66	-48.89	3,034.85	-4,486.32	5,744.75	5,717.71	27.04	212.449				
5,400.00	5,188.04	1,786.00	1,622.83	25.64	12.90	-48.98	3,035.32	-4,497.07	5,789.09	5,761.68	27.41	211.194				
5,500.00	5,282.98	5,822.42	5,309.88	26.17	37.93	-64.84	2,964.07	-5,608.34	5,596.55	5,553.55	42.99	130.168				
5,600.00	5,377.93	5,914.78	5,402.15	26.70	38.00	-65.15	2,960.03	-5,608.58	5,581.69	5,538.15	43.54	128.194				
5,623.25	5,400.00	5,936.26	5,423.61	26.82	38.01	-65.22	2,959.10	-5,608.64	5,578.27	5,534.60	43.67	127.742				
5,700.00	5,473.03	6,007.38	5,494.66	27.22	38.06	-65.35	2,956.06	-5,608.83	5,567.26	5,523.17	44.09	126.280				
5,800.00	5,568.64	6,100.61	5,587.81	27.73	38.12	-65.53	2,952.15	-5,609.06	5,553.71	5,509.08	44.63	124.441				
5,900.00	5,664.75	6,194.46	5,681.58	28.23	38.18	-65.69	2,948.30	-5,609.30	5,541.06	5,495.89	45.17	122.675				
6,000.00	5,761.33	6,288.89	5,775.93	28.71	38.25	-65.86	2,944.52	-5,609.53	5,529.28	5,483.58	45.70	120.980				
6,100.00	5,858.34	6,383.87	5,870.84	29.18	38.31	-66.01	2,940.81	-5,609.75	5,518.35	5,472.12	46.23	119.355				
6,200.00	5,955.76	6,479.37	5,966.27	29.64	38.38	-66.16	2,937.17	-5,609.98	5,508.27	5,461.50	46.76	117.798				
6,300.00	6,053.57	6,575.35	6,062.18	30.07	38.44	-66.30	2,933.60	-5,610.19	5,499.00	5,451.71	47.28	116.306				
6,400.00	6,151.72	6,671.78	6,158.55	30.50	38.51	-66.44	2,930.10	-5,610.41	5,490.53	5,442.73	47.79	114.878				
6,500.00	6,250.19	6,768.62	6,255.34	30.91	38.57	-66.56	2,926.69	-5,610.62	5,482.85	5,434.55	48.30	113.512				
6,600.00	6,348.94	6,865.85	6,352.51	31.30	38.64	-66.68	2,923.36	-5,610.82	5,475.94	5,427.14	48.80	112.206				
6,659.67	6,408.00	6,924.04	6,410.66	31.53	38.68	-66.75	2,921.41	-5,610.94	5,472.18	5,423.08	49.10	111.455				
6,700.00	6,447.82	6,963.25	6,449.85	31.68	38.71	-83.44	2,920.11	-5,611.02	5,470.41	5,421.11	49.30	110.957				
6,731.55	6,478.72	6,993.65	6,480.23	31.82	38.73	-91.45	2,919.12	-5,611.08	5,469.99	5,420.51	49.47	110.567				
6,750.00	6,496.66	7,011.27	6,497.85	31.90	38.74	-94.86	2,918.55	-5,611.11	5,470.13	5,420.56	49.57	110.351				
6,800.00	6,544.65	7,058.37	6,544.92	32.13	38.77	-101.22	2,917.04	-5,611.20	5,471.99	5,422.14	49.85	109.761				
6,850.00	6,591.49	7,104.26	6,590.79	32.37	38.80	-105.05	2,915.58	-5,611.29	5,476.01	5,425.86	50.15	109.191				
6,900.00	6,636.89	7,148.66	6,635.17	32.62	38.83	-107.45	2,914.20	-5,611.38	5,482.18	5,431.72	50.46	108.645				
6,950.00	6,680.57	7,191.30	6,677.79	32.89	38.86	-108.92	2,912.89	-5,611.46	5,490.50	5,439.72	50.78	108.125				
7,000.00	6,722.26	7,231.91	6,718.38	33.17	38.89	-109.74	2,911.66	-5,611.53	5,500.96	5,449.85	51.11	107.634				
7,050.00	6,761.71	7,270.26	6,756.71	33.45	38.91	-110.05	2,910.51	-5,611.60	5,513.53	5,462.09	51.45	107.173				
7,100.00	6,798.67	7,306.09	6,792.52	33.75	38.94	-109.94	2,909.45	-5,611.67	5,528.17	5,476.38	51.79	106.744				
7,150.00	6,832.91	7,339.20	6,825.62	34.06	38.96	-109.47	2,908.48	-5,611.73	5,544.81	5,492.68	52.14	106.348				
7,200.00	6,864.22	7,369.37	6,855.77	34.37	38.98	-108.65	2,907.61	-5,611.78	5,563.40	5,510.91	52.49	105.985				
7,250.00	6,892.42	7,396.41	6,882.81	34.69	39.00	-107.50	2,906.84	-5,611.83	5,583.85	5,531.00	52.85	105.656				
7,300.00	6,917.32	7,420.17	6,906.56	35.03	39.02	-106.04	2,906.16	-5,611.87	5,606.06	5,552.85	53.21	105.361				
7,350.00	6,938.77	7,440.49	6,926.87	35.37	39.03	-104.26	2,905.59	-5,611.90	5,629.92	5,576.35	53.57	105.099				
7,400.00	6,956.64	7,457.24	6,943.61	35.72	39.04	-102.16	2,905.12	-5,611.93	5,655.29	5,601.36	53.93	104.871				
7,450.00	6,970.83	7,470.32	6,956.69	36.07	39.05	-99.76	2,904.76	-5,611.95	5,682.03	5,627.75	54.28	104.677				
7,500.00	6,981.23	7,479.64	6,966.00	36.44	39.06	-97.05	2,904.50	-5,611.97	5,709.99	5,655.36	54.63	104.515				
7,550.00	6,987.80	7,485.13	6,971.49	36.81	39.06	-94.05	2,904.35	-5,611.98	5,739.00	5,684.02	54.98	104.386				
7,600.00	6,990.48	7,486.77	6,973.13	37.19	39.06	-90.78	2,904.30	-5,611.98	5,768.87	5,713.56	55.32	104.288				
7,609.87	6,990.55	7,486.63	6,972.99	37.26	39.06	-90.11	2,904.31	-5,611.98	5,774.85	5,719.47	55.38	104.272				
7,700.00	6,990.49	7,484.71	6,971.07	37.97	39.06	-90.09	2,904.36	-5,611.98	5,830.04	5,774.05	55.99	104.134				
7,800.00	6,990.42	7,482.58	6,968.94	38.78	39.06	-90.06	2,904.42	-5,611.97	5,892.27	5,835.61	56.67	103.982				
7,900.00	6,990.35	7,480.44	6,966.80	39.64	39.06	-90.04	2,904.48	-5,611.97	5,955.53	5,898.18	57.36	103.836				
8,000.00	6,990.28	7,478.30	6,964.66	40.53	39.06	-90.01	2,904.54	-5,611.97	6,019.79	5,961.74	58.05	103.697				
8,100.00	6,990.21	7,476.16	6,962.52	41.45	39.06	-89.98	2,904.60	-5,611.96	6,085.01	6,026.26	58.75	103.570				
8,200.00	6,990.14	7,474.01	6,960.37	42.40	39.05	-89.95	2,904.66	-5,611.96	6,151.17	6,091.71	59.46	103.456				
8,306.37	6,990.06	7,471.72	6,958.09	43.45	39.05	-89.93	2,904.72	-5,611.95	6,222.53	6,162.32	60.21	103.350				
8,400.00	6,990.00	7,469.76	6,956.13	44.38	39.05	-89.89	2,904.77	-5,611.95	6,288.35	6,227.50	60.85	103.340				
8,500.00	6,989.93	7,467.80	6,954.17	45.36	39.05	-89.85	2,904.83	-5,611.95	6,363.98	6,302.49	61.49	103.493				
8,600.00	6,989.85	7,465.98	6,952.35	46.33	39.05	-89.80	2,904.88	-5,611.94	6,444.56	6,382.49	62.08	103.817				
8,700.00	6,989.78	7,464.31	6,950.68	47.28	39.05	-89.74	2,904.93	-5,611.94	6,529.54	6,466.94	62.60	104.307				

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 072B - OH - OH-SVY													Offset Site Error:	0.00 usft	
Survey Program:		358-APC_ISCWSA REV 2 MWD								Rule Assigned:				Offset Well Error:	0.00 usft
Reference	Offset	Reference	Offset	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
8,800.00	6,989.70	7,462.81	6,949.18	48.21	39.05	-89.67	2,904.97	-5,611.94	6,618.34	6,555.28	63.06	104.958			
8,900.00	6,989.63	7,461.47	6,947.84	49.11	39.05	-89.58	2,905.00	-5,611.94	6,710.37	6,646.93	63.45	105.763			
9,000.00	6,989.55	7,460.32	6,946.69	49.99	39.04	-89.45	2,905.04	-5,611.94	6,805.08	6,741.31	63.77	106.718			
9,100.00	6,989.48	7,459.34	6,945.71	50.84	39.04	-89.23	2,905.06	-5,611.93	6,901.90	6,837.88	64.02	107.814			
9,200.00	6,989.40	7,458.55	6,944.92	51.66	39.04	-88.82	2,905.09	-5,611.93	7,000.27	6,936.08	64.20	109.046			
9,300.00	6,989.33	7,457.96	6,944.33	52.45	39.04	-87.63	2,905.10	-5,611.93	7,099.68	7,035.37	64.31	110.405			
9,393.87	6,989.27	7,457.57	6,943.95	53.15	39.04	-82.66	2,905.11	-5,611.93	7,193.45	7,129.11	64.35	111.790			
9,400.00	6,989.26	7,457.56	6,943.93	53.20	39.04	-82.63	2,905.11	-5,611.93	7,199.59	7,135.24	64.35	111.884			
9,500.00	6,989.19	7,457.24	6,943.61	53.95	39.04	-82.30	2,905.12	-5,611.93	7,299.59	7,235.22	64.36	113.413			
9,600.00	6,989.12	7,456.93	6,943.30	54.73	39.04	-81.96	2,905.13	-5,611.93	7,399.58	7,335.21	64.38	114.941			
9,700.00	6,989.05	7,456.61	6,942.98	55.55	39.04	-81.63	2,905.14	-5,611.93	7,499.58	7,435.19	64.39	116.468			
9,800.00	6,988.98	7,456.30	6,942.67	56.40	39.04	-81.30	2,905.15	-5,611.93	7,599.58	7,535.17	64.41	117.993			
9,900.00	6,988.91	7,455.98	6,942.36	57.28	39.04	-80.97	2,905.16	-5,611.93	7,699.58	7,635.16	64.42	119.517			
10,000.00	6,988.84	7,455.67	6,942.04	58.20	39.04	-80.64	2,905.17	-5,611.93	7,799.58	7,735.14	64.44	121.039			
10,100.00	6,988.77	7,455.35	6,941.73	59.14	39.04	-80.31	2,905.18	-5,611.93	7,899.57	7,835.12	64.45	122.560			
10,200.00	6,988.70	7,455.04	6,941.41	60.11	39.04	-79.99	2,905.18	-5,611.93	7,999.57	7,935.10	64.47	124.079			
10,300.00	6,988.63	7,454.72	6,941.10	61.11	39.04	-79.67	2,905.19	-5,611.93	8,099.57	8,035.08	64.49	125.597			
10,400.00	6,988.56	7,454.41	6,940.78	62.14	39.04	-79.35	2,905.20	-5,611.92	8,199.57	8,135.06	64.51	127.114			
10,500.00	6,988.49	7,454.09	6,940.47	63.19	39.04	-79.04	2,905.21	-5,611.92	8,299.57	8,235.04	64.52	128.628			
10,600.00	6,988.42	7,453.78	6,940.15	64.26	39.04	-78.72	2,905.22	-5,611.92	8,399.57	8,335.02	64.54	130.141			
10,700.00	6,988.35	7,453.46	6,939.84	65.36	39.04	-78.41	2,905.23	-5,611.92	8,499.56	8,435.00	64.56	131.652			
10,800.00	6,988.28	7,453.15	6,939.52	66.48	39.04	-78.10	2,905.24	-5,611.92	8,599.56	8,534.98	64.58	133.162			
10,900.00	6,988.21	7,452.83	6,939.21	67.61	39.04	-77.79	2,905.25	-5,611.92	8,699.56	8,634.96	64.60	134.670			
11,000.00	6,988.14	7,452.52	6,938.89	68.77	39.04	-77.49	2,905.25	-5,611.92	8,799.56	8,734.94	64.62	136.176			
11,100.00	6,988.07	7,452.20	6,938.58	69.95	39.04	-77.18	2,905.26	-5,611.92	8,899.56	8,834.92	64.64	137.680			
11,200.00	6,988.01	7,451.89	6,938.26	71.14	39.04	-76.88	2,905.27	-5,611.92	8,999.56	8,934.90	64.66	139.182			
11,300.00	6,987.94	7,451.57	6,937.95	72.35	39.04	-76.58	2,905.28	-5,611.92	9,099.55	9,034.87	64.68	140.683			
11,400.00	6,987.87	7,451.26	6,937.63	73.57	39.04	-76.28	2,905.29	-5,611.92	9,199.55	9,134.85	64.70	142.181			
11,500.00	6,987.80	7,450.94	6,937.32	74.81	39.04	-75.99	2,905.30	-5,611.92	9,299.55	9,234.83	64.73	143.678			
11,600.00	6,987.73	7,450.63	6,937.00	76.07	39.04	-75.70	2,905.31	-5,611.92	9,399.55	9,334.80	64.75	145.172			
11,643.87	6,987.70	7,450.49	6,936.86	76.62	39.04	-75.57	2,905.31	-5,611.92	9,443.41	9,378.66	64.76	145.827			
11,700.00	6,987.66	7,450.33	6,936.70	77.33	39.04	78.85	2,905.32	-5,611.92	9,499.55	9,434.78	64.77	146.674			
11,737.27	6,987.63	7,450.24	6,936.61	77.80	39.04	83.95	2,905.32	-5,611.92	9,536.81	9,472.04	64.77	147.245			
11,800.00	6,987.59	7,450.10	6,936.47	78.59	39.04	83.92	2,905.32	-5,611.92	9,599.51	9,534.74	64.77	148.212			
11,900.00	6,987.52	7,449.88	6,936.25	79.86	39.04	83.88	2,905.33	-5,611.92	9,699.47	9,634.70	64.77	149.751			
12,000.00	6,987.46	7,449.66	6,936.03	81.14	39.04	83.83	2,905.33	-5,611.92	9,799.44	9,734.66	64.77	151.288			
12,100.00	6,987.39	7,449.44	6,935.81	82.43	39.04	83.78	2,905.34	-5,611.92	9,899.40	9,834.62	64.78	152.823			
12,200.00	6,987.32	7,449.21	6,935.59	83.73	39.04	83.74	2,905.35	-5,611.92	9,999.36	9,934.58	64.78	154.356			
12,300.00	6,987.26	7,448.99	6,935.37	85.05	39.04	83.69	2,905.35	-5,611.92	10,099.33	10,034.54	64.79	155.887			
12,400.00	6,987.19	7,448.77	6,935.15	86.38	39.04	83.64	2,905.36	-5,611.92	10,199.29	10,134.50	64.79	157.415			
12,500.00	6,987.12	7,448.55	6,934.93	87.71	39.04	83.60	2,905.37	-5,611.92	10,299.26	10,234.46	64.80	158.941			
12,600.00	6,987.06	7,448.33	6,934.71	89.06	39.04	83.55	2,905.37	-5,611.91	10,399.22	10,334.42	64.81	160.464			
12,700.00	6,986.99	7,448.11	6,934.49	90.41	39.04	83.50	2,905.38	-5,611.91	10,499.19	10,434.37	64.82	161.985			
12,800.00	6,986.92	7,447.89	6,934.26	91.77	39.04	83.46	2,905.38	-5,611.91	10,599.16	10,534.33	64.83	163.504			
12,900.00	6,986.86	7,447.67	6,934.04	93.14	39.04	83.41	2,905.39	-5,611.91	10,699.12	10,634.29	64.84	165.020			
13,000.00	6,986.79	7,447.45	6,933.82	94.52	39.04	83.36	2,905.40	-5,611.91	10,799.09	10,734.25	64.85	166.533			
13,100.00	6,986.72	7,447.23	6,933.60	95.90	39.04	83.31	2,905.40	-5,611.91	10,899.06	10,834.20	64.86	168.044			
13,200.00	6,986.66	7,447.00	6,933.38	97.30	39.04	83.27	2,905.41	-5,611.91	10,999.03	10,934.16	64.87	169.553			
13,300.00	6,986.59	7,446.78	6,933.16	98.69	39.03	83.22	2,905.41	-5,611.91	11,099.00	11,034.12	64.88	171.059			
13,400.00	6,986.52	7,446.56	6,932.94	100.10	39.03	83.17	2,905.42	-5,611.91	11,198.97	11,134.07	64.90	172.562			
13,500.00	6,986.46	7,446.34	6,932.72	101.51	39.03	83.13	2,905.43	-5,611.91	11,298.94	11,234.03	64.91	174.063			
13,600.00	6,986.39	7,446.12	6,932.50	102.93	39.03	83.08	2,905.43	-5,611.91	11,398.92	11,333.99	64.93	175.561			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 072B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program:		358-APC_ISCWSA REV 2 MWD						Rule Assigned:					Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,700.00	6,986.32	7,445.90	6,932.27	104.35	39.03	83.03	2,905.44	-5,611.91	11,498.89	11,433.94	64.94	177.056		
13,800.00	6,986.25	7,445.68	6,932.05	105.78	39.03	82.99	2,905.45	-5,611.91	11,598.86	11,533.90	64.96	178.548		
13,900.00	6,986.19	7,445.46	6,931.83	107.21	39.03	82.94	2,905.45	-5,611.91	11,698.83	11,633.85	64.98	180.038		
14,000.00	6,986.12	7,445.23	6,931.61	108.65	39.03	82.89	2,905.46	-5,611.91	11,798.81	11,733.81	65.00	181.525		
14,100.00	6,986.05	1,105.29	1,071.43	110.09	4.29	1.37	3,022.95	-4,098.89	11,936.40	11,881.34	55.06	216.790		
14,200.00	6,985.99	1,091.00	1,058.95	111.54	4.15	1.37	3,022.73	-4,091.93	12,023.50	11,968.28	55.22	217.738		
14,300.00	6,985.92	1,091.00	1,058.95	112.99	4.15	1.37	3,022.73	-4,091.93	12,110.71	12,055.29	55.42	218.533		
14,400.00	6,985.85	1,091.00	1,058.95	114.45	4.15	1.37	3,022.73	-4,091.93	12,198.10	12,142.49	55.61	219.337		
14,500.00	6,985.79	1,091.00	1,058.95	115.91	4.15	1.37	3,022.73	-4,091.93	12,285.69	12,229.89	55.81	220.149		
14,600.00	6,985.72	1,091.00	1,058.95	117.38	4.15	1.37	3,022.73	-4,091.93	12,373.47	12,317.47	56.00	220.969		
14,700.00	6,985.65	1,075.11	1,045.00	118.84	3.99	1.36	3,022.51	-4,084.33	12,461.36	12,405.21	56.15	221.948		
14,800.00	6,985.59	1,062.00	1,033.44	120.32	3.86	1.36	3,022.36	-4,078.15	12,549.44	12,493.14	56.30	222.904		
14,900.00	6,985.52	1,062.00	1,033.44	121.79	3.86	1.36	3,022.36	-4,078.15	12,637.65	12,581.17	56.48	223.741		
15,000.00	6,985.45	1,062.00	1,033.44	123.27	3.86	1.36	3,022.36	-4,078.15	12,726.03	12,669.37	56.66	224.585		
15,100.00	6,985.39	1,062.00	1,033.44	124.75	3.86	1.36	3,022.36	-4,078.15	12,814.59	12,757.75	56.84	225.435		
15,200.00	6,985.32	1,045.51	1,018.83	126.24	3.71	1.36	3,022.18	-4,070.50	12,903.23	12,846.24	56.99	226.428		
15,300.00	6,985.25	1,031.00	1,005.93	127.72	3.57	1.36	3,022.01	-4,063.87	12,992.07	12,934.94	57.13	227.410		
15,400.00	6,985.19	1,031.00	1,005.93	129.21	3.57	1.36	3,022.01	-4,063.87	13,081.01	13,023.70	57.30	228.274		
15,500.00	6,985.12	1,031.00	1,005.93	130.71	3.57	1.36	3,022.01	-4,063.87	13,170.11	13,112.63	57.48	229.143		
15,600.00	6,985.05	1,031.00	1,005.93	132.20	3.57	1.36	3,022.01	-4,063.87	13,259.36	13,201.71	57.64	230.019		
15,700.00	6,984.99	1,031.00	1,005.93	133.70	3.57	1.36	3,022.01	-4,063.87	13,348.76	13,290.95	57.81	230.900		
15,800.00	6,984.92	1,000.00	978.17	135.20	3.29	1.35	3,021.68	-4,050.08	13,438.28	13,380.35	57.92	232.006		
15,900.00	6,984.85	1,000.00	978.17	136.71	3.29	1.35	3,021.68	-4,050.08	13,527.87	13,469.79	58.09	232.892		
16,000.00	6,984.79	1,000.00	978.17	138.21	3.29	1.35	3,021.68	-4,050.08	13,617.62	13,559.37	58.25	233.783		
16,100.00	6,984.72	1,000.00	978.17	139.72	3.29	1.35	3,021.68	-4,050.08	13,707.50	13,649.09	58.41	234.679		
16,200.00	6,984.65	1,000.00	978.17	141.23	3.29	1.35	3,021.68	-4,050.08	13,797.53	13,738.96	58.57	235.580		
16,300.00	6,984.59	1,000.00	978.17	142.75	3.29	1.35	3,021.68	-4,050.08	13,887.69	13,828.96	58.73	236.485		
16,400.00	6,984.52	1,000.00	978.17	144.26	3.29	1.35	3,021.68	-4,050.08	13,977.99	13,919.10	58.88	237.395		
16,500.00	6,984.45	971.00	951.95	145.78	3.05	1.35	3,021.44	-4,037.68	14,068.36	14,009.37	58.99	238.474		
16,600.00	6,984.39	971.00	951.95	147.29	3.05	1.35	3,021.44	-4,037.68	14,158.83	14,099.68	59.15	239.388		
16,700.00	6,984.32	971.00	951.95	148.82	3.05	1.35	3,021.44	-4,037.68	14,249.42	14,190.13	59.30	240.305		
16,800.00	6,984.25	971.00	951.95	150.34	3.05	1.35	3,021.44	-4,037.68	14,340.14	14,280.70	59.45	241.226		
16,900.00	6,984.19	971.00	951.95	151.86	3.05	1.35	3,021.44	-4,037.68	14,430.99	14,371.39	59.60	242.151		
17,000.00	6,984.12	971.00	951.95	153.39	3.05	1.35	3,021.44	-4,037.68	14,521.95	14,462.21	59.74	243.079		
17,100.00	6,984.05	971.00	951.95	154.91	3.05	1.35	3,021.44	-4,037.68	14,613.03	14,553.14	59.89	244.010		
17,200.00	6,983.99	971.00	951.95	156.44	3.05	1.35	3,021.44	-4,037.68	14,704.23	14,644.20	60.03	244.945		
17,300.00	6,983.92	954.84	937.23	157.97	2.91	1.35	3,021.30	-4,031.02	14,795.43	14,735.28	60.16	245.951		
17,400.00	6,983.85	940.00	923.64	159.50	2.80	1.35	3,021.16	-4,025.06	14,886.86	14,826.58	60.28	246.955		
17,500.00	6,983.79	940.00	923.64	161.04	2.80	1.35	3,021.16	-4,025.06	14,978.31	14,917.89	60.42	247.894		
17,600.00	6,983.72	940.00	923.64	162.57	2.80	1.35	3,021.16	-4,025.06	15,069.87	15,009.31	60.56	248.836		
17,700.00	6,983.65	940.00	923.64	164.11	2.80	1.35	3,021.16	-4,025.06	15,161.53	15,100.83	60.70	249.781		
17,800.00	6,983.59	940.00	923.64	165.65	2.80	1.35	3,021.16	-4,025.06	15,253.30	15,192.46	60.84	250.728		
17,900.00	6,983.52	940.00	923.64	167.18	2.80	1.35	3,021.16	-4,025.06	15,345.17	15,284.20	60.97	251.677		
18,000.00	6,983.45	940.00	923.64	168.72	2.80	1.35	3,021.16	-4,025.06	15,437.14	15,376.04	61.11	252.629		
18,100.00	6,983.39	940.00	923.64	170.27	2.80	1.35	3,021.16	-4,025.06	15,529.22	15,467.98	61.24	253.582		
18,200.00	6,983.32	940.00	923.64	171.81	2.80	1.35	3,021.16	-4,025.06	15,621.39	15,560.01	61.37	254.538		
18,300.00	6,983.25	923.98	908.89	173.35	2.67	1.34	3,020.96	-4,018.80	15,713.54	15,652.05	61.49	255.543		
18,400.00	6,983.19	910.00	895.96	174.90	2.57	1.34	3,020.75	-4,013.49	15,805.91	15,744.30	61.61	256.543		
18,500.00	6,983.12	910.00	895.96	176.44	2.57	1.34	3,020.75	-4,013.49	15,898.29	15,836.55	61.74	257.501		
18,600.00	6,983.05	910.00	895.96	177.99	2.57	1.34	3,020.75	-4,013.49	15,990.76	15,928.89	61.87	258.461		
18,700.00	6,982.99	910.00	895.96	179.54	2.57	1.34	3,020.75	-4,013.49	16,083.32	16,021.32	62.00	259.422		
18,800.00	6,982.92	910.00	895.96	181.09	2.57	1.34	3,020.75	-4,013.49	16,175.97	16,113.85	62.12	260.385		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 072B - OH - OH-SVY													Offset Site Error:	0.00 usft
Survey Program: 358-APC_ISCWSA REV 2 MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
18,900.00	6,982.85	910.00	895.96	182.64	2.57	1.34	3,020.75	-4,013.49	16,268.71	16,206.46	62.25	261.349		
19,000.00	6,982.78	910.00	895.96	184.19	2.57	1.34	3,020.75	-4,013.49	16,361.53	16,299.16	62.37	262.315		
19,100.00	6,982.72	910.00	895.96	185.74	2.57	1.34	3,020.75	-4,013.49	16,454.44	16,391.94	62.50	263.282		
19,200.00	6,982.65	910.00	895.96	187.29	2.57	1.34	3,020.75	-4,013.49	16,547.42	16,484.80	62.62	264.250		
19,300.00	6,982.58	910.00	895.96	188.84	2.57	1.34	3,020.75	-4,013.49	16,640.49	16,577.75	62.74	265.218		
19,400.00	6,982.52	895.49	882.48	190.40	2.47	1.34	3,020.51	-4,008.15	16,733.55	16,670.69	62.86	266.211		
19,500.00	6,982.45	879.00	867.07	191.95	2.35	1.34	3,020.21	-4,002.27	16,826.83	16,763.86	62.97	267.209		
19,600.00	6,982.38	879.00	867.07	193.51	2.35	1.34	3,020.21	-4,002.27	16,920.07	16,856.98	63.09	268.178		
19,700.00	6,982.32	879.00	867.07	195.07	2.35	1.34	3,020.21	-4,002.27	17,013.39	16,950.18	63.21	269.148		
19,800.00	6,982.25	879.00	867.07	196.62	2.35	1.34	3,020.21	-4,002.27	17,106.78	17,043.45	63.33	270.118		
19,900.00	6,982.18	879.00	867.07	198.18	2.35	1.34	3,020.21	-4,002.27	17,200.25	17,136.80	63.45	271.089		
20,000.00	6,982.12	879.00	867.07	199.74	2.35	1.34	3,020.21	-4,002.27	17,293.79	17,230.22	63.57	272.061		
20,100.00	6,982.05	879.00	867.07	201.30	2.35	1.34	3,020.21	-4,002.27	17,387.40	17,323.72	63.68	273.033		
20,176.02	6,982.00	879.00	867.07	202.36	2.35	1.34	3,020.21	-4,002.27	17,458.61	17,393.06	65.54	266.363		

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 148 COM - OH - OH-INC														Offset Site Error: 0.00 usft	
Survey Program: Reference		248-A027Ua_INC-ONLY Offset						Rule Assigned: Distance				Offset Well Error: 0.00 usft			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.00	0.00	0.00	0.00	0.00	0.00	-84.94	1,244.66	-14,061.82	14,116.85						
100.00	100.00	61.00	61.00	0.25	1.13	-84.94	1,244.66	-14,061.82	14,116.79	14,115.41	1.38	N/A			
200.00	200.00	161.00	161.00	0.61	2.98	-84.94	1,244.66	-14,061.82	14,116.79	14,113.21	3.59	3,937.056			
300.00	300.00	261.00	261.00	0.97	4.85	-84.94	1,244.66	-14,061.82	14,116.79	14,110.98	5.82	2,427.493			
400.00	400.00	361.00	361.00	1.33	6.87	-84.94	1,244.66	-14,061.82	14,116.79	14,108.60	8.20	1,722.105			
500.00	500.00	464.64	464.64	1.68	8.97	-84.94	1,244.82	-14,061.82	14,116.81	14,106.15	10.65	1,325.138			
600.00	600.00	561.04	561.00	2.04	11.14	-84.94	1,244.66	-14,061.82	14,116.79	14,103.61	13.18	1,070.986			
700.00	699.98	664.09	664.05	2.40	13.64	-74.96	1,245.33	-14,061.82	14,116.40	14,100.36	16.04	879.965			
800.00	799.84	775.69	775.63	2.76	16.35	-75.01	1,244.52	-14,061.82	14,114.98	14,095.87	19.11	738.609			
900.00	899.45	860.58	860.45	3.13	18.66	-75.08	1,244.66	-14,061.82	14,112.72	14,090.95	21.78	648.056			
1,000.00	998.70	962.91	962.76	3.49	21.40	-75.19	1,245.94	-14,061.82	14,109.69	14,084.80	24.88	567.008			
1,100.00	1,097.47	1,073.48	1,073.32	3.86	24.37	-75.34	1,245.11	-14,061.82	14,105.59	14,077.37	28.22	499.833			
1,200.00	1,195.62	1,156.91	1,156.62	4.24	26.57	-75.50	1,244.66	-14,061.82	14,100.66	14,069.85	30.81	457.675			
1,300.00	1,293.06	1,254.34	1,254.06	4.64	29.12	-75.69	1,244.66	-14,061.82	14,094.92	14,061.16	33.76	417.506			
1,400.00	1,389.64	1,350.93	1,350.64	5.06	31.65	-75.92	1,244.66	-14,061.82	14,088.37	14,051.66	36.71	383.820			
1,500.00	1,485.27	1,453.24	1,452.92	5.50	34.33	-76.18	1,246.27	-14,061.82	14,081.14	14,041.32	39.82	353.601			
1,515.00	1,499.52	1,468.51	1,468.18	5.57	34.73	-76.22	1,246.17	-14,061.82	14,079.97	14,039.68	40.29	349.472			
1,600.00	1,580.22	1,554.75	1,554.40	5.96	36.99	-76.33	1,245.34	-14,061.82	14,073.25	14,030.32	42.94	327.777			
1,700.00	1,675.17	1,636.65	1,636.17	6.44	39.04	-76.43	1,244.66	-14,061.82	14,065.43	14,019.98	45.45	309.489			
1,800.00	1,770.11	1,731.59	1,731.11	6.92	41.24	-76.55	1,244.66	-14,061.82	14,057.72	14,009.61	48.12	292.141			
1,900.00	1,865.05	1,826.54	1,826.05	7.41	43.44	-76.67	1,244.66	-14,061.82	14,050.09	13,999.29	50.80	276.581			
2,000.00	1,959.99	1,925.02	1,924.51	7.90	45.72	-76.79	1,246.17	-14,061.82	14,042.62	13,989.06	53.57	262.152			
2,100.00	2,054.94	2,024.68	2,024.15	8.40	48.02	-76.92	1,245.54	-14,061.82	14,035.08	13,978.71	56.37	248.998			
2,200.00	2,149.88	2,111.48	2,110.88	8.90	50.02	-77.03	1,244.66	-14,061.82	14,027.58	13,968.72	58.86	238.332			
2,300.00	2,244.82	2,206.43	2,205.82	9.41	52.02	-77.15	1,244.66	-14,061.82	14,020.21	13,958.85	61.36	228.480			
2,400.00	2,339.76	2,301.37	2,300.76	9.92	54.03	-77.27	1,244.66	-14,061.82	14,012.91	13,949.03	63.87	219.392			
2,500.00	2,434.71	2,398.54	2,397.92	10.43	56.08	-77.38	1,245.54	-14,061.82	14,005.72	13,939.29	66.43	210.835			
2,600.00	2,529.65	2,496.33	2,495.70	10.94	58.15	-77.51	1,245.08	-14,061.82	13,998.52	13,929.52	69.00	202.867			
2,700.00	2,624.59	2,586.26	2,585.59	11.45	59.98	-77.62	1,244.66	-14,061.82	13,991.39	13,920.05	71.34	196.111			
2,800.00	2,719.53	2,681.21	2,680.53	11.97	61.80	-77.74	1,244.66	-14,061.82	13,984.36	13,910.68	73.68	189.798			
2,900.00	2,814.48	2,776.15	2,775.48	12.49	63.63	-77.86	1,244.66	-14,061.82	13,977.39	13,901.37	76.02	183.870			
3,000.00	2,909.42	2,872.86	2,872.17	13.01	65.48	-77.98	1,245.63	-14,061.82	13,970.53	13,892.14	78.39	178.216			
3,100.00	3,004.36	2,969.82	2,969.13	13.53	67.35	-78.11	1,245.20	-14,061.82	13,963.67	13,882.90	80.77	172.882			
3,200.00	3,099.30	3,061.02	3,060.30	14.05	69.05	-78.22	1,244.66	-14,061.82	13,956.88	13,873.89	82.99	168.180			
3,300.00	3,194.25	3,155.96	3,155.25	14.57	70.62	-78.34	1,244.66	-14,061.82	13,950.18	13,865.09	85.08	163.959			
3,400.00	3,289.19	3,250.91	3,250.19	15.09	72.20	-78.46	1,244.66	-14,061.82	13,943.54	13,856.36	87.18	159.939			
3,500.00	3,384.13	3,345.85	3,345.13	15.62	73.78	-78.58	1,244.66	-14,061.82	13,936.98	13,847.70	89.28	156.108			
3,600.00	3,479.07	3,441.23	3,440.51	16.14	75.36	-78.70	1,245.34	-14,061.82	13,930.50	13,839.12	91.38	152.440			
3,700.00	3,574.02	3,536.69	3,535.96	16.67	76.95	-78.82	1,245.19	-14,061.82	13,924.07	13,830.57	93.49	148.935			
3,800.00	3,668.96	3,632.06	3,631.34	17.19	78.54	-78.95	1,244.91	-14,061.82	13,917.69	13,822.10	95.60	145.585			
3,900.00	3,763.90	3,725.63	3,724.90	17.72	80.12	-79.07	1,244.66	-14,061.82	13,911.39	13,813.68	97.71	142.373			
4,000.00	3,858.84	3,820.58	3,819.84	18.24	81.81	-79.19	1,244.66	-14,061.82	13,905.17	13,805.25	99.92	139.163			
4,100.00	3,953.79	3,915.97	3,915.23	18.77	83.50	-79.31	1,244.74	-14,061.82	13,899.01	13,796.87	102.14	136.081			
4,200.00	4,048.73	4,010.47	4,009.73	19.30	85.61	-79.43	1,244.66	-14,061.82	13,892.92	13,788.14	104.77	132.600			
4,300.00	4,143.67	4,105.41	4,104.67	19.82	88.06	-79.55	1,244.66	-14,061.82	13,886.89	13,779.16	107.74	128.894			
4,400.00	4,238.61	4,201.12	4,200.37	20.35	90.52	-79.67	1,245.01	-14,061.82	13,880.95	13,770.22	110.72	125.365			
4,500.00	4,333.56	4,295.44	4,294.56	20.88	93.11	-79.79	1,244.66	-14,061.82	13,875.06	13,761.21	113.85	121.875			
4,600.00	4,428.50	4,392.16	4,391.25	21.41	96.23	-79.91	1,245.25	-14,061.82	13,869.25	13,751.76	117.49	118.047			
4,700.00	4,523.44	4,485.47	4,484.44	21.93	99.30	-80.04	1,244.66	-14,061.82	13,863.49	13,742.40	121.09	114.486			
4,800.00	4,618.38	4,580.55	4,579.38	22.46	102.52	-80.16	1,244.66	-14,061.82	13,857.81	13,732.98	124.83	111.012			
4,900.00	4,713.33	4,676.61	4,675.40	22.99	105.84	-80.28	1,244.85	-14,061.82	13,852.20	13,723.51	128.69	107.641			
5,000.00	4,808.27	4,770.80	4,769.46	23.52	109.22	-80.40	1,245.25	-14,061.82	13,846.66	13,714.07	132.59	104.434			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 148 COM - OH - OH-INC											Offset Site Error: 0.00 usft		
Survey Program: Reference		248-A027Ua_INC-ONLY Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance			Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,100.00	4,903.21	4,865.68	4,864.21	24.05	112.70	-80.52	1,244.66	-14,061.82	13,841.19	13,704.59	136.60	101.328	
5,200.00	4,998.16	4,960.79	4,959.16	24.58	116.27	-80.64	1,244.66	-14,061.82	13,835.79	13,695.08	140.70	98.334	
5,300.00	5,093.10	5,055.15	5,053.47	25.11	119.91	-80.76	1,245.76	-14,061.82	13,830.45	13,685.58	144.87	95.470	
5,400.00	5,188.04	5,150.96	5,149.04	25.64	123.61	-80.89	1,244.66	-14,061.82	13,825.19	13,676.09	149.10	92.725	
5,500.00	5,282.98	5,246.09	5,243.98	26.17	127.30	-81.01	1,244.66	-14,061.82	13,819.99	13,666.67	153.32	90.138	
5,600.00	5,377.93	5,340.04	5,337.90	26.70	130.78	-81.13	1,245.63	-14,061.82	13,814.85	13,657.53	157.32	87.812	
5,623.25	5,400.00	5,360.88	5,358.74	26.82	131.55	-81.16	1,245.43	-14,061.82	13,813.67	13,655.46	158.22	87.308	
5,700.00	5,473.03	5,436.33	5,434.03	27.22	134.30	-81.22	1,244.66	-14,061.82	13,809.89	13,648.51	161.38	85.576	
5,800.00	5,568.64	5,532.08	5,529.64	27.73	137.76	-81.28	1,244.66	-14,061.82	13,805.23	13,639.89	165.34	83.495	
5,900.00	5,664.75	5,628.19	5,625.75	28.23	141.24	-81.35	1,244.66	-14,061.82	13,800.90	13,631.58	169.32	81.508	
6,000.00	5,761.33	5,721.10	5,718.59	28.71	144.60	-81.41	1,245.69	-14,061.82	13,796.86	13,623.69	173.17	79.673	
6,100.00	5,858.34	5,822.07	5,819.34	29.18	148.32	-81.47	1,244.66	-14,061.82	13,793.16	13,615.81	177.35	77.772	
6,200.00	5,955.76	5,918.42	5,915.64	29.64	151.93	-81.52	1,246.13	-14,061.82	13,789.71	13,608.29	181.42	76.009	
6,300.00	6,053.57	6,010.22	6,007.40	30.07	155.38	-81.58	1,245.01	-14,061.82	13,786.61	13,601.30	185.31	74.399	
6,400.00	6,151.72	6,115.76	6,112.72	30.50	159.45	-81.63	1,244.66	-14,061.82	13,783.77	13,593.96	189.81	72.619	
6,500.00	6,250.19	6,207.82	6,204.70	30.91	163.03	-81.67	1,245.49	-14,061.82	13,781.18	13,587.39	193.79	71.113	
6,600.00	6,348.94	6,312.68	6,309.30	31.30	167.03	-81.71	1,245.48	-14,061.82	13,778.89	13,580.69	198.19	69.523	
6,659.67	6,408.00	6,372.51	6,369.00	31.53	169.30	-81.74	1,244.66	-14,061.82	13,777.67	13,576.99	200.68	68.654	
6,677.09	6,425.23	6,389.74	6,386.23	31.60	169.93	-90.01	1,244.66	-14,061.82	13,777.49	13,576.11	201.38	68.414	CC
6,700.00	6,447.82	6,412.32	6,408.82	31.68	170.76	-98.24	1,244.66	-14,061.82	13,777.80	13,575.49	202.30	68.104	ES
6,750.00	6,496.66	6,461.17	6,457.66	31.90	172.55	-109.39	1,244.66	-14,061.82	13,780.55	13,576.23	204.32	67.447	
6,800.00	6,544.65	6,505.35	6,501.80	32.13	174.18	-115.43	1,245.67	-14,061.82	13,786.14	13,579.96	206.18	66.866	
6,850.00	6,591.49	6,547.46	6,543.89	32.37	175.73	-118.92	1,245.08	-14,061.82	13,794.62	13,586.64	207.98	66.328	
6,900.00	6,636.89	6,601.62	6,597.89	32.62	177.72	-120.95	1,244.66	-14,061.82	13,805.88	13,595.64	210.24	65.668	
6,950.00	6,680.57	6,644.63	6,640.88	32.89	179.30	-121.99	1,245.54	-14,061.82	13,819.83	13,607.73	212.10	65.156	
7,000.00	6,722.26	6,680.37	6,676.60	33.17	180.62	-122.33	1,245.28	-14,061.82	13,836.47	13,622.76	213.71	64.743	
7,050.00	6,761.71	6,726.61	6,722.71	33.45	182.28	-122.14	1,244.66	-14,061.82	13,855.69	13,640.02	215.68	64.243	
7,100.00	6,798.67	6,763.57	6,759.67	33.75	183.51	-121.45	1,244.66	-14,061.82	13,877.35	13,660.12	217.22	63.885	
7,150.00	6,832.91	6,797.81	6,793.91	34.06	184.65	-120.32	1,244.66	-14,061.82	13,901.33	13,682.64	218.69	63.567	
7,200.00	6,864.22	6,829.13	6,825.22	34.37	185.70	-118.77	1,244.66	-14,061.82	13,927.50	13,707.44	220.06	63.290	
7,250.00	6,892.42	6,857.32	6,853.42	34.69	186.64	-116.80	1,244.66	-14,061.82	13,955.72	13,734.38	221.33	63.053	
7,300.00	6,917.32	6,881.10	6,877.15	35.03	187.44	-114.39	1,246.53	-14,061.81	13,985.71	13,763.25	222.46	62.868	
7,350.00	6,938.77	6,900.40	6,896.44	35.37	188.08	-111.54	1,246.47	-14,061.82	14,017.49	13,794.04	223.44	62.734	
7,400.00	6,956.64	6,916.30	6,912.33	35.72	188.61	-108.25	1,246.38	-14,061.82	14,050.77	13,826.46	224.31	62.640	
7,450.00	6,970.83	6,928.75	6,924.78	36.07	189.03	-104.51	1,246.28	-14,061.82	14,085.35	13,860.29	225.06	62.584	
7,500.00	6,981.23	6,937.72	6,933.75	36.44	189.33	-100.34	1,246.19	-14,061.82	14,121.03	13,895.33	225.70	62.567	SF
7,550.00	6,987.80	6,943.20	6,939.23	36.81	189.51	-95.78	1,246.13	-14,061.82	14,157.57	13,931.36	226.21	62.586	
7,600.00	6,990.48	6,945.22	6,941.24	37.19	189.58	-90.89	1,246.11	-14,061.82	14,194.76	13,968.16	226.60	62.642	
7,609.87	6,990.55	6,945.21	6,941.23	37.26	189.58	-89.89	1,246.11	-14,061.82	14,202.16	13,975.49	226.67	62.657	
7,700.00	6,990.49	6,944.51	6,940.54	37.97	189.55	-89.89	1,246.12	-14,061.82	14,269.90	14,042.68	227.22	62.801	
7,800.00	6,990.42	6,943.76	6,939.79	38.78	189.53	-89.88	1,246.13	-14,061.82	14,345.35	14,117.51	227.85	62.960	
7,900.00	6,990.35	6,943.02	6,939.04	39.64	189.50	-89.88	1,246.14	-14,061.82	14,421.10	14,192.63	228.48	63.118	
8,000.00	6,990.28	6,942.29	6,938.32	40.53	189.48	-89.87	1,246.14	-14,061.82	14,497.15	14,268.04	229.11	63.276	
8,100.00	6,990.21	6,941.58	6,937.60	41.45	189.45	-89.87	1,246.15	-14,061.82	14,573.48	14,343.73	229.75	63.433	
8,200.00	6,990.14	6,940.87	6,936.90	42.40	189.43	-89.87	1,246.16	-14,061.82	14,650.10	14,419.71	230.38	63.590	
8,306.37	6,990.06	6,940.14	6,936.17	43.45	189.41	-89.86	1,246.17	-14,061.82	14,731.90	14,500.83	231.07	63.756	
8,400.00	6,990.00	6,939.53	6,935.56	44.38	189.39	-89.84	1,246.17	-14,061.82	14,806.05	14,574.41	231.64	63.917	
8,500.00	6,989.93	6,938.92	6,934.95	45.36	189.37	-89.81	1,246.18	-14,061.82	14,889.40	14,657.20	232.21	64.121	
8,600.00	6,989.85	6,938.37	6,934.40	46.33	189.35	-89.78	1,246.19	-14,061.82	14,976.57	14,743.86	232.71	64.357	
8,700.00	6,989.78	6,937.88	6,933.91	47.28	189.33	-89.74	1,246.19	-14,061.82	15,067.07	14,833.92	233.15	64.624	
8,800.00	6,989.70	6,937.44	6,933.47	48.21	189.32	-89.67	1,246.20	-14,061.82	15,160.41	14,926.89	233.52	64.920	
8,900.00	6,989.63	6,937.06	6,933.09	49.11	189.30	-89.58	1,246.20	-14,061.82	15,256.09	15,022.26	233.83	65.246	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 148 COM - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		248-A027Ua_INC-ONLY						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
9,000.00	6,989.55	6,936.74	6,932.77	49.99	189.29	-89.42	1,246.20	-14,061.82	15,353.59	15,119.53	234.06	65.598	
9,100.00	6,989.48	6,936.47	6,932.50	50.84	189.28	-89.07	1,246.21	-14,061.82	15,452.41	15,218.20	234.22	65.975	
9,200.00	6,989.40	6,936.25	6,932.28	51.66	189.28	-87.66	1,246.21	-14,061.82	15,552.06	15,317.76	234.30	66.376	
9,300.00	6,989.33	6,936.10	6,932.13	52.45	189.27	85.44	1,246.21	-14,061.82	15,652.04	15,417.72	234.32	66.798	
9,393.87	6,989.27	6,936.00	6,932.03	53.15	189.27	88.80	1,246.21	-14,061.82	15,745.74	15,511.46	234.27	67.211	
9,400.00	6,989.26	6,936.00	6,932.03	53.20	189.27	88.80	1,246.21	-14,061.82	15,751.85	15,517.58	234.27	67.239	
9,500.00	6,989.19	6,935.92	6,931.95	53.95	189.27	88.80	1,246.21	-14,061.82	15,851.46	15,617.27	234.19	67.687	
9,600.00	6,989.12	6,935.84	6,931.87	54.73	189.26	88.80	1,246.21	-14,061.82	15,951.07	15,716.96	234.11	68.136	
9,700.00	6,989.05	6,935.77	6,931.80	55.55	189.26	88.79	1,246.21	-14,061.82	16,050.69	15,816.66	234.03	68.584	
9,800.00	6,988.98	6,935.69	6,931.72	56.40	189.26	88.79	1,246.21	-14,061.82	16,150.31	15,916.36	233.95	69.032	
9,900.00	6,988.91	6,935.62	6,931.65	57.28	189.26	88.79	1,246.21	-14,061.82	16,249.94	16,016.06	233.88	69.480	
10,000.00	6,988.84	6,935.54	6,931.57	58.20	189.25	88.78	1,246.21	-14,061.82	16,349.57	16,115.76	233.81	69.927	
10,100.00	6,988.77	6,935.47	6,931.50	59.14	189.25	88.78	1,246.22	-14,061.82	16,449.21	16,215.47	233.74	70.374	
10,200.00	6,988.70	6,935.39	6,931.42	60.11	189.25	88.78	1,246.22	-14,061.82	16,548.85	16,315.18	233.67	70.821	
10,300.00	6,988.63	6,935.32	6,931.35	61.11	189.25	88.77	1,246.22	-14,061.82	16,648.50	16,414.89	233.60	71.268	
10,400.00	6,988.56	6,935.24	6,931.27	62.14	189.24	88.77	1,246.22	-14,061.82	16,748.14	16,514.61	233.54	71.715	
10,500.00	6,988.49	6,935.17	6,931.20	63.19	189.24	88.77	1,246.22	-14,061.82	16,847.80	16,614.32	233.47	72.161	
10,600.00	6,988.42	6,935.09	6,931.12	64.26	189.24	88.76	1,246.22	-14,061.82	16,947.46	16,714.04	233.41	72.607	
10,700.00	6,988.35	6,935.01	6,931.05	65.36	189.24	88.76	1,246.22	-14,061.82	17,047.12	16,813.77	233.35	73.053	
10,800.00	6,988.28	6,934.94	6,930.97	66.48	189.23	88.76	1,246.22	-14,061.82	17,146.79	16,913.49	233.29	73.499	
10,900.00	6,988.21	6,934.86	6,930.90	67.61	189.23	88.76	1,246.22	-14,061.82	17,246.45	17,013.22	233.24	73.944	
11,000.00	6,988.14	6,934.79	6,930.82	68.77	189.23	88.75	1,246.22	-14,061.82	17,346.13	17,112.95	233.18	74.389	
11,100.00	6,988.07	6,934.71	6,930.75	69.95	189.23	88.75	1,246.22	-14,061.82	17,445.81	17,212.68	233.13	74.834	
11,200.00	6,988.01	6,934.64	6,930.67	71.14	189.22	88.75	1,246.22	-14,061.82	17,545.49	17,312.41	233.07	75.279	
11,300.00	6,987.94	6,934.57	6,930.60	72.35	189.22	88.74	1,246.22	-14,061.82	17,645.17	17,412.15	233.02	75.723	
11,400.00	6,987.87	6,934.49	6,930.52	73.57	189.22	88.74	1,246.22	-14,061.82	17,744.86	17,511.89	232.97	76.167	
11,500.00	6,987.80	6,934.42	6,930.45	74.81	189.22	88.74	1,246.23	-14,061.82	17,844.55	17,611.63	232.92	76.611	
11,600.00	6,987.73	6,934.34	6,930.37	76.07	189.21	88.73	1,246.23	-14,061.82	17,944.25	17,711.37	232.88	77.055	
11,643.87	6,987.70	6,934.31	6,930.34	76.62	189.21	88.73	1,246.23	-14,061.82	17,987.98	17,755.12	232.86	77.249	
11,700.00	6,987.66	6,934.27	6,930.30	77.33	189.21	89.00	1,246.23	-14,061.82	18,043.90	17,811.07	232.83	77.499	
11,737.27	6,987.63	6,934.25	6,930.28	77.80	189.21	89.12	1,246.23	-14,061.82	18,080.97	17,848.16	232.80	77.666	
11,800.00	6,987.59	6,934.22	6,930.25	78.59	189.21	89.12	1,246.23	-14,061.82	18,143.32	17,910.56	232.76	77.949	
11,900.00	6,987.52	6,934.17	6,930.20	79.86	189.21	89.12	1,246.23	-14,061.82	18,242.73	18,010.04	232.69	78.399	
12,000.00	6,987.46	6,934.13	6,930.16	81.14	189.21	89.12	1,246.23	-14,061.82	18,342.14	18,109.52	232.62	78.849	
12,100.00	6,987.39	6,934.08	6,930.11	82.43	189.20	89.12	1,246.23	-14,061.82	18,441.56	18,209.00	232.56	79.298	
12,200.00	6,987.32	6,934.03	6,930.06	83.73	189.20	89.12	1,246.23	-14,061.82	18,540.98	18,308.49	232.50	79.747	
12,300.00	6,987.26	6,933.98	6,930.02	85.05	189.20	89.11	1,246.23	-14,061.82	18,640.41	18,407.98	232.44	80.196	
12,400.00	6,987.19	6,933.94	6,929.97	86.38	189.20	89.11	1,246.23	-14,061.82	18,739.85	18,507.47	232.38	80.645	
12,500.00	6,987.12	6,933.89	6,929.92	87.71	189.20	89.11	1,246.23	-14,061.82	18,839.29	18,606.97	232.32	81.093	
12,600.00	6,987.06	6,933.84	6,929.87	89.06	189.20	89.11	1,246.23	-14,061.82	18,938.74	18,706.48	232.26	81.540	
12,700.00	6,986.99	6,933.79	6,929.83	90.41	189.19	89.11	1,246.23	-14,061.82	19,038.19	18,805.99	232.21	81.988	
12,800.00	6,986.92	6,933.75	6,929.78	91.77	189.19	89.11	1,246.23	-14,061.82	19,137.65	18,905.50	232.16	82.435	
12,900.00	6,986.86	6,933.70	6,929.73	93.14	189.19	89.11	1,246.23	-14,061.82	19,237.12	19,005.01	232.10	82.881	
13,000.00	6,986.79	6,933.65	6,929.68	94.52	189.19	89.11	1,246.23	-14,061.82	19,336.59	19,104.53	232.05	83.328	
13,100.00	6,986.72	6,933.60	6,929.64	95.90	189.19	89.10	1,246.23	-14,061.82	19,436.07	19,204.06	232.01	83.774	
13,200.00	6,986.66	6,933.56	6,929.59	97.30	189.19	89.10	1,246.23	-14,061.82	19,535.55	19,303.59	231.96	84.219	
13,300.00	6,986.59	6,933.51	6,929.54	98.69	189.19	89.10	1,246.23	-14,061.82	19,635.03	19,403.12	231.92	84.664	
13,400.00	6,986.52	6,933.46	6,929.49	100.10	189.18	89.10	1,246.23	-14,061.82	19,734.53	19,502.65	231.87	85.109	
13,500.00	6,986.46	6,933.41	6,929.45	101.51	189.18	89.10	1,246.24	-14,061.82	19,834.02	19,602.19	231.83	85.554	
13,600.00	6,986.39	6,933.37	6,929.40	102.93	189.18	89.10	1,246.24	-14,061.82	19,933.53	19,701.73	231.79	85.998	
13,700.00	6,986.32	6,933.32	6,929.35	104.35	189.18	89.10	1,246.24	-14,061.82	20,033.03	19,801.28	231.75	86.441	
13,800.00	6,986.25	6,933.27	6,929.30	105.78	189.18	89.09	1,246.24	-14,061.82	20,132.55	19,900.83	231.72	86.884	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 148 COM - OH - OH-INC												Offset Site Error:	0.00 usft
Survey Program:		248-A027Ua_INC-ONLY					Rule Assigned:				Offset Well Error:	0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
13,900.00	6,986.19	6,933.22	6,929.26	107.21	189.18	89.09	1,246.24	-14,061.82	20,232.06	20,000.38	231.68	87.327	
14,000.00	6,986.12	6,933.18	6,929.21	108.65	189.17	89.09	1,246.24	-14,061.82	20,331.58	20,099.94	231.65	87.770	
14,100.00	6,986.05	6,933.13	6,929.16	110.09	189.17	89.09	1,246.24	-14,061.82	20,431.11	20,199.50	231.61	88.212	
14,200.00	6,985.99	6,933.08	6,929.11	111.54	189.17	89.09	1,246.24	-14,061.82	20,530.64	20,299.06	231.58	88.653	
14,300.00	6,985.92	6,933.03	6,929.07	112.99	189.17	89.09	1,246.24	-14,061.82	20,630.18	20,398.62	231.55	89.095	
14,400.00	6,985.85	6,932.99	6,929.02	114.45	189.17	89.09	1,246.24	-14,061.82	20,729.72	20,498.19	231.53	89.535	
14,500.00	6,985.79	6,932.94	6,928.97	115.91	189.17	89.08	1,246.24	-14,061.82	20,829.26	20,597.76	231.50	89.976	
14,600.00	6,985.72	6,932.89	6,928.92	117.38	189.16	89.08	1,246.24	-14,061.82	20,928.81	20,697.34	231.47	90.416	
14,700.00	6,985.65	6,932.84	6,928.88	118.84	189.16	89.08	1,246.24	-14,061.82	21,028.36	20,796.91	231.45	90.855	
14,800.00	6,985.59	6,932.80	6,928.83	120.32	189.16	89.08	1,246.24	-14,061.82	21,127.92	20,896.49	231.43	91.294	
14,900.00	6,985.52	6,932.75	6,928.78	121.79	189.16	89.08	1,246.24	-14,061.82	21,227.48	20,996.08	231.40	91.733	
15,000.00	6,985.45	6,932.70	6,928.73	123.27	189.16	89.08	1,246.24	-14,061.82	21,327.05	21,095.66	231.38	92.171	
15,100.00	6,985.39	6,932.65	6,928.69	124.75	189.16	89.08	1,246.24	-14,061.82	21,426.62	21,195.25	231.37	92.609	
15,200.00	6,985.32	6,932.61	6,928.64	126.24	189.15	89.08	1,246.24	-14,061.82	21,526.19	21,294.84	231.35	93.046	
15,300.00	6,985.25	6,932.56	6,928.59	127.72	189.15	89.07	1,246.24	-14,061.82	21,625.77	21,394.43	231.33	93.483	
15,400.00	6,985.19	6,932.51	6,928.54	129.21	189.15	89.07	1,246.24	-14,061.82	21,725.35	21,494.03	231.32	93.920	
15,500.00	6,985.12	6,932.46	6,928.49	130.71	189.15	89.07	1,246.24	-14,061.82	21,824.93	21,593.63	231.30	94.356	
15,600.00	6,985.05	6,932.42	6,928.45	132.20	189.15	89.07	1,246.24	-14,061.82	21,924.52	21,693.23	231.29	94.791	
15,700.00	6,984.99	6,932.37	6,928.40	133.70	189.15	89.07	1,246.25	-14,061.82	22,024.11	21,792.83	231.28	95.227	
15,800.00	6,984.92	6,932.32	6,928.35	135.20	189.15	89.07	1,246.25	-14,061.82	22,123.71	21,892.44	231.27	95.661	
15,900.00	6,984.85	6,932.27	6,928.30	136.71	189.14	89.07	1,246.25	-14,061.82	22,223.31	21,992.05	231.26	96.095	
16,000.00	6,984.79	6,932.23	6,928.26	138.21	189.14	89.06	1,246.25	-14,061.82	22,322.91	22,091.66	231.26	96.529	
16,100.00	6,984.72	6,932.18	6,928.21	139.72	189.14	89.06	1,246.25	-14,061.82	22,422.52	22,191.27	231.25	96.962	
16,200.00	6,984.65	6,932.13	6,928.16	141.23	189.14	89.06	1,246.25	-14,061.82	22,522.13	22,290.89	231.24	97.395	
16,300.00	6,984.59	6,932.08	6,928.11	142.75	189.14	89.06	1,246.25	-14,061.82	22,621.75	22,390.50	231.24	97.827	
16,400.00	6,984.52	6,932.03	6,928.07	144.26	189.14	89.06	1,246.25	-14,061.82	22,721.36	22,490.12	231.24	98.259	
16,500.00	6,984.45	6,931.99	6,928.02	145.78	189.13	89.06	1,246.25	-14,061.82	22,820.98	22,589.75	231.24	98.691	
16,600.00	6,984.39	6,931.94	6,927.97	147.29	189.13	89.06	1,246.25	-14,061.82	22,920.61	22,689.37	231.24	99.122	
16,700.00	6,984.32	6,931.89	6,927.92	148.82	189.13	89.05	1,246.25	-14,061.82	23,020.23	22,789.00	231.24	99.552	
16,800.00	6,984.25	6,931.84	6,927.88	150.34	189.13	89.05	1,246.25	-14,061.82	23,119.87	22,888.62	231.24	99.982	
16,900.00	6,984.19	6,931.80	6,927.83	151.86	189.13	89.05	1,246.25	-14,061.82	23,219.50	22,988.26	231.24	100.411	
17,000.00	6,984.12	6,931.75	6,927.78	153.39	189.13	89.05	1,246.25	-14,061.82	23,319.14	23,087.89	231.25	100.840	
17,100.00	6,984.05	6,931.70	6,927.73	154.91	189.12	89.05	1,246.25	-14,061.82	23,418.78	23,187.52	231.25	101.269	
17,200.00	6,983.99	6,931.65	6,927.68	156.44	189.12	89.05	1,246.25	-14,061.82	23,518.42	23,287.16	231.26	101.697	
17,300.00	6,983.92	6,931.60	6,927.64	157.97	189.12	89.05	1,246.25	-14,061.82	23,618.06	23,386.80	231.27	102.124	
17,400.00	6,983.85	6,931.56	6,927.59	159.50	189.12	89.04	1,246.25	-14,061.82	23,717.71	23,486.44	231.28	102.551	
17,500.00	6,983.79	6,931.51	6,927.54	161.04	189.12	89.04	1,246.25	-14,061.82	23,817.37	23,586.08	231.29	102.978	
17,600.00	6,983.72	6,931.46	6,927.49	162.57	189.12	89.04	1,246.25	-14,061.82	23,917.02	23,685.72	231.30	103.404	
17,700.00	6,983.65	6,931.41	6,927.45	164.11	189.12	89.04	1,246.25	-14,061.82	24,016.68	23,785.37	231.31	103.829	
17,800.00	6,983.59	6,931.37	6,927.40	165.65	189.11	89.04	1,246.25	-14,061.82	24,116.34	23,885.02	231.32	104.254	
17,900.00	6,983.52	6,931.32	6,927.35	167.18	189.11	89.04	1,246.26	-14,061.82	24,216.00	23,984.66	231.34	104.679	
18,000.00	6,983.45	6,931.27	6,927.30	168.72	189.11	89.04	1,246.26	-14,061.82	24,315.67	24,084.32	231.35	105.103	
18,100.00	6,983.39	6,931.22	6,927.25	170.27	189.11	89.04	1,246.26	-14,061.82	24,415.34	24,183.97	231.37	105.526	
18,200.00	6,983.32	6,931.17	6,927.21	171.81	189.11	89.03	1,246.26	-14,061.82	24,515.01	24,283.62	231.39	105.949	
18,300.00	6,983.25	6,931.13	6,927.16	173.35	189.11	89.03	1,246.26	-14,061.82	24,614.68	24,383.28	231.40	106.371	
18,400.00	6,983.19	6,931.08	6,927.11	174.90	189.10	89.03	1,246.26	-14,061.82	24,714.36	24,482.94	231.42	106.793	
18,500.00	6,983.12	6,931.03	6,927.06	176.44	189.10	89.03	1,246.26	-14,061.82	24,814.04	24,582.60	231.44	107.215	
18,600.00	6,983.05	6,930.98	6,927.02	177.99	189.10	89.03	1,246.26	-14,061.82	24,913.72	24,682.26	231.46	107.636	
18,700.00	6,982.99	6,930.94	6,926.97	179.54	189.10	89.03	1,246.26	-14,061.82	25,013.40	24,781.92	231.49	108.056	
18,800.00	6,982.92	6,930.89	6,926.92	181.09	189.10	89.03	1,246.26	-14,061.82	25,113.09	24,881.58	231.51	108.476	
18,900.00	6,982.85	6,930.84	6,926.87	182.64	189.10	89.02	1,246.26	-14,061.82	25,212.78	24,981.25	231.53	108.895	
19,000.00	6,982.78	6,930.79	6,926.82	184.19	189.09	89.02	1,246.26	-14,061.82	25,312.47	25,080.92	231.56	109.314	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - (O) Rosa Unit 148 COM - OH - OH-INC													Offset Site Error:	0.00 usft
Survey Program: 248-A027Ua_INC-ONLY													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,100.00	6,982.72	6,930.74	6,926.78	185.74	189.09	89.02	1,246.26	-14,061.82	25,412.17	25,180.58	231.58	109.732		
19,200.00	6,982.65	6,930.70	6,926.73	187.29	189.09	89.02	1,246.26	-14,061.82	25,511.86	25,280.25	231.61	110.150		
19,300.00	6,982.58	6,930.65	6,926.68	188.84	189.09	89.02	1,246.26	-14,061.82	25,611.56	25,379.92	231.64	110.567		
19,400.00	6,982.52	6,930.60	6,926.63	190.40	189.09	89.02	1,246.26	-14,061.82	25,711.26	25,479.60	231.67	110.984		
19,500.00	6,982.45	6,930.55	6,926.58	191.95	189.09	89.02	1,246.26	-14,061.82	25,810.97	25,579.27	231.70	111.400		
19,600.00	6,982.38	6,930.50	6,926.54	193.51	189.08	89.01	1,246.26	-14,061.82	25,910.67	25,678.95	231.73	111.815		
19,700.00	6,982.32	6,930.46	6,926.49	195.07	189.08	89.01	1,246.26	-14,061.82	26,010.38	25,778.62	231.76	112.231		
19,800.00	6,982.25	6,930.41	6,926.44	196.62	189.08	89.01	1,246.26	-14,061.82	26,110.09	25,878.30	231.79	112.645		
19,900.00	6,982.18	6,930.36	6,926.39	198.18	189.08	89.01	1,246.26	-14,061.82	26,209.81	25,977.98	231.82	113.059		
20,000.00	6,982.12	6,930.31	6,926.34	199.74	189.08	89.01	1,246.26	-14,061.82	26,309.52	26,077.66	231.86	113.473		
20,100.00	6,982.05	6,930.26	6,926.30	201.30	189.08	89.01	1,246.26	-14,061.82	26,409.24	26,177.35	231.89	113.886		
20,176.02	6,982.00	6,930.23	6,926.26	202.36	189.08	89.01	1,246.27	-14,061.82	26,485.04	26,248.87	236.17	112.143		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #672H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	29.27	34.95	19.59	40.06				
100.00	100.00	100.00	100.00	0.25	0.25	29.27	34.95	19.59	40.06	39.56	0.50	79.832	
200.00	200.00	200.00	200.00	0.61	0.61	29.27	34.95	19.59	40.06	38.85	1.22	32.872	
300.00	300.00	300.00	300.00	0.97	0.97	29.27	34.95	19.59	40.06	38.13	1.94	20.697	
400.00	400.00	400.00	400.00	1.33	1.33	29.27	34.95	19.59	40.06	37.41	2.65	15.103	
500.00	500.00	500.00	500.00	1.68	1.68	29.27	34.95	19.59	40.06	36.69	3.37	11.890 CC, ES	
600.00	600.00	598.66	598.64	2.04	2.04	28.49	36.62	19.88	41.69	37.61	4.08	10.215	
700.00	699.98	697.17	697.02	2.40	2.40	37.76	41.63	20.76	45.23	40.44	4.79	9.443	
800.00	799.84	795.55	795.02	2.76	2.75	38.38	49.95	22.23	49.28	43.79	5.49	8.974	
900.00	899.45	893.76	892.52	3.13	3.11	40.01	61.56	24.28	53.88	47.69	6.19	8.703	
1,000.00	998.70	991.80	989.39	3.49	3.47	42.37	76.42	26.90	59.09	52.20	6.89	8.574	
1,100.00	1,097.47	1,089.91	1,085.76	3.86	3.85	44.94	94.57	29.74	64.82	57.22	7.60	8.526	
1,200.00	1,195.62	1,187.93	1,181.38	4.24	4.25	47.29	115.98	32.31	70.85	62.52	8.33	8.505	
1,300.00	1,293.06	1,285.85	1,276.11	4.64	4.66	49.45	140.62	34.61	77.16	68.08	9.08	8.498	
1,400.00	1,389.64	1,383.67	1,369.87	5.06	5.09	51.42	168.43	36.63	83.75	73.89	9.86	8.495	
1,500.00	1,485.27	1,481.39	1,462.53	5.50	5.54	53.24	199.39	38.37	90.61	79.94	10.67	8.489	
1,515.00	1,499.52	1,496.97	1,477.20	5.57	5.62	53.52	204.62	38.63	91.67	80.85	10.82	8.473	
1,600.00	1,580.22	1,580.77	1,556.06	5.96	6.02	54.99	232.95	39.96	97.69	86.13	11.56	8.449	
1,700.00	1,675.17	1,680.48	1,649.88	6.44	6.52	56.51	266.65	41.55	104.85	92.37	12.48	8.401	
1,800.00	1,770.11	1,780.18	1,743.71	6.92	7.02	57.85	300.36	43.14	112.08	98.66	13.42	8.352	
1,900.00	1,865.05	1,879.89	1,837.53	7.41	7.53	59.02	334.06	44.73	119.36	104.99	14.37	8.304	
2,000.00	1,959.99	1,979.60	1,931.35	7.90	8.05	60.05	367.76	46.32	126.69	111.35	15.34	8.258	
2,100.00	2,054.94	2,079.30	2,025.18	8.40	8.57	60.97	401.47	47.91	134.05	117.73	16.32	8.214	
2,200.00	2,149.88	2,179.01	2,119.00	8.90	9.10	61.80	435.17	49.50	141.44	124.14	17.31	8.172	
2,300.00	2,244.82	2,278.72	2,212.83	9.41	9.63	62.54	468.88	51.09	148.86	130.56	18.30	8.133	
2,400.00	2,339.76	2,378.42	2,306.65	9.92	10.16	63.22	502.58	52.68	156.31	137.00	19.31	8.096	
2,500.00	2,434.71	2,478.13	2,400.47	10.43	10.69	63.83	536.29	54.27	163.77	143.45	20.31	8.062	
2,600.00	2,529.65	2,577.84	2,494.30	10.94	11.22	64.39	569.99	55.86	171.25	149.92	21.33	8.030	
2,700.00	2,624.59	2,677.54	2,588.12	11.45	11.76	64.90	603.69	57.45	178.74	156.40	22.34	8.000	
2,800.00	2,719.53	2,777.25	2,681.95	11.97	12.30	65.37	637.40	59.03	186.25	162.88	23.36	7.971	
2,900.00	2,814.48	2,876.96	2,775.77	12.49	12.84	65.80	671.10	60.62	193.76	169.38	24.39	7.945	
3,000.00	2,909.42	2,976.66	2,869.59	13.01	13.38	66.20	704.81	62.21	201.29	175.88	25.42	7.920	
3,100.00	3,004.36	3,076.37	2,963.42	13.53	13.92	66.58	738.51	63.80	208.83	182.38	26.45	7.897	
3,200.00	3,099.30	3,176.08	3,057.24	14.05	14.46	66.92	772.21	65.39	216.38	188.90	27.48	7.875	
3,300.00	3,194.25	3,275.78	3,151.06	14.57	15.01	67.25	805.92	66.98	223.93	195.42	28.51	7.854	
3,400.00	3,289.19	3,375.49	3,244.89	15.09	15.55	67.55	839.62	68.57	231.49	201.94	29.55	7.834	
3,500.00	3,384.13	3,475.20	3,338.71	15.62	16.10	67.83	873.33	70.16	239.05	208.47	30.59	7.816	
3,600.00	3,479.07	3,574.90	3,432.54	16.14	16.64	68.10	907.03	71.75	246.62	215.00	31.62	7.799	
3,700.00	3,574.02	3,674.61	3,526.36	16.67	17.19	68.35	940.74	73.34	254.20	221.54	32.66	7.782	
3,800.00	3,668.96	3,774.32	3,620.18	17.19	17.73	68.58	974.44	74.93	261.78	228.07	33.71	7.767	
3,900.00	3,763.90	3,874.02	3,714.01	17.72	18.28	68.80	1,008.14	76.52	269.37	234.62	34.75	7.752	
4,000.00	3,858.84	3,973.73	3,807.83	18.24	18.83	69.01	1,041.85	78.11	276.95	241.16	35.79	7.738	
4,100.00	3,953.79	4,073.44	3,901.66	18.77	19.38	69.21	1,075.55	79.70	284.55	247.71	36.84	7.724	
4,200.00	4,048.73	4,173.14	3,995.48	19.30	19.92	69.40	1,109.26	81.29	292.14	254.26	37.88	7.712	
4,300.00	4,143.67	4,272.85	4,089.30	19.82	20.47	69.58	1,142.96	82.88	299.74	260.81	38.93	7.700	
4,400.00	4,238.61	4,372.56	4,183.13	20.35	21.02	69.75	1,176.67	84.47	307.34	267.36	39.98	7.688	
4,500.00	4,333.56	4,472.26	4,276.95	20.88	21.57	69.91	1,210.37	86.06	314.94	273.92	41.02	7.677	
4,600.00	4,428.50	4,571.97	4,370.77	21.41	22.12	70.07	1,244.07	87.64	322.55	280.48	42.07	7.667	
4,700.00	4,523.44	4,671.68	4,464.60	21.93	22.67	70.21	1,277.78	89.23	330.16	287.04	43.12	7.657	
4,800.00	4,618.38	4,771.38	4,558.42	22.46	23.22	70.35	1,311.48	90.82	337.77	293.60	44.17	7.647	
4,900.00	4,713.33	4,871.09	4,652.25	22.99	23.77	70.49	1,345.19	92.41	345.38	300.16	45.22	7.638	
5,000.00	4,808.27	4,970.80	4,746.07	23.52	24.32	70.62	1,378.89	94.00	352.99	306.72	46.27	7.629	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #672H - OH - Prelim 5													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HRGM+MS													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,100.00	4,903.21	5,070.50	4,839.89	24.05	24.87	70.74	1,412.60	95.59	360.61	313.29	47.32	7.620	
5,200.00	4,998.16	5,170.21	4,933.72	24.58	25.42	70.86	1,446.30	97.18	368.22	319.85	48.37	7.612	
5,300.00	5,093.10	5,269.92	5,027.54	25.11	25.97	70.97	1,480.00	98.77	375.84	326.42	49.42	7.605	
5,400.00	5,188.04	5,369.62	5,121.37	25.64	26.52	71.08	1,513.71	100.36	383.46	332.99	50.48	7.597	
5,500.00	5,282.98	5,469.33	5,215.19	26.17	27.07	71.18	1,547.41	101.95	391.08	339.56	51.53	7.590	
5,600.00	5,377.93	5,569.04	5,309.01	26.70	27.62	71.28	1,581.12	103.54	398.71	346.13	52.58	7.583	
5,623.25	5,400.00	5,592.22	5,330.83	26.82	27.75	71.31	1,588.95	103.91	400.48	347.65	52.82	7.581	
5,700.00	5,473.03	5,668.84	5,402.93	27.22	28.17	71.37	1,614.85	105.13	406.49	352.87	53.62	7.581	
5,800.00	5,568.64	5,772.32	5,500.63	27.73	28.73	71.36	1,648.90	106.74	414.34	359.67	54.67	7.579	
5,900.00	5,664.75	5,875.91	5,599.04	28.23	29.28	71.33	1,681.21	108.26	421.81	366.13	55.69	7.575	
6,000.00	5,761.33	5,979.61	5,698.13	28.71	29.81	71.29	1,711.77	109.70	428.92	372.25	56.67	7.569	
6,100.00	5,858.34	6,083.42	5,797.85	29.18	30.33	71.23	1,740.56	111.06	435.66	378.04	57.62	7.560	
6,200.00	5,955.76	6,187.33	5,898.17	29.64	30.83	71.16	1,767.57	112.33	442.03	383.49	58.55	7.550	
6,300.00	6,053.57	6,291.33	5,999.07	30.07	31.32	71.08	1,792.79	113.52	448.03	388.60	59.43	7.538	
6,400.00	6,151.72	6,395.44	6,100.51	30.50	31.78	70.98	1,816.18	114.62	453.65	393.36	60.29	7.525	
6,500.00	6,250.19	6,499.64	6,202.44	30.91	32.24	70.87	1,837.76	115.64	458.89	397.79	61.11	7.509	
6,600.00	6,348.94	6,603.92	6,304.84	31.30	32.67	70.75	1,857.49	116.57	463.76	401.86	61.90	7.492	
6,659.67	6,408.00	6,666.20	6,366.15	31.53	32.92	70.67	1,868.38	117.09	466.48	404.13	62.35	7.482	
6,700.00	6,447.82	6,708.33	6,407.69	31.68	33.09	54.17	1,875.38	117.42	466.97	404.30	62.66	7.452	
6,750.00	6,496.66	6,769.43	6,467.79	31.90	33.34	42.94	1,886.30	116.62	463.59	400.52	63.06	7.351	
6,800.00	6,544.65	6,832.54	6,528.80	32.13	33.63	36.19	1,901.47	111.41	454.97	391.60	63.38	7.179	
6,850.00	6,591.49	6,892.62	6,585.32	32.37	33.94	31.36	1,919.60	102.22	441.31	377.71	63.60	6.939	
6,900.00	6,636.89	6,948.47	6,636.04	32.62	34.24	27.32	1,939.51	90.06	423.01	359.26	63.75	6.635	
6,950.00	6,680.57	6,999.35	6,680.39	32.89	34.54	23.53	1,960.10	76.03	400.57	336.71	63.86	6.273	
7,000.00	6,722.26	7,044.94	6,718.38	33.17	34.82	19.65	1,980.41	61.14	374.58	310.65	63.93	5.859	
7,050.00	6,761.71	7,085.25	6,750.42	33.45	35.08	15.43	1,999.75	46.21	345.63	281.67	63.97	5.403	
7,100.00	6,798.67	7,120.49	6,777.15	33.75	35.31	10.68	2,017.66	31.85	314.37	250.47	63.90	4.920	
7,150.00	6,832.91	7,151.01	6,799.27	34.06	35.51	5.21	2,033.89	18.47	281.48	217.76	63.72	4.418	
7,200.00	6,864.22	7,177.22	6,817.45	34.37	35.70	-1.08	2,048.31	6.29	247.77	184.51	63.25	3.917	
7,250.00	6,892.42	7,200.00	6,832.61	34.69	35.86	-8.27	2,061.21	-4.78	214.27	151.96	62.30	3.439	
7,300.00	6,917.32	7,218.28	6,844.35	35.03	35.99	-15.65	2,071.78	-13.99	182.50	121.98	60.52	3.016	
7,350.00	6,938.77	7,233.85	6,854.02	35.37	36.10	-23.01	2,080.93	-22.05	154.91	97.48	57.43	2.697	
7,400.00	6,956.64	7,250.00	6,863.74	35.72	36.22	-30.95	2,090.57	-30.62	135.36	81.71	53.66	2.523 SF	
7,447.68	6,970.25	7,256.14	6,867.35	36.06	36.26	-34.16	2,094.27	-33.93	128.42	78.14	50.28	2.554	
7,450.00	6,970.83	7,256.54	6,867.59	36.07	36.27	-34.34	2,094.51	-34.15	128.43	78.20	50.23	2.557	
7,500.00	6,981.23	7,264.11	6,871.97	36.44	36.32	-37.22	2,099.10	-38.28	136.87	85.14	51.72	2.646	
7,550.00	6,987.80	7,269.38	6,874.98	36.81	36.36	-38.04	2,102.32	-41.18	158.52	102.72	55.80	2.841	
7,600.00	6,990.48	7,272.48	6,876.73	37.19	36.38	-36.93	2,104.21	-42.89	189.02	129.50	59.52	3.176	
7,609.87	6,990.55	7,272.84	6,876.93	37.26	36.39	-36.51	2,104.43	-43.09	195.74	135.63	60.12	3.256	
7,700.00	6,990.49	7,275.73	6,878.55	37.97	36.41	-37.68	2,106.20	-44.70	266.11	202.46	63.65	4.181	
7,800.00	6,990.42	7,278.85	6,880.29	38.78	36.43	-38.94	2,108.12	-46.44	354.77	289.52	65.24	5.438	
7,900.00	6,990.35	7,281.87	6,881.96	39.64	36.46	-40.15	2,109.98	-48.13	448.20	382.26	65.94	6.797	
8,000.00	6,990.28	7,284.81	6,883.58	40.53	36.48	-41.32	2,111.80	-49.79	543.95	477.65	66.30	8.204	
8,100.00	6,990.21	7,287.67	6,885.13	41.45	36.50	-42.45	2,113.57	-51.40	640.98	574.47	66.51	9.637	
8,200.00	6,990.14	7,290.44	6,886.64	42.40	36.52	-43.54	2,115.29	-52.97	738.79	672.14	66.65	11.085	
8,306.37	6,990.06	7,300.00	6,891.74	43.45	36.59	-47.23	2,121.25	-58.44	843.41	776.37	67.04	12.581	
8,400.00	6,990.00	7,300.00	6,891.74	44.38	36.59	-26.52	2,121.25	-58.44	936.07	869.01	67.05	13.960	
8,500.00	6,989.93	7,290.54	6,886.69	45.36	36.52	14.58	2,115.35	-53.03	1,035.47	968.64	66.83	15.495	
8,600.00	6,989.85	7,283.29	6,882.74	46.33	36.47	45.10	2,110.86	-48.93	1,134.78	1,067.98	66.80	16.988	
8,700.00	6,989.78	7,272.55	6,876.77	47.28	36.39	60.17	2,104.25	-42.93	1,233.49	1,166.75	66.74	18.483	
8,800.00	6,989.70	7,250.00	6,863.74	48.21	36.22	67.33	2,090.57	-30.62	1,331.22	1,264.84	66.38	20.056	
8,900.00	6,989.63	7,250.00	6,863.74	49.11	36.22	72.26	2,090.57	-30.62	1,427.51	1,360.72	66.78	21.376	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #672H - OH - Prelim 5													Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS					Rule Assigned:			Offset Well Error:			0.00 usft	
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,000.00	6,989.55	7,223.96	6,847.91	49.99	36.03	74.46	2,075.10	-16.91	1,522.09	1,455.63	66.45	22.905		
9,100.00	6,989.48	7,200.00	6,832.61	50.84	35.86	75.95	2,061.21	-4.78	1,614.75	1,548.50	66.25	24.372		
9,200.00	6,989.40	7,182.87	6,821.26	51.66	35.74	77.24	2,051.48	3.59	1,705.24	1,638.95	66.28	25.726		
9,300.00	6,989.33	7,150.00	6,798.55	52.45	35.51	77.63	2,033.34	18.92	1,793.43	1,727.47	65.96	27.191		
9,393.87	6,989.27	7,150.00	6,798.55	53.15	35.51	78.90	2,033.34	18.92	1,873.85	1,807.41	66.44	28.202		
9,400.00	6,989.26	7,150.00	6,798.55	53.20	35.51	78.90	2,033.34	18.92	1,879.05	1,812.58	66.47	28.268		
9,500.00	6,989.19	7,118.29	6,775.53	53.95	35.29	77.81	2,016.52	32.78	1,964.03	1,897.81	66.22	29.658		
9,600.00	6,989.12	7,100.00	6,761.76	54.73	35.17	77.18	2,007.14	40.35	2,050.02	1,983.74	66.28	30.929		
9,700.00	6,989.05	7,081.75	6,747.71	55.55	35.05	76.54	1,998.02	47.57	2,136.90	2,070.57	66.33	32.217		
9,800.00	6,988.98	7,065.73	6,735.09	56.40	34.95	75.97	1,990.23	53.64	2,224.60	2,158.20	66.40	33.504		
9,900.00	6,988.91	7,050.00	6,722.48	57.28	34.85	75.41	1,982.77	59.36	2,313.06	2,246.60	66.45	34.807		
10,000.00	6,988.84	7,050.00	6,722.48	58.20	34.85	75.41	1,982.77	59.36	2,402.30	2,335.50	66.80	35.964		
10,100.00	6,988.77	7,024.85	6,701.85	59.14	34.69	74.51	1,971.24	67.97	2,492.02	2,425.37	66.66	37.385		
10,200.00	6,988.70	7,000.00	6,680.94	60.11	34.54	73.61	1,960.37	75.84	2,582.53	2,516.00	66.52	38.821		
10,300.00	6,988.63	7,000.00	6,680.94	61.11	34.54	73.61	1,960.37	75.84	2,673.40	2,606.59	66.81	40.015		
10,400.00	6,988.56	7,000.00	6,680.94	62.14	34.54	73.61	1,960.37	75.84	2,764.91	2,697.83	67.07	41.222		
10,500.00	6,988.49	6,983.03	6,666.37	63.19	34.44	73.00	1,953.25	80.83	2,856.83	2,789.77	67.05	42.605		
10,600.00	6,988.42	6,974.30	6,658.79	64.26	34.39	72.68	1,949.68	83.29	2,949.22	2,882.06	67.15	43.918		
10,700.00	6,988.35	6,950.00	6,637.40	65.36	34.25	71.79	1,940.10	89.68	3,042.15	2,975.14	67.01	45.396		
10,800.00	6,988.28	6,950.00	6,637.40	66.48	34.25	71.79	1,940.10	89.68	3,135.23	3,068.01	67.22	46.638		
10,900.00	6,988.21	6,950.00	6,637.40	67.61	34.25	71.79	1,940.10	89.68	3,228.72	3,161.30	67.42	47.889		
11,000.00	6,988.14	6,950.00	6,637.40	68.77	34.25	71.79	1,940.10	89.68	3,322.59	3,254.98	67.60	49.147		
11,100.00	6,988.07	6,950.00	6,637.40	69.95	34.25	71.79	1,940.10	89.68	3,416.80	3,349.03	67.78	50.412		
11,200.00	6,988.01	6,950.00	6,637.40	71.14	34.25	71.79	1,940.10	89.68	3,511.34	3,443.40	67.94	51.683		
11,300.00	6,987.94	6,926.42	6,616.25	72.35	34.12	70.92	1,931.30	95.28	3,605.87	3,538.07	67.80	53.183		
11,400.00	6,987.87	6,921.05	6,611.37	73.57	34.09	70.72	1,929.37	96.47	3,700.82	3,632.93	67.89	54.515		
11,500.00	6,987.80	6,900.00	6,592.13	74.81	33.97	69.95	1,922.06	100.81	3,796.14	3,728.36	67.78	56.004		
11,600.00	6,987.73	6,900.00	6,592.13	76.07	33.97	69.95	1,922.06	100.81	3,891.46	3,823.54	67.92	57.292		
11,643.87	6,987.70	6,900.00	6,592.13	76.62	33.97	69.95	1,922.06	100.81	3,933.35	3,865.37	67.98	57.859		
11,700.00	6,987.66	6,900.00	6,592.13	77.33	33.97	71.13	1,922.06	100.81	3,986.87	3,918.81	68.06	58.581		
11,737.27	6,987.63	6,900.00	6,592.13	77.80	33.97	71.85	1,922.06	100.81	4,022.26	3,954.15	68.11	59.058		
11,800.00	6,987.59	6,900.00	6,592.13	78.59	33.97	71.85	1,922.06	100.81	4,081.79	4,013.60	68.19	59.858		
11,900.00	6,987.52	6,900.00	6,592.13	79.86	33.97	71.85	1,922.06	100.81	4,176.88	4,108.55	68.32	61.135		
12,000.00	6,987.46	6,900.00	6,592.13	81.14	33.97	71.85	1,922.06	100.81	4,272.19	4,203.74	68.45	62.417		
12,100.00	6,987.39	6,900.00	6,592.13	82.43	33.97	71.85	1,922.06	100.81	4,367.71	4,299.15	68.57	63.701		
12,200.00	6,987.32	6,900.00	6,592.13	83.73	33.97	71.85	1,922.06	100.81	4,463.43	4,394.75	68.68	64.989		
12,300.00	6,987.26	6,900.00	6,592.13	85.05	33.97	71.85	1,922.06	100.81	4,559.34	4,490.54	68.79	66.278		
12,400.00	6,987.19	6,878.44	6,572.14	86.38	33.86	71.11	1,915.00	104.76	4,655.16	4,586.47	68.69	67.773		
12,500.00	6,987.12	6,875.12	6,569.04	87.71	33.85	70.99	1,913.96	105.32	4,751.31	4,682.55	68.76	69.098		
12,600.00	6,987.06	6,871.94	6,566.07	89.06	33.83	70.88	1,912.96	105.84	4,847.60	4,778.77	68.83	70.424		
12,700.00	6,986.99	6,850.00	6,545.40	90.41	33.72	70.12	1,906.38	109.16	4,944.23	4,875.50	68.73	71.933		
12,800.00	6,986.92	6,850.00	6,545.40	91.77	33.72	70.12	1,906.38	109.16	5,040.74	4,971.91	68.83	73.232		
12,900.00	6,986.86	6,850.00	6,545.40	93.14	33.72	70.12	1,906.38	109.16	5,137.38	5,068.45	68.93	74.532		
13,000.00	6,986.79	6,850.00	6,545.40	94.52	33.72	70.12	1,906.38	109.16	5,234.15	5,165.13	69.02	75.833		
13,100.00	6,986.72	6,850.00	6,545.40	95.90	33.72	70.12	1,906.38	109.16	5,331.03	5,261.92	69.11	77.135		
13,200.00	6,986.66	6,850.00	6,545.40	97.30	33.72	70.12	1,906.38	109.16	5,428.03	5,358.83	69.20	78.437		
13,300.00	6,986.59	6,850.00	6,545.40	98.69	33.72	70.12	1,906.38	109.16	5,525.14	5,455.85	69.29	79.740		
13,400.00	6,986.52	6,850.00	6,545.40	100.10	33.72	70.12	1,906.38	109.16	5,622.35	5,552.97	69.37	81.043		
13,500.00	6,986.46	6,850.00	6,545.40	101.51	33.72	70.12	1,906.38	109.16	5,719.65	5,650.19	69.46	82.347		
13,600.00	6,986.39	6,850.00	6,545.40	102.93	33.72	70.12	1,906.38	109.16	5,817.04	5,747.50	69.54	83.650		
13,700.00	6,986.32	6,850.00	6,545.40	104.35	33.72	70.12	1,906.38	109.16	5,914.53	5,844.90	69.62	84.953		
13,800.00	6,986.25	6,850.00	6,545.40	105.78	33.72	70.12	1,906.38	109.16	6,012.09	5,942.39	69.70	86.256		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #672H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
13,900.00	6,986.19	6,850.00	6,545.40	107.21	33.72	70.12	1,906.38	109.16	6,109.73	6,039.95	69.78	87.559	
14,000.00	6,986.12	6,850.00	6,545.40	108.65	33.72	70.12	1,906.38	109.16	6,207.45	6,137.60	69.86	88.861	
14,100.00	6,986.05	6,850.00	6,545.40	110.09	33.72	70.12	1,906.38	109.16	6,305.24	6,235.31	69.93	90.162	
14,200.00	6,985.99	6,850.00	6,545.40	111.54	33.72	70.12	1,906.38	109.16	6,403.10	6,333.09	70.01	91.463	
14,300.00	6,985.92	6,850.00	6,545.40	112.99	33.72	70.12	1,906.38	109.16	6,501.02	6,430.94	70.08	92.763	
14,400.00	6,985.85	6,850.00	6,545.40	114.45	33.72	70.12	1,906.38	109.16	6,599.01	6,528.85	70.16	94.062	
14,500.00	6,985.79	6,850.00	6,545.40	115.91	33.72	70.12	1,906.38	109.16	6,697.05	6,626.83	70.23	95.360	
14,600.00	6,985.72	6,850.00	6,545.40	117.38	33.72	70.12	1,906.38	109.16	6,795.16	6,724.86	70.30	96.657	
14,700.00	6,985.65	6,826.84	6,523.35	118.84	33.60	69.32	1,899.94	112.07	6,893.01	6,822.80	70.21	98.180	
14,800.00	6,985.59	6,825.38	6,521.95	120.32	33.60	69.27	1,899.55	112.23	6,991.18	6,920.91	70.27	99.490	
14,900.00	6,985.52	6,823.97	6,520.60	121.79	33.59	69.22	1,899.18	112.38	7,089.40	7,019.07	70.33	100.799	
15,000.00	6,985.45	6,822.59	6,519.28	123.27	33.58	69.17	1,898.81	112.53	7,187.67	7,117.27	70.39	102.105	
15,100.00	6,985.39	6,800.00	6,497.51	124.75	33.48	68.38	1,893.14	114.67	7,286.23	7,215.92	70.31	103.624	
15,200.00	6,985.32	6,800.00	6,497.51	126.24	33.48	68.38	1,893.14	114.67	7,384.55	7,314.17	70.39	104.915	
15,300.00	6,985.25	6,800.00	6,497.51	127.72	33.48	68.38	1,893.14	114.67	7,482.92	7,412.47	70.46	106.205	
15,400.00	6,985.19	6,800.00	6,497.51	129.21	33.48	68.38	1,893.14	114.67	7,581.33	7,510.81	70.53	107.493	
15,500.00	6,985.12	6,800.00	6,497.51	130.71	33.48	68.38	1,893.14	114.67	7,679.79	7,609.19	70.60	108.780	
15,600.00	6,985.05	6,800.00	6,497.51	132.20	33.48	68.38	1,893.14	114.67	7,778.28	7,707.61	70.67	110.065	
15,700.00	6,984.99	6,800.00	6,497.51	133.70	33.48	68.38	1,893.14	114.67	7,876.81	7,806.07	70.74	111.348	
15,800.00	6,984.92	6,800.00	6,497.51	135.20	33.48	68.38	1,893.14	114.67	7,975.37	7,904.56	70.81	112.629	
15,900.00	6,984.85	6,800.00	6,497.51	136.71	33.48	68.38	1,893.14	114.67	8,073.98	8,003.09	70.88	113.908	
16,000.00	6,984.79	6,800.00	6,497.51	138.21	33.48	68.38	1,893.14	114.67	8,172.61	8,101.66	70.95	115.186	
16,100.00	6,984.72	6,800.00	6,497.51	139.72	33.48	68.38	1,893.14	114.67	8,271.28	8,200.26	71.02	116.461	
16,200.00	6,984.65	6,800.00	6,497.51	141.23	33.48	68.38	1,893.14	114.67	8,369.98	8,298.89	71.09	117.735	
16,300.00	6,984.59	6,800.00	6,497.51	142.75	33.48	68.38	1,893.14	114.67	8,468.71	8,397.55	71.16	119.006	
16,400.00	6,984.52	6,800.00	6,497.51	144.26	33.48	68.38	1,893.14	114.67	8,567.47	8,496.24	71.23	120.275	
16,500.00	6,984.45	6,800.00	6,497.51	145.78	33.48	68.38	1,893.14	114.67	8,666.26	8,594.96	71.30	121.542	
16,600.00	6,984.39	6,800.00	6,497.51	147.29	33.48	68.38	1,893.14	114.67	8,765.07	8,693.70	71.37	122.807	
16,700.00	6,984.32	6,800.00	6,497.51	148.82	33.48	68.38	1,893.14	114.67	8,863.92	8,792.47	71.44	124.070	
16,800.00	6,984.25	6,800.00	6,497.51	150.34	33.48	68.38	1,893.14	114.67	8,962.78	8,891.27	71.51	125.330	
16,900.00	6,984.19	6,800.00	6,497.51	151.86	33.48	68.38	1,893.14	114.67	9,061.68	8,990.09	71.58	126.588	
17,000.00	6,984.12	6,800.00	6,497.51	153.39	33.48	68.38	1,893.14	114.67	9,160.59	9,088.94	71.65	127.844	
17,100.00	6,984.05	6,800.00	6,497.51	154.91	33.48	68.38	1,893.14	114.67	9,259.53	9,187.81	71.73	129.098	
17,200.00	6,983.99	6,800.00	6,497.51	156.44	33.48	68.38	1,893.14	114.67	9,358.50	9,286.70	71.80	130.348	
17,300.00	6,983.92	6,800.00	6,497.51	157.97	33.48	68.38	1,893.14	114.67	9,457.48	9,385.61	71.87	131.597	
17,400.00	6,983.85	6,800.00	6,497.51	159.50	33.48	68.38	1,893.14	114.67	9,556.49	9,484.55	71.94	132.843	
17,500.00	6,983.79	6,800.00	6,497.51	161.04	33.48	68.38	1,893.14	114.67	9,655.51	9,583.50	72.01	134.086	
17,600.00	6,983.72	6,800.00	6,497.51	162.57	33.48	68.38	1,893.14	114.67	9,754.56	9,682.48	72.08	135.327	
17,700.00	6,983.65	6,800.00	6,497.51	164.11	33.48	68.38	1,893.14	114.67	9,853.62	9,781.47	72.15	136.566	
17,800.00	6,983.59	6,800.00	6,497.51	165.65	33.48	68.38	1,893.14	114.67	9,952.71	9,880.48	72.22	137.802	
17,900.00	6,983.52	6,800.00	6,497.51	167.18	33.48	68.38	1,893.14	114.67	10,051.81	9,979.51	72.30	139.035	
18,000.00	6,983.45	6,800.00	6,497.51	168.72	33.48	68.38	1,893.14	114.67	10,150.93	10,078.56	72.37	140.265	
18,100.00	6,983.39	6,800.00	6,497.51	170.27	33.48	68.38	1,893.14	114.67	10,250.07	10,177.63	72.44	141.493	
18,200.00	6,983.32	6,800.00	6,497.51	171.81	33.48	68.38	1,893.14	114.67	10,349.22	10,276.71	72.52	142.718	
18,300.00	6,983.25	6,800.00	6,497.51	173.35	33.48	68.38	1,893.14	114.67	10,448.39	10,375.80	72.59	143.941	
18,400.00	6,983.19	6,800.00	6,497.51	174.90	33.48	68.38	1,893.14	114.67	10,547.58	10,474.91	72.66	145.160	
18,500.00	6,983.12	6,800.00	6,497.51	176.44	33.48	68.38	1,893.14	114.67	10,646.78	10,574.04	72.74	146.377	
18,600.00	6,983.05	6,800.00	6,497.51	177.99	33.48	68.38	1,893.14	114.67	10,745.99	10,673.18	72.81	147.591	
18,700.00	6,982.99	6,800.00	6,497.51	179.54	33.48	68.38	1,893.14	114.67	10,845.22	10,772.34	72.88	148.803	
18,800.00	6,982.92	6,800.00	6,497.51	181.09	33.48	68.38	1,893.14	114.67	10,944.46	10,871.51	72.96	150.011	
18,900.00	6,982.85	6,800.00	6,497.51	182.64	33.48	68.38	1,893.14	114.67	11,043.72	10,970.69	73.03	151.217	
19,000.00	6,982.78	6,800.00	6,497.51	184.19	33.48	68.38	1,893.14	114.67	11,142.99	11,069.89	73.11	152.419	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #672H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	6,800.00	6,497.51	185.74	33.48	68.38	1,893.14	114.67	11,242.28	11,169.09	73.18	153.619	
19,200.00	6,982.65	6,800.00	6,497.51	187.29	33.48	68.38	1,893.14	114.67	11,341.57	11,268.31	73.26	154.816	
19,300.00	6,982.58	6,800.00	6,497.51	188.84	33.48	68.38	1,893.14	114.67	11,440.88	11,367.55	73.33	156.010	
19,400.00	6,982.52	6,800.00	6,497.51	190.40	33.48	68.38	1,893.14	114.67	11,540.20	11,466.79	73.41	157.201	
19,500.00	6,982.45	6,800.00	6,497.51	191.95	33.48	68.38	1,893.14	114.67	11,639.53	11,566.05	73.49	158.390	
19,600.00	6,982.38	6,800.00	6,497.51	193.51	33.48	68.38	1,893.14	114.67	11,738.88	11,665.31	73.56	159.575	
19,700.00	6,982.32	6,800.00	6,497.51	195.07	33.48	68.38	1,893.14	114.67	11,838.23	11,764.59	73.64	160.757	
19,800.00	6,982.25	6,800.00	6,497.51	196.62	33.48	68.38	1,893.14	114.67	11,937.60	11,863.88	73.72	161.936	
19,900.00	6,982.18	6,800.00	6,497.51	198.18	33.48	68.38	1,893.14	114.67	12,036.97	11,963.18	73.80	163.112	
20,000.00	6,982.12	6,800.00	6,497.51	199.74	33.48	68.38	1,893.14	114.67	12,136.36	12,062.49	73.87	164.285	
20,100.00	6,982.05	6,800.00	6,497.51	201.30	33.48	68.38	1,893.14	114.67	12,235.75	12,161.80	73.95	165.455	
20,176.02	6,982.00	6,800.00	6,497.51	202.36	33.48	68.38	1,893.14	114.67	12,311.32	12,233.08	78.24	157.359	

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #674H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	29.63	17.48	9.94	20.10				
100.00	100.00	100.00	100.00	0.25	0.25	29.63	17.48	9.94	20.10	19.60	0.50	40.059	
200.00	200.00	200.00	200.00	0.61	0.61	29.63	17.48	9.94	20.10	18.89	1.22	16.495	
300.00	300.00	300.00	300.00	0.97	0.97	29.63	17.48	9.94	20.10	18.17	1.94	10.386	
400.00	400.00	400.00	400.00	1.33	1.33	29.63	17.48	9.94	20.10	17.45	2.65	7.579	
500.00	500.00	500.00	500.00	1.68	1.68	29.63	17.48	9.94	20.10	16.73	3.37	5.966	
510.00	510.00	510.00	510.00	1.72	1.72	29.63	17.48	9.94	20.10	16.66	3.44	5.842	CC
600.00	600.00	599.70	599.70	2.04	2.04	28.99	17.91	9.92	20.47	16.39	4.09	5.011	ES
700.00	699.98	699.05	698.98	2.40	2.40	37.14	21.35	9.78	22.09	17.29	4.80	4.604	
800.00	799.84	798.33	798.02	2.76	2.76	36.51	28.22	9.49	23.95	18.45	5.51	4.350	
900.00	899.45	897.55	896.70	3.13	3.12	36.85	38.51	9.06	26.04	19.83	6.21	4.192	
1,000.00	998.70	996.71	994.90	3.49	3.48	37.92	52.20	8.49	28.37	21.45	6.92	4.099	
1,100.00	1,097.47	1,095.80	1,092.50	3.86	3.86	39.55	69.27	7.78	30.94	23.30	7.63	4.052	
1,200.00	1,195.62	1,195.44	1,190.14	4.24	4.25	42.28	89.09	6.96	33.18	24.80	8.38	3.959	
1,300.00	1,293.06	1,295.36	1,288.02	4.64	4.64	48.70	109.19	6.12	33.26	24.09	9.17	3.626	
1,400.00	1,389.64	1,395.13	1,385.76	5.06	5.05	60.15	129.25	5.28	31.88	21.86	10.02	3.181	
1,491.44	1,477.12	1,486.13	1,474.89	5.47	5.42	76.37	147.55	4.52	30.94	20.09	10.86	2.850	
1,500.00	1,485.27	1,494.64	1,483.22	5.50	5.46	78.18	149.26	4.45	30.96	20.02	10.94	2.831	
1,515.00	1,499.52	1,509.53	1,497.81	5.57	5.52	81.44	152.25	4.33	31.05	19.97	11.07	2.803	SF
1,600.00	1,580.22	1,593.90	1,580.46	5.96	5.87	99.22	169.22	3.62	33.41	21.59	11.82	2.826	
1,700.00	1,675.17	1,693.17	1,677.69	6.44	6.28	115.64	189.18	2.79	39.59	26.98	12.61	3.139	
1,800.00	1,770.11	1,792.43	1,774.92	6.92	6.70	126.99	209.14	1.96	48.09	34.73	13.36	3.600	
1,900.00	1,865.05	1,891.69	1,872.16	7.41	7.12	134.76	229.09	1.12	57.89	43.78	14.10	4.105	
2,000.00	1,959.99	1,990.96	1,969.39	7.90	7.54	140.21	249.05	0.29	68.43	53.58	14.85	4.607	
2,100.00	2,054.94	2,090.22	2,066.62	8.40	7.96	144.19	269.01	-0.54	79.42	63.81	15.61	5.087	
2,200.00	2,149.88	2,189.48	2,163.85	8.90	8.38	147.19	288.97	-1.37	90.70	74.32	16.38	5.537	
2,300.00	2,244.82	2,288.75	2,261.09	9.41	8.81	149.52	308.93	-2.20	102.18	85.02	17.16	5.956	
2,400.00	2,339.76	2,388.01	2,358.32	9.92	9.23	151.38	328.89	-3.03	113.78	95.84	17.94	6.344	
2,500.00	2,434.71	2,487.27	2,455.55	10.43	9.66	152.90	348.85	-3.86	125.48	106.76	18.72	6.703	
2,600.00	2,529.65	2,586.54	2,552.78	10.94	10.08	154.15	368.81	-4.69	137.26	117.75	19.51	7.036	
2,700.00	2,624.59	2,685.80	2,650.02	11.45	10.51	155.21	388.77	-5.53	149.08	128.78	20.30	7.344	
2,800.00	2,719.53	2,785.06	2,747.25	11.97	10.93	156.11	408.73	-6.36	160.95	139.86	21.09	7.631	
2,900.00	2,814.48	2,884.33	2,844.48	12.49	11.36	156.89	428.69	-7.19	172.86	150.97	21.89	7.898	
3,000.00	2,909.42	2,983.59	2,941.71	13.01	11.79	157.57	448.65	-8.02	184.79	162.11	22.68	8.146	
3,100.00	3,004.36	3,082.85	3,038.94	13.53	12.22	158.16	468.61	-8.85	196.75	173.26	23.48	8.378	
3,200.00	3,099.30	3,182.12	3,136.18	14.05	12.65	158.69	488.57	-9.68	208.72	184.44	24.28	8.596	
3,300.00	3,194.25	3,281.38	3,233.41	14.57	13.07	159.16	508.53	-10.51	220.71	195.63	25.08	8.799	
3,400.00	3,289.19	3,380.64	3,330.64	15.09	13.50	159.58	528.48	-11.34	232.71	206.83	25.88	8.990	
3,500.00	3,384.13	3,479.91	3,427.87	15.62	13.93	159.96	548.44	-12.18	244.72	218.04	26.69	9.170	
3,600.00	3,479.07	3,579.17	3,525.11	16.14	14.36	160.31	568.40	-13.01	256.75	229.26	27.49	9.340	
3,700.00	3,574.02	3,678.43	3,622.34	16.67	14.79	160.62	588.36	-13.84	268.78	240.48	28.29	9.500	
3,800.00	3,668.96	3,777.70	3,719.57	17.19	15.22	160.91	608.32	-14.67	280.82	251.72	29.10	9.651	
3,900.00	3,763.90	3,876.96	3,816.80	17.72	15.65	161.17	628.28	-15.50	292.86	262.96	29.90	9.794	
4,000.00	3,858.84	3,976.22	3,914.04	18.24	16.08	161.41	648.24	-16.33	304.91	274.20	30.71	9.929	
4,100.00	3,953.79	4,075.49	4,011.27	18.77	16.51	161.64	668.20	-17.16	316.96	285.45	31.51	10.058	
4,200.00	4,048.73	4,174.75	4,108.50	19.30	16.94	161.84	688.16	-18.00	329.02	296.70	32.32	10.180	
4,300.00	4,143.67	4,274.01	4,205.73	19.82	17.37	162.04	708.12	-18.83	341.09	307.96	33.13	10.296	
4,400.00	4,238.61	4,373.28	4,302.97	20.35	17.80	162.22	728.08	-19.66	353.16	319.22	33.93	10.407	
4,500.00	4,333.56	4,472.54	4,400.20	20.88	18.23	162.38	748.04	-20.49	365.23	330.48	34.74	10.512	
4,600.00	4,428.50	4,571.80	4,497.43	21.41	18.66	162.54	768.00	-21.32	377.30	341.75	35.55	10.613	
4,700.00	4,523.44	4,671.07	4,594.66	21.93	19.09	162.69	787.96	-22.15	389.37	353.02	36.36	10.709	
4,800.00	4,618.38	4,770.33	4,691.90	22.46	19.52	162.83	807.92	-22.98	401.45	364.29	37.17	10.801	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #674H - OH - Prelim 5													Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:				Offset Well Error:	0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		Separation Factor	
4,900.00	4,713.33	4,869.59	4,789.13	22.99	19.95	162.96	827.87	-23.81	413.53	375.56	37.97	10.890		
5,000.00	4,808.27	4,968.86	4,886.36	23.52	20.39	163.08	847.83	-24.65	425.62	386.83	38.78	10.974		
5,100.00	4,903.21	5,068.12	4,983.59	24.05	20.82	163.20	867.79	-25.48	437.70	398.11	39.59	11.055		
5,200.00	4,998.16	5,167.39	5,080.83	24.58	21.25	163.31	887.75	-26.31	449.79	409.38	40.40	11.133		
5,300.00	5,093.10	5,266.65	5,178.06	25.11	21.68	163.41	907.71	-27.14	461.87	420.66	41.21	11.207		
5,400.00	5,188.04	5,365.91	5,275.29	25.64	22.11	163.51	927.67	-27.97	473.96	431.94	42.02	11.279		
5,500.00	5,282.98	5,465.18	5,372.52	26.17	22.54	163.60	947.63	-28.80	486.05	443.22	42.83	11.348		
5,600.00	5,377.93	5,561.71	5,467.13	26.70	22.96	163.70	966.84	-29.60	498.34	454.72	43.62	11.424		
5,623.25	5,400.00	5,583.88	5,488.88	26.82	23.06	163.73	971.15	-29.78	501.30	457.49	43.80	11.444		
5,700.00	5,473.03	5,657.07	5,560.72	27.22	23.37	163.84	985.07	-30.36	510.86	466.46	44.40	11.506		
5,800.00	5,568.64	5,752.44	5,654.48	27.73	23.77	163.96	1,002.52	-31.09	522.53	477.36	45.17	11.569		
5,900.00	5,664.75	5,847.82	5,748.39	28.23	24.17	164.06	1,019.19	-31.78	533.29	487.36	45.93	11.612		
6,000.00	5,761.33	5,943.22	5,842.45	28.71	24.56	164.14	1,035.08	-32.44	543.14	496.46	46.68	11.636		
6,100.00	5,858.34	6,038.63	5,936.65	29.18	24.95	164.20	1,050.20	-33.07	552.08	504.66	47.42	11.643		
6,200.00	5,955.76	6,134.05	6,030.99	29.64	25.33	164.24	1,064.53	-33.67	560.10	511.96	48.15	11.633		
6,300.00	6,053.57	6,229.48	6,125.46	30.07	25.71	164.26	1,078.07	-34.24	567.22	518.35	48.87	11.607		
6,400.00	6,151.72	6,324.92	6,220.04	30.50	26.08	164.27	1,090.83	-34.77	573.43	523.85	49.58	11.566		
6,500.00	6,250.19	6,420.38	6,314.73	30.91	26.45	164.26	1,102.81	-35.27	578.72	528.44	50.28	11.510		
6,600.00	6,348.94	6,536.53	6,429.96	31.30	26.90	164.32	1,117.10	-37.19	582.17	531.00	51.17	11.377		
6,659.67	6,408.00	6,782.90	6,661.83	31.53	28.00	167.93	1,173.04	-92.06	570.75	519.97	50.78	11.240		
6,700.00	6,447.82	6,899.72	6,757.78	31.68	28.60	157.38	1,212.73	-145.23	555.79	506.33	49.46	11.236		
6,750.00	6,496.66	7,009.39	6,835.59	31.90	29.20	155.04	1,256.11	-208.96	533.91	485.58	48.33	11.047		
6,800.00	6,544.65	7,087.30	6,882.35	32.13	29.66	157.18	1,289.81	-261.31	511.99	463.67	48.32	10.595		
6,850.00	6,591.49	7,142.45	6,910.70	32.37	30.00	160.09	1,314.80	-301.45	493.05	443.70	49.36	9.990		
6,900.00	6,636.89	7,181.78	6,928.39	32.62	30.25	162.50	1,333.08	-331.44	479.40	428.30	51.10	9.382		
6,950.00	6,680.57	7,210.02	6,939.74	32.89	30.44	164.15	1,346.40	-353.60	472.65	419.49	53.16	8.892		
6,968.00	6,695.82	7,218.12	6,942.79	32.99	30.49	164.56	1,350.24	-360.05	472.12	418.22	53.90	8.759		
7,000.00	6,722.26	7,230.32	6,947.20	33.17	30.57	165.07	1,356.05	-369.83	473.81	418.64	55.17	8.588		
7,050.00	6,761.71	7,244.77	6,952.13	33.45	30.67	165.36	1,362.95	-381.52	483.21	426.33	56.88	8.495		
7,100.00	6,798.67	7,254.78	6,955.37	33.75	30.74	165.06	1,367.76	-389.69	500.58	442.43	58.15	8.608		
7,150.00	6,832.91	7,261.34	6,957.42	34.06	30.79	164.18	1,370.91	-395.07	525.16	466.18	58.98	8.904		
7,200.00	6,864.22	7,265.13	6,958.57	34.37	30.81	162.68	1,372.73	-398.19	555.95	496.50	59.44	9.352		
7,250.00	6,892.42	7,266.65	6,959.02	34.69	30.82	160.40	1,373.46	-399.44	591.83	532.19	59.64	9.924		
7,300.00	6,917.32	7,266.24	6,958.90	35.03	30.82	157.12	1,373.26	-399.10	631.76	572.10	59.66	10.590		
7,350.00	6,938.77	7,264.16	6,958.27	35.37	30.81	152.39	1,372.26	-397.38	674.79	615.21	59.58	11.326		
7,400.00	6,956.64	7,260.58	6,957.18	35.72	30.78	145.53	1,370.54	-394.45	720.11	660.66	59.45	12.112		
7,450.00	6,970.83	7,255.65	6,955.65	36.07	30.75	135.45	1,368.17	-390.40	767.04	707.73	59.31	12.932		
7,500.00	6,981.23	7,250.00	6,953.84	36.44	30.71	121.06	1,365.46	-385.78	815.01	755.82	59.19	13.769		
7,550.00	6,987.80	7,241.98	6,951.20	36.81	30.65	102.04	1,361.62	-379.26	863.53	804.48	59.05	14.624		
7,600.00	6,990.48	7,233.32	6,948.25	37.19	30.59	82.07	1,357.48	-372.25	912.21	853.28	58.93	15.479		
7,609.87	6,990.55	7,231.47	6,947.60	37.26	30.58	78.43	1,356.60	-370.75	921.80	862.89	58.91	15.648		
7,700.00	6,990.49	7,214.70	6,941.51	37.97	30.47	77.72	1,348.61	-357.32	1,009.44	950.72	58.72	17.191		
7,800.00	6,990.42	7,200.00	6,935.85	38.78	30.37	77.08	1,341.66	-345.68	1,106.79	1,048.21	58.59	18.891		
7,900.00	6,990.35	7,180.02	6,927.65	39.64	30.24	76.21	1,332.26	-330.08	1,204.25	1,145.91	58.34	20.642		
8,000.00	6,990.28	7,163.93	6,920.63	40.53	30.14	75.51	1,324.74	-317.69	1,301.83	1,243.65	58.17	22.378		
8,100.00	6,990.21	7,150.00	6,914.27	41.45	30.05	74.90	1,318.28	-307.12	1,399.51	1,341.46	58.05	24.110		
8,200.00	6,990.14	7,134.01	6,906.63	42.40	29.94	74.20	1,310.93	-295.16	1,497.28	1,439.41	57.88	25.869		
8,306.37	6,990.06	7,119.26	6,899.28	43.45	29.85	73.55	1,304.19	-284.29	1,601.39	1,543.65	57.74	27.734		
8,400.00	6,990.00	7,100.00	6,889.24	44.38	29.73	76.71	1,295.49	-270.35	1,692.49	1,634.98	57.51	29.428		
8,500.00	6,989.93	7,087.38	6,882.39	45.36	29.66	78.97	1,289.84	-261.37	1,788.20	1,730.76	57.44	31.132		
8,600.00	6,989.85	7,067.17	6,871.00	46.33	29.54	80.17	1,280.91	-247.28	1,882.00	1,824.75	57.25	32.875		
8,700.00	6,989.78	7,050.00	6,860.91	47.28	29.43	81.08	1,273.41	-235.57	1,973.61	1,916.48	57.13	34.547		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #674H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS				Rule Assigned:				Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,800.00	6,989.70	7,021.79	6,843.54	48.21	29.27	81.39	1,261.33	-216.92	2,062.74	2,005.90	56.84	36.290	
8,900.00	6,989.63	7,000.00	6,829.46	49.11	29.14	81.76	1,252.19	-203.03	2,149.24	2,092.55	56.68	37.918	
9,000.00	6,989.55	6,973.21	6,811.40	49.99	28.99	81.89	1,241.22	-186.57	2,232.89	2,176.43	56.46	39.549	
9,100.00	6,989.48	6,950.00	6,795.09	50.84	28.87	82.04	1,231.96	-172.90	2,313.57	2,257.25	56.31	41.085	
9,200.00	6,989.40	6,924.90	6,776.80	51.66	28.73	82.09	1,222.21	-158.75	2,391.14	2,334.99	56.15	42.582	
9,300.00	6,989.33	6,900.00	6,758.00	52.45	28.60	82.10	1,212.83	-145.38	2,465.51	2,409.50	56.02	44.015	
9,393.87	6,989.27	6,880.63	6,742.95	53.15	28.50	82.17	1,205.75	-135.46	2,532.33	2,476.37	55.96	45.251	
9,400.00	6,989.26	6,879.29	6,741.90	53.20	28.49	82.14	1,205.26	-134.79	2,536.60	2,480.65	55.95	45.333	
9,500.00	6,989.19	6,850.00	6,718.42	53.95	28.34	81.46	1,194.93	-120.64	2,607.15	2,551.36	55.79	46.732	
9,600.00	6,989.12	6,850.00	6,718.42	54.73	28.34	81.46	1,194.93	-120.64	2,679.20	2,623.17	56.03	47.815	
9,700.00	6,989.05	6,822.57	6,695.74	55.55	28.20	80.81	1,185.68	-108.30	2,752.65	2,696.75	55.90	49.242	
9,800.00	6,988.98	6,800.00	6,676.60	56.40	28.09	80.26	1,178.38	-98.82	2,827.56	2,771.72	55.84	50.639	
9,900.00	6,988.91	6,800.00	6,676.60	57.28	28.09	80.26	1,178.38	-98.82	2,903.74	2,847.68	56.06	51.795	
10,000.00	6,988.84	6,779.47	6,658.85	58.20	27.98	79.76	1,171.99	-90.75	2,981.13	2,925.10	56.03	53.208	
10,100.00	6,988.77	6,767.38	6,648.24	59.14	27.93	79.46	1,168.34	-86.24	3,059.69	3,003.60	56.09	54.546	
10,200.00	6,988.70	6,750.00	6,632.80	60.11	27.84	79.03	1,163.26	-80.08	3,139.37	3,083.27	56.10	55.964	
10,300.00	6,988.63	6,750.00	6,632.80	61.11	27.84	79.03	1,163.26	-80.08	3,220.03	3,163.73	56.29	57.200	
10,400.00	6,988.56	6,750.00	6,632.80	62.14	27.84	79.03	1,163.26	-80.08	3,301.75	3,245.27	56.48	58.456	
10,500.00	6,988.49	6,727.44	6,612.46	63.19	27.73	78.46	1,156.93	-72.65	3,384.18	3,327.76	56.43	59.977	
10,600.00	6,988.42	6,719.16	6,604.91	64.26	27.69	78.25	1,154.69	-70.09	3,467.56	3,411.04	56.52	61.354	
10,700.00	6,988.35	6,700.00	6,587.28	65.36	27.60	77.76	1,149.67	-64.51	3,551.79	3,495.30	56.50	62.867	
10,800.00	6,988.28	6,700.00	6,587.28	66.48	27.60	77.76	1,149.67	-64.51	3,636.64	3,579.98	56.66	64.179	
10,900.00	6,988.21	6,700.00	6,587.28	67.61	27.60	77.76	1,149.67	-64.51	3,722.24	3,665.42	56.82	65.505	
11,000.00	6,988.14	6,700.00	6,587.28	68.77	27.60	77.76	1,149.67	-64.51	3,808.54	3,751.57	56.98	66.843	
11,100.00	6,988.07	6,700.00	6,587.28	69.95	27.60	77.76	1,149.67	-64.51	3,895.50	3,838.38	57.12	68.193	
11,200.00	6,988.01	6,679.42	6,568.12	71.14	27.51	77.23	1,144.55	-59.05	3,982.83	3,925.74	57.09	69.769	
11,300.00	6,987.94	6,674.11	6,563.13	72.35	27.49	77.10	1,143.27	-57.73	4,070.83	4,013.65	57.18	71.193	
11,400.00	6,987.87	6,650.00	6,540.33	73.57	27.38	76.47	1,137.70	-52.22	4,159.55	4,102.44	57.12	72.827	
11,500.00	6,987.80	6,650.00	6,540.33	74.81	27.38	76.47	1,137.70	-52.22	4,248.46	4,191.21	57.25	74.210	
11,600.00	6,987.73	6,650.00	6,540.33	76.07	27.38	76.47	1,137.70	-52.22	4,337.85	4,280.47	57.38	75.601	
11,643.87	6,987.70	6,650.00	6,540.33	76.62	27.38	76.47	1,137.70	-52.22	4,377.20	4,319.77	57.43	76.214	
11,700.00	6,987.66	6,650.00	6,540.33	77.33	27.38	76.99	1,137.70	-52.22	4,427.45	4,369.95	57.50	76.996	
11,737.27	6,987.63	6,650.00	6,540.33	77.80	27.38	77.32	1,137.70	-52.22	4,460.63	4,403.08	57.55	77.511	
11,800.00	6,987.59	6,650.00	6,540.33	78.59	27.38	77.32	1,137.70	-52.22	4,516.44	4,458.81	57.63	78.375	
11,900.00	6,987.52	6,650.00	6,540.33	79.86	27.38	77.32	1,137.70	-52.22	4,605.77	4,548.02	57.75	79.756	
12,000.00	6,987.46	6,650.00	6,540.33	81.14	27.38	77.32	1,137.70	-52.22	4,695.53	4,637.66	57.87	81.144	
12,100.00	6,987.39	6,650.00	6,540.33	82.43	27.38	77.32	1,137.70	-52.22	4,785.70	4,727.72	57.98	82.538	
12,200.00	6,987.32	6,650.00	6,540.33	83.73	27.38	77.32	1,137.70	-52.22	4,876.25	4,818.16	58.09	83.938	
12,300.00	6,987.26	6,650.00	6,540.33	85.05	27.38	77.32	1,137.70	-52.22	4,967.16	4,908.96	58.20	85.344	
12,400.00	6,987.19	6,650.00	6,540.33	86.38	27.38	77.32	1,137.70	-52.22	5,058.42	5,000.11	58.31	86.754	
12,500.00	6,987.12	6,627.01	6,518.35	87.71	27.28	76.75	1,132.77	-47.69	5,149.68	5,091.42	58.26	88.394	
12,600.00	6,987.06	6,624.13	6,515.57	89.06	27.26	76.68	1,132.17	-47.17	5,241.49	5,183.14	58.34	89.839	
12,700.00	6,986.99	6,621.37	6,512.91	90.41	27.25	76.61	1,131.61	-46.69	5,333.57	5,275.15	58.43	91.287	
12,800.00	6,986.92	6,600.00	6,492.24	91.77	27.16	76.08	1,127.43	-43.28	5,426.15	5,367.75	58.39	92.926	
12,900.00	6,986.86	6,600.00	6,492.24	93.14	27.16	76.08	1,127.43	-43.28	5,518.71	5,460.22	58.49	94.352	
13,000.00	6,986.79	6,600.00	6,492.24	94.52	27.16	76.08	1,127.43	-43.28	5,611.53	5,552.94	58.59	95.781	
13,100.00	6,986.72	6,600.00	6,492.24	95.90	27.16	76.08	1,127.43	-43.28	5,704.59	5,645.91	58.68	97.212	
13,200.00	6,986.66	6,600.00	6,492.24	97.30	27.16	76.08	1,127.43	-43.28	5,797.88	5,739.11	58.78	98.645	
13,300.00	6,986.59	6,600.00	6,492.24	98.69	27.16	76.08	1,127.43	-43.28	5,891.40	5,832.53	58.87	100.080	
13,400.00	6,986.52	6,600.00	6,492.24	100.10	27.16	76.08	1,127.43	-43.28	5,985.12	5,926.16	58.96	101.516	
13,500.00	6,986.46	6,600.00	6,492.24	101.51	27.16	76.08	1,127.43	-43.28	6,079.04	6,019.99	59.05	102.954	
13,600.00	6,986.39	6,600.00	6,492.24	102.93	27.16	76.08	1,127.43	-43.28	6,173.15	6,114.02	59.13	104.393	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #674H - OH - Prelim 5													Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS				Rule Assigned:							Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance						Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
13,700.00	6,986.32	6,600.00	6,492.24	104.35	27.16	76.08	1,127.43	-43.28	6,267.45	6,208.23	59.22	105.833		
13,800.00	6,986.25	6,600.00	6,492.24	105.78	27.16	76.08	1,127.43	-43.28	6,361.92	6,302.61	59.31	107.273		
13,900.00	6,986.19	6,600.00	6,492.24	107.21	27.16	76.08	1,127.43	-43.28	6,456.56	6,397.17	59.39	108.714		
14,000.00	6,986.12	6,600.00	6,492.24	108.65	27.16	76.08	1,127.43	-43.28	6,551.35	6,491.88	59.47	110.155		
14,100.00	6,986.05	6,600.00	6,492.24	110.09	27.16	76.08	1,127.43	-43.28	6,646.30	6,586.74	59.56	111.596		
14,200.00	6,985.99	6,600.00	6,492.24	111.54	27.16	76.08	1,127.43	-43.28	6,741.39	6,681.76	59.64	113.037		
14,300.00	6,985.92	6,600.00	6,492.24	112.99	27.16	76.08	1,127.43	-43.28	6,836.63	6,776.91	59.72	114.478		
14,400.00	6,985.85	6,600.00	6,492.24	114.45	27.16	76.08	1,127.43	-43.28	6,932.00	6,872.20	59.80	115.918		
14,500.00	6,985.79	6,600.00	6,492.24	115.91	27.16	76.08	1,127.43	-43.28	7,027.50	6,967.61	59.88	117.357		
14,600.00	6,985.72	6,600.00	6,492.24	117.38	27.16	76.08	1,127.43	-43.28	7,123.12	7,063.16	59.96	118.796		
14,700.00	6,985.65	6,600.00	6,492.24	118.84	27.16	76.08	1,127.43	-43.28	7,218.86	7,158.82	60.04	120.234		
14,800.00	6,985.59	6,600.00	6,492.24	120.32	27.16	76.08	1,127.43	-43.28	7,314.71	7,254.59	60.12	121.671		
14,900.00	6,985.52	6,600.00	6,492.24	121.79	27.16	76.08	1,127.43	-43.28	7,410.67	7,350.48	60.20	123.106		
15,000.00	6,985.45	6,600.00	6,492.24	123.27	27.16	76.08	1,127.43	-43.28	7,506.74	7,446.47	60.28	124.541		
15,100.00	6,985.39	6,600.00	6,492.24	124.75	27.16	76.08	1,127.43	-43.28	7,602.91	7,542.56	60.35	125.974		
15,200.00	6,985.32	6,577.04	6,469.85	126.24	27.06	75.51	1,123.29	-40.32	7,698.84	7,638.52	60.32	127.625		
15,300.00	6,985.25	6,575.89	6,468.73	127.72	27.06	75.48	1,123.10	-40.19	7,795.17	7,734.77	60.40	129.066		
15,400.00	6,985.19	6,574.78	6,467.64	129.21	27.05	75.46	1,122.91	-40.06	7,891.58	7,831.11	60.47	130.505		
15,500.00	6,985.12	6,573.69	6,466.57	130.71	27.05	75.43	1,122.72	-39.94	7,988.08	7,927.54	60.54	131.942		
15,600.00	6,985.05	6,572.64	6,465.54	132.20	27.05	75.40	1,122.54	-39.83	8,084.67	8,024.06	60.62	133.377		
15,700.00	6,984.99	6,550.00	6,443.29	133.70	26.95	74.84	1,118.91	-37.75	8,181.64	8,121.05	60.59	135.025		
15,800.00	6,984.92	6,550.00	6,443.29	135.20	26.95	74.84	1,118.91	-37.75	8,278.36	8,217.69	60.67	136.446		
15,900.00	6,984.85	6,550.00	6,443.29	136.71	26.95	74.84	1,118.91	-37.75	8,375.15	8,314.40	60.75	137.864		
16,000.00	6,984.79	6,550.00	6,443.29	138.21	26.95	74.84	1,118.91	-37.75	8,472.02	8,411.19	60.83	139.281		
16,100.00	6,984.72	6,550.00	6,443.29	139.72	26.95	74.84	1,118.91	-37.75	8,568.96	8,508.06	60.90	140.694		
16,200.00	6,984.65	6,550.00	6,443.29	141.23	26.95	74.84	1,118.91	-37.75	8,665.97	8,604.99	60.98	142.106		
16,300.00	6,984.59	6,550.00	6,443.29	142.75	26.95	74.84	1,118.91	-37.75	8,763.05	8,701.99	61.06	143.515		
16,400.00	6,984.52	6,550.00	6,443.29	144.26	26.95	74.84	1,118.91	-37.75	8,860.19	8,799.06	61.14	144.921		
16,500.00	6,984.45	6,550.00	6,443.29	145.78	26.95	74.84	1,118.91	-37.75	8,957.40	8,896.18	61.22	146.325		
16,600.00	6,984.39	6,550.00	6,443.29	147.29	26.95	74.84	1,118.91	-37.75	9,054.67	8,993.37	61.29	147.726		
16,700.00	6,984.32	6,550.00	6,443.29	148.82	26.95	74.84	1,118.91	-37.75	9,151.99	9,090.62	61.37	149.124		
16,800.00	6,984.25	6,550.00	6,443.29	150.34	26.95	74.84	1,118.91	-37.75	9,249.37	9,187.92	61.45	150.520		
16,900.00	6,984.19	6,550.00	6,443.29	151.86	26.95	74.84	1,118.91	-37.75	9,346.81	9,285.28	61.53	151.912		
17,000.00	6,984.12	6,550.00	6,443.29	153.39	26.95	74.84	1,118.91	-37.75	9,444.30	9,382.70	61.61	153.302		
17,100.00	6,984.05	6,550.00	6,443.29	154.91	26.95	74.84	1,118.91	-37.75	9,541.85	9,480.16	61.68	154.689		
17,200.00	6,983.99	6,550.00	6,443.29	156.44	26.95	74.84	1,118.91	-37.75	9,639.44	9,577.68	61.76	156.072		
17,300.00	6,983.92	6,550.00	6,443.29	157.97	26.95	74.84	1,118.91	-37.75	9,737.08	9,675.24	61.84	157.453		
17,400.00	6,983.85	6,550.00	6,443.29	159.50	26.95	74.84	1,118.91	-37.75	9,834.77	9,772.85	61.92	158.830		
17,500.00	6,983.79	6,550.00	6,443.29	161.04	26.95	74.84	1,118.91	-37.75	9,932.51	9,870.51	62.00	160.204		
17,600.00	6,983.72	6,550.00	6,443.29	162.57	26.95	74.84	1,118.91	-37.75	10,030.29	9,968.21	62.08	161.575		
17,700.00	6,983.65	6,550.00	6,443.29	164.11	26.95	74.84	1,118.91	-37.75	10,128.11	10,065.95	62.16	162.942		
17,800.00	6,983.59	6,550.00	6,443.29	165.65	26.95	74.84	1,118.91	-37.75	10,225.98	10,163.74	62.24	164.306		
17,900.00	6,983.52	6,550.00	6,443.29	167.18	26.95	74.84	1,118.91	-37.75	10,323.89	10,261.57	62.32	165.667		
18,000.00	6,983.45	6,550.00	6,443.29	168.72	26.95	74.84	1,118.91	-37.75	10,421.83	10,359.43	62.40	167.024		
18,100.00	6,983.39	6,550.00	6,443.29	170.27	26.95	74.84	1,118.91	-37.75	10,519.82	10,457.34	62.48	168.378		
18,200.00	6,983.32	6,550.00	6,443.29	171.81	26.95	74.84	1,118.91	-37.75	10,617.84	10,555.28	62.56	169.729		
18,300.00	6,983.25	6,550.00	6,443.29	173.35	26.95	74.84	1,118.91	-37.75	10,715.90	10,653.26	62.64	171.075		
18,400.00	6,983.19	6,550.00	6,443.29	174.90	26.95	74.84	1,118.91	-37.75	10,813.99	10,751.27	62.72	172.419		
18,500.00	6,983.12	6,550.00	6,443.29	176.44	26.95	74.84	1,118.91	-37.75	10,912.12	10,849.32	62.80	173.758		
18,600.00	6,983.05	6,550.00	6,443.29	177.99	26.95	74.84	1,118.91	-37.75	11,010.29	10,947.40	62.88	175.094		
18,700.00	6,982.99	6,550.00	6,443.29	179.54	26.95	74.84	1,118.91	-37.75	11,108.48	11,045.52	62.96	176.427		
18,800.00	6,982.92	6,550.00	6,443.29	181.09	26.95	74.84	1,118.91	-37.75	11,206.71	11,143.66	63.05	177.755		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #674H - OH - Prelim 5													Offset Site Error: 0.00 usft	
Survey Program: Reference		0-MWD+HRGM+MS Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned: Distance				Offset Well Error: 0.00 usft		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
18,900.00	6,982.85	6,550.00	6,443.29	182.64	26.95	74.84	1,118.91	-37.75	11,304.97	11,241.84	63.13	179.080		
19,000.00	6,982.78	6,550.00	6,443.29	184.19	26.95	74.84	1,118.91	-37.75	11,403.26	11,340.05	63.21	180.401		
19,100.00	6,982.72	6,550.00	6,443.29	185.74	26.95	74.84	1,118.91	-37.75	11,501.58	11,438.28	63.29	181.719		
19,200.00	6,982.65	6,550.00	6,443.29	187.29	26.95	74.84	1,118.91	-37.75	11,599.92	11,536.55	63.38	183.032		
19,300.00	6,982.58	6,550.00	6,443.29	188.84	26.95	74.84	1,118.91	-37.75	11,698.30	11,634.84	63.46	184.342		
19,400.00	6,982.52	6,550.00	6,443.29	190.40	26.95	74.84	1,118.91	-37.75	11,796.70	11,733.16	63.54	185.648		
19,500.00	6,982.45	6,550.00	6,443.29	191.95	26.95	74.84	1,118.91	-37.75	11,895.13	11,831.50	63.63	186.950		
19,600.00	6,982.38	6,550.00	6,443.29	193.51	26.95	74.84	1,118.91	-37.75	11,993.59	11,929.88	63.71	188.248		
19,700.00	6,982.32	6,550.00	6,443.29	195.07	26.95	74.84	1,118.91	-37.75	12,092.07	12,028.27	63.80	189.542		
19,800.00	6,982.25	6,550.00	6,443.29	196.62	26.95	74.84	1,118.91	-37.75	12,190.57	12,126.69	63.88	190.832		
19,900.00	6,982.18	6,550.00	6,443.29	198.18	26.95	74.84	1,118.91	-37.75	12,289.10	12,225.14	63.97	192.118		
20,000.00	6,982.12	6,550.00	6,443.29	199.74	26.95	74.84	1,118.91	-37.75	12,387.66	12,323.60	64.05	193.401		
20,100.00	6,982.05	6,550.00	6,443.29	201.30	26.95	74.84	1,118.91	-37.75	12,486.23	12,422.09	64.14	194.679		
20,176.02	6,982.00	6,550.00	6,443.29	202.36	26.95	74.84	1,118.91	-37.75	12,561.18	12,492.62	68.56	183.210		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #692H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-151.10	-17.48	-9.65	19.96				
100.00	100.00	100.00	100.00	0.25	0.25	-151.10	-17.48	-9.65	19.96	19.46	0.50	39.774	
200.00	200.00	200.00	200.00	0.61	0.61	-151.10	-17.48	-9.65	19.96	18.74	1.22	16.378	
300.00	300.00	300.00	300.00	0.97	0.97	-151.10	-17.48	-9.65	19.96	18.03	1.94	10.312	
400.00	400.00	400.00	400.00	1.33	1.33	-151.10	-17.48	-9.65	19.96	17.31	2.65	7.525	
500.00	500.00	500.00	500.00	1.68	1.68	-151.10	-17.48	-9.65	19.96	16.59	3.37	5.924	
600.00	600.00	600.00	600.00	2.04	2.04	-151.10	-17.48	-9.65	19.96	15.87	4.09	4.885 CC, ES	
700.00	699.98	699.98	699.98	2.40	2.40	-144.03	-17.48	-9.65	21.35	16.54	4.80	4.444	
800.00	799.84	800.61	800.59	2.76	2.76	-149.09	-15.72	-9.84	24.20	18.67	5.52	4.382	
900.00	899.45	901.37	901.20	3.13	3.13	-153.47	-10.45	-10.43	27.08	20.84	6.24	4.342	
1,000.00	998.70	1,002.25	1,001.69	3.49	3.49	-157.37	-1.64	-11.42	29.98	23.04	6.95	4.316	
1,100.00	1,097.47	1,103.24	1,101.91	3.86	3.86	-160.92	10.68	-12.80	32.91	25.25	7.66	4.298	
1,200.00	1,195.62	1,203.74	1,201.22	4.24	4.23	-164.34	26.00	-14.52	36.27	27.90	8.37	4.332	
1,300.00	1,293.06	1,303.49	1,299.72	4.64	4.60	-168.09	41.64	-16.27	42.72	33.61	9.10	4.692	
1,400.00	1,389.64	1,402.95	1,397.93	5.06	4.98	-171.43	57.23	-18.01	52.74	42.89	9.84	5.358	
1,500.00	1,485.27	1,501.98	1,495.72	5.50	5.36	-174.03	72.75	-19.75	66.32	55.74	10.59	6.265	
1,515.00	1,499.52	1,516.79	1,510.35	5.57	5.42	-174.35	75.07	-20.01	68.67	57.97	10.70	6.418	
1,600.00	1,580.22	1,600.68	1,593.19	5.96	5.75	-175.87	88.22	-21.48	82.20	70.87	11.33	7.254	
1,700.00	1,675.17	1,699.38	1,690.65	6.44	6.13	-177.13	103.70	-23.22	98.17	86.09	12.08	8.126	
1,800.00	1,770.11	1,798.07	1,788.11	6.92	6.52	-178.03	119.17	-24.95	114.18	101.34	12.83	8.896	
1,900.00	1,865.05	1,896.77	1,885.57	7.41	6.91	-178.71	134.64	-26.68	130.20	116.61	13.59	9.579	
2,000.00	1,959.99	1,995.47	1,983.03	7.90	7.30	-179.24	150.11	-28.41	146.24	131.89	14.35	10.189	
2,100.00	2,054.94	2,094.17	2,080.50	8.40	7.69	-179.67	165.58	-30.15	162.29	147.18	15.12	10.736	
2,200.00	2,149.88	2,192.86	2,177.96	8.90	8.09	-179.99	181.06	-31.88	178.35	162.47	15.88	11.228	
2,300.00	2,244.82	2,291.56	2,275.42	9.41	8.48	-179.69	196.53	-33.61	194.41	177.76	16.65	11.675	
2,400.00	2,339.76	2,390.26	2,372.88	9.92	8.87	-179.45	212.00	-35.35	210.48	193.06	17.42	12.081	
2,500.00	2,434.71	2,488.95	2,470.34	10.43	9.27	-179.24	227.47	-37.08	226.55	208.36	18.19	12.451	
2,600.00	2,529.65	2,587.65	2,567.80	10.94	9.66	-179.05	242.95	-38.81	242.62	223.66	18.97	12.791	
2,700.00	2,624.59	2,686.35	2,665.26	11.45	10.06	-178.89	258.42	-40.54	258.70	238.96	19.74	13.104	
2,800.00	2,719.53	2,785.04	2,762.73	11.97	10.46	-178.75	273.89	-42.28	274.78	254.26	20.52	13.392	
2,900.00	2,814.48	2,883.74	2,860.19	12.49	10.85	-178.62	289.36	-44.01	290.85	269.56	21.29	13.659	
3,000.00	2,909.42	2,982.44	2,957.65	13.01	11.25	-178.51	304.83	-45.74	306.93	284.86	22.07	13.906	
3,100.00	3,004.36	3,081.14	3,055.11	13.53	11.65	-178.41	320.31	-47.48	323.01	300.16	22.85	14.136	
3,200.00	3,099.30	3,179.83	3,152.57	14.05	12.04	-178.31	335.78	-49.21	339.09	315.47	23.63	14.351	
3,300.00	3,194.25	3,278.53	3,250.03	14.57	12.44	-178.23	351.25	-50.94	355.18	330.77	24.41	14.551	
3,400.00	3,289.19	3,377.23	3,347.49	15.09	12.84	-178.15	366.72	-52.67	371.26	346.07	25.19	14.739	
3,500.00	3,384.13	3,475.92	3,444.96	15.62	13.24	-178.08	382.20	-54.41	387.34	361.37	25.97	14.915	
3,600.00	3,479.07	3,574.62	3,542.42	16.14	13.64	-178.02	397.67	-56.14	403.43	376.68	26.75	15.081	
3,700.00	3,574.02	3,673.32	3,639.88	16.67	14.04	-177.96	413.14	-57.87	419.51	391.98	27.53	15.237	
3,800.00	3,668.96	3,772.02	3,737.34	17.19	14.43	-177.90	428.61	-59.60	435.60	407.28	28.31	15.385	
3,900.00	3,763.90	3,870.71	3,834.80	17.72	14.83	-177.85	444.08	-61.34	451.68	422.58	29.10	15.524	
4,000.00	3,858.84	3,969.41	3,932.26	18.24	15.23	-177.80	459.56	-63.07	467.77	437.89	29.88	15.655	
4,100.00	3,953.79	4,068.11	4,029.72	18.77	15.63	-177.76	475.03	-64.80	483.85	453.19	30.66	15.780	
4,200.00	4,048.73	4,166.80	4,127.19	19.30	16.03	-177.72	490.50	-66.54	499.94	468.49	31.44	15.899	
4,300.00	4,143.67	4,265.50	4,224.65	19.82	16.43	-177.68	505.97	-68.27	516.02	483.80	32.23	16.011	
4,400.00	4,238.61	4,364.20	4,322.11	20.35	16.83	-177.64	521.45	-70.00	532.11	499.10	33.01	16.119	
4,500.00	4,333.56	4,462.90	4,419.57	20.88	17.23	-177.61	536.92	-71.73	548.20	514.40	33.80	16.221	
4,600.00	4,428.50	4,561.59	4,517.03	21.41	17.63	-177.57	552.39	-73.47	564.28	529.70	34.58	16.318	
4,700.00	4,523.44	4,660.29	4,614.49	21.93	18.03	-177.54	567.86	-75.20	580.37	545.01	35.36	16.411	
4,800.00	4,618.38	4,758.99	4,711.95	22.46	18.43	-177.51	583.33	-76.93	596.46	560.31	36.15	16.500	
4,900.00	4,713.33	4,857.68	4,809.42	22.99	18.83	-177.49	598.81	-78.66	612.55	575.61	36.93	16.585	
5,000.00	4,808.27	4,956.38	4,906.88	23.52	19.23	-177.46	614.28	-80.40	628.63	590.91	37.72	16.666	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #692H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)
5,100.00	4,903.21	5,055.08	5,004.34	24.05	19.63	177.44	629.75	-82.13	644.72	606.22	38.50	16.744	
5,200.00	4,998.16	5,153.78	5,101.80	24.58	20.03	177.41	645.22	-83.86	660.81	621.52	39.29	16.819	
5,300.00	5,093.10	5,252.47	5,199.26	25.11	20.43	177.39	660.70	-85.60	676.90	636.82	40.08	16.891	
5,400.00	5,188.04	5,351.17	5,296.72	25.64	20.83	177.37	676.17	-87.33	692.98	652.12	40.86	16.959	
5,500.00	5,282.98	5,449.87	5,394.18	26.17	21.23	177.35	691.64	-89.06	709.07	667.42	41.65	17.026	
5,600.00	5,377.93	5,538.19	5,481.49	26.70	21.58	177.33	704.90	-90.55	725.82	683.46	42.36	17.133	
5,623.25	5,400.00	5,558.50	5,501.60	26.82	21.66	177.33	707.77	-90.87	729.93	687.40	42.53	17.164	
5,700.00	5,473.03	5,625.47	5,567.96	27.22	21.93	177.34	716.70	-91.87	743.56	700.50	43.06	17.267	
5,800.00	5,568.64	5,712.55	5,654.40	27.73	22.26	177.35	727.16	-93.04	761.12	717.38	43.74	17.400	
5,900.00	5,664.75	5,800.00	5,741.36	28.23	22.60	177.37	736.35	-94.07	778.45	734.03	44.41	17.528	
6,000.00	5,761.33	5,886.12	5,827.13	28.71	22.91	177.39	744.11	-94.94	795.54	750.49	45.05	17.658	
6,100.00	5,858.34	5,972.62	5,913.38	29.18	23.23	177.41	750.62	-95.67	812.39	766.72	45.68	17.785	
6,200.00	5,955.76	6,058.94	5,999.54	29.64	23.53	177.44	755.82	-96.25	829.01	782.72	46.29	17.909	
6,300.00	6,053.57	6,145.08	6,085.58	30.07	23.83	177.48	759.72	-96.69	845.38	798.50	46.88	18.033	
6,400.00	6,151.72	6,231.03	6,171.50	30.50	24.12	177.51	762.33	-96.98	861.51	814.05	47.45	18.154	
6,500.00	6,250.19	6,316.82	6,257.27	30.91	24.41	177.56	763.66	-97.13	877.38	829.37	48.01	18.276	
6,600.00	6,348.94	6,408.05	6,348.50	31.30	24.69	177.60	763.68	-97.13	893.02	844.42	48.60	18.374	
6,659.67	6,408.00	6,499.48	6,439.64	31.53	24.99	177.24	766.25	-91.37	900.86	851.46	49.40	18.237	
6,700.00	6,447.82	6,567.86	6,506.70	31.68	25.23	159.78	772.43	-79.71	905.06	855.07	49.99	18.106	
6,750.00	6,496.66	6,650.43	6,585.20	31.90	25.52	147.02	784.64	-57.44	910.47	859.80	50.67	17.969	
6,800.00	6,544.65	6,729.98	6,657.12	32.13	25.82	138.94	801.13	-27.85	916.20	864.88	51.32	17.854	
6,850.00	6,591.49	6,806.15	6,721.52	32.37	26.11	133.06	821.03	7.54	922.38	870.43	51.95	17.756	
6,900.00	6,636.89	6,878.78	6,777.99	32.62	26.39	128.33	843.48	47.24	929.13	876.53	52.59	17.667	
6,950.00	6,680.57	6,947.88	6,826.56	32.89	26.68	124.26	867.73	89.93	936.54	883.28	53.26	17.585	
7,000.00	6,722.26	7,013.59	6,867.57	33.17	26.97	120.59	893.13	134.51	944.69	890.75	53.95	17.512	
7,050.00	6,761.71	7,076.12	6,901.48	33.45	27.26	117.20	919.18	180.10	953.62	898.98	54.65	17.450	
7,100.00	6,798.67	7,135.74	6,928.87	33.75	27.57	114.00	945.47	226.04	963.35	907.99	55.35	17.403	
7,150.00	6,832.91	7,192.72	6,950.31	34.06	27.88	110.94	971.73	271.82	973.84	917.79	56.06	17.373	
7,200.00	6,864.22	7,247.35	6,966.36	34.37	28.19	108.00	997.72	317.08	985.07	928.33	56.74	17.362	
7,250.00	6,892.42	7,299.87	6,977.52	34.69	28.52	105.17	1,023.31	361.56	996.96	939.57	57.39	17.371	
7,300.00	6,917.32	7,350.54	6,984.23	35.03	28.84	102.43	1,048.37	405.06	1,009.43	951.42	58.01	17.401	
7,350.00	6,938.77	7,399.56	6,986.92	35.37	29.16	99.78	1,072.83	447.46	1,022.37	963.79	58.59	17.451	
7,400.00	6,956.64	7,444.98	6,987.00	35.72	29.47	97.32	1,095.53	486.79	1,035.73	976.63	59.10	17.524	
7,450.00	6,970.83	7,490.84	6,987.00	36.07	29.79	95.10	1,118.46	526.50	1,049.38	989.74	59.64	17.596	
7,500.00	6,981.23	7,537.74	6,987.00	36.44	30.13	93.13	1,141.91	567.12	1,063.07	1,002.84	60.23	17.651	
7,550.00	6,987.80	7,585.41	6,987.00	36.81	30.49	91.44	1,165.75	608.40	1,076.61	1,015.75	60.86	17.690	
7,600.00	6,990.48	7,633.54	6,987.00	37.19	30.87	90.04	1,189.81	650.08	1,089.83	1,028.28	61.55	17.707	
7,609.87	6,990.55	7,643.07	6,987.00	37.26	30.95	89.80	1,194.58	658.33	1,092.39	1,030.70	61.69	17.708	
7,700.00	6,990.49	7,730.13	6,987.00	37.97	31.67	89.80	1,238.11	733.73	1,115.72	1,052.69	63.03	17.701	
7,800.00	6,990.42	7,826.72	6,987.00	38.78	32.51	89.81	1,286.40	817.38	1,141.60	1,076.99	64.61	17.669	
7,900.00	6,990.35	7,923.31	6,987.00	39.64	33.39	89.82	1,334.70	901.04	1,167.48	1,101.21	66.27	17.617	
8,000.00	6,990.28	8,019.91	6,987.00	40.53	34.31	89.83	1,383.00	984.69	1,193.36	1,125.35	68.01	17.546	
8,100.00	6,990.21	8,116.50	6,987.00	41.45	35.27	89.83	1,431.29	1,068.34	1,219.25	1,149.42	69.83	17.460	
8,200.00	6,990.14	8,213.09	6,987.00	42.40	36.26	89.84	1,479.59	1,151.99	1,245.13	1,173.41	71.72	17.362	
8,306.37	6,990.06	8,314.89	6,987.00	43.45	37.33	89.85	1,530.49	1,240.15	1,272.66	1,198.89	73.76	17.253	
8,400.00	6,990.00	8,363.27	6,987.00	44.38	37.86	89.85	1,553.96	1,282.45	1,295.47	1,220.97	74.50	17.388	
8,500.00	6,989.93	8,400.00	6,987.00	45.36	38.25	89.86	1,570.83	1,315.08	1,316.78	1,241.94	74.83	17.596	
8,600.00	6,989.85	8,465.48	6,987.00	46.33	38.97	89.87	1,598.80	1,374.28	1,334.43	1,258.47	75.96	17.567	
8,700.00	6,989.78	8,500.00	6,987.00	47.28	39.35	89.87	1,612.44	1,405.99	1,349.06	1,272.94	76.12	17.722	
8,800.00	6,989.70	8,567.65	6,987.00	48.21	40.09	89.88	1,636.95	1,469.03	1,359.91	1,282.63	77.29	17.595	
8,900.00	6,989.63	8,600.00	6,987.00	49.11	40.45	89.89	1,647.61	1,499.58	1,367.81	1,290.54	77.27	17.702	
9,000.00	6,989.55	8,669.78	6,987.00	49.99	41.22	89.89	1,668.24	1,566.23	1,371.80	1,293.33	78.47	17.481	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #692H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
9,100.00	6,989.48	8,700.00	6,987.00	50.84	41.56	89.90	1,676.17	1,595.39	1,372.93	1,294.68	78.26	17.544	
9,200.00	6,989.40	8,771.91	6,987.00	51.66	42.35	89.90	1,692.53	1,665.41	1,370.03	1,290.52	79.51	17.232	
9,300.00	6,989.33	8,800.00	6,987.00	52.45	42.66	89.90	1,697.97	1,692.97	1,364.40	1,285.33	79.07	17.256	
9,393.87	6,989.27	8,870.92	6,987.00	53.15	43.43	89.91	1,709.28	1,762.97	1,355.29	1,274.94	80.34	16.868	
9,400.00	6,989.26	8,874.05	6,987.00	53.20	43.47	89.91	1,709.70	1,766.08	1,354.63	1,274.26	80.37	16.855	
9,500.00	6,989.19	8,925.33	6,987.00	53.95	44.02	89.91	1,715.60	1,817.01	1,345.72	1,264.99	80.73	16.669	
9,600.00	6,989.12	9,000.00	6,987.00	54.73	44.83	89.91	1,720.92	1,891.48	1,340.78	1,258.75	82.03	16.344	
9,697.78	6,989.05	9,027.39	6,987.00	55.53	45.12	89.91	1,721.90	1,918.85	1,338.67	1,257.35	81.32	16.462	
9,700.00	6,989.05	9,028.54	6,987.00	55.55	45.13	89.91	1,721.93	1,920.00	1,338.67	1,257.35	81.33	16.461	
9,800.00	6,988.98	9,088.13	6,987.00	56.40	45.77	89.91	1,722.30	1,979.59	1,340.51	1,258.60	81.90	16.367	
9,900.00	6,988.91	9,188.08	6,987.00	57.28	46.84	89.92	1,721.82	2,079.54	1,343.60	1,259.29	84.31	15.936	
10,000.00	6,988.84	9,288.03	6,987.00	58.20	47.94	89.92	1,721.34	2,179.49	1,346.70	1,259.92	86.78	15.519	
10,100.00	6,988.77	9,387.99	6,987.00	59.14	49.06	89.92	1,720.86	2,279.44	1,349.79	1,260.51	89.29	15.118	
10,200.00	6,988.70	9,487.94	6,987.00	60.11	50.22	89.93	1,720.39	2,379.39	1,352.89	1,261.05	91.84	14.731	
10,300.00	6,988.63	9,587.89	6,987.00	61.11	51.39	89.93	1,719.91	2,479.34	1,355.98	1,261.55	94.43	14.359	
10,400.00	6,988.56	9,687.84	6,987.00	62.14	52.59	89.93	1,719.43	2,579.29	1,359.08	1,262.02	97.06	14.002	
10,500.00	6,988.49	9,787.79	6,987.00	63.19	53.81	89.94	1,718.95	2,679.24	1,362.18	1,262.45	99.72	13.660	
10,600.00	6,988.42	9,887.75	6,987.00	64.26	55.05	89.94	1,718.47	2,779.19	1,365.27	1,262.85	102.42	13.331	
10,700.00	6,988.35	9,987.70	6,987.00	65.36	56.31	89.94	1,718.00	2,879.15	1,368.37	1,263.23	105.14	13.015	
10,800.00	6,988.28	10,087.65	6,987.00	66.48	57.59	89.95	1,717.52	2,979.10	1,371.46	1,263.57	107.89	12.712	
10,900.00	6,988.21	10,187.60	6,987.00	67.61	58.88	89.95	1,717.04	3,079.05	1,374.56	1,263.90	110.66	12.421	
11,000.00	6,988.14	10,287.55	6,987.00	68.77	60.19	89.95	1,716.56	3,179.00	1,377.65	1,264.19	113.46	12.142	
11,100.00	6,988.07	10,387.51	6,987.00	69.95	61.51	89.95	1,716.08	3,278.95	1,380.75	1,264.47	116.28	11.875	
11,200.00	6,988.01	10,487.46	6,987.00	71.14	62.84	89.96	1,715.61	3,378.90	1,383.84	1,264.73	119.11	11.618	
11,300.00	6,987.94	10,587.41	6,987.00	72.35	64.19	89.96	1,715.13	3,478.85	1,386.94	1,264.97	121.97	11.371	
11,400.00	6,987.87	10,687.36	6,987.00	73.57	65.55	89.96	1,714.65	3,578.80	1,390.04	1,265.19	124.84	11.134	
11,500.00	6,987.80	10,787.31	6,987.00	74.81	66.92	89.97	1,714.17	3,678.75	1,393.13	1,265.40	127.73	10.907	
11,600.00	6,987.73	10,887.27	6,987.00	76.07	68.29	89.97	1,713.70	3,778.70	1,396.23	1,265.59	130.63	10.688	
11,643.87	6,987.70	10,931.11	6,987.00	76.62	68.90	89.97	1,713.49	3,822.55	1,397.59	1,265.68	131.91	10.595	
11,700.00	6,987.66	10,987.23	6,987.00	77.33	69.68	89.97	1,713.22	3,878.67	1,398.77	1,265.22	133.55	10.474	
11,737.27	6,987.63	11,024.50	6,987.00	77.80	70.20	89.97	1,713.04	3,915.93	1,398.95	1,264.31	134.64	10.390	
11,800.00	6,987.59	11,087.23	6,987.00	78.59	71.08	89.98	1,712.74	3,978.67	1,398.85	1,262.37	136.48	10.250	
11,900.00	6,987.52	11,187.23	6,987.00	79.86	72.49	89.98	1,712.26	4,078.66	1,398.69	1,259.26	139.42	10.032	
12,000.00	6,987.46	11,287.23	6,987.00	81.14	73.91	89.98	1,711.78	4,178.66	1,398.52	1,256.14	142.38	9.822	
12,100.00	6,987.39	11,387.23	6,987.00	82.43	75.33	89.98	1,711.30	4,278.66	1,398.36	1,253.01	145.35	9.621	
12,200.00	6,987.32	11,487.23	6,987.00	83.73	76.76	89.99	1,710.83	4,378.66	1,398.19	1,249.87	148.32	9.427	
12,300.00	6,987.26	11,587.23	6,987.00	85.05	78.20	89.99	1,710.35	4,478.66	1,398.03	1,246.72	151.31	9.240	
12,400.00	6,987.19	11,687.23	6,987.00	86.38	79.64	89.99	1,709.87	4,578.66	1,397.87	1,243.56	154.30	9.059	
12,500.00	6,987.12	11,787.23	6,987.00	87.71	81.09	90.00	1,709.39	4,678.66	1,397.70	1,240.39	157.31	8.885	
12,600.00	6,987.06	11,887.23	6,987.00	89.06	82.54	90.00	1,708.91	4,778.66	1,397.54	1,237.22	160.32	8.717	
12,700.00	6,986.99	11,987.23	6,987.00	90.41	84.00	90.00	1,708.44	4,878.65	1,397.37	1,234.03	163.34	8.555	
12,800.00	6,986.92	12,087.23	6,987.00	91.77	85.47	90.00	1,707.96	4,978.65	1,397.21	1,230.84	166.36	8.398	
12,900.00	6,986.86	12,187.23	6,987.00	93.14	86.94	90.01	1,707.48	5,078.65	1,397.04	1,227.65	169.40	8.247	
13,000.00	6,986.79	12,287.23	6,987.00	94.52	88.42	90.01	1,707.00	5,178.65	1,396.88	1,224.44	172.44	8.101	
13,100.00	6,986.72	12,387.23	6,987.00	95.90	89.90	90.01	1,706.52	5,278.65	1,396.72	1,221.23	175.48	7.959	
13,200.00	6,986.66	12,487.23	6,987.00	97.30	91.38	90.01	1,706.05	5,378.65	1,396.55	1,218.02	178.53	7.822	
13,300.00	6,986.59	12,587.23	6,987.00	98.69	92.87	90.02	1,705.57	5,478.65	1,396.39	1,214.80	181.59	7.690	
13,400.00	6,986.52	12,687.23	6,987.00	100.10	94.36	90.02	1,705.09	5,578.65	1,396.22	1,211.57	184.65	7.561	
13,500.00	6,986.46	12,787.23	6,987.00	101.51	95.86	90.02	1,704.61	5,678.64	1,396.06	1,208.34	187.72	7.437	
13,600.00	6,986.39	12,887.23	6,987.00	102.93	97.36	90.03	1,704.13	5,778.64	1,395.90	1,205.10	190.79	7.316	
13,700.00	6,986.32	12,987.23	6,987.00	104.35	98.86	90.03	1,703.65	5,878.64	1,395.73	1,201.86	193.87	7.199	
13,800.00	6,986.25	13,087.23	6,987.00	105.78	100.37	90.03	1,703.18	5,978.64	1,395.57	1,198.62	196.95	7.086	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design:		Rosa Unit 34 - Rosa Unit #692H - OH - Prelim 5											Offset Site Error:		0.00 usft	
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:				Offset Well Error:		0.00 usft		
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)						
13,900.00	6,986.19	13,187.23	6,987.00	107.21	101.87	90.03	1,702.70	6,078.64	1,395.40	1,195.37	200.03	6.976				
14,000.00	6,986.12	13,287.23	6,987.00	108.65	103.39	90.04	1,702.22	6,178.64	1,395.24	1,192.12	203.12	6.869				
14,100.00	6,986.05	13,387.23	6,987.00	110.09	104.90	90.04	1,701.74	6,278.64	1,395.07	1,188.86	206.21	6.765				
14,200.00	6,985.99	13,487.23	6,987.00	111.54	106.42	90.04	1,701.26	6,378.63	1,394.91	1,185.60	209.31	6.664				
14,300.00	6,985.92	13,587.23	6,987.00	112.99	107.94	90.04	1,700.79	6,478.63	1,394.75	1,182.34	212.41	6.566				
14,400.00	6,985.85	13,687.23	6,987.00	114.45	109.46	90.05	1,700.31	6,578.63	1,394.58	1,179.07	215.51	6.471				
14,500.00	6,985.79	13,787.23	6,987.00	115.91	110.98	90.05	1,699.83	6,678.63	1,394.42	1,175.81	218.61	6.378				
14,600.00	6,985.72	13,887.23	6,987.00	117.38	112.51	90.05	1,699.35	6,778.63	1,394.25	1,172.53	221.72	6.288				
14,700.00	6,985.65	13,987.23	6,987.00	118.84	114.04	90.06	1,698.87	6,878.63	1,394.09	1,169.26	224.83	6.201				
14,800.00	6,985.59	14,087.23	6,987.00	120.32	115.57	90.06	1,698.40	6,978.63	1,393.93	1,165.98	227.95	6.115				
14,900.00	6,985.52	14,187.23	6,987.00	121.79	117.10	90.06	1,697.92	7,078.63	1,393.76	1,162.70	231.06	6.032				
15,000.00	6,985.45	14,287.23	6,987.00	123.27	118.64	90.06	1,697.44	7,178.62	1,393.60	1,159.42	234.18	5.951				
15,100.00	6,985.39	14,387.23	6,987.00	124.75	120.17	90.07	1,696.96	7,278.62	1,393.43	1,156.13	237.30	5.872				
15,200.00	6,985.32	14,487.23	6,987.00	126.24	121.71	90.07	1,696.48	7,378.62	1,393.27	1,152.84	240.43	5.795				
15,300.00	6,985.25	14,587.23	6,987.00	127.72	123.25	90.07	1,696.00	7,478.62	1,393.10	1,149.55	243.55	5.720				
15,400.00	6,985.19	14,687.23	6,987.00	129.21	124.79	90.07	1,695.53	7,578.62	1,392.94	1,146.26	246.68	5.647				
15,500.00	6,985.12	14,787.22	6,987.00	130.71	126.34	90.08	1,695.05	7,678.62	1,392.78	1,142.97	249.81	5.575				
15,600.00	6,985.05	14,887.22	6,987.00	132.20	127.88	90.08	1,694.57	7,778.62	1,392.61	1,139.67	252.94	5.506				
15,700.00	6,984.99	14,987.22	6,987.00	133.70	129.43	90.08	1,694.09	7,878.62	1,392.45	1,136.37	256.08	5.438				
15,800.00	6,984.92	15,087.22	6,987.00	135.20	130.98	90.09	1,693.61	7,978.61	1,392.28	1,133.07	259.21	5.371				
15,900.00	6,984.85	15,187.22	6,987.00	136.71	132.53	90.09	1,693.14	8,078.61	1,392.12	1,129.77	262.35	5.306				
16,000.00	6,984.79	15,287.22	6,987.00	138.21	134.08	90.09	1,692.66	8,178.61	1,391.96	1,126.47	265.49	5.243				
16,100.00	6,984.72	15,387.22	6,987.00	139.72	135.63	90.09	1,692.18	8,278.61	1,391.79	1,123.16	268.63	5.181				
16,200.00	6,984.65	15,487.22	6,987.00	141.23	137.18	90.10	1,691.70	8,378.61	1,391.63	1,119.86	271.77	5.121				
16,300.00	6,984.59	15,587.22	6,987.00	142.75	138.73	90.10	1,691.22	8,478.61	1,391.46	1,116.55	274.92	5.061				
16,400.00	6,984.52	15,687.22	6,987.00	144.26	140.29	90.10	1,690.75	8,578.61	1,391.30	1,113.24	278.06	5.004				
16,500.00	6,984.45	15,787.22	6,987.00	145.78	141.85	90.10	1,690.27	8,678.61	1,391.14	1,109.93	281.21	4.947				
16,600.00	6,984.39	15,887.22	6,987.00	147.29	143.40	90.11	1,689.79	8,778.60	1,390.97	1,106.61	284.36	4.892				
16,700.00	6,984.32	15,987.22	6,987.00	148.82	144.96	90.11	1,689.31	8,878.60	1,390.81	1,103.30	287.51	4.837				
16,800.00	6,984.25	16,087.22	6,987.00	150.34	146.52	90.11	1,688.83	8,978.60	1,390.64	1,099.98	290.66	4.784				
16,900.00	6,984.19	16,187.22	6,987.00	151.86	148.08	90.12	1,688.35	9,078.60	1,390.48	1,096.67	293.81	4.733				
17,000.00	6,984.12	16,287.22	6,987.00	153.39	149.64	90.12	1,687.88	9,178.60	1,390.32	1,093.35	296.97	4.682				
17,100.00	6,984.05	16,387.22	6,987.00	154.91	151.20	90.12	1,687.40	9,278.60	1,390.15	1,090.03	300.12	4.632				
17,200.00	6,983.99	16,487.22	6,987.00	156.44	152.77	90.12	1,686.92	9,378.60	1,389.99	1,086.71	303.28	4.583				
17,300.00	6,983.92	16,587.22	6,987.00	157.97	154.33	90.13	1,686.44	9,478.59	1,389.82	1,083.39	306.43	4.535				
17,400.00	6,983.85	16,687.22	6,987.00	159.50	155.90	90.13	1,685.96	9,578.59	1,389.66	1,080.07	309.59	4.489				
17,500.00	6,983.79	16,787.22	6,987.00	161.04	157.46	90.13	1,685.49	9,678.59	1,389.50	1,076.74	312.75	4.443				
17,600.00	6,983.72	16,887.22	6,987.00	162.57	159.03	90.14	1,685.01	9,778.59	1,389.33	1,073.42	315.91	4.398				
17,700.00	6,983.65	16,987.22	6,987.00	164.11	160.59	90.14	1,684.53	9,878.59	1,389.17	1,070.09	319.07	4.354				
17,800.00	6,983.59	17,087.22	6,987.00	165.65	162.16	90.14	1,684.05	9,978.59	1,389.00	1,066.77	322.23	4.311				
17,900.00	6,983.52	17,187.22	6,987.00	167.18	163.73	90.14	1,683.57	10,078.59	1,388.84	1,063.44	325.40	4.268				
18,000.00	6,983.45	17,287.22	6,987.00	168.72	165.30	90.15	1,683.10	10,178.59	1,388.67	1,060.11	328.56	4.227				
18,100.00	6,983.39	17,387.22	6,987.00	170.27	166.87	90.15	1,682.62	10,278.58	1,388.51	1,056.78	331.73	4.186				
18,200.00	6,983.32	17,487.22	6,987.00	171.81	168.44	90.15	1,682.14	10,378.58	1,388.35	1,053.45	334.89	4.146				
18,300.00	6,983.25	17,587.22	6,987.00	173.35	170.01	90.15	1,681.66	10,478.58	1,388.18	1,050.12	338.06	4.106				
18,400.00	6,983.19	17,687.22	6,987.00	174.90	171.58	90.16	1,681.18	10,578.58	1,388.02	1,046.79	341.23	4.068				
18,500.00	6,983.12	17,787.22	6,987.00	176.44	173.16	90.16	1,680.70	10,678.58	1,387.85	1,043.46	344.39	4.030				
18,600.00	6,983.05	17,887.22	6,987.00	177.99	174.73	90.16	1,680.23	10,778.58	1,387.69	1,040.13	347.56	3.993				
18,700.00	6,982.99	17,987.22	6,987.00	179.54	176.30	90.17	1,679.75	10,878.58	1,387.53	1,036.79	350.73	3.956				
18,800.00	6,982.92	18,087.22	6,987.00	181.09	177.88	90.17	1,679.27	10,978.58	1,387.36	1,033.46	353.90	3.920				
18,900.00	6,982.85	18,187.22	6,987.00	182.64	179.45	90.17	1,678.79	11,078.57	1,387.20	1,030.12	357.08	3.885				
19,000.00	6,982.78	18,287.22	6,987.00	184.19	181.03	90.17	1,678.31	11,178.57	1,387.03	1,026.79	360.25	3.850				

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #692H - OH - Prelim 5													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS							Rule Assigned:						Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
19,100.00	6,982.72	18,387.22	6,987.00	185.74	182.60	90.18	1,677.84	11,278.57	1,386.87	1,023.45	363.42	3.816		
19,200.00	6,982.65	18,487.22	6,987.00	187.29	184.18	90.18	1,677.36	11,378.57	1,386.71	1,020.11	366.59	3.783		
19,300.00	6,982.58	18,587.22	6,987.00	188.84	185.76	90.18	1,676.88	11,478.57	1,386.54	1,016.78	369.77	3.750		
19,400.00	6,982.52	18,687.22	6,987.00	190.40	187.33	90.19	1,676.40	11,578.57	1,386.38	1,013.44	372.94	3.717		
19,500.00	6,982.45	18,787.22	6,987.00	191.95	188.91	90.19	1,675.92	11,678.57	1,386.21	1,010.10	376.12	3.686		
19,600.00	6,982.38	18,887.22	6,987.00	193.51	190.49	90.19	1,675.45	11,778.56	1,386.05	1,006.76	379.29	3.654		
19,700.00	6,982.32	18,987.22	6,987.00	195.07	192.07	90.19	1,674.97	11,878.56	1,385.89	1,003.42	382.47	3.624		
19,800.00	6,982.25	19,087.22	6,987.00	196.62	193.65	90.20	1,674.49	11,978.56	1,385.72	1,000.08	385.64	3.593		
19,900.00	6,982.18	19,187.22	6,987.00	198.18	195.23	90.20	1,674.01	12,078.56	1,385.56	996.74	388.82	3.563		
20,000.00	6,982.12	19,287.22	6,987.00	199.74	196.80	90.20	1,673.53	12,178.56	1,385.39	993.40	392.00	3.534		
20,100.00	6,982.05	19,387.22	6,987.00	201.30	198.38	90.20	1,673.05	12,278.56	1,385.23	990.05	395.18	3.505		
20,176.02	6,982.00	19,463.23	6,987.00	202.36	199.42	90.21	1,672.69	12,354.57	1,385.11	987.96	397.15	3.488 SF		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #694H - OH - Prelim 5													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HRGM+MS													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-151.10	-34.95	-19.29	39.92				
100.00	100.00	100.00	100.00	0.25	0.25	-151.10	-34.95	-19.29	39.92	39.42	0.50	79.549	
200.00	200.00	200.00	200.00	0.61	0.61	-151.10	-34.95	-19.29	39.92	38.70	1.22	32.755	
300.00	300.00	300.00	300.00	0.97	0.97	-151.10	-34.95	-19.29	39.92	37.99	1.94	20.624	
400.00	400.00	400.00	400.00	1.33	1.33	-151.10	-34.95	-19.29	39.92	37.27	2.65	15.050	
500.00	500.00	500.00	500.00	1.68	1.68	-151.10	-34.95	-19.29	39.92	36.55	3.37	11.848	
600.00	600.00	600.00	600.00	2.04	2.04	-151.10	-34.95	-19.29	39.92	35.84	4.09	9.769 CC, ES	
700.00	699.98	699.98	699.98	2.40	2.40	-142.60	-34.95	-19.29	41.30	36.49	4.80	8.597	
800.00	799.84	801.13	801.11	2.76	2.76	-145.32	-33.20	-19.63	44.12	38.59	5.52	7.987	
900.00	899.45	901.68	901.54	3.13	3.13	-147.92	-28.44	-20.53	47.41	41.17	6.24	7.595 SF	
1,000.00	998.70	1,001.43	1,001.15	3.49	3.48	-151.77	-23.31	-21.50	53.49	46.53	6.96	7.681	
1,100.00	1,097.47	1,100.87	1,100.46	3.86	3.84	-156.14	-18.20	-22.47	62.93	55.24	7.69	8.186	
1,200.00	1,195.62	1,199.89	1,199.35	4.24	4.20	-160.26	-13.12	-23.44	75.91	67.50	8.41	9.023	
1,300.00	1,293.06	1,298.37	1,297.69	4.64	4.55	-163.76	-8.06	-24.40	92.48	83.34	9.14	10.120	
1,400.00	1,389.64	1,396.18	1,395.36	5.06	4.90	-166.58	-3.03	-25.36	112.63	102.77	9.86	11.419	
1,500.00	1,485.27	1,493.20	1,492.25	5.50	5.25	-168.82	1.95	-26.30	136.32	125.73	10.59	12.873	
1,515.00	1,499.52	1,507.68	1,506.71	5.57	5.31	-169.11	2.70	-26.44	140.18	129.48	10.70	13.098	
1,600.00	1,580.22	1,589.67	1,588.59	5.96	5.60	-170.58	6.91	-27.24	162.29	150.98	11.31	14.345	
1,700.00	1,675.17	1,686.12	1,684.91	6.44	5.95	-171.88	11.87	-28.19	188.41	176.37	12.04	15.652	
1,800.00	1,770.11	1,782.58	1,781.23	6.92	6.30	-172.85	16.82	-29.13	214.59	201.83	12.76	16.812	
1,900.00	1,865.05	1,879.03	1,877.55	7.41	6.65	-173.62	21.78	-30.07	240.82	227.33	13.49	17.846	
2,000.00	1,959.99	1,975.49	1,973.88	7.90	7.00	-174.23	26.73	-31.01	267.08	252.85	14.23	18.772	
2,100.00	2,054.94	2,071.94	2,070.20	8.40	7.35	-174.74	31.69	-31.95	293.36	278.40	14.96	19.606	
2,200.00	2,149.88	2,168.39	2,166.52	8.90	7.70	-175.16	36.65	-32.89	319.67	303.97	15.70	20.360	
2,300.00	2,244.82	2,264.85	2,262.84	9.41	8.05	-175.52	41.60	-33.83	345.98	329.54	16.44	21.045	
2,400.00	2,339.76	2,361.30	2,359.17	9.92	8.39	-175.82	46.56	-34.78	372.31	355.13	17.18	21.670	
2,500.00	2,434.71	2,457.76	2,455.49	10.43	8.74	-176.09	51.51	-35.72	398.64	380.72	17.92	22.242	
2,600.00	2,529.65	2,554.21	2,551.81	10.94	9.09	-176.32	56.47	-36.66	424.98	406.32	18.67	22.768	
2,700.00	2,624.59	2,650.67	2,648.13	11.45	9.44	-176.53	61.42	-37.60	451.33	431.92	19.41	23.252	
2,800.00	2,719.53	2,747.12	2,744.46	11.97	9.79	-176.71	66.38	-38.54	477.69	457.53	20.16	23.700	
2,900.00	2,814.48	2,843.58	2,840.78	12.49	10.14	-176.88	71.34	-39.48	504.04	483.14	20.90	24.114	
3,000.00	2,909.42	2,940.03	2,937.10	13.01	10.49	-177.02	76.29	-40.42	530.40	508.75	21.65	24.500	
3,100.00	3,004.36	3,036.49	3,033.43	13.53	10.84	-177.16	81.25	-41.36	556.76	534.37	22.40	24.859	
3,200.00	3,099.30	3,132.94	3,129.75	14.05	11.19	-177.28	86.20	-42.31	583.13	559.99	23.14	25.195	
3,300.00	3,194.25	3,229.40	3,226.07	14.57	11.54	-177.39	91.16	-43.25	609.50	585.60	23.89	25.509	
3,400.00	3,289.19	3,325.85	3,322.39	15.09	11.89	-177.49	96.11	-44.19	635.87	611.23	24.64	25.803	
3,500.00	3,384.13	3,422.30	3,418.72	15.62	12.24	-177.59	101.07	-45.13	662.24	636.85	25.39	26.080	
3,600.00	3,479.07	3,518.76	3,515.04	16.14	12.59	-177.67	106.03	-46.07	688.61	662.47	26.14	26.341	
3,700.00	3,574.02	3,615.21	3,611.36	16.67	12.94	-177.75	110.98	-47.01	714.99	688.09	26.89	26.586	
3,800.00	3,668.96	3,711.67	3,707.68	17.19	13.29	-177.83	115.94	-47.95	741.36	713.72	27.64	26.818	
3,900.00	3,763.90	3,808.12	3,804.01	17.72	13.64	-177.90	120.89	-48.89	767.74	739.34	28.40	27.037	
4,000.00	3,858.84	3,904.58	3,900.33	18.24	13.99	-177.96	125.85	-49.84	794.12	764.97	29.15	27.245	
4,100.00	3,953.79	4,001.03	3,996.65	18.77	14.34	-178.02	130.81	-50.78	820.50	790.60	29.90	27.442	
4,200.00	4,048.73	4,097.49	4,092.97	19.30	14.69	-178.08	135.76	-51.72	846.87	816.22	30.65	27.629	
4,300.00	4,143.67	4,193.94	4,189.30	19.82	15.04	-178.13	140.72	-52.66	873.25	841.85	31.40	27.807	
4,400.00	4,238.61	4,290.40	4,285.62	20.35	15.39	-178.18	145.67	-53.60	899.64	867.48	32.16	27.977	
4,500.00	4,333.56	4,386.85	4,381.94	20.88	15.74	-178.23	150.63	-54.54	926.02	893.11	32.91	28.138	
4,600.00	4,428.50	4,483.31	4,478.26	21.41	16.09	-178.28	155.58	-55.48	952.40	918.74	33.66	28.292	
4,700.00	4,523.44	4,579.76	4,574.59	21.93	16.44	-178.32	160.54	-56.43	978.78	944.37	34.42	28.440	
4,800.00	4,618.38	4,676.21	4,670.91	22.46	16.79	-178.36	165.50	-57.37	1,005.16	969.99	35.17	28.580	
4,900.00	4,713.33	4,772.67	4,767.23	22.99	17.14	-178.40	170.45	-58.31	1,031.55	995.62	35.92	28.715	
5,000.00	4,808.27	4,869.12	4,863.55	23.52	17.49	-178.43	175.41	-59.25	1,057.93	1,021.25	36.68	28.844	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #694H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
5,100.00	4,903.21	4,965.58	4,959.88	24.05	17.84	-178.47	180.36	-60.19	1,084.32	1,046.88	37.43	28.968	
5,200.00	4,998.16	5,062.03	5,056.20	24.58	18.19	-178.50	185.32	-61.13	1,110.70	1,072.51	38.19	29.086	
5,300.00	5,093.10	5,158.49	5,152.52	25.11	18.54	-178.53	190.28	-62.07	1,137.08	1,098.14	38.94	29.200	
5,400.00	5,188.04	5,254.94	5,248.85	25.64	18.89	-178.56	195.23	-63.01	1,163.47	1,123.77	39.70	29.310	
5,500.00	5,282.98	5,350.04	5,343.81	26.17	19.23	-178.59	200.11	-63.94	1,189.86	1,149.42	40.44	29.422	
5,600.00	5,377.93	5,437.21	5,430.89	26.70	19.55	-178.62	204.17	-64.71	1,216.73	1,175.60	41.13	29.582	
5,623.25	5,400.00	5,457.43	5,451.08	26.82	19.62	-178.62	205.01	-64.87	1,223.08	1,181.79	41.29	29.622	
5,700.00	5,473.03	5,524.14	5,517.75	27.22	19.86	-178.65	207.56	-65.36	1,243.82	1,202.01	41.81	29.747	
5,800.00	5,568.64	5,611.11	5,604.67	27.73	20.17	-178.68	210.31	-65.88	1,270.02	1,227.53	42.49	29.890	
5,900.00	5,664.75	5,700.00	5,693.53	28.23	20.49	-178.70	212.45	-66.29	1,295.26	1,252.09	43.17	30.001	
6,000.00	5,761.33	5,785.21	5,778.73	28.71	20.80	-178.73	213.87	-66.55	1,319.55	1,275.72	43.82	30.112	
6,100.00	5,858.34	5,872.34	5,865.85	29.18	21.11	-178.75	214.67	-66.71	1,342.87	1,298.40	44.48	30.194	
6,200.00	5,955.76	5,962.25	5,955.76	29.64	21.42	-178.78	214.85	-66.74	1,365.22	1,320.07	45.14	30.241	
6,300.00	6,053.57	6,060.05	6,053.57	30.07	21.77	-178.80	214.85	-66.74	1,386.06	1,340.19	45.87	30.216	
6,400.00	6,151.72	6,158.20	6,151.72	30.50	22.12	-178.82	214.85	-66.74	1,405.19	1,358.60	46.60	30.156	
6,500.00	6,250.19	6,256.67	6,250.19	30.91	22.47	-178.84	214.85	-66.74	1,422.61	1,375.29	47.32	30.065	
6,600.00	6,348.94	6,355.43	6,348.94	31.30	22.82	-178.86	214.85	-66.74	1,438.31	1,390.27	48.04	29.942	
6,659.67	6,408.00	6,950.24	6,862.15	31.53	25.11	-169.40	282.77	-313.34	1,435.54	1,384.82	50.71	28.307	
6,700.00	6,447.82	7,106.39	6,939.36	31.68	25.88	179.90	318.70	-443.77	1,428.15	1,376.53	51.62	27.666	
6,750.00	6,496.66	7,188.08	6,965.95	31.90	26.33	172.11	339.19	-518.17	1,421.55	1,369.00	52.55	27.049	
6,797.90	6,542.65	7,223.13	6,974.29	32.12	26.54	167.47	348.23	-550.99	1,419.36	1,366.11	53.25	26.657	
6,800.00	6,544.65	7,224.15	6,974.50	32.13	26.54	167.30	348.50	-551.96	1,419.36	1,366.09	53.27	26.644	
6,850.00	6,591.49	7,240.70	6,977.76	32.37	26.64	163.87	352.81	-567.60	1,422.04	1,368.20	53.83	26.416	
6,900.00	6,636.89	7,247.18	6,978.91	32.62	26.68	161.08	354.50	-573.74	1,429.67	1,375.40	54.27	26.343	
6,950.00	6,680.57	7,247.75	6,979.01	32.89	26.68	158.56	354.65	-574.28	1,442.18	1,387.57	54.61	26.409	
7,000.00	6,722.26	7,244.50	6,978.44	33.17	26.66	156.08	353.80	-571.20	1,459.37	1,404.51	54.86	26.603	
7,050.00	6,761.71	7,238.58	6,977.36	33.45	26.63	153.49	352.25	-565.59	1,480.96	1,425.93	55.03	26.912	
7,100.00	6,798.67	7,230.65	6,975.83	33.75	26.58	150.66	350.19	-558.09	1,506.60	1,451.47	55.13	27.327	
7,150.00	6,832.91	7,221.13	6,973.86	34.06	26.52	147.47	347.72	-549.11	1,535.92	1,480.75	55.18	27.837	
7,200.00	6,864.22	7,210.28	6,971.45	34.37	26.46	143.80	344.90	-538.90	1,568.51	1,513.34	55.17	28.431	
7,250.00	6,892.42	7,198.24	6,968.56	34.69	26.39	139.53	341.80	-527.64	1,603.93	1,548.81	55.12	29.099	
7,300.00	6,917.32	7,185.13	6,965.16	35.03	26.32	134.51	338.44	-515.43	1,641.77	1,586.73	55.04	29.829	
7,350.00	6,938.77	7,170.98	6,961.21	35.37	26.24	128.62	334.83	-502.34	1,681.59	1,626.66	54.93	30.614	
7,400.00	6,956.64	7,155.83	6,956.64	35.72	26.15	121.78	330.99	-488.40	1,722.99	1,668.19	54.80	31.443	
7,450.00	6,970.83	7,139.65	6,951.38	36.07	26.06	114.02	326.93	-473.66	1,765.56	1,710.91	54.65	32.307	
7,500.00	6,981.23	7,122.44	6,945.36	36.44	25.97	105.51	322.65	-458.12	1,808.94	1,754.45	54.49	33.198	
7,550.00	6,987.80	7,104.16	6,938.49	36.81	25.87	96.60	318.15	-441.78	1,852.76	1,798.44	54.32	34.111	
7,600.00	6,990.48	7,084.74	6,930.67	37.19	25.77	87.77	313.43	-424.65	1,896.68	1,842.54	54.14	35.035	
7,609.87	6,990.55	7,080.77	6,929.00	37.26	25.75	86.08	312.48	-421.17	1,905.33	1,851.23	54.10	35.218	
7,700.00	6,990.49	7,045.27	6,913.11	37.97	25.57	85.24	304.05	-390.57	1,984.43	1,930.65	53.78	36.898	
7,800.00	6,990.42	7,008.21	6,894.67	38.78	25.38	84.29	295.51	-359.59	2,072.49	2,019.03	53.46	38.768	
7,900.00	6,990.35	6,973.62	6,875.79	39.64	25.22	83.36	287.82	-331.65	2,160.88	2,107.72	53.17	40.644	
8,000.00	6,990.28	6,941.43	6,856.83	40.53	25.07	82.46	280.91	-306.57	2,249.64	2,196.74	52.90	42.526	
8,100.00	6,990.21	6,911.55	6,838.08	41.45	24.93	81.59	274.73	-284.15	2,338.79	2,286.13	52.66	44.410	
8,200.00	6,990.14	6,883.87	6,819.75	42.40	24.81	80.76	269.23	-264.15	2,428.34	2,375.89	52.45	46.298	
8,306.37	6,990.06	6,850.00	6,796.12	43.45	24.67	79.72	262.78	-240.76	2,524.04	2,471.85	52.19	48.363	
8,400.00	6,990.00	6,833.30	6,784.00	44.38	24.60	80.47	259.73	-229.68	2,607.30	2,555.22	52.08	50.065	
8,500.00	6,989.93	6,800.00	6,758.97	45.36	24.46	80.66	253.90	-208.53	2,693.56	2,641.73	51.83	51.971	
8,600.00	6,989.85	6,782.45	6,745.32	46.33	24.39	81.15	250.97	-197.89	2,776.79	2,725.07	51.72	53.688	
8,700.00	6,989.78	6,750.00	6,719.30	47.28	24.26	81.18	245.82	-179.20	2,856.91	2,805.42	51.49	55.481	
8,800.00	6,989.70	6,733.61	6,705.79	48.21	24.20	81.52	243.36	-170.25	2,933.71	2,882.30	51.41	57.063	
8,900.00	6,989.63	6,700.00	6,677.37	49.11	24.07	81.41	238.60	-152.96	3,007.16	2,955.96	51.19	58.741	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design:		Rosa Unit 34 - Rosa Unit #694H - OH - Prelim 5											Offset Site Error:		0.00 usft	
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:				Offset Well Error:		0.00 usft		
Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor				
9,000.00	6,989.55	6,700.00	6,677.37	49.99	24.07	81.98	238.60	-152.96	3,077.06	3,025.79	51.27	60.020				
9,100.00	6,989.48	6,669.29	6,650.61	50.84	23.95	81.86	234.60	-138.45	3,143.32	3,092.22	51.10	61.519				
9,200.00	6,989.40	6,650.00	6,633.44	51.66	23.88	81.93	232.27	-129.97	3,205.94	3,154.91	51.03	62.826				
9,300.00	6,989.33	6,633.58	6,618.62	52.45	23.82	82.03	230.39	-123.16	3,264.82	3,213.82	51.00	64.020				
9,393.87	6,989.27	6,618.78	6,605.10	53.15	23.76	82.10	228.78	-117.33	3,316.62	3,265.64	50.98	65.055				
9,400.00	6,989.26	6,617.85	6,604.25	53.20	23.76	82.08	228.69	-116.98	3,319.90	3,268.92	50.98	65.123				
9,500.00	6,989.19	6,600.00	6,587.77	53.95	23.69	81.76	226.87	-110.38	3,374.38	3,323.42	50.96	66.213				
9,600.00	6,989.12	6,600.00	6,587.77	54.73	23.69	81.76	226.87	-110.38	3,430.80	3,379.70	51.10	67.145				
9,700.00	6,989.05	6,579.15	6,568.27	55.55	23.62	81.37	224.90	-103.24	3,488.98	3,437.91	51.07	68.315				
9,800.00	6,988.98	6,568.60	6,558.32	56.40	23.58	81.17	223.97	-99.87	3,548.97	3,497.83	51.13	69.405				
9,900.00	6,988.91	6,550.00	6,540.64	57.28	23.51	80.82	222.44	-94.31	3,610.67	3,559.53	51.14	70.602				
10,000.00	6,988.84	6,550.00	6,540.64	58.20	23.51	80.82	222.44	-94.31	3,673.92	3,622.63	51.29	71.629				
10,100.00	6,988.77	6,550.00	6,540.64	59.14	23.51	80.82	222.44	-94.31	3,738.77	3,687.33	51.44	72.680				
10,200.00	6,988.70	6,550.00	6,540.64	60.11	23.51	80.82	222.44	-94.31	3,805.15	3,753.55	51.59	73.754				
10,300.00	6,988.63	6,527.75	6,519.28	61.11	23.43	80.40	220.79	-88.31	3,872.72	3,821.13	51.59	75.069				
10,400.00	6,988.56	6,521.37	6,513.11	62.14	23.41	80.28	220.35	-86.72	3,941.74	3,890.05	51.70	76.246				
10,500.00	6,988.49	6,500.00	6,492.36	63.19	23.33	79.87	219.01	-81.84	4,012.16	3,960.45	51.71	77.596				
10,600.00	6,988.42	6,500.00	6,492.36	64.26	23.33	79.87	219.01	-81.84	4,083.58	4,031.72	51.86	78.744				
10,700.00	6,988.35	6,500.00	6,492.36	65.36	23.33	79.87	219.01	-81.84	4,156.19	4,104.18	52.01	79.911				
10,800.00	6,988.28	6,500.00	6,492.36	66.48	23.33	79.87	219.01	-81.84	4,229.91	4,177.75	52.16	81.096				
10,900.00	6,988.21	6,500.00	6,492.36	67.61	23.33	79.87	219.01	-81.84	4,304.69	4,252.39	52.31	82.298				
11,000.00	6,988.14	6,500.00	6,492.36	68.77	23.33	79.87	219.01	-81.84	4,380.48	4,328.03	52.45	83.516				
11,100.00	6,988.07	6,500.00	6,492.36	69.95	23.33	79.87	219.01	-81.84	4,457.23	4,404.63	52.59	84.749				
11,200.00	6,988.01	6,500.00	6,492.36	71.14	23.33	79.87	219.01	-81.84	4,534.88	4,482.14	52.73	85.998				
11,300.00	6,987.94	6,500.00	6,492.36	72.35	23.33	79.87	219.01	-81.84	4,613.39	4,560.52	52.87	87.260				
11,400.00	6,987.87	6,476.51	6,469.36	73.57	23.25	79.42	217.75	-77.26	4,692.40	4,639.53	52.87	88.751				
11,500.00	6,987.80	6,473.33	6,466.23	74.81	23.23	79.36	217.59	-76.70	4,772.41	4,719.42	52.99	90.066				
11,600.00	6,987.73	6,450.00	6,443.20	76.07	23.15	78.91	216.59	-73.07	4,853.39	4,800.40	52.99	91.587				
11,643.87	6,987.70	6,450.00	6,443.20	76.62	23.15	78.91	216.59	-73.07	4,889.00	4,835.95	53.05	92.159				
11,700.00	6,987.66	6,450.00	6,443.20	77.33	23.15	79.20	216.59	-73.07	4,934.45	4,881.33	53.12	92.887				
11,737.27	6,987.63	6,450.00	6,443.20	77.80	23.15	79.39	216.59	-73.07	4,964.40	4,911.22	53.17	93.366				
11,800.00	6,987.59	6,450.00	6,443.20	78.59	23.15	79.39	216.59	-73.07	5,014.79	4,961.53	53.25	94.167				
11,900.00	6,987.52	6,450.00	6,443.20	79.86	23.15	79.39	216.59	-73.07	5,095.68	5,042.30	53.39	95.451				
12,000.00	6,987.46	6,450.00	6,443.20	81.14	23.15	79.39	216.59	-73.07	5,177.24	5,123.73	53.51	96.745				
12,100.00	6,987.39	6,450.00	6,443.20	82.43	23.15	79.39	216.59	-73.07	5,259.44	5,205.80	53.64	98.048				
12,200.00	6,987.32	6,450.00	6,443.20	83.73	23.15	79.39	216.59	-73.07	5,342.25	5,288.48	53.77	99.362				
12,300.00	6,987.26	6,450.00	6,443.20	85.05	23.15	79.39	216.59	-73.07	5,425.63	5,371.74	53.89	100.684				
12,400.00	6,987.19	6,450.00	6,443.20	86.38	23.15	79.39	216.59	-73.07	5,509.57	5,455.56	54.01	102.014				
12,500.00	6,987.12	6,450.00	6,443.20	87.71	23.15	79.39	216.59	-73.07	5,594.04	5,539.91	54.13	103.352				
12,600.00	6,987.06	6,450.00	6,443.20	89.06	23.15	79.39	216.59	-73.07	5,679.01	5,624.76	54.24	104.698				
12,700.00	6,986.99	6,450.00	6,443.20	90.41	23.15	79.39	216.59	-73.07	5,764.46	5,710.10	54.36	106.050				
12,800.00	6,986.92	6,450.00	6,443.20	91.77	23.15	79.39	216.59	-73.07	5,850.37	5,795.90	54.47	107.409				
12,900.00	6,986.86	6,450.00	6,443.20	93.14	23.15	79.39	216.59	-73.07	5,936.73	5,882.15	54.58	108.774				
13,000.00	6,986.79	6,450.00	6,443.20	94.52	23.15	79.39	216.59	-73.07	6,023.51	5,968.82	54.69	110.144				
13,100.00	6,986.72	6,450.00	6,443.20	95.90	23.15	79.39	216.59	-73.07	6,110.69	6,055.89	54.79	111.519				
13,200.00	6,986.66	6,450.00	6,443.20	97.30	23.15	79.39	216.59	-73.07	6,198.26	6,143.35	54.90	112.900				
13,300.00	6,986.59	6,450.00	6,443.20	98.69	23.15	79.39	216.59	-73.07	6,286.19	6,231.19	55.00	114.285				
13,400.00	6,986.52	6,450.00	6,443.20	100.10	23.15	79.39	216.59	-73.07	6,374.49	6,319.38	55.11	115.674				
13,500.00	6,986.46	6,450.00	6,443.20	101.51	23.15	79.39	216.59	-73.07	6,463.13	6,407.92	55.21	117.066				
13,600.00	6,986.39	6,450.00	6,443.20	102.93	23.15	79.39	216.59	-73.07	6,552.09	6,496.78	55.31	118.463				
13,700.00	6,986.32	6,450.00	6,443.20	104.35	23.15	79.39	216.59	-73.07	6,641.37	6,585.96	55.41	119.862				
13,800.00	6,986.25	6,450.00	6,443.20	105.78	23.15	79.39	216.59	-73.07	6,730.95	6,675.44	55.51	121.264				

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #694H - OH - Prelim 5													Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:					Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Offset Wellbore Centre		Distance				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,900.00	6,986.19	6,450.00	6,443.20	107.21	23.15	79.39	216.59	-73.07	6,820.81	6,765.21	55.60	122.669		
14,000.00	6,986.12	6,426.66	6,420.05	108.65	23.07	78.96	215.82	-70.26	6,910.59	6,854.98	55.61	124.270		
14,100.00	6,986.05	6,425.56	6,418.96	110.09	23.06	78.94	215.79	-70.14	7,000.97	6,945.27	55.70	125.688		
14,200.00	6,985.99	6,424.50	6,417.90	111.54	23.06	78.92	215.76	-70.04	7,091.61	7,035.81	55.79	127.107		
14,300.00	6,985.92	6,423.47	6,416.87	112.99	23.06	78.90	215.73	-69.94	7,182.49	7,126.61	55.88	128.528		
14,400.00	6,985.85	6,400.00	6,393.49	114.45	22.97	78.46	215.21	-68.05	7,273.95	7,218.06	55.89	130.151		
14,500.00	6,985.79	6,400.00	6,393.49	115.91	22.97	78.46	215.21	-68.05	7,365.27	7,309.29	55.98	131.565		
14,600.00	6,985.72	6,400.00	6,393.49	117.38	22.97	78.46	215.21	-68.05	7,456.82	7,400.74	56.07	132.980		
14,700.00	6,985.65	6,400.00	6,393.49	118.84	22.97	78.46	215.21	-68.05	7,548.57	7,492.41	56.17	134.396		
14,800.00	6,985.59	6,400.00	6,393.49	120.32	22.97	78.46	215.21	-68.05	7,640.54	7,584.28	56.26	135.812		
14,900.00	6,985.52	6,400.00	6,393.49	121.79	22.97	78.46	215.21	-68.05	7,732.70	7,676.35	56.35	137.229		
15,000.00	6,985.45	6,400.00	6,393.49	123.27	22.97	78.46	215.21	-68.05	7,825.06	7,768.62	56.44	138.646		
15,100.00	6,985.39	6,400.00	6,393.49	124.75	22.97	78.46	215.21	-68.05	7,917.60	7,861.07	56.53	140.063		
15,200.00	6,985.32	6,400.00	6,393.49	126.24	22.97	78.46	215.21	-68.05	8,010.32	7,953.71	56.62	141.480		
15,300.00	6,985.25	6,400.00	6,393.49	127.72	22.97	78.46	215.21	-68.05	8,103.22	8,046.51	56.71	142.897		
15,400.00	6,985.19	6,400.00	6,393.49	129.21	22.97	78.46	215.21	-68.05	8,196.28	8,139.49	56.80	144.313		
15,500.00	6,985.12	6,400.00	6,393.49	130.71	22.97	78.46	215.21	-68.05	8,289.50	8,232.62	56.88	145.729		
15,600.00	6,985.05	6,400.00	6,393.49	132.20	22.97	78.46	215.21	-68.05	8,382.88	8,325.91	56.97	147.144		
15,700.00	6,984.99	6,400.00	6,393.49	133.70	22.97	78.46	215.21	-68.05	8,476.41	8,419.36	57.06	148.559		
15,800.00	6,984.92	6,400.00	6,393.49	135.20	22.97	78.46	215.21	-68.05	8,570.09	8,512.95	57.14	149.972		
15,900.00	6,984.85	6,400.00	6,393.49	136.71	22.97	78.46	215.21	-68.05	8,663.91	8,606.68	57.23	151.385		
16,000.00	6,984.79	6,400.00	6,393.49	138.21	22.97	78.46	215.21	-68.05	8,757.86	8,700.55	57.32	152.796		
16,100.00	6,984.72	6,400.00	6,393.49	139.72	22.97	78.46	215.21	-68.05	8,851.95	8,794.55	57.40	154.206		
16,200.00	6,984.65	6,400.00	6,393.49	141.23	22.97	78.46	215.21	-68.05	8,946.17	8,888.68	57.49	155.614		
16,300.00	6,984.59	6,400.00	6,393.49	142.75	22.97	78.46	215.21	-68.05	9,040.51	8,982.93	57.57	157.021		
16,400.00	6,984.52	6,400.00	6,393.49	144.26	22.97	78.46	215.21	-68.05	9,134.97	9,077.31	57.66	158.427		
16,500.00	6,984.45	6,400.00	6,393.49	145.78	22.97	78.46	215.21	-68.05	9,229.55	9,171.80	57.75	159.830		
16,600.00	6,984.39	6,400.00	6,393.49	147.29	22.97	78.46	215.21	-68.05	9,324.24	9,266.40	57.83	161.232		
16,700.00	6,984.32	6,400.00	6,393.49	148.82	22.97	78.46	215.21	-68.05	9,419.04	9,361.12	57.92	162.632		
16,800.00	6,984.25	6,400.00	6,393.49	150.34	22.97	78.46	215.21	-68.05	9,513.94	9,455.94	58.00	164.029		
16,900.00	6,984.19	6,400.00	6,393.49	151.86	22.97	78.46	215.21	-68.05	9,608.95	9,550.87	58.09	165.425		
17,000.00	6,984.12	6,400.00	6,393.49	153.39	22.97	78.46	215.21	-68.05	9,704.06	9,645.89	58.17	166.818		
17,100.00	6,984.05	6,400.00	6,393.49	154.91	22.97	78.46	215.21	-68.05	9,799.27	9,741.01	58.26	168.209		
17,200.00	6,983.99	6,400.00	6,393.49	156.44	22.97	78.46	215.21	-68.05	9,894.57	9,836.23	58.34	169.598		
17,300.00	6,983.92	6,400.00	6,393.49	157.97	22.97	78.46	215.21	-68.05	9,989.97	9,931.54	58.43	170.984		
17,400.00	6,983.85	6,400.00	6,393.49	159.50	22.97	78.46	215.21	-68.05	10,085.45	10,026.94	58.51	172.368		
17,500.00	6,983.79	6,400.00	6,393.49	161.04	22.97	78.46	215.21	-68.05	10,181.02	10,122.42	58.60	173.749		
17,600.00	6,983.72	6,400.00	6,393.49	162.57	22.97	78.46	215.21	-68.05	10,276.67	10,217.99	58.68	175.128		
17,700.00	6,983.65	6,400.00	6,393.49	164.11	22.97	78.46	215.21	-68.05	10,372.41	10,313.64	58.77	176.503		
17,800.00	6,983.59	6,400.00	6,393.49	165.65	22.97	78.46	215.21	-68.05	10,468.22	10,409.37	58.85	177.876		
17,900.00	6,983.52	6,400.00	6,393.49	167.18	22.97	78.46	215.21	-68.05	10,564.12	10,505.18	58.94	179.246		
18,000.00	6,983.45	6,400.00	6,393.49	168.72	22.97	78.46	215.21	-68.05	10,660.09	10,601.07	59.02	180.613		
18,100.00	6,983.39	6,400.00	6,393.49	170.27	22.97	78.46	215.21	-68.05	10,756.13	10,697.02	59.11	181.977		
18,200.00	6,983.32	6,400.00	6,393.49	171.81	22.97	78.46	215.21	-68.05	10,852.24	10,793.05	59.19	183.338		
18,300.00	6,983.25	6,400.00	6,393.49	173.35	22.97	78.46	215.21	-68.05	10,948.43	10,889.15	59.28	184.696		
18,400.00	6,983.19	6,400.00	6,393.49	174.90	22.97	78.46	215.21	-68.05	11,044.68	10,985.31	59.36	186.051		
18,500.00	6,983.12	6,400.00	6,393.49	176.44	22.97	78.46	215.21	-68.05	11,140.99	11,081.55	59.45	187.403		
18,600.00	6,983.05	6,400.00	6,393.49	177.99	22.97	78.46	215.21	-68.05	11,237.38	11,177.84	59.54	188.751		
18,700.00	6,982.99	6,400.00	6,393.49	179.54	22.97	78.46	215.21	-68.05	11,333.82	11,274.20	59.62	190.096		
18,800.00	6,982.92	6,400.00	6,393.49	181.09	22.97	78.46	215.21	-68.05	11,430.33	11,370.62	59.71	191.438		
18,900.00	6,982.85	6,400.00	6,393.49	182.64	22.97	78.46	215.21	-68.05	11,526.89	11,467.10	59.79	192.776		
19,000.00	6,982.78	6,400.00	6,393.49	184.19	22.97	78.46	215.21	-68.05	11,623.51	11,563.63	59.88	194.111		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT
Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #694H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Rule Assigned:		Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
19,100.00	6,982.72	6,400.00	6,393.49	185.74	22.97	78.46	215.21	-68.05	11,720.19	11,660.23	59.97	195.443	
19,200.00	6,982.65	6,400.00	6,393.49	187.29	22.97	78.46	215.21	-68.05	11,816.93	11,756.87	60.05	196.771	
19,300.00	6,982.58	6,400.00	6,393.49	188.84	22.97	78.46	215.21	-68.05	11,913.72	11,853.58	60.14	198.095	
19,400.00	6,982.52	6,400.00	6,393.49	190.40	22.97	78.46	215.21	-68.05	12,010.56	11,950.33	60.23	199.416	
19,500.00	6,982.45	6,400.00	6,393.49	191.95	22.97	78.46	215.21	-68.05	12,107.45	12,047.14	60.32	200.733	
19,600.00	6,982.38	6,400.00	6,393.49	193.51	22.97	78.46	215.21	-68.05	12,204.39	12,143.99	60.40	202.047	
19,700.00	6,982.32	6,400.00	6,393.49	195.07	22.97	78.46	215.21	-68.05	12,301.39	12,240.90	60.49	203.357	
19,800.00	6,982.25	6,400.00	6,393.49	196.62	22.97	78.46	215.21	-68.05	12,398.43	12,337.85	60.58	204.663	
19,900.00	6,982.18	6,400.00	6,393.49	198.18	22.97	78.46	215.21	-68.05	12,495.51	12,434.85	60.67	205.966	
20,000.00	6,982.12	6,400.00	6,393.49	199.74	22.97	78.46	215.21	-68.05	12,592.65	12,531.89	60.76	207.264	
20,100.00	6,982.05	6,400.00	6,393.49	201.30	22.97	78.46	215.21	-68.05	12,689.82	12,628.98	60.85	208.559	
20,176.02	6,982.00	6,400.00	6,393.49	202.36	22.97	78.46	215.21	-68.05	12,763.72	12,698.80	64.92	196.600	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #696H - OH - Prelim 5													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HRGM+MS													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-150.86	-52.43	-29.23	60.03				
100.00	100.00	100.00	100.00	0.25	0.25	-150.86	-52.43	-29.23	60.03	59.52	0.50	119.605	
200.00	200.00	200.00	200.00	0.61	0.61	-150.86	-52.43	-29.23	60.03	58.81	1.22	49.249	
300.00	300.00	300.00	300.00	0.97	0.97	-150.86	-52.43	-29.23	60.03	58.09	1.94	31.009	
400.00	400.00	400.00	400.00	1.33	1.33	-150.86	-52.43	-29.23	60.03	57.37	2.65	22.628	
500.00	500.00	500.00	500.00	1.68	1.68	-150.86	-52.43	-29.23	60.03	56.66	3.37	17.814	
600.00	600.00	600.00	600.00	2.04	2.04	-150.86	-52.43	-29.23	60.03	55.94	4.09	14.688	CC, ES
700.00	699.98	699.98	699.98	2.40	2.40	-141.87	-52.43	-29.23	61.39	56.59	4.80	12.780	
800.00	799.84	801.10	801.08	2.76	2.76	-143.39	-50.88	-30.12	64.60	59.08	5.52	11.695	
900.00	899.45	900.94	900.86	3.13	3.12	-145.21	-47.86	-31.87	69.72	63.48	6.24	11.170	
1,000.00	998.70	1,000.53	1,000.39	3.49	3.48	-148.15	-44.85	-33.60	77.84	70.88	6.96	11.180	
1,100.00	1,097.47	1,099.75	1,099.54	3.86	3.83	-151.59	-41.86	-35.34	89.18	81.49	7.69	11.604	
1,200.00	1,195.62	1,198.47	1,198.21	4.24	4.19	-155.04	-38.87	-37.06	103.91	95.50	8.41	12.357	
1,300.00	1,293.06	1,296.58	1,296.26	4.64	4.54	-158.21	-35.91	-38.77	122.13	113.00	9.13	13.372	
1,400.00	1,389.64	1,393.96	1,393.57	5.06	4.89	-160.98	-32.96	-40.47	143.88	134.02	9.86	14.595	
1,500.00	1,485.27	1,490.48	1,490.04	5.50	5.23	-163.32	-30.05	-42.15	169.14	158.55	10.58	15.983	
1,515.00	1,499.52	1,504.88	1,504.43	5.57	5.29	-163.64	-29.61	-42.40	173.23	162.53	10.69	16.198	
1,600.00	1,580.22	1,586.41	1,585.91	5.96	5.58	-165.33	-27.15	-43.83	196.70	185.39	11.30	17.401	
1,700.00	1,675.17	1,682.32	1,681.77	6.44	5.92	-166.86	-24.25	-45.50	224.47	212.45	12.02	18.668	
1,800.00	1,770.11	1,778.24	1,777.62	6.92	6.27	-168.05	-21.35	-47.17	252.36	239.61	12.75	19.796	
1,900.00	1,865.05	1,874.15	1,873.48	7.41	6.61	-169.01	-18.45	-48.85	280.32	266.85	13.47	20.804	
2,000.00	1,959.99	1,970.07	1,969.33	7.90	6.96	-169.79	-15.55	-50.52	308.35	294.15	14.20	21.710	
2,100.00	2,054.94	2,065.98	2,065.19	8.40	7.30	-170.44	-12.65	-52.20	336.42	321.49	14.93	22.526	
2,200.00	2,149.88	2,161.90	2,161.05	8.90	7.65	-171.00	-9.75	-53.87	364.53	348.86	15.67	23.265	
2,300.00	2,244.82	2,257.81	2,256.90	9.41	7.99	-171.47	-6.85	-55.54	392.66	376.26	16.40	23.938	
2,400.00	2,339.76	2,353.72	2,352.76	9.92	8.34	-171.88	-3.96	-57.22	420.81	403.67	17.14	24.552	
2,500.00	2,434.71	2,449.64	2,448.61	10.43	8.68	-172.24	-1.06	-58.89	448.98	431.11	17.88	25.114	
2,600.00	2,529.65	2,545.55	2,544.47	10.94	9.03	-172.55	1.84	-60.56	477.17	458.55	18.62	25.631	
2,700.00	2,624.59	2,641.47	2,640.33	11.45	9.37	-172.84	4.74	-62.24	505.37	486.01	19.36	26.108	
2,800.00	2,719.53	2,737.38	2,736.18	11.97	9.72	-173.09	7.64	-63.91	533.57	513.48	20.10	26.549	
2,900.00	2,814.48	2,833.30	2,832.04	12.49	10.06	-173.31	10.54	-65.59	561.79	540.95	20.84	26.958	
3,000.00	2,909.42	2,929.21	2,927.89	13.01	10.41	-173.52	13.44	-67.26	590.01	568.43	21.58	27.338	
3,100.00	3,004.36	3,025.13	3,023.75	13.53	10.76	-173.70	16.34	-68.93	618.24	595.92	22.33	27.692	
3,200.00	3,099.30	3,121.04	3,119.61	14.05	11.10	-173.87	19.24	-70.61	646.48	623.41	23.07	28.023	
3,300.00	3,194.25	3,216.95	3,215.46	14.57	11.45	-174.03	22.13	-72.28	674.72	650.90	23.81	28.333	
3,400.00	3,289.19	3,312.87	3,311.32	15.09	11.79	-174.17	25.03	-73.95	702.96	678.40	24.56	28.623	
3,500.00	3,384.13	3,408.78	3,407.17	15.62	12.14	-174.30	27.93	-75.63	731.21	705.90	25.30	28.896	
3,600.00	3,479.07	3,504.70	3,503.03	16.14	12.48	-174.43	30.83	-77.30	759.46	733.41	26.05	29.153	
3,700.00	3,574.02	3,600.61	3,598.89	16.67	12.83	-174.54	33.73	-78.97	787.71	760.91	26.80	29.396	
3,800.00	3,668.96	3,696.53	3,694.74	17.19	13.17	-174.64	36.63	-80.65	815.97	788.42	27.54	29.625	
3,900.00	3,763.90	3,792.44	3,790.60	17.72	13.52	-174.74	39.53	-82.32	844.23	815.94	28.29	29.841	
4,000.00	3,858.84	3,888.36	3,886.45	18.24	13.86	-174.83	42.43	-84.00	872.49	843.45	29.04	30.047	
4,100.00	3,953.79	3,984.27	3,982.31	18.77	14.21	-174.92	45.33	-85.67	900.75	870.96	29.79	30.241	
4,200.00	4,048.73	4,080.18	4,078.17	19.30	14.56	-175.00	48.22	-87.34	929.01	898.48	30.53	30.426	
4,300.00	4,143.67	4,176.10	4,174.02	19.82	14.90	-175.08	51.12	-89.02	957.28	926.00	31.28	30.602	
4,400.00	4,238.61	4,272.01	4,269.88	20.35	15.25	-175.15	54.02	-90.69	985.55	953.52	32.03	30.769	
4,500.00	4,333.56	4,367.93	4,365.73	20.88	15.59	-175.22	56.92	-92.36	1,013.82	981.04	32.78	30.929	
4,600.00	4,428.50	4,463.84	4,461.59	21.41	15.94	-175.28	59.82	-94.04	1,042.09	1,008.56	33.53	31.081	
4,700.00	4,523.44	4,559.76	4,557.45	21.93	16.28	-175.34	62.72	-95.71	1,070.36	1,036.08	34.28	31.227	
4,800.00	4,618.38	4,655.67	4,653.30	22.46	16.63	-175.40	65.62	-97.39	1,098.63	1,063.60	35.03	31.366	
4,900.00	4,713.33	4,751.59	4,749.16	22.99	16.97	-175.45	68.52	-99.06	1,126.90	1,091.13	35.78	31.499	
5,000.00	4,808.27	4,847.50	4,845.01	23.52	17.32	-175.51	71.42	-100.73	1,155.18	1,118.65	36.53	31.626	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #696H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:				Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance			Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)		Separation Factor
5,100.00	4,903.21	4,943.41	4,940.87	24.05	17.67	-175.56	74.32	-102.41	1,183.45	1,146.18	37.28	31.748	
5,200.00	4,998.16	5,039.33	5,036.73	24.58	18.01	-175.60	77.21	-104.08	1,211.73	1,173.70	38.03	31.865	
5,300.00	5,093.10	5,135.24	5,132.58	25.11	18.36	-175.65	80.11	-105.75	1,240.01	1,201.23	38.78	31.978	
5,400.00	5,188.04	5,231.16	5,228.44	25.64	18.70	-175.69	83.01	-107.43	1,268.28	1,228.75	39.53	32.086	
5,500.00	5,282.98	5,327.07	5,324.29	26.17	19.05	-175.73	85.91	-109.10	1,296.56	1,256.28	40.28	32.190	
5,600.00	5,377.93	5,421.06	5,418.23	26.70	19.39	-175.77	88.74	-110.73	1,324.85	1,283.84	41.02	32.301	
5,623.25	5,400.00	5,441.21	5,438.37	26.82	19.46	-175.78	89.30	-111.06	1,331.48	1,290.30	41.18	32.337	
5,700.00	5,473.03	5,507.73	5,504.86	27.22	19.70	-175.83	90.96	-112.01	1,353.11	1,311.41	41.70	32.450	
5,800.00	5,568.64	5,594.47	5,591.58	27.73	20.01	-175.90	92.61	-112.97	1,380.41	1,338.03	42.38	32.576	
5,900.00	5,664.75	5,681.29	5,678.39	28.23	20.32	-175.97	93.69	-113.59	1,406.69	1,363.65	43.05	32.679	
6,000.00	5,761.33	5,768.19	5,765.28	28.71	20.63	-176.04	94.20	-113.89	1,431.97	1,388.26	43.71	32.763	
6,100.00	5,858.34	5,861.25	5,858.34	29.18	20.96	-176.12	94.25	-113.91	1,456.11	1,411.70	44.41	32.788	
6,200.00	5,955.76	5,958.67	5,955.76	29.64	21.31	-176.19	94.25	-113.91	1,478.61	1,433.47	45.14	32.757	
6,300.00	6,053.57	6,056.47	6,053.57	30.07	21.65	-176.26	94.25	-113.91	1,499.41	1,453.55	45.87	32.691	
6,400.00	6,151.72	6,154.62	6,151.72	30.50	22.00	-176.32	94.25	-113.91	1,518.51	1,471.92	46.59	32.593	
6,500.00	6,250.19	6,253.09	6,250.19	30.91	22.35	-176.37	94.25	-113.91	1,535.90	1,488.59	47.31	32.465	
6,600.00	6,348.94	6,351.85	6,348.94	31.30	22.70	-176.42	94.25	-113.91	1,551.57	1,503.54	48.03	32.306	
6,659.67	6,408.00	6,424.04	6,421.00	31.53	22.95	-176.59	94.96	-110.23	1,559.86	1,511.32	48.54	32.137	
6,700.00	6,447.82	6,472.57	6,469.00	31.68	23.11	166.28	96.31	-103.27	1,565.76	1,516.88	48.87	32.038	
6,750.00	6,496.66	6,531.48	6,526.32	31.90	23.30	154.00	98.89	-90.03	1,574.92	1,525.64	49.28	31.960	
6,800.00	6,544.65	6,588.82	6,580.69	32.13	23.48	146.42	102.35	-72.20	1,586.10	1,536.43	49.67	31.931	
6,850.00	6,591.49	6,644.46	6,631.68	32.37	23.65	141.03	106.60	-50.38	1,599.27	1,549.22	50.06	31.950	
6,900.00	6,636.89	6,698.36	6,679.03	32.62	23.82	136.73	111.50	-25.16	1,614.37	1,563.94	50.43	32.013	
6,950.00	6,680.57	6,750.50	6,722.62	32.89	23.99	133.01	116.95	2.91	1,631.33	1,580.53	50.79	32.117	
7,000.00	6,722.26	6,800.94	6,762.43	33.17	24.16	129.58	122.86	33.30	1,650.04	1,598.89	51.15	32.259	
7,050.00	6,761.71	6,849.77	6,798.51	33.45	24.33	126.30	129.13	65.57	1,670.41	1,618.90	51.50	32.434	
7,100.00	6,798.67	6,897.11	6,830.99	33.75	24.49	123.08	135.70	99.37	1,692.30	1,640.45	51.85	32.639	
7,150.00	6,832.91	6,943.09	6,860.00	34.06	24.66	119.85	142.51	134.37	1,715.58	1,663.39	52.19	32.869	
7,200.00	6,864.22	6,987.88	6,885.72	34.37	24.83	116.60	149.50	170.35	1,740.10	1,687.56	52.54	33.121	
7,250.00	6,892.42	7,031.62	6,908.28	34.69	25.00	113.31	156.65	207.13	1,765.68	1,712.80	52.88	33.390	
7,300.00	6,917.32	7,074.48	6,927.85	35.03	25.18	109.99	163.92	244.55	1,792.17	1,738.95	53.22	33.673	
7,350.00	6,938.77	7,116.64	6,944.55	35.37	25.36	106.65	171.31	282.54	1,819.39	1,765.82	53.57	33.964	
7,400.00	6,956.64	7,158.25	6,958.49	35.72	25.55	103.30	178.79	321.02	1,847.16	1,793.24	53.92	34.260	
7,450.00	6,970.83	7,199.49	6,969.74	36.07	25.74	99.98	186.36	359.96	1,875.29	1,821.02	54.27	34.556	
7,500.00	6,981.23	7,240.52	6,978.37	36.44	25.94	96.71	194.01	399.33	1,903.61	1,848.98	54.63	34.847	
7,550.00	6,987.80	7,281.50	6,984.39	36.81	26.15	93.53	201.74	439.11	1,931.94	1,876.95	54.99	35.132	
7,600.00	6,990.48	7,322.60	6,987.80	37.19	26.36	90.48	209.56	479.31	1,960.11	1,904.75	55.36	35.405	
7,609.87	6,990.55	7,330.73	6,988.16	37.26	26.41	89.89	211.11	487.29	1,965.63	1,910.20	55.44	35.458	
7,700.00	6,990.49	7,405.38	6,988.64	37.97	26.82	89.91	225.35	560.55	2,016.04	1,959.89	56.14	35.909	
7,800.00	6,990.42	7,488.28	6,988.67	38.78	27.32	89.91	241.17	641.93	2,071.96	2,014.93	57.02	36.335	
7,900.00	6,990.35	7,571.18	6,988.70	39.64	27.89	89.92	256.99	723.31	2,127.88	2,069.87	58.00	36.687	
8,000.00	6,990.28	7,654.09	6,988.72	40.53	28.49	89.92	272.80	804.69	2,183.79	2,124.73	59.07	36.971	
8,100.00	6,990.21	7,736.99	6,988.75	41.45	29.15	89.93	288.62	886.07	2,239.71	2,179.49	60.22	37.192	
8,200.00	6,990.14	7,819.89	6,988.78	42.40	29.84	89.93	304.44	967.46	2,295.63	2,234.18	61.45	37.357	
8,306.37	6,990.06	7,908.07	6,988.81	43.45	30.63	89.94	321.27	1,054.02	2,355.11	2,292.27	62.84	37.475	
8,400.00	6,990.00	7,987.36	6,988.84	44.38	31.37	89.94	336.39	1,131.84	2,404.90	2,340.73	64.17	37.477	
8,500.00	6,989.93	8,075.42	6,988.87	45.36	32.23	89.95	353.20	1,218.29	2,452.23	2,386.51	65.72	37.314	
8,600.00	6,989.85	8,166.58	6,988.90	46.33	33.16	89.96	370.59	1,307.77	2,493.30	2,425.90	67.40	36.991	
8,700.00	6,989.78	8,237.55	6,988.93	47.28	33.91	89.97	384.02	1,377.46	2,528.13	2,459.34	68.79	36.749	
8,800.00	6,989.70	8,300.00	6,988.95	48.21	34.58	89.97	394.71	1,438.99	2,557.88	2,487.81	70.07	36.503	
8,900.00	6,989.63	8,339.19	6,988.96	49.11	35.02	89.98	400.73	1,477.71	2,582.51	2,511.57	70.94	36.405	
9,000.00	6,989.55	8,400.00	6,988.98	49.99	35.70	89.98	409.03	1,537.95	2,602.17	2,529.93	72.24	36.021	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design:		Rosa Unit 34 - Rosa Unit #696H - OH - Prelim 5											Offset Site Error:		0.00 usft		
Survey Program:		0-MWD+HRGM+MS						Rule Assigned:						Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)							
9,100.00	6,989.48	8,442.43	6,989.00	50.84	36.18	89.98	414.06	1,580.08	2,616.66	2,543.46	73.20	35.748					
9,200.00	6,989.40	8,500.00	6,989.01	51.66	36.84	89.99	419.89	1,637.35	2,626.06	2,551.59	74.48	35.260					
9,300.00	6,989.33	8,546.50	6,989.03	52.45	37.39	89.99	423.75	1,683.70	2,630.29	2,554.75	75.54	34.820					
9,393.87	6,989.27	8,600.00	6,989.04	53.15	38.02	90.00	427.27	1,737.08	2,629.58	2,552.82	76.76	34.258					
9,400.00	6,989.26	8,600.00	6,989.04	53.20	38.02	90.00	427.27	1,737.08	2,629.38	2,552.62	76.76	34.254					
9,500.00	6,989.19	8,650.77	6,989.06	53.95	38.63	90.00	429.68	1,787.79	2,627.22	2,549.28	77.94	33.710					
9,582.35	6,989.13	8,700.00	6,989.07	54.59	39.22	90.00	431.17	1,837.00	2,626.82	2,547.74	79.08	33.217					
9,600.00	6,989.12	8,700.00	6,989.07	54.73	39.22	90.00	431.17	1,837.00	2,626.88	2,547.80	79.07	33.220					
9,700.00	6,989.05	8,755.09	6,989.09	55.55	39.89	90.00	431.82	1,892.08	2,628.35	2,547.99	80.36	32.706					
9,800.00	6,988.98	8,838.81	6,989.11	56.40	40.92	90.00	431.55	1,975.80	2,631.25	2,548.88	82.37	31.944					
9,900.00	6,988.91	8,938.76	6,989.14	57.28	42.18	90.00	431.17	2,075.75	2,634.26	2,549.43	84.83	31.055					
10,000.00	6,988.84	9,038.72	6,989.17	58.20	43.45	90.01	430.78	2,175.70	2,637.26	2,549.93	87.33	30.199					
10,100.00	6,988.77	9,138.67	6,989.19	59.14	44.75	90.01	430.39	2,275.66	2,640.27	2,550.39	89.88	29.376					
10,200.00	6,988.70	9,238.63	6,989.22	60.11	46.06	90.01	430.00	2,375.61	2,643.27	2,550.81	92.47	28.586					
10,300.00	6,988.63	9,338.58	6,989.25	61.11	47.40	90.01	429.62	2,475.57	2,646.28	2,551.19	95.09	27.828					
10,400.00	6,988.56	9,438.53	6,989.27	62.14	48.75	90.01	429.23	2,575.52	2,649.28	2,551.53	97.76	27.101					
10,500.00	6,988.49	9,538.49	6,989.30	63.19	50.11	90.02	428.84	2,675.47	2,652.29	2,551.84	100.45	26.404					
10,600.00	6,988.42	9,638.44	6,989.33	64.26	51.49	90.02	428.45	2,775.43	2,655.30	2,552.12	103.17	25.737					
10,700.00	6,988.35	9,738.40	6,989.35	65.36	52.88	90.02	428.07	2,875.38	2,658.30	2,552.38	105.92	25.097					
10,800.00	6,988.28	9,838.35	6,989.38	66.48	54.29	90.02	427.68	2,975.34	2,661.31	2,552.61	108.69	24.484					
10,900.00	6,988.21	9,938.31	6,989.41	67.61	55.70	90.02	427.29	3,075.29	2,664.31	2,552.82	111.49	23.897					
11,000.00	6,988.14	10,038.26	6,989.44	68.77	57.13	90.03	426.90	3,175.24	2,667.32	2,553.01	114.31	23.334					
11,100.00	6,988.07	10,138.22	6,989.46	69.95	58.56	90.03	426.52	3,275.20	2,670.32	2,553.17	117.15	22.794					
11,200.00	6,988.01	10,238.17	6,989.49	71.14	60.00	90.03	426.13	3,375.15	2,673.33	2,553.32	120.01	22.277					
11,300.00	6,987.94	10,338.13	6,989.52	72.35	61.45	90.03	425.74	3,475.11	2,676.33	2,553.45	122.88	21.780					
11,400.00	6,987.87	10,438.08	6,989.54	73.57	62.91	90.03	425.35	3,575.06	2,679.34	2,553.57	125.77	21.303					
11,500.00	6,987.80	10,538.04	6,989.57	74.81	64.37	90.04	424.97	3,675.01	2,682.34	2,553.67	128.68	20.846					
11,600.00	6,987.73	10,637.99	6,989.60	76.07	65.84	90.04	424.58	3,774.97	2,685.35	2,553.75	131.59	20.406					
11,643.87	6,987.70	10,681.84	6,989.61	76.62	66.49	90.04	424.41	3,818.81	2,686.67	2,553.79	132.88	20.219					
11,700.00	6,987.66	10,737.96	6,989.62	77.33	67.32	90.04	424.19	3,874.94	2,687.80	2,553.28	134.53	19.980					
11,737.27	6,987.63	10,775.23	6,989.63	77.80	67.87	90.04	424.05	3,912.20	2,687.95	2,552.33	135.62	19.820					
11,800.00	6,987.59	10,837.96	6,989.65	78.59	68.80	90.04	423.80	3,974.93	2,687.79	2,550.32	137.47	19.552					
11,900.00	6,987.52	10,937.96	6,989.68	79.86	70.29	90.05	423.42	4,074.93	2,687.54	2,547.11	140.43	19.138					
12,000.00	6,987.46	11,037.96	6,989.71	81.14	71.79	90.05	423.03	4,174.93	2,687.28	2,543.88	143.40	18.740					
12,100.00	6,987.39	11,137.96	6,989.73	82.43	73.28	90.05	422.64	4,274.93	2,687.03	2,540.65	146.38	18.357					
12,200.00	6,987.32	11,237.96	6,989.76	83.73	74.79	90.05	422.25	4,374.93	2,686.77	2,537.41	149.36	17.988					
12,300.00	6,987.26	11,337.96	6,989.79	85.05	76.29	90.05	421.87	4,474.93	2,686.52	2,534.16	152.36	17.632					
12,400.00	6,987.19	11,437.96	6,989.81	86.38	77.80	90.06	421.48	4,574.93	2,686.26	2,530.90	155.37	17.290					
12,500.00	6,987.12	11,537.96	6,989.84	87.71	79.32	90.06	421.09	4,674.93	2,686.01	2,527.63	158.38	16.959					
12,600.00	6,987.06	11,637.96	6,989.87	89.06	80.84	90.06	420.70	4,774.93	2,685.75	2,524.35	161.40	16.640					
12,700.00	6,986.99	11,737.96	6,989.89	90.41	82.36	90.06	420.32	4,874.92	2,685.50	2,521.07	164.43	16.332					
12,800.00	6,986.92	11,837.96	6,989.92	91.77	83.88	90.06	419.93	4,974.92	2,685.25	2,517.78	167.47	16.034					
12,900.00	6,986.86	11,937.96	6,989.95	93.14	85.41	90.07	419.54	5,074.92	2,684.99	2,514.48	170.51	15.747					
13,000.00	6,986.79	12,037.95	6,989.98	94.52	86.94	90.07	419.15	5,174.92	2,684.74	2,511.18	173.56	15.469					
13,100.00	6,986.72	12,137.95	6,990.00	95.90	88.47	90.07	418.76	5,274.92	2,684.48	2,507.87	176.61	15.200					
13,200.00	6,986.66	12,237.95	6,990.03	97.30	90.01	90.07	418.38	5,374.92	2,684.23	2,504.56	179.67	14.940					
13,300.00	6,986.59	12,337.95	6,990.06	98.69	91.54	90.07	417.99	5,474.92	2,683.97	2,501.24	182.73	14.688					
13,400.00	6,986.52	12,437.95	6,990.08	100.10	93.08	90.08	417.60	5,574.92	2,683.72	2,497.92	185.80	14.444					
13,500.00	6,986.46	12,537.95	6,990.11	101.51	94.63	90.08	417.21	5,674.92	2,683.46	2,494.59	188.88	14.208					
13,600.00	6,986.39	12,637.95	6,990.14	102.93	96.17	90.08	416.83	5,774.91	2,683.21	2,491.26	191.95	13.978					
13,700.00	6,986.32	12,737.95	6,990.16	104.35	97.72	90.08	416.44	5,874.91	2,682.95	2,487.92	195.04	13.756					
13,800.00	6,986.25	12,837.95	6,990.19	105.78	99.26	90.08	416.05	5,974.91	2,682.70	2,484.58	198.12	13.541					

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #696H - OH - Prelim 5												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM+MS												Offset Well Error:	0.00 usft
Reference												Rule Assigned:	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
13,900.00	6,986.19	12,937.95	6,990.22	107.21	100.81	90.09	415.66	6,074.91	2,682.45	2,481.23	201.21	13.331	
14,000.00	6,986.12	13,037.95	6,990.25	108.65	102.36	90.09	415.28	6,174.91	2,682.19	2,477.88	204.31	13.128	
14,100.00	6,986.05	13,137.95	6,990.27	110.09	103.92	90.09	414.89	6,274.91	2,681.94	2,474.53	207.40	12.931	
14,200.00	6,985.99	13,237.95	6,990.30	111.54	105.47	90.09	414.50	6,374.91	2,681.68	2,471.18	210.50	12.739	
14,300.00	6,985.92	13,337.95	6,990.33	112.99	107.03	90.09	414.11	6,474.91	2,681.43	2,467.82	213.61	12.553	
14,400.00	6,985.85	13,437.95	6,990.35	114.45	108.58	90.10	413.72	6,574.91	2,681.17	2,464.46	216.72	12.372	
14,500.00	6,985.79	13,537.95	6,990.38	115.91	110.14	90.10	413.34	6,674.90	2,680.92	2,461.09	219.82	12.196	
14,600.00	6,985.72	13,637.95	6,990.41	117.38	111.70	90.10	412.95	6,774.90	2,680.66	2,457.73	222.94	12.024	
14,700.00	6,985.65	13,737.95	6,990.44	118.84	113.26	90.10	412.56	6,874.90	2,680.41	2,454.36	226.05	11.857	
14,800.00	6,985.59	13,837.95	6,990.46	120.32	114.83	90.10	412.17	6,974.90	2,680.15	2,450.98	229.17	11.695	
14,900.00	6,985.52	13,937.95	6,990.49	121.79	116.39	90.11	411.79	7,074.90	2,679.90	2,447.61	232.29	11.537	
15,000.00	6,985.45	14,037.95	6,990.52	123.27	117.95	90.11	411.40	7,174.90	2,679.65	2,444.23	235.41	11.383	
15,100.00	6,985.39	14,137.95	6,990.54	124.75	119.52	90.11	411.01	7,274.90	2,679.39	2,440.85	238.54	11.232	
15,200.00	6,985.32	14,237.95	6,990.57	126.24	121.09	90.11	410.62	7,374.90	2,679.14	2,437.47	241.67	11.086	
15,300.00	6,985.25	14,337.95	6,990.60	127.72	122.65	90.11	410.24	7,474.90	2,678.88	2,434.09	244.80	10.943	
15,400.00	6,985.19	14,437.95	6,990.62	129.21	124.22	90.12	409.85	7,574.89	2,678.63	2,430.70	247.93	10.804	
15,500.00	6,985.12	14,537.95	6,990.65	130.71	125.79	90.12	409.46	7,674.89	2,678.37	2,427.31	251.06	10.668	
15,600.00	6,985.05	14,637.95	6,990.68	132.20	127.36	90.12	409.07	7,774.89	2,678.12	2,423.92	254.20	10.536	
15,700.00	6,984.99	14,737.94	6,990.71	133.70	128.93	90.12	408.69	7,874.89	2,677.86	2,420.53	257.33	10.406	
15,800.00	6,984.92	14,837.94	6,990.73	135.20	130.51	90.12	408.30	7,974.89	2,677.61	2,417.14	260.47	10.280	
15,900.00	6,984.85	14,937.94	6,990.76	136.71	132.08	90.13	407.91	8,074.89	2,677.36	2,413.74	263.61	10.156	
16,000.00	6,984.79	15,037.94	6,990.79	138.21	133.65	90.13	407.52	8,174.89	2,677.10	2,410.34	266.76	10.036	
16,100.00	6,984.72	15,137.94	6,990.81	139.72	135.23	90.13	407.13	8,274.89	2,676.85	2,406.95	269.90	9.918	
16,200.00	6,984.65	15,237.94	6,990.84	141.23	136.80	90.13	406.75	8,374.88	2,676.59	2,403.55	273.05	9.803	
16,300.00	6,984.59	15,337.94	6,990.87	142.75	138.38	90.13	406.36	8,474.88	2,676.34	2,400.14	276.19	9.690	
16,400.00	6,984.52	15,437.94	6,990.89	144.26	139.95	90.14	405.97	8,574.88	2,676.08	2,396.74	279.34	9.580	
16,500.00	6,984.45	15,537.94	6,990.92	145.78	141.53	90.14	405.58	8,674.88	2,675.83	2,393.34	282.49	9.472	
16,600.00	6,984.39	15,637.94	6,990.95	147.29	143.11	90.14	405.20	8,774.88	2,675.57	2,389.93	285.64	9.367	
16,700.00	6,984.32	15,737.94	6,990.98	148.82	144.69	90.14	404.81	8,874.88	2,675.32	2,386.53	288.79	9.264	
16,800.00	6,984.25	15,837.94	6,991.00	150.34	146.27	90.14	404.42	8,974.88	2,675.07	2,383.12	291.95	9.163	
16,900.00	6,984.19	15,937.94	6,991.03	151.86	147.84	90.15	404.03	9,074.88	2,674.81	2,379.71	295.10	9.064	
17,000.00	6,984.12	16,037.94	6,991.06	153.39	149.42	90.15	403.65	9,174.88	2,674.56	2,376.30	298.26	8.967	
17,100.00	6,984.05	16,137.94	6,991.08	154.91	151.00	90.15	403.26	9,274.87	2,674.30	2,372.89	301.42	8.872	
17,200.00	6,983.99	16,237.94	6,991.11	156.44	152.59	90.15	402.87	9,374.87	2,674.05	2,369.47	304.57	8.780	
17,300.00	6,983.92	16,337.94	6,991.14	157.97	154.17	90.15	402.48	9,474.87	2,673.79	2,366.06	307.73	8.689	
17,400.00	6,983.85	16,437.94	6,991.16	159.50	155.75	90.16	402.10	9,574.87	2,673.54	2,362.65	310.89	8.600	
17,500.00	6,983.79	16,537.94	6,991.19	161.04	157.33	90.16	401.71	9,674.87	2,673.28	2,359.23	314.05	8.512	
17,600.00	6,983.72	16,637.94	6,991.22	162.57	158.91	90.16	401.32	9,774.87	2,673.03	2,355.81	317.22	8.427	
17,700.00	6,983.65	16,737.94	6,991.25	164.11	160.50	90.16	400.93	9,874.87	2,672.78	2,352.40	320.38	8.343	
17,800.00	6,983.59	16,837.94	6,991.27	165.65	162.08	90.16	400.54	9,974.87	2,672.52	2,348.98	323.54	8.260	
17,900.00	6,983.52	16,937.94	6,991.30	167.18	163.66	90.17	400.16	10,074.87	2,672.27	2,345.56	326.71	8.179	
18,000.00	6,983.45	17,037.94	6,991.33	168.72	165.25	90.17	399.77	10,174.86	2,672.01	2,342.14	329.87	8.100	
18,100.00	6,983.39	17,137.94	6,991.35	170.27	166.83	90.17	399.38	10,274.86	2,671.76	2,338.72	333.04	8.022	
18,200.00	6,983.32	17,237.94	6,991.38	171.81	168.42	90.17	398.99	10,374.86	2,671.50	2,335.29	336.21	7.946	
18,300.00	6,983.25	17,337.94	6,991.41	173.35	170.00	90.18	398.61	10,474.86	2,671.25	2,331.87	339.38	7.871	
18,400.00	6,983.19	17,437.93	6,991.44	174.90	171.59	90.18	398.22	10,574.86	2,670.99	2,328.45	342.55	7.797	
18,500.00	6,983.12	17,537.93	6,991.46	176.44	173.18	90.18	397.83	10,674.86	2,670.74	2,325.02	345.72	7.725	
18,600.00	6,983.05	17,637.93	6,991.49	177.99	174.76	90.18	397.44	10,774.86	2,670.49	2,321.60	348.89	7.654	
18,700.00	6,982.99	17,737.93	6,991.52	179.54	176.35	90.18	397.06	10,874.86	2,670.23	2,318.17	352.06	7.585	
18,800.00	6,982.92	17,837.93	6,991.54	181.09	177.94	90.19	396.67	10,974.86	2,669.98	2,314.75	355.23	7.516	
18,900.00	6,982.85	17,937.93	6,991.57	182.64	179.52	90.19	396.28	11,074.85	2,669.72	2,311.32	358.40	7.449	
19,000.00	6,982.78	18,037.93	6,991.60	184.19	181.11	90.19	395.89	11,174.85	2,669.47	2,307.89	361.57	7.383	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Offset Design: Rosa Unit 34 - Rosa Unit #696H - OH - Prelim 5													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HRGM+MS							Rule Assigned:						Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,100.00	6,982.72	18,137.93	6,991.62	185.74	182.70	90.19	395.51	11,274.85	2,669.21	2,304.47	364.75	7.318	
19,200.00	6,982.65	18,237.93	6,991.65	187.29	184.29	90.19	395.12	11,374.85	2,668.96	2,301.04	367.92	7.254	
19,300.00	6,982.58	18,337.93	6,991.68	188.84	185.88	90.20	394.73	11,474.85	2,668.71	2,297.61	371.10	7.191	
19,400.00	6,982.52	18,437.93	6,991.71	190.40	187.46	90.20	394.34	11,574.85	2,668.45	2,294.18	374.27	7.130	
19,500.00	6,982.45	18,537.93	6,991.73	191.95	189.05	90.20	393.95	11,674.85	2,668.20	2,290.75	377.45	7.069	
19,600.00	6,982.38	18,637.93	6,991.76	193.51	190.64	90.20	393.57	11,774.85	2,667.94	2,287.32	380.63	7.009	
19,700.00	6,982.32	18,737.93	6,991.79	195.07	192.23	90.20	393.18	11,874.85	2,667.69	2,283.88	383.80	6.951	
19,800.00	6,982.25	18,837.93	6,991.81	196.62	193.82	90.21	392.79	11,974.84	2,667.43	2,280.45	386.98	6.893	
19,900.00	6,982.18	18,937.93	6,991.84	198.18	195.41	90.21	392.40	12,074.84	2,667.18	2,277.02	390.16	6.836	
20,000.00	6,982.12	19,037.93	6,991.87	199.74	197.00	90.21	392.02	12,174.84	2,666.93	2,273.59	393.34	6.780	
20,100.00	6,982.05	19,137.93	6,991.89	201.30	198.59	90.21	391.63	12,274.84	2,666.67	2,270.15	396.52	6.725	
20,176.02	6,982.00	19,213.94	6,991.91	202.36	199.80	90.21	391.33	12,350.86	2,666.48	2,267.79	398.69	6.688 SF	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 6347+30 @ 6377.00usft (H&P 530)

Offset Depths are relative to Offset Datum

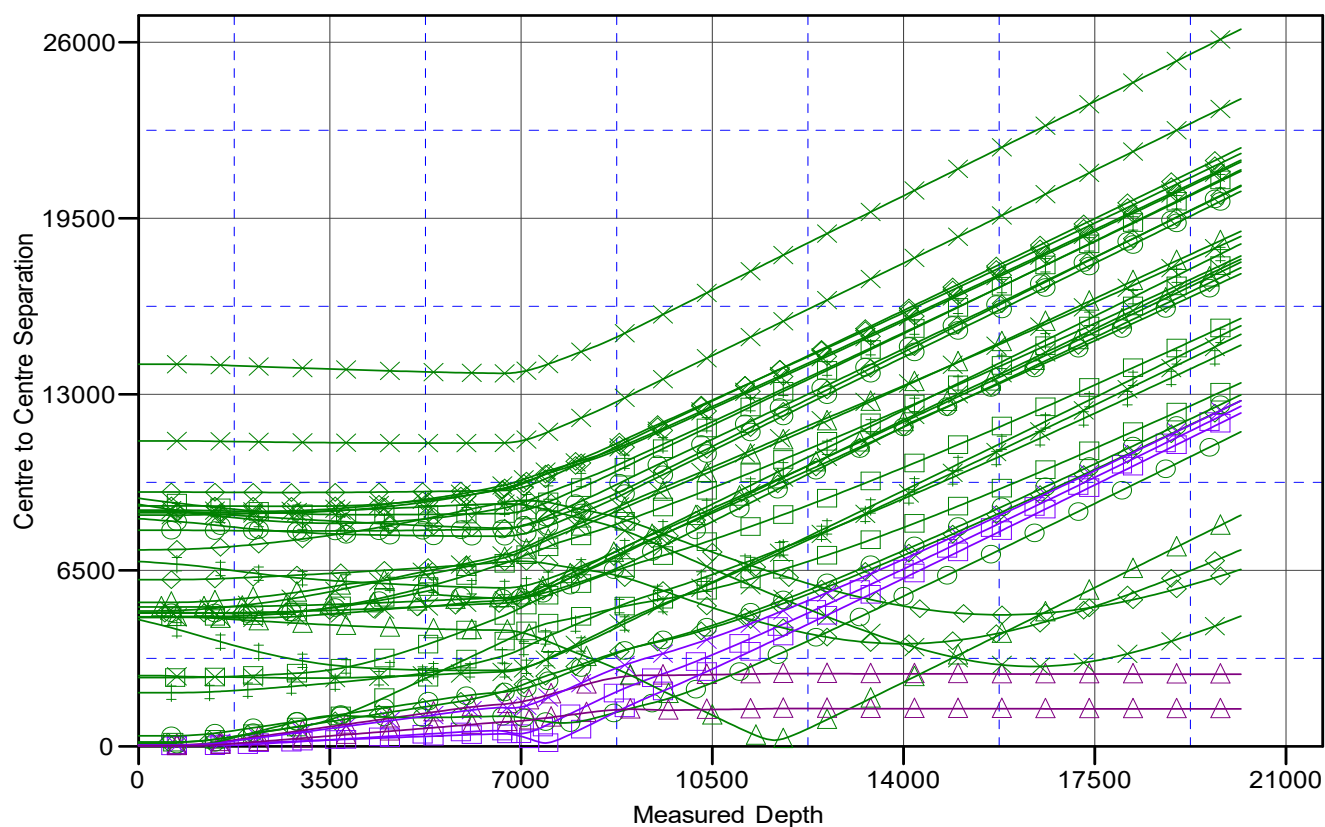
Central Meridian is -107.833334

Coordinates are relative to: Rosa Unit #690H

Coordinate System is US State Plane 1983, New Mexico Western Zone

Grid Convergence at Surface is: 0.27°

Ladder Plot



LEGEND

(C) Rosa Unit #674H, OH, Prelim 5 V0	(C) Rosa Unit #350A, OH, OH-SVY V0	(C) Rosa Unit #228A, OH, OH-SVY V0
(C) Rosa Unit #95, OH, OH-INC V0	(C) Rosa Unit #171B, OH, OH-SVY V0	(C) Rosa Unit #46, OH, OH-INC V0
(C) Rosa Unit #149B, OH, OH-INC V0	(C) Rosa Unit 148 COM, OH, OH-INC V0	Rosa Unit #694H, OH, Prelim 5 V0
(C) Rosa Unit #108, OH, OH-SVY V0	(C) Rosa Unit #336, OH, OH-INC V0	Rosa Unit #692H, OH, Prelim 5 V0
(C) Rosa Unit #164C, OH, OH-SVY V0	(C) Rosa Unit #041C, OH, OH-SVY V0	(C) Rosa Unit #149A, OH, OH-INC V0
(C) Rosa Unit #149C, OH, OH-SVY V0	(C) Rosa Unit #164B, OH, OH-SVY V0	(C) Rosa Unit #171A, OH, OH-SVY V0
(C) Rosa Unit #164, OH, OH-SVY V0	(C) Rosa Unit #107, OH, OH-INC V0	(C) Rosa Unit #149, OH, OH-INC V0
Rosa Unit #696H, OH, Prelim 5 V0	(C) Rosa Unit #164A, OH, OH-INC V0	(C) Rosa Unit #171C, OH, OH-SVY V0
(C) Rosa Unit #080A, OH, OH-INC V0	(C) Rosa Unit #041B, OH, OH-SVY V0	(C) Rosa Unit #171, OH, OH-INC V0
(C) Carson #1, OH, OH-INC V0	(C) Rosa Unit #336A, OH, OH-INC V0	(C) Rosa Unit #053, OH, OH-INC V0
(C) Rosa Unit #072C, OH, OH-SVY V0	Rosa Unit #672H, OH, Prelim 5 V0	(C) Rosa Unit #80B, OH, OH-SVY V0
(C) Rosa Unit #228A, OH, OH-SVY V0	(C) Rosa Unit 072B, OH, OH-SVY V0	(C) Rosa Unit #228, OH, OH-INC V0

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

SDT

Anticollision Report

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Rosa Unit #690H
Project:	Rio Arriba, NM (NAD83)	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Reference Site:	Rosa Unit 34	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000 Multi User Db
Reference Design:	Prelim 5	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 6347+30 @ 6377.00usft (H&P 530)

Offset Depths are relative to Offset Datum

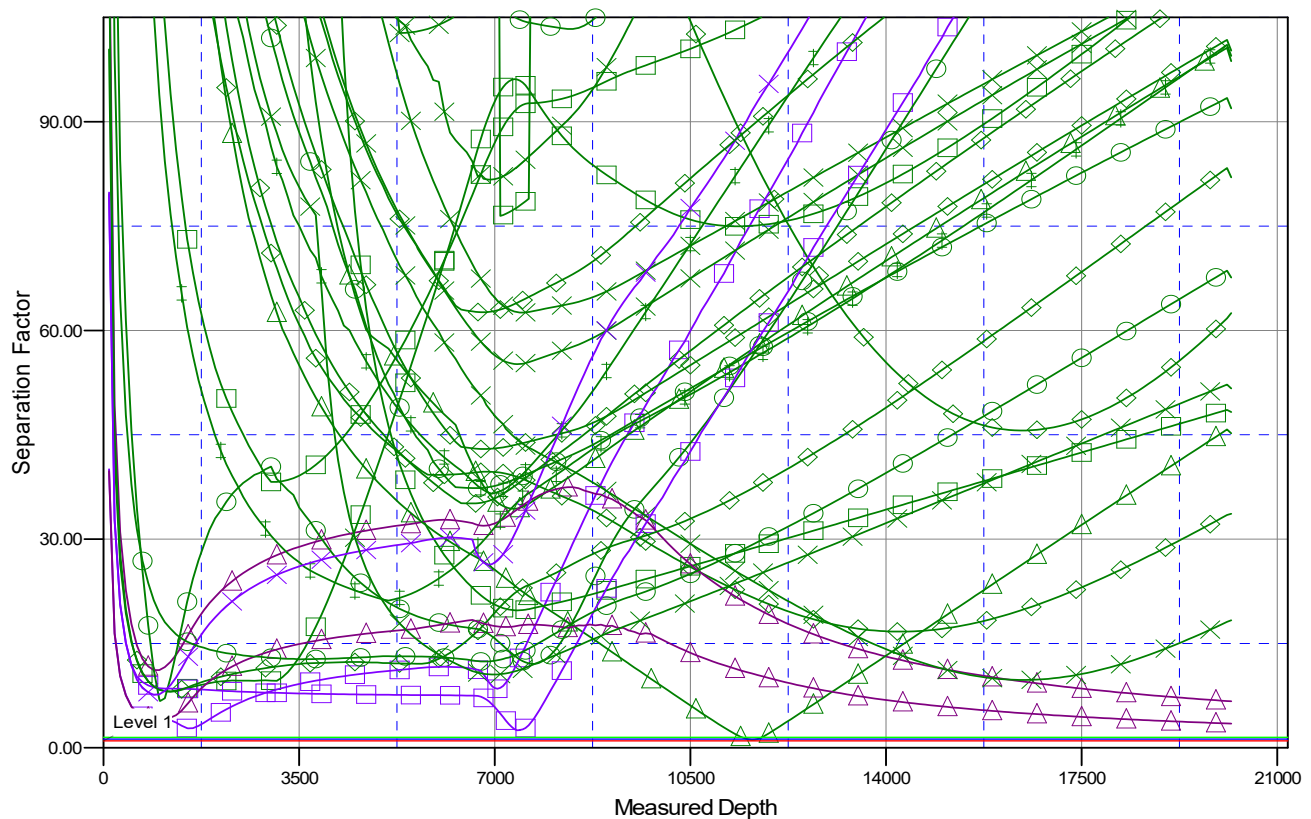
Central Meridian is -107.833334

Coordinates are relative to: Rosa Unit #690H

Coordinate System is US State Plane 1983, New Mexico Western Zone

Grid Convergence at Surface is: 0.27°

Separation Factor Plot



LEGEND

(C) Rosa Unit #674H, OH, Prelim 5 V0	(C) Rosa Unit #350A, OH, OH-SVY V0	(C) Rosa Unit #228A, OH, OH-SVY V0
(C) Rosa Unit #65, OH, OH-INC V0	(C) Rosa Unit #171B, OH, OH-SVY V0	(C) Rosa Unit #46, OH, OH-INC V0
(C) Rosa Unit #140B, OH, OH-INC V0	(C) Rosa Unit 148 COM, OH, OH-INC V0	Rosa Unit #694H, OH, Prelim 5 V0
(C) Rosa Unit #106, OH, OH-SVY V0	(C) Rosa Unit #336, OH, OH-INC V0	Rosa Unit #692H, OH, Prelim 5 V0
(C) Rosa Unit #164C, OH, OH-SVY V0	(C) Rosa Unit #641C, OH, OH-SVY V0	(C) Rosa Unit #149A, OH, OH-INC V0
(C) Rosa Unit #140C, OH, OH-SVY V0	(C) Rosa Unit #164B, OH, OH-SVY V0	(C) Rosa Unit #171A, OH, OH-SVY V0
(C) Rosa Unit #164, OH, OH-SVY V0	(C) Rosa Unit #107, OH, OH-INC V0	(C) Rosa Unit #149, OH, OH-INC V0
Rosa Unit #696H, OH, Prelim 5 V0	(C) Rosa Unit #164A, OH, OH-INC V0	(C) Rosa Unit #171C, OH, OH-SVY V0
(C) Rosa Unit #080A, OH, OH-INC V0	(C) Rosa Unit #041B, OH, OH-SVY V0	(C) Rosa Unit #171, OH, OH-INC V0
(C) Carson #1, OH, OH-INC V0	(C) Rosa Unit #336A, OH, OH-INC V0	(C) Rosa Unit #053, OH, OH-INC V0
(C) Rosa Unit #072C, OH, OH-SVY V0	Rosa Unit #672H, OH, Prelim 5 V0	(C) Rosa Unit #68B, OH, OH-SVY V0
(C) Rosa Unit #226A, OH, OH-SVY V0	(C) Rosa Unit 072B, OH, OH-SVY V0	(C) Rosa Unit #226, OH, OH-INC V0

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Logos Operating LLC

Rio Arriba, NM (NAD83)

Rosa Unit 34

Rosa Unit #690H

OH

Plan: Prelim 5

Standard Planning Report

22 November, 2024

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Project	Rio Arriba, NM (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	Rosa Unit 34				
Site Position:		Northing:	2,154,213.35 usft	Latitude:	36.919164
From:	Lat/Long	Easting:	2,854,601.45 usft	Longitude:	-107.383447
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "		

Well	Rosa Unit #690H					
Well Position	+N/-S	0.00 usft	Northing:	2,154,226.49 usft	Latitude:	36.919200
	+E/-W	0.00 usft	Easting:	2,854,608.70 usft	Longitude:	-107.383422
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	6,347.00 usft
Grid Convergence:		0.27 °				

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/16/2024	8.40	63.46	49,423.20402640

Design	Prelim 5				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	89.98	

Plan Survey Tool Program	Date	11/22/2024			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	20,175.56 Prelim 5 (OH)	MWD+HRGM+MS		
			MWD + HRGM + Multi-Station		

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,515.00	18.30	350.00	1,499.52	142.68	-25.16	2.00	2.00	0.00	350.00	
5,623.25	18.30	350.00	5,400.00	1,413.05	-249.16	0.00	0.00	0.00	0.00	
6,659.67	7.94	350.00	6,408.00	1,644.38	-289.95	1.00	-1.00	0.00	-180.00	
7,609.87	90.04	45.00	6,990.55	2,140.61	112.14	9.00	8.64	5.79	55.25	
8,306.37	90.04	45.00	6,990.06	2,633.11	604.64	0.00	0.00	0.00	0.00	
9,393.87	90.04	88.50	6,989.27	3,052.16	1,580.00	4.00	0.00	4.00	89.98	
11,643.87	90.04	88.50	6,987.70	3,111.05	3,829.23	0.00	0.00	0.00	0.00	
11,737.27	90.04	90.37	6,987.63	3,111.98	3,922.62	2.00	0.00	2.00	90.05	
20,176.02	90.04	90.37	6,982.00	3,057.77	12,361.20	0.00	0.00	0.00	0.00	RU 690H PBHL

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	2.00	350.00	699.98	1.72	-0.30	-0.30	2.00	2.00	0.00
800.00	4.00	350.00	799.84	6.87	-1.21	-1.21	2.00	2.00	0.00
900.00	6.00	350.00	899.45	15.46	-2.73	-2.72	2.00	2.00	0.00
1,000.00	8.00	350.00	998.70	27.46	-4.84	-4.83	2.00	2.00	0.00
1,100.00	10.00	350.00	1,097.47	42.86	-7.56	-7.54	2.00	2.00	0.00
1,200.00	12.00	350.00	1,195.62	61.65	-10.87	-10.85	2.00	2.00	0.00
1,300.00	14.00	350.00	1,293.06	83.80	-14.78	-14.75	2.00	2.00	0.00
1,392.50	15.85	350.00	1,382.43	107.26	-18.91	-18.88	2.00	2.00	0.00
Start 4225.26 hold at 1392.50 MD									
1,400.00	16.00	350.00	1,389.64	109.29	-19.27	-19.23	2.00	2.00	0.00
1,500.00	18.00	350.00	1,485.27	138.08	-24.35	-24.30	2.00	2.00	0.00
1,515.00	18.30	350.00	1,499.52	142.68	-25.16	-25.11	2.00	2.00	0.00
1,600.00	18.30	350.00	1,580.22	168.97	-29.79	-29.73	0.00	0.00	0.00
1,700.00	18.30	350.00	1,675.17	199.89	-35.25	-35.18	0.00	0.00	0.00
1,800.00	18.30	350.00	1,770.11	230.81	-40.70	-40.62	0.00	0.00	0.00
1,900.00	18.30	350.00	1,865.05	261.73	-46.15	-46.06	0.00	0.00	0.00
2,000.00	18.30	350.00	1,959.99	292.66	-51.60	-51.50	0.00	0.00	0.00
2,100.00	18.30	350.00	2,054.94	323.58	-57.06	-56.94	0.00	0.00	0.00
2,200.00	18.30	350.00	2,149.88	354.50	-62.51	-62.38	0.00	0.00	0.00
2,300.00	18.30	350.00	2,244.82	385.42	-67.96	-67.83	0.00	0.00	0.00
2,400.00	18.30	350.00	2,339.76	416.35	-73.41	-73.27	0.00	0.00	0.00
2,500.00	18.30	350.00	2,434.71	447.27	-78.87	-78.71	0.00	0.00	0.00
2,504.52	18.30	350.00	2,439.00	448.67	-79.11	-78.96	0.00	0.00	0.00
Ojo Alamo									
2,600.00	18.30	350.00	2,529.65	478.19	-84.32	-84.15	0.00	0.00	0.00
2,630.91	18.30	350.00	2,559.00	487.75	-86.00	-85.83	0.00	0.00	0.00
Kirtland									
2,700.00	18.30	350.00	2,624.59	509.11	-89.77	-89.59	0.00	0.00	0.00
2,800.00	18.30	350.00	2,719.53	540.03	-95.22	-95.03	0.00	0.00	0.00
2,900.00	18.30	350.00	2,814.48	570.96	-100.68	-100.48	0.00	0.00	0.00
2,945.84	18.30	350.00	2,858.00	585.13	-103.17	-102.97	0.00	0.00	0.00
Fruitland									
3,000.00	18.30	350.00	2,909.42	601.88	-106.13	-105.92	0.00	0.00	0.00
3,096.46	18.30	350.00	3,001.00	631.71	-111.39	-111.17	0.00	0.00	0.00
T/Coals									
3,100.00	18.30	350.00	3,004.36	632.80	-111.58	-111.36	0.00	0.00	0.00
3,200.00	18.30	350.00	3,099.30	663.72	-117.03	-116.80	0.00	0.00	0.00
3,271.30	18.30	350.00	3,167.00	685.77	-120.92	-120.68	0.00	0.00	0.00
B/Coals									
3,300.00	18.30	350.00	3,194.25	694.65	-122.48	-122.24	0.00	0.00	0.00
3,400.00	18.30	350.00	3,289.19	725.57	-127.94	-127.68	0.00	0.00	0.00
3,483.01	18.30	350.00	3,368.00	751.24	-132.46	-132.20	0.00	0.00	0.00
Pictured Cliffs									
3,500.00	18.30	350.00	3,384.13	756.49	-133.39	-133.13	0.00	0.00	0.00
3,591.50	18.30	350.00	3,471.00	784.78	-138.38	-138.10	0.00	0.00	0.00

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Lewis									
3,600.00	18.30	350.00	3,479.07	787.41	-138.84	-138.57	0.00	0.00	0.00
3,700.00	18.30	350.00	3,574.02	818.33	-144.29	-144.01	0.00	0.00	0.00
3,800.00	18.30	350.00	3,668.96	849.26	-149.75	-149.45	0.00	0.00	0.00
3,900.00	18.30	350.00	3,763.90	880.18	-155.20	-154.89	0.00	0.00	0.00
4,000.00	18.30	350.00	3,858.84	911.10	-160.65	-160.33	0.00	0.00	0.00
4,100.00	18.30	350.00	3,953.79	942.02	-166.10	-165.78	0.00	0.00	0.00
4,200.00	18.30	350.00	4,048.73	972.95	-171.56	-171.22	0.00	0.00	0.00
4,300.00	18.30	350.00	4,143.67	1,003.87	-177.01	-176.66	0.00	0.00	0.00
4,400.00	18.30	350.00	4,238.61	1,034.79	-182.46	-182.10	0.00	0.00	0.00
4,500.00	18.30	350.00	4,333.56	1,065.71	-187.91	-187.54	0.00	0.00	0.00
4,600.00	18.30	350.00	4,428.50	1,096.63	-193.37	-192.98	0.00	0.00	0.00
4,700.00	18.30	350.00	4,523.44	1,127.56	-198.82	-198.43	0.00	0.00	0.00
4,800.00	18.30	350.00	4,618.38	1,158.48	-204.27	-203.87	0.00	0.00	0.00
4,832.25	18.30	350.00	4,649.00	1,168.45	-206.03	-205.62	0.00	0.00	0.00
Chacra									
4,900.00	18.30	350.00	4,713.33	1,189.40	-209.72	-209.31	0.00	0.00	0.00
5,000.00	18.30	350.00	4,808.27	1,220.32	-215.18	-214.75	0.00	0.00	0.00
5,100.00	18.30	350.00	4,903.21	1,251.25	-220.63	-220.19	0.00	0.00	0.00
5,200.00	18.30	350.00	4,998.16	1,282.17	-226.08	-225.63	0.00	0.00	0.00
5,300.00	18.30	350.00	5,093.10	1,313.09	-231.53	-231.07	0.00	0.00	0.00
5,318.86	18.30	350.00	5,111.00	1,318.92	-232.56	-232.10	0.00	0.00	0.00
U/Cliff House									
5,400.00	18.30	350.00	5,188.04	1,344.01	-236.99	-236.52	0.00	0.00	0.00
5,500.00	18.30	350.00	5,282.98	1,374.93	-242.44	-241.96	0.00	0.00	0.00
5,600.00	18.30	350.00	5,377.93	1,405.86	-247.89	-247.40	0.00	0.00	0.00
5,617.76	18.30	350.00	5,394.79	1,411.35	-248.86	-248.37	0.00	0.00	0.00
Start DLS 1.00 TFO -180.00									
5,623.25	18.30	350.00	5,400.00	1,413.05	-249.16	-248.66	0.00	0.00	0.00
5,650.61	18.03	350.00	5,426.00	1,421.45	-250.64	-250.14	1.00	-1.00	0.00
Cliff House									
5,687.38	17.66	350.00	5,461.00	1,432.54	-252.60	-252.10	1.00	-1.00	0.00
Menefee									
5,700.00	17.53	350.00	5,473.03	1,436.30	-253.26	-252.76	1.00	-1.00	0.00
5,800.00	16.53	350.00	5,568.64	1,465.14	-258.34	-257.83	1.00	-1.00	0.00
5,869.10	15.84	350.00	5,635.00	1,484.11	-261.69	-261.17	1.00	-1.00	0.00
Point Lookout									
5,900.00	15.53	350.00	5,664.75	1,492.34	-263.14	-262.62	1.00	-1.00	0.00
6,000.00	14.53	350.00	5,761.33	1,517.88	-267.64	-267.11	1.00	-1.00	0.00
6,100.00	13.53	350.00	5,858.34	1,541.76	-271.85	-271.32	1.00	-1.00	0.00
6,200.00	12.53	350.00	5,955.76	1,563.97	-275.77	-275.22	1.00	-1.00	0.00
6,300.00	11.53	350.00	6,053.57	1,584.50	-279.39	-278.84	1.00	-1.00	0.00
6,400.00	10.53	350.00	6,151.72	1,603.35	-282.71	-282.15	1.00	-1.00	0.00
6,487.64	9.66	350.00	6,238.00	1,618.47	-285.38	-284.82	1.00	-1.00	0.00
Mancos									
6,500.00	9.53	350.00	6,250.19	1,620.50	-285.74	-285.17	1.00	-1.00	0.00
6,600.00	8.53	350.00	6,348.94	1,635.96	-288.46	-287.89	1.00	-1.00	0.00
6,650.34	8.03	350.00	6,398.76	1,643.10	-289.72	-289.15	1.00	-1.00	0.00
Start DLS 9.02 TFO 55.69									
6,659.67	7.94	350.00	6,408.00	1,644.38	-289.95	-289.37	1.00	-1.00	0.00
6,700.00	10.44	6.68	6,447.82	1,650.75	-290.01	-289.43	9.00	6.20	41.37
6,750.00	14.22	18.22	6,496.66	1,661.09	-287.56	-286.98	9.00	7.57	23.07
6,800.00	18.33	24.83	6,544.65	1,674.06	-282.33	-281.75	9.00	8.21	13.23

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
6,850.00	22.58	29.06	6,591.49	1,689.60	-274.36	-273.77	9.00	8.50	8.45	
6,900.00	26.91	31.99	6,636.89	1,707.59	-263.70	-263.11	9.00	8.66	5.87	
6,950.00	31.28	34.16	6,680.57	1,727.94	-250.41	-249.81	9.00	8.75	4.34	
7,000.00	35.69	35.85	6,722.26	1,750.52	-234.57	-233.96	9.00	8.80	3.37	
7,050.00	40.11	37.20	6,761.71	1,775.18	-216.28	-215.66	9.00	8.84	2.71	
7,100.00	44.54	38.33	6,798.67	1,801.78	-195.66	-195.03	9.00	8.87	2.26	
7,126.26	46.88	38.86	6,817.00	1,816.46	-183.93	-183.30	9.00	8.88	1.99	
Black Top										
7,150.00	48.99	39.30	6,832.91	1,830.14	-172.82	-172.18	9.00	8.89	1.85	
7,200.00	53.44	40.14	6,864.22	1,860.11	-147.92	-147.27	9.00	8.90	1.68	
7,250.00	57.89	40.89	6,892.42	1,891.49	-121.10	-120.44	9.00	8.91	1.50	
7,300.00	62.35	41.57	6,917.32	1,924.08	-92.53	-91.86	9.00	8.92	1.36	
7,350.00	66.82	42.19	6,938.77	1,957.69	-62.38	-61.70	9.00	8.93	1.25	
7,400.00	71.28	42.78	6,956.64	1,992.12	-30.85	-30.16	9.00	8.93	1.17	
7,450.00	75.75	43.33	6,970.83	2,027.14	1.88	2.58	9.00	8.93	1.11	
7,500.00	80.22	43.87	6,981.23	2,062.54	35.59	36.31	9.00	8.94	1.07	
7,550.00	84.69	44.39	6,987.80	2,098.11	70.10	70.83	9.00	8.94	1.04	
7,600.00	89.16	44.90	6,990.48	2,133.63	105.17	105.92	9.00	8.94	1.02	
7,601.29	89.27	44.91	6,990.50	2,134.54	106.08	106.83	9.00	8.94	1.02	
Start 695.00 hold at 7601.29 MD										
7,609.87	90.04	45.00	6,990.55	2,140.61	112.14	112.89	9.00	8.94	1.02	
7,700.00	90.04	45.00	6,990.49	2,204.34	175.88	176.65	0.00	0.00	0.00	
7,800.00	90.04	45.00	6,990.42	2,275.05	246.59	247.38	0.00	0.00	0.00	
7,900.00	90.04	45.00	6,990.35	2,345.77	317.30	318.12	0.00	0.00	0.00	
8,000.00	90.04	45.00	6,990.28	2,416.48	388.01	388.85	0.00	0.00	0.00	
8,100.00	90.04	45.00	6,990.21	2,487.19	458.72	459.59	0.00	0.00	0.00	
8,200.00	90.04	45.00	6,990.14	2,557.90	529.43	530.32	0.00	0.00	0.00	
8,296.29	90.04	45.00	6,990.07	2,625.98	597.51	598.43	0.00	0.00	0.00	
Start DLS 4.00 TFO 89.99										
8,306.37	90.04	45.00	6,990.06	2,633.11	604.64	605.56	0.00	0.00	0.00	
8,400.00	90.04	48.75	6,990.00	2,697.11	672.97	673.91	4.00	0.00	4.00	
8,500.00	90.04	52.75	6,989.93	2,760.37	750.39	751.35	4.00	0.00	4.00	
8,600.00	90.04	56.75	6,989.85	2,818.08	832.03	833.01	4.00	0.00	4.00	
8,700.00	90.04	60.75	6,989.78	2,869.96	917.50	918.50	4.00	0.00	4.00	
8,800.00	90.04	64.75	6,989.70	2,915.74	1,006.38	1,007.40	4.00	0.00	4.00	
8,900.00	90.04	68.75	6,989.63	2,955.21	1,098.24	1,099.27	4.00	0.00	4.00	
9,000.00	90.04	72.75	6,989.55	2,988.18	1,192.62	1,193.67	4.00	0.00	4.00	
9,100.00	90.04	76.75	6,989.48	3,014.49	1,289.08	1,290.13	4.00	0.00	4.00	
9,200.00	90.04	80.75	6,989.40	3,034.00	1,387.14	1,388.20	4.00	0.00	4.00	
9,300.00	90.04	84.75	6,989.33	3,046.63	1,486.32	1,487.38	4.00	0.00	4.00	
9,393.87	90.04	88.50	6,989.27	3,052.16	1,580.00	1,581.07	4.00	0.00	4.00	
9,400.00	90.04	88.50	6,989.26	3,052.32	1,586.13	1,587.20	0.00	0.00	0.00	
9,420.73	90.04	88.50	6,989.25	3,052.86	1,606.86	1,607.93	0.00	0.00	0.00	
Start 10531.81 hold at 9420.73 MD										
9,500.00	90.04	88.50	6,989.19	3,054.93	1,686.10	1,687.17	0.00	0.00	0.00	
9,600.00	90.04	88.50	6,989.12	3,057.55	1,786.07	1,787.13	0.00	0.00	0.00	
9,700.00	90.04	88.50	6,989.05	3,060.17	1,886.03	1,887.10	0.00	0.00	0.00	
9,800.00	90.04	88.50	6,988.98	3,062.79	1,986.00	1,987.07	0.00	0.00	0.00	
9,900.00	90.04	88.50	6,988.91	3,065.41	2,085.96	2,087.03	0.00	0.00	0.00	
10,000.00	90.04	88.50	6,988.84	3,068.02	2,185.93	2,187.00	0.00	0.00	0.00	
10,100.00	90.04	88.50	6,988.77	3,070.64	2,285.89	2,286.97	0.00	0.00	0.00	
10,200.00	90.04	88.50	6,988.70	3,073.26	2,385.86	2,386.93	0.00	0.00	0.00	
10,300.00	90.04	88.50	6,988.63	3,075.88	2,485.83	2,486.90	0.00	0.00	0.00	

SDT

Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,400.00	90.04	88.50	6,988.56	3,078.49	2,585.79	2,586.87	0.00	0.00	0.00	
10,500.00	90.04	88.50	6,988.49	3,081.11	2,685.76	2,686.83	0.00	0.00	0.00	
10,600.00	90.04	88.50	6,988.42	3,083.73	2,785.72	2,786.80	0.00	0.00	0.00	
10,700.00	90.04	88.50	6,988.35	3,086.35	2,885.69	2,886.77	0.00	0.00	0.00	
10,800.00	90.04	88.50	6,988.28	3,088.96	2,985.65	2,986.73	0.00	0.00	0.00	
10,900.00	90.04	88.50	6,988.21	3,091.58	3,085.62	3,086.70	0.00	0.00	0.00	
11,000.00	90.04	88.50	6,988.14	3,094.20	3,185.59	3,186.67	0.00	0.00	0.00	
11,100.00	90.04	88.50	6,988.07	3,096.82	3,285.55	3,286.63	0.00	0.00	0.00	
11,200.00	90.04	88.50	6,988.01	3,099.44	3,385.52	3,386.60	0.00	0.00	0.00	
11,300.00	90.04	88.50	6,987.94	3,102.05	3,485.48	3,486.56	0.00	0.00	0.00	
11,400.00	90.04	88.50	6,987.87	3,104.67	3,585.45	3,586.53	0.00	0.00	0.00	
11,500.00	90.04	88.50	6,987.80	3,107.29	3,685.41	3,686.50	0.00	0.00	0.00	
11,600.00	90.04	88.50	6,987.73	3,109.91	3,785.38	3,786.46	0.00	0.00	0.00	
11,643.87	90.04	88.50	6,987.70	3,111.05	3,829.23	3,830.32	0.00	0.00	0.00	
11,700.00	90.04	89.62	6,987.66	3,111.97	3,885.36	3,886.44	2.00	0.00	2.00	
11,737.27	90.04	90.37	6,987.63	3,111.98	3,922.62	3,923.71	2.00	0.00	2.00	
11,800.00	90.04	90.37	6,987.59	3,111.57	3,985.35	3,986.44	0.00	0.00	0.00	
11,900.00	90.04	90.37	6,987.52	3,110.93	4,085.35	4,086.44	0.00	0.00	0.00	
12,000.00	90.04	90.37	6,987.46	3,110.29	4,185.35	4,186.44	0.00	0.00	0.00	
12,100.00	90.04	90.37	6,987.39	3,109.65	4,285.35	4,286.43	0.00	0.00	0.00	
12,200.00	90.04	90.37	6,987.32	3,109.01	4,385.35	4,386.43	0.00	0.00	0.00	
12,300.00	90.04	90.37	6,987.26	3,108.36	4,485.34	4,486.43	0.00	0.00	0.00	
12,400.00	90.04	90.37	6,987.19	3,107.72	4,585.34	4,586.43	0.00	0.00	0.00	
12,500.00	90.04	90.37	6,987.12	3,107.08	4,685.34	4,686.42	0.00	0.00	0.00	
12,600.00	90.04	90.37	6,987.06	3,106.44	4,785.34	4,786.42	0.00	0.00	0.00	
12,700.00	90.04	90.37	6,986.99	3,105.79	4,885.34	4,886.42	0.00	0.00	0.00	
12,800.00	90.04	90.37	6,986.92	3,105.15	4,985.33	4,986.42	0.00	0.00	0.00	
12,900.00	90.04	90.37	6,986.86	3,104.51	5,085.33	5,086.41	0.00	0.00	0.00	
13,000.00	90.04	90.37	6,986.79	3,103.87	5,185.33	5,186.41	0.00	0.00	0.00	
13,100.00	90.04	90.37	6,986.72	3,103.22	5,285.33	5,286.41	0.00	0.00	0.00	
13,200.00	90.04	90.37	6,986.66	3,102.58	5,385.33	5,386.41	0.00	0.00	0.00	
13,300.00	90.04	90.37	6,986.59	3,101.94	5,485.32	5,486.41	0.00	0.00	0.00	
13,400.00	90.04	90.37	6,986.52	3,101.30	5,585.32	5,586.40	0.00	0.00	0.00	
13,500.00	90.04	90.37	6,986.46	3,100.65	5,685.32	5,686.40	0.00	0.00	0.00	
13,600.00	90.04	90.37	6,986.39	3,100.01	5,785.32	5,786.40	0.00	0.00	0.00	
13,700.00	90.04	90.37	6,986.32	3,099.37	5,885.31	5,886.40	0.00	0.00	0.00	
13,800.00	90.04	90.37	6,986.25	3,098.73	5,985.31	5,986.39	0.00	0.00	0.00	
13,900.00	90.04	90.37	6,986.19	3,098.09	6,085.31	6,086.39	0.00	0.00	0.00	
14,000.00	90.04	90.37	6,986.12	3,097.44	6,185.31	6,186.39	0.00	0.00	0.00	
14,100.00	90.04	90.37	6,986.05	3,096.80	6,285.31	6,286.39	0.00	0.00	0.00	
14,200.00	90.04	90.37	6,985.99	3,096.16	6,385.30	6,386.38	0.00	0.00	0.00	
14,300.00	90.04	90.37	6,985.92	3,095.52	6,485.30	6,486.38	0.00	0.00	0.00	
14,400.00	90.04	90.37	6,985.85	3,094.87	6,585.30	6,586.38	0.00	0.00	0.00	
14,500.00	90.04	90.37	6,985.79	3,094.23	6,685.30	6,686.38	0.00	0.00	0.00	
14,600.00	90.04	90.37	6,985.72	3,093.59	6,785.30	6,786.38	0.00	0.00	0.00	
14,700.00	90.04	90.37	6,985.65	3,092.95	6,885.29	6,886.37	0.00	0.00	0.00	
14,800.00	90.04	90.37	6,985.59	3,092.30	6,985.29	6,986.37	0.00	0.00	0.00	
14,900.00	90.04	90.37	6,985.52	3,091.66	7,085.29	7,086.37	0.00	0.00	0.00	
15,000.00	90.04	90.37	6,985.45	3,091.02	7,185.29	7,186.37	0.00	0.00	0.00	
15,100.00	90.04	90.37	6,985.39	3,090.38	7,285.29	7,286.36	0.00	0.00	0.00	
15,200.00	90.04	90.37	6,985.32	3,089.74	7,385.28	7,386.36	0.00	0.00	0.00	
15,300.00	90.04	90.37	6,985.25	3,089.09	7,485.28	7,486.36	0.00	0.00	0.00	
15,400.00	90.04	90.37	6,985.19	3,088.45	7,585.28	7,586.36	0.00	0.00	0.00	
15,500.00	90.04	90.37	6,985.12	3,087.81	7,685.28	7,686.35	0.00	0.00	0.00	

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
15,600.00	90.04	90.37	6,985.05	3,087.17	7,785.28	7,786.35	0.00	0.00	0.00	
15,700.00	90.04	90.37	6,984.99	3,086.52	7,885.27	7,886.35	0.00	0.00	0.00	
15,800.00	90.04	90.37	6,984.92	3,085.88	7,985.27	7,986.35	0.00	0.00	0.00	
15,900.00	90.04	90.37	6,984.85	3,085.24	8,085.27	8,086.35	0.00	0.00	0.00	
16,000.00	90.04	90.37	6,984.79	3,084.60	8,185.27	8,186.34	0.00	0.00	0.00	
16,100.00	90.04	90.37	6,984.72	3,083.95	8,285.26	8,286.34	0.00	0.00	0.00	
16,200.00	90.04	90.37	6,984.65	3,083.31	8,385.26	8,386.34	0.00	0.00	0.00	
16,300.00	90.04	90.37	6,984.59	3,082.67	8,485.26	8,486.34	0.00	0.00	0.00	
16,400.00	90.04	90.37	6,984.52	3,082.03	8,585.26	8,586.33	0.00	0.00	0.00	
16,500.00	90.04	90.37	6,984.45	3,081.38	8,685.26	8,686.33	0.00	0.00	0.00	
16,600.00	90.04	90.37	6,984.39	3,080.74	8,785.25	8,786.33	0.00	0.00	0.00	
16,700.00	90.04	90.37	6,984.32	3,080.10	8,885.25	8,886.33	0.00	0.00	0.00	
16,800.00	90.04	90.37	6,984.25	3,079.46	8,985.25	8,986.32	0.00	0.00	0.00	
16,900.00	90.04	90.37	6,984.19	3,078.82	9,085.25	9,086.32	0.00	0.00	0.00	
17,000.00	90.04	90.37	6,984.12	3,078.17	9,185.25	9,186.32	0.00	0.00	0.00	
17,100.00	90.04	90.37	6,984.05	3,077.53	9,285.24	9,286.32	0.00	0.00	0.00	
17,200.00	90.04	90.37	6,983.99	3,076.89	9,385.24	9,386.32	0.00	0.00	0.00	
17,300.00	90.04	90.37	6,983.92	3,076.25	9,485.24	9,486.31	0.00	0.00	0.00	
17,400.00	90.04	90.37	6,983.85	3,075.60	9,585.24	9,586.31	0.00	0.00	0.00	
17,500.00	90.04	90.37	6,983.79	3,074.96	9,685.24	9,686.31	0.00	0.00	0.00	
17,600.00	90.04	90.37	6,983.72	3,074.32	9,785.23	9,786.31	0.00	0.00	0.00	
17,700.00	90.04	90.37	6,983.65	3,073.68	9,885.23	9,886.30	0.00	0.00	0.00	
17,800.00	90.04	90.37	6,983.59	3,073.03	9,985.23	9,986.30	0.00	0.00	0.00	
17,900.00	90.04	90.37	6,983.52	3,072.39	10,085.23	10,086.30	0.00	0.00	0.00	
18,000.00	90.04	90.37	6,983.45	3,071.75	10,185.23	10,186.30	0.00	0.00	0.00	
18,100.00	90.04	90.37	6,983.39	3,071.11	10,285.22	10,286.29	0.00	0.00	0.00	
18,200.00	90.04	90.37	6,983.32	3,070.47	10,385.22	10,386.29	0.00	0.00	0.00	
18,300.00	90.04	90.37	6,983.25	3,069.82	10,485.22	10,486.29	0.00	0.00	0.00	
18,400.00	90.04	90.37	6,983.19	3,069.18	10,585.22	10,586.29	0.00	0.00	0.00	
18,500.00	90.04	90.37	6,983.12	3,068.54	10,685.21	10,686.29	0.00	0.00	0.00	
18,600.00	90.04	90.37	6,983.05	3,067.90	10,785.21	10,786.28	0.00	0.00	0.00	
18,700.00	90.04	90.37	6,982.99	3,067.25	10,885.21	10,886.28	0.00	0.00	0.00	
18,800.00	90.04	90.37	6,982.92	3,066.61	10,985.21	10,986.28	0.00	0.00	0.00	
18,900.00	90.04	90.37	6,982.85	3,065.97	11,085.21	11,086.28	0.00	0.00	0.00	
19,000.00	90.04	90.37	6,982.78	3,065.33	11,185.20	11,186.27	0.00	0.00	0.00	
19,100.00	90.04	90.37	6,982.72	3,064.68	11,285.20	11,286.27	0.00	0.00	0.00	
19,200.00	90.04	90.37	6,982.65	3,064.04	11,385.20	11,386.27	0.00	0.00	0.00	
19,300.00	90.04	90.37	6,982.58	3,063.40	11,485.20	11,486.27	0.00	0.00	0.00	
19,400.00	90.04	90.37	6,982.52	3,062.76	11,585.20	11,586.26	0.00	0.00	0.00	
19,500.00	90.04	90.37	6,982.45	3,062.12	11,685.19	11,686.26	0.00	0.00	0.00	
19,600.00	90.04	90.37	6,982.38	3,061.47	11,785.19	11,786.26	0.00	0.00	0.00	
19,700.00	90.04	90.37	6,982.32	3,060.83	11,885.19	11,886.26	0.00	0.00	0.00	
19,800.00	90.04	90.37	6,982.25	3,060.19	11,985.19	11,986.26	0.00	0.00	0.00	
19,900.00	90.04	90.37	6,982.18	3,059.55	12,085.19	12,086.25	0.00	0.00	0.00	
19,952.55	90.04	90.37	6,982.15	3,059.21	12,137.73	12,138.80	0.00	0.00	0.00	
FPP @ 330' FEL										
20,000.00	90.04	90.37	6,982.12	3,058.90	12,185.18	12,186.25	0.00	0.00	0.00	
20,100.00	90.04	90.37	6,982.05	3,058.26	12,285.18	12,286.25	0.00	0.00	0.00	
20,166.13	90.04	90.37	6,982.01	3,057.84	12,351.31	12,352.37	0.00	0.00	0.00	
TD at 20166.31' MD @ 116' FEL										
20,176.02	90.04	90.37	6,982.00	3,057.77	12,361.20	12,362.26	0.00	0.00	0.00	

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
RU 690H SHL - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	2,154,226.49	2,854,608.70	36.919200	-107.383422
RU 690H KOP - plan hits target center - Point	0.00	0.00	6,408.00	1,644.38	-289.95	2,155,869.48	2,854,311.00	36.923717	-107.384414
RU 690H PBHL - plan hits target center - Point	0.00	0.00	6,982.00	3,057.77	12,361.20	2,157,342.54	2,866,955.33	36.927591	-107.341132
RU 690H FPP - plan misses target center by 1.46usft at 19962.26usft MD (6982.14 TVD, 3059.15 N, 12147.44 E) - Point	0.00	0.00	6,982.14	3,057.69	12,147.43	2,157,341.44	2,866,741.57	36.927591	-107.341863
RU 690H IP3 - plan hits target center - Point	0.00	0.00	6,987.70	3,111.05	3,829.23	2,157,355.57	2,858,423.21	36.927745	-107.370321
RU 690H IP2 - plan hits target center - Point	0.00	0.00	6,989.27	3,052.16	1,580.00	2,157,286.06	2,856,174.28	36.927583	-107.378017
RU 690H IP1 - plan hits target center - Point	0.00	0.00	6,990.06	2,633.11	604.64	2,156,862.42	2,855,200.91	36.926432	-107.381354
RU 690H POE - plan hits target center - Point	0.00	0.00	6,990.55	2,140.61	112.14	2,156,367.60	2,854,710.74	36.925080	-107.383039

Formations						
	Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
	(usft)	(usft)			(°)	(°)
	2,504.52	2,439.00	Ojo Alamo			
	2,630.91	2,559.00	Kirtland			
	2,945.84	2,858.00	Fruitland			
	3,096.46	3,001.00	T/Coals			
	3,271.30	3,167.00	B/Coals			
	3,483.01	3,368.00	Pictured Cliffs			
	3,591.50	3,471.00	Lewis			
	4,832.25	4,649.00	Chacra			
	5,318.86	5,111.00	U/Cliff House			
	5,650.61	5,426.00	Cliff House			
	5,687.38	5,461.00	Menefee			
	5,869.10	5,635.00	Point Lookout			
	6,487.64	6,238.00	Mancos			
	7,126.26	6,817.00	Black Top			

SDT
Planning Report

Database:	EDM 5000 Multi User Db	Local Co-ordinate Reference:	Well Rosa Unit #690H
Company:	Logos Operating LLC	TVD Reference:	6347+30 @ 6377.00usft (H&P 530)
Project:	Rio Arriba, NM (NAD83)	MD Reference:	6347+30 @ 6377.00usft (H&P 530)
Site:	Rosa Unit 34	North Reference:	True
Well:	Rosa Unit #690H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim 5		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.00	500.00	0.00	0.00	Start Build 2.00
1,392.50	1,382.43	107.26	-18.91	Start 4225.26 hold at 1392.50 MD
5,617.76	5,394.79	1,411.35	-248.86	Start DLS 1.00 TFO -180.00
6,650.34	6,398.76	1,643.10	-289.72	Start DLS 9.02 TFO 55.69
7,601.29	6,990.50	2,134.54	106.08	Start 695.00 hold at 7601.29 MD
8,296.29	6,990.07	2,625.98	597.51	Start DLS 4.00 TFO 89.99
9,420.73	6,989.25	3,052.86	1,606.86	Start 10531.81 hold at 9420.73 MD
19,952.55	6,982.15	3,059.21	12,137.73	FPP @ 330' FEL
20,166.13	6,982.01	3,057.84	12,351.31	TD at 20166.31' MD @ 116' FEL

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
<https://www.emnrd.nm.gov/oed/contact-us>

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 471343

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 471343
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
etta trujillo	Cement is required to circulate on both surface and intermediate1 strings of casing.	6/5/2025
etta trujillo	If cement does not circulate on any string, a Cement Bond Log (CBL) is required for that string of casing.	6/5/2025
ward.rikala	Notify the OCD 24 hours prior to casing & cement.	7/15/2025
ward.rikala	File As Drilled C-102 and a directional Survey with C-104 completion packet.	7/15/2025
ward.rikala	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string.	7/15/2025
ward.rikala	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.	7/15/2025