

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well ☐ Oil Well ☒ Gas Well ☐ Other		5. Lease Serial No. NMNM03358
2. Name of Operator BP AMERICA PRODUCTION CO		6. If Indian, Allottee or Tribe Name
Contact: TOYA COLVIN E-Mail: Toya.Colvin@bp.com		7. If Unit or CA/Agreement, Name and/or No.
3a. Address PO BOX 3092 HOUSTON, TX 77253	3b. Phone No. (include area code) Ph: 281.892.5369	8. Well Name and No. NEBU 604 COM 2H
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 13 T31N R7W SWNW 1891FNL 594FWL 36.901585 N Lat, 107.529243 W Lon		9. API Well No. 30-045-35794-00-X1
		10. Field and Pool or Exploratory Area BASIN MANCOS
		11. County or Parish, State SAN JUAN COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original A
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	PD

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Please see the attached change to our APD casing for the subject well.

Updated C-102 and drill plan documents are attached.

OIL CONS. DIV DIST. 3
MAY 23 2017

14. I hereby certify that the foregoing is true and correct. Electronic Submission #374552 verified by the BLM Well Information System For BP AMERICA PRODUCTION CO, sent to the Farmington Committed to AFMSS for processing by JACK SAVAGE on 05/02/2017 (17JWS0090SE)	
Name (Printed/Typed) TOYA COLVIN	Title REGULATORY ANALYST
Signature (Electronic Submission)	Date 05/02/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By JACK SAVAGE	Title PETROLEUM ENGINEER	Date 05/04/2017
Conditions of approval, if any, are attached. Approval of this notice 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.		Office Farmington

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.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

NMOCDA

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office
☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-045-35794	² Pool Code 97232	³ Pool Name Basin Mancos Gas
⁴ Property Code	⁵ Property Name Northeast Blanco Unit 604 Com	
⁷ OGRID No. 000778	⁸ Operator Name BP America Production Company	⁶ Well Number 2H ⁹ Elevation 6500

¹⁰ Surface Location

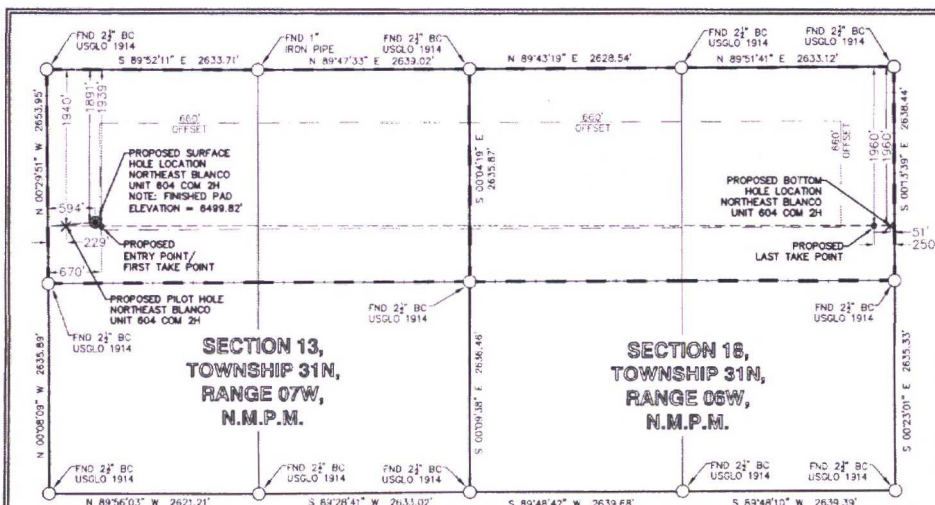
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	13	31N	07W		1891	North	594	West	San Juan

¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	18	31N	06W		1960	North	51	East	San Juan

¹² Dedicated Acres 640.00 N/2 - SEC. 13 N/2 - SEC. 18	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



LEGEND
FOUND MONUMENT O
PROPOSED SURFACE HOLE LOCATION X
PROPOSED BOTTOM HOLE LOCATION X

¹⁷ OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and 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 such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division

Signature: *Toya Colvin* Date: 5/01/17
Printed Name: Toya Colvin

E-mail Address: toya.colvin@bp.com

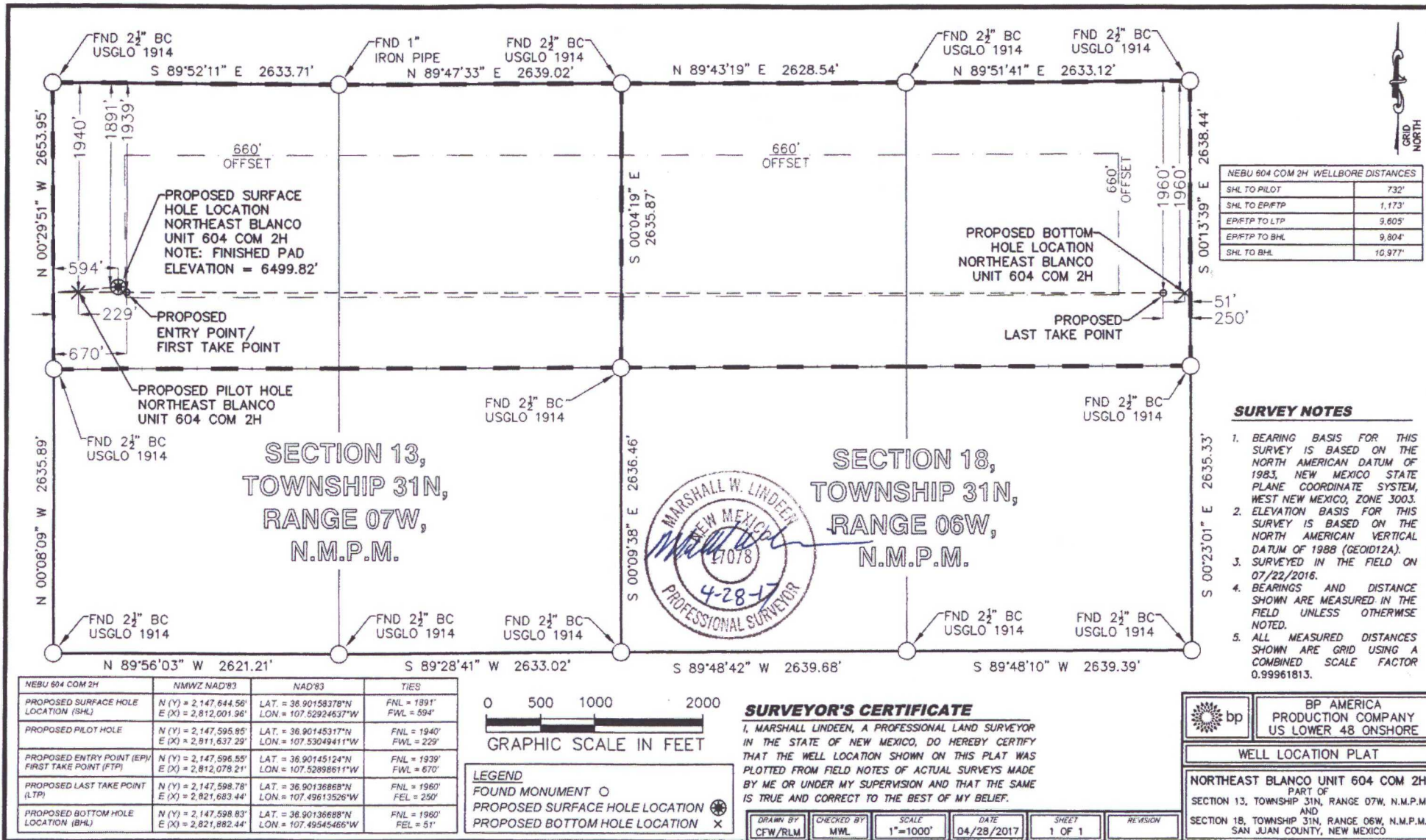
¹⁸ SURVEYOR CERTIFICATION

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.

7-22-16
Date of Survey
Signature and Seal of Professional Surveyor

17078
Certificate Number
MARSHALL W. LINDEEN
NEW MEXICO
17078
PROFESSIONAL SURVEYOR
4-28-17

NEBU 604 COM 2H	NMWZ NAD'83	NAD'83	TIES
PROPOSED SURFACE HOLE LOCATION (SHL)	N (Y) = 2,147,644.56' E (X) = 2,812,001.96'	LAT. = 36.90158378°N LON. = 107.52924637°W	FNL = 1891' FWL = 594'
PROPOSED PILOT HOLE	N (Y) = 2,147,595.85' E (X) = 2,811,637.29'	LAT. = 36.90145317°N LON. = 107.53049411°W	FNL = 1940' FWL = 229'
PROPOSED ENTRY POINT (EP)/ FIRST TAKE POINT (FTP)	N (Y) = 2,147,596.55' E (X) = 2,812,078.21'	LAT. = 36.90145124°N LON. = 107.52898611°W	FNL = 1939' FWL = 670'
PROPOSED LAST TAKE POINT (LTP)	N (Y) = 2,147,598.78' E (X) = 2,821,683.44'	LAT. = 36.90136868°N LON. = 107.49613526°W	FNL = 1960' FEL = 250'
PROPOSED BOTTOM HOLE LOCATION (BHL)	N (Y) = 2,147,598.83' E (X) = 2,821,882.44'	LAT. = 36.90136688°N LON. = 107.49545466°W	FNL = 1960' FEL = 51'



**Attachment to Application for Permit to Drill.
Drilling program**

**BP America Production Company
US Lower 48 Onshore
200 Energy Court
Farmington, NM 87401**

NEBU 604 #2H
Mancos Horizontal Development Well
Surface Location: 1891' FNL & 594' FWL
Section 13, T31N, R07W
GL Elevation = 6499.82'
Lat. = 36.90158378°N
Long. = 107.52924637°W
NAD83
San Juan County, New Mexico

**Proposed Bottom Hole Location Pilot: 1940' FNL – 229' FWL
Section 13, T31N, R07W**

**Proposed Bottom Hole Location Lateral: 1960' FNL – 51' FEL
Section 18, T31N, R06W
San Juan County, New Mexico**

**Drilling program written in compliance with onshore Oil and Gas
Order No. 1**

(III.D.3, effective May 2007) and Onshore Order No. 2 Dated November 18, 1988

SECTION – 1 – GEOLOGIC FORMATIONS AND CONTENTS

Marker	TVD	MD	Comments	BHP PSI/FT
Tertiary/San Jose Ss	25	25	Wet/aquifer	0.43
Ojo Alamo Ss	2,385	2,392	Wet/aquifer	0.43
Kirtland (Top/Cretaceous)	2,505	2,513	Gas & water-bearing	0.43
Fruitland	3,000	3,014	Gas & water-bearing	0.15
Lemon coal zone	3,195	3,211	Gas & water-bearing	0.07
Ignacio coal zone	3,240	3,257	Gas & water-bearing	0.07
Cotton Wood Coal	3,315	3,333	Gas & water-bearing	0.07
Pictured Cliff Ss	3,335	3,353	Wet	0.12
Cliffhouse Ss	5,415	5,455	Gas- & water-bearing	0.35
Mancos sh	6,180	6,220	Gas-bearing	0.43
Sanostee sh	7,455	7,499	Gas-bearing	0.30
Greenhorn ls	7,780	7,825	Gas-bearing	0.30
Burro Canyon	8,150	8,197	Gas- & water-bearing	0.30
Pilot Hole TD – Morrison Ss	8,450	8,498	Water-bearing	0.30

Possible Aquifers: San Jose and Ojo Alamo

Oil Shale: None Expected.

Oil & Gas: Primary objective is the Mancos formation from 7,030' TVD (heel) to 7,030' TVD (toe). Landing point is expected to be in the Mancos at 7,030' TVD.

Protection of oil, gas, water, or other mineral bearing formations: Protection shall be accomplished by setting surface casing below base of possible aquifer and cementing surface casing to surface.

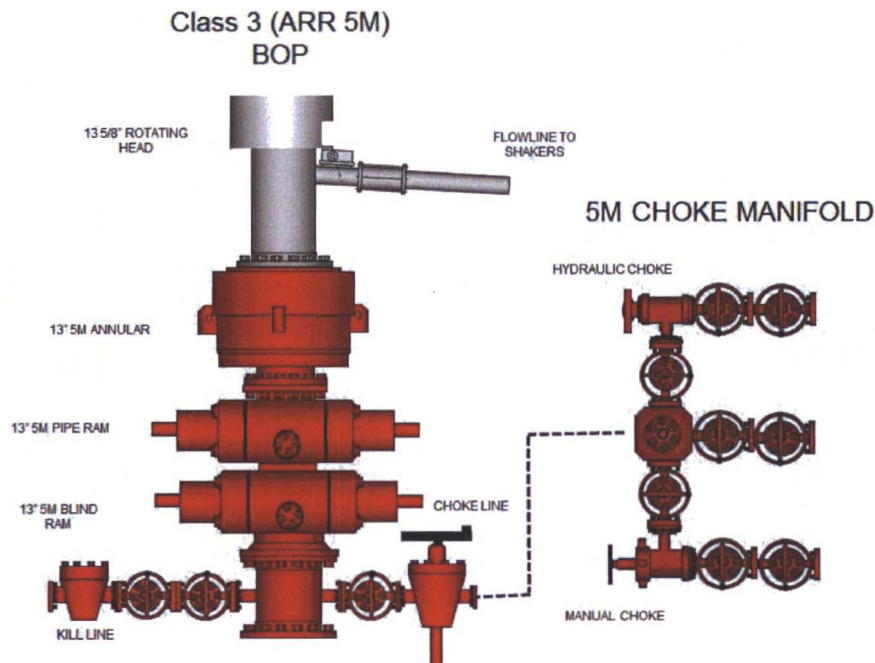
SECTION – 2 BOPE

BOP equipment and accessories will meet or exceed BLM requirements outlined in 43 CFR Part 3160.

A 13 5/8" 5M BOPE will be utilized to drill this well. Maximum anticipated surface pressure for 13 5/8" 5M BOPE is 1,565 psi. The 13 5/8" BOPE will be tested 250 psi (Low) for 5 minutes and 5000 psi (High) for 10 minutes. Pressure test conductor, surface, and intermediate casing(s) to 1500 psi for 30 minutes. All preventers and surface casing will be tested before drilling out of surface casing. 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 rams will be activated daily and blind rams shall be activated each trip or at least weekly. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE.

		BHP	MASP
13 5/8" 5M BOPE	7,450 TVD	3,204	1,565

13-5/8" BOPE



SECTION – 3 Casing

Bit Program

26" Conductor Hole = Surface to 120'
17 1/2" Surface Hole = 120' to 1,000'
12 1/4" Intermediate Hole = 1,000' to 6,400'
8 3/4" Pilot Hole = 6,400 to 8,498' MD
8 3/4" Curve and Lateral = 6,547' MD (KOP) to 17,242' MD

Casing Program – all casing strings are new casing

Type	Casing & Hole Size	Weight	Grade	Coupling	Setting Depth (MD)	Comments
Conductor	20" (26")	94 ppf	J55	BT&C	0' - 120'	New casing. Conductor Casing maybe preset. Will be cemented to surface
Surface	13-3/8" (17-1/2")	54.5 ppf	J-55	BT&C	0' - 1,000'	New Casing. Surface Casing maybe preset
Intermediate	9-5/8" (12-1/4")	40 ppf	P110HC	BT&C	0' - 6,400'	New Casing. Two Stage Cement to surface
Production	5-1/2" (8-3/4")	20 ppf	P-110	GBCD	0' - 17,242'	New Casing – Single Stage Cement to overlap previous casing shoe.

Design Factor Table

Conductor Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

	Collapse	Burst	Tension
Min Safety Factors	1.125	1.100	1.400

	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)	Notes
Conductor	20	94	J55	BTC	520	2,110	1,480,000	1,402,000	
					80% of Burst =	1,688			

	Casing Depth	MW in	MW out	Pres in	Pres out	SF	
Collapse	120	0	8.33	0	52	10.00	
Burst	120	8.3	0	1500	0	1.41	1500psi casing test
		Mud Wt	Air Wt	Bouy Wt	BW +100k		
Tension (Pipe Body)	120	9.0	11,280	9,730	109,730	13.49	100k over pull
Tension (Connection)	120	9.0	11,280	9,730	109,730	12.78	
		BF= 1- (MW)/65.5 = 0.8626					

Surface Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

	Collapse	Burst	Tension
Min Safety Factors	1.125	1.100	1.400

	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)	Notes
Surface	13.375	54	K55	BTC	1,130	2,740	853,000	909,000	
					80% of Burst =	2,192			

	Casing Depth	MW in	MW out	Pres in	Pres out	SF	
Collapse	1000	0	15.80	0	822	1.38	Full evacuation with 15.8ppg cement in the annulus
Burst	1000	9.0	0	1500	0	1.83	1500psi casing test
		Mud Wt	Air Wt	Bouy Wt	BW +100k		
Tension (Pipe Body)	1000	9.0	54,000	46,580	146,580	5.82	100k over pull
Tension (Connection)	1000	9.0	54,000	46,580	146,580	6.20	
		BF= 1- (MW)/65.5 = 0.8626					

Intermediate Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

					Collapse	Burst	Tension		
Min Safety Factors					1.125	1.100	1.400		
	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)	Notes
Intermediate	9.625	40	P110HC	BTC	4,230	7,910	1,260,000	1,266,000	
					80% of Burst =		6,328		
	Casing Depth TVD	MW in	MW out	Pres in	Pres out	SF			
Collapse	6359	0.00	10.00	0	3307	1.28	Full evacuatio with 10 ppg mud outside		
Burst	6359	9.0	0	1500	0	5.27	1500 psi casing test		
		Mud Wt	Air Wt	Bouy Wt	BW +100k				
Tension (Pipe Body)	6359	9.0	254,360	219,410	319,410	3.94	100k over pull		
Tension (Connection)	6359	9.0	254,360	219,410	319,410	3.96			
BF= 1- (MW)/65.5 = 0.8626									

Production Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

					Collapse	Burst	Tension		
Min Safety Factors					1.125	1.100	1.400		
	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)	Notes
Production	5.5	20	P110	GBCD	13,300	10,640	546,000	568,000	
					80% of Burst =		8,512		
	Casing Depth TVD	MW in	MW out	Pres in	Pres out	SF			
Collapse	7030	0.00	13.30	0	4862	2.74	Full evacuation with 13.3 ppg cement in the annulus		
Burst	7030	9.0	0	1500	0	7.09	1500 psi casing test		
		Mud Wt	Air Wt	Bouy Wt	BW +100k				
Tension (Pipe Body)	7030	9.0	140,600	121,281	221,281	2.47	100k over pull		
Tension (Connection)	7030	9.0	140,600	121,281	221,281	2.57			
BF= 1- (MW)/65.5 = 0.8626									

All casing strings including conductor casing will be tested to .22 psi per foot of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield.

Minimum casing design factors used:

Collapse -	1.125
Burst -	1.1
Jt. Strength -	1.40

Surface Casing – Centralizers shall be placed on the first 4 (bottom 4) joints of casing (1 per joint) and 1 every 3rd joint to surface.

Intermediate casing – Centralizers shall be placed on first 3 (bottom 3) joints of casing (1 per joint) and 1 every 3rd joint to surface. DV tool will be placed at +/- 2,400' MD.

Production String – Centralizers will be placed at discretion in lateral to achieve adequate standoff for quality cement job. A toe sleeve will be placed 2 joints above shoe track.

NOTE: DV tool placement is described in cement section and will be used at the discretion of the operator if there is evidence of heavy losses and we are concerned that cement will not make it to surface.

*Surface casing maybe preset with a preset rig.

SECTION – 4 Cement

The proposed cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. All indications of useable water shall be reported.

- Pea Gravel or other material shall not be used to fill up around the conductor casing or surface casing in the event cement fall back occurs.
- The conductor casing and surface casing shall in all cases be cemented back to surface. In the event cement does not circulate to surface or fall back of the cement column occurs, remedial cementing shall be done to cement the casing back to surface. No more than the top 100' will be remediated with 1" line if fall back occurs. Anything more than 100' will require plan approval to remediate.
- Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.
- Cement Volumes may be adjusted based on hole conditions.

Conductor Casing Single Stage Job – (0-120' MD/TVD): 27" hole x 20" casing – 100% XS

Cement will be circulated to surface with 367 sx of Class G cement, 15.8 ppg, 1.174 ft³/sk, 94 lbm/sk, 2% CaCl, 0.1250 lbm/sk Poly E Flake, 5.13 Gal/sk fresh water. Volume 430 ft³

Surface Casing Single Stage Job – (0-1,000' MD/TVD): 17-1/2" hole x 13-3/8" casing – 100% XS

Cement will be circulated to surface with 753 sx of Class G cement, 15.8 ppg, 1.174 ft³/sk, 94 lbm/sk, 2% CaCl, 0.1250 lbm/sk Poly E Flake, 5.13 Gal/sk fresh water. Volume 884 ft³

Intermediate Casing – Two Stage (0-6,400' MD/6,359' TVD): 12-1/4" (1,000' to 6,400') hole x 9-5/8" casing with stage tool @ +/- 2,400' MD

Cement will be circulated to surface. Stage 1 Lead – 1075 sx of Poz 12.3 ppg, 1.958 ft³/sk, 61.10 lbm/sk, 0.1250 lbm/sk Poly E Flake, 10.42 Gal/sk fresh water. Tail – 220 sx 15.8 ppg, 1.147 ft³/sk, 94 lbm/sk, 0.10% Halad, 0.150 lbm/sk Poly E Flake, 4.96 Gal/sk freshwater. Stage 2 Lead – 1225 sx of Poz 12.3 ppg, 2.005 ft³/sk, 61.10 lbm/sk, 2% CaCl, 0.1250 lbm/sk Poly E Flake, 10.74 Gal/sk. Tail – 270 sx 15.8 ppg, 1.147 ft³/sk, 94 lbm/sk, 4.99 Gal/sk. Volume 5,079 ft³

Production Casing – Single Stage Conventional Cement (0' - 17,242' MD/ 7,030' TVD) 8-3/4" hole x 5-1/2" casing:

Estimated top of cement at 5,400' MD. 1650 sx of Class G cement, 15.8 ppg, 1.174 ft³/sk, 94 lbm/sk, 2% CaCl, 0.1250 lbm/sk Poly E Flake, 5.13 Gal/sk fresh water Volume 1921 ft³

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.

SECTION – 5 Circulating Medium (Mud Program)

CLOSED-LOOP SYSTEM DESIGN PLAN

The closed-loop system will consist of a series of temporary above-ground storage tanks and/or haul-off bins suitable for holding the cuttings and fluids from drilling operations. The closed-loop system will not entail temporary pits, below-grade storage tanks, below-grade sumps, or drying pads.

Design considerations include:

- The closed-loop system will be signed in accordance with 19.15.17.11 NMAC.
- The closed-loop system storage tanks will be of adequate volume to ensure confinement of all fluids and provide sufficient freeboard to prevent uncontrolled releases.
- Topsoil will be salvaged and stored for use in reclamation activities.

CLOSED-LOOP SYSTEM OPERATING & MAINTENANCE PLAN

The closed-loop system will be operated and maintained to contain liquids and solids; minimize the amount of drilling fluids and cuttings that require disposal; maximize the amount of drilling fluid recycled and reused in the drilling process; isolate drilling wastes from the environment; prevent contamination of fresh water; and protect public health and the environment.

Operation and maintenance considerations include:

- Fluid levels will be maintained to provide sufficient freeboard to prevent over-topping.
- Visual inspections will be conducted on a daily basis to identify any potential leaks and to ensure that the closed-loop system storage tanks have sufficient freeboard to prevent over-topping.
- Only drilling fluids or cuttings intrinsic to, used by, or generated from, drilling operations will be stored in the closed-loop system storage tanks. Hazardous waste, miscellaneous solid waste, and/or debris will not be stored in the storage tanks.
- The OCD District Office will be notified within 48 hours of discovery of a leak in the closed-loop drilling system. If a leak is discovered, all liquid will be removed within 48 hours and the damage repaired.

CLOSED-LOOP SYSTEM CLOSURE PLAN

The closed-loop system will be closed in accordance with 19.15.17.13 NMAC. Closure

considerations include:

- Drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical.
- Residual fluids will be pulled from the storage tanks, mixed with saw dust or similar absorbent material, and disposed of at Industrial Envirotech, Inc. waste disposal facilities.
- Remaining cuttings or sludges will be vacuumed from the storage tanks and disposed of at the Envirotech, Inc and/or Industrial Ecosystem, Inc. waste disposal facilities.
- Storage tanks will be removed from the well location during the rig move.
- The well pad will be reclaimed and seeded in accordance with subsections G, H and I of 19.15.17.13 NMAC.

Mud Tables

Interval (MD)	Hole Section	Hole Size	Type	MW	FL	PV	YP	PH	REMARKS
0'-120'	Conductor	27"	FW/Gel	8.4	NC	8	12	9.0	Spud Mud
0'-1,000'	Surface	17-1/2"	FW/Gel	8.4	NC	8	12	9.0	Spud Mud
1,000'-6,400'	Intermediate	12-1/4"	LSND	8.6-10.0	<8	4-6	12-15	10.0	Fresh Water
6,400'-17,242'	Production	8-3/4"	LSND	9.0-13.0	<8	14-20	8-14	11.0	Fresh Water

Contingency

Interval (MD)	Hole Section	Hole Size	Type	MW	FL	PV	YP	PH	REMARKS
1,000'-6,400'	Intermediate	12-1/4"	Aerated Fluid	7.5-9.0	<8	4-6	12-15	10.0	Fresh water w/ air
6,400'-17,242'	Production	8-3/4"	OBM	9.0-13.0	<8	14-20	8-14	11.0	OBM

Sufficient weighting material will be on hand to weight mud up to 1 PPG over, if required.

The formula for weight up with barite is listed below:

$$\text{Sacks of Barite per 100 bbl of mud} = 1470 \times (W2 - W1) \div (35 - W2)$$

Where; W1 = current mud weight

W2 = new mud weight

$$\text{Sacks} = 1470 \times (10 - 9) / (35 - 10) = 59 \text{ sx} \times 5 \text{ (500bbls minimum)} = 294 \text{sx}$$

Pason Pit Volume Totalizer (PVT) equipment (or equivalent) will be on each pit to monitor pit levels. A trip tank equipped with a Pason PVT will be used to monitor trip volumes.

A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals, including fresh water and oil-based operations. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of as outlined is surface use plane location will be lined in accordance with the Surface Use Plan of Operations.

SECTION – 6 Test, Logging & Coring

Testing: None planned.

Logging:

Quad Combo – 9-5/8" Intermediate shoe to Pilot Hole TD

Azimuthal and Radial GR – Drilling curve and lateral

Quad combo – KOP to lateral TD

Directional from surface shoe to TD

Mud Logging:

Geologist & a manned mud-logging unit will be operational @ +/- 3,000' to TD of pilot and lateral.

Gas detecting equipment shall be installed in the mud return system for exploratory wells and hydrocarbon gas shall be monitored for pore pressure changes from base of surface casing to TD.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume.

Coring: None

Cement Bond Log:

BP will run a cement bond log (CBL) if cement returns are not observed on the surface and first intermediate casing strings. The CBL will confirm the quality of cement and the actual top of cement.

SECTION – 7 Pressure

Normal to subnormal pressure gradient to TD.

MASP and casing design parameters determined using 0.43 psi/ft.

Maximum expected BHP @ 7450' TVD: 3,204 psi

Maximum expected BHT @ 8450' TVD: ~220° F

Possible lost circulation in the Fruitland Coal to Cliffhouse (~3,000' to 5,000'). Lost circulation has been successfully mitigated with lost circulation materials in concentrations of up to 30% by volume. Intermediate casing will be set through this interval to +/- 6,400'.

No hydrogen sulfide gas is anticipated, however, if H₂S is encountered, the guidelines in Onshore Order No. 6 will be followed.

Directional Plans: Horizontal directional well, directional plans attached. Lateral KOP subject to change based on OH logs evaluation.

Completion:

- **Pressure test**
 - Pressure test production casing to allowable frac pressure or as per BLM requirements
- **Stimulation**
 - well will be stimulated with approximately 35,000,000 pound of proppant in 775,000 bbls of water; the number of stages and the amount of proppant will be adjusted based on the petrophysical properties of the target zone
 - stages will be isolated with plugs
 - plugs will be drilled out
 - flowback well
- **Turn well to production**
 - It is intended to produce the well up the casing, without installing tubing, for at least 60 days or until tubing is needed to unload the well

Timing: BP plans to drill this well in June, 2017

It is anticipated that the drilling of this well will take approximately 30 days.

It is anticipated that completion operations will begin immediately after the well has been drilled depending on stimulation company availability.

Conductor Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

	Collapse	Burst	Tension
Min Safety Factors	1.125	1.100	1.400

	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)
Conductor	20	94	J55	BTC	520	2,110	1,480,000	1,402,000

80% of Burst = 1,688

	Casing Depth	MW in	MW out	Pres in	Pres out	SF
Collapse	120	0	8.33	0	52	10.00

Burst	120	8.3	0	1500	0	1.41	1500psi casing test
-------	-----	-----	---	------	---	------	---------------------

		Mud Wt	Air Wt	Bouy Wt	BW +100k	
Tension (Pipe Body)	120	9.0	11,280	9,730	109,730	13.49
Tension (Connection)	120	9.0	11,280	9,730	109,730	12.78
100k over pull						
BF= 1- (MW)/65.5 = 0.8626						



Surface Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

	Collapse	Burst	Tension
Min Safety Factors	1.125	1.100	1.400

	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)
Surface	13.375	54	K55	BTC	1,130	2,740	853,000	909,000

80% of Burst = 2,192

	Casing Depth	MW in	MW out	Pres in	Pres out	SF	
Collapse	1000	0	15.80	0	822	1.38	Full evacuation with 15.8ppg c

Burst	1000	9.0	0	1500	0	1.83	1500psi casing test
-------	------	-----	---	------	---	------	---------------------

		Mud Wt	Air Wt	Bouy Wt	BW +100k	
Tension (Pipe Body)	1000	9.0	54,000	46,580	146,580	5.82
Tension (Connection)	1000	9.0	54,000	46,580	146,580	6.20
100k over pull						
BF= 1- (MW)/65.5 =		0.8626				

at Info

API Recommended Properties of Casing

New Open Save Wellbore Options ? Hide

API Recommended Properties of Casing

Intermediate Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

	Collapse	Burst	Tension
Min Safety Factors	1.125	1.100	1.400

	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)
Intermediate	9.625	40	P110HC	BTC	4,230	7,910	1,260,000	1,266,000

80% of Burst = 6,328

	Casing Depth TVD	MW in	MW out	Pres in	Pres out	SF	
Collapse	6359	0.00	10.00	0	3307	1.28	Full evacuation with 10 ppg ml
Burst	6359	9.0	0	1500	0	5.27	1500 psi casing test
		Mud Wt	Air Wt	Bouy Wt	BW +100k		
Tension (Pipe Body)	6359	9.0	254,360	219,410	319,410	3.94	100k over pull
Tension (Connection)	6359	9.0	254,360	219,410	319,410	3.96	
	BF= 1- (MW)/65.5 =		0.8626				

Production Casing Design - Evacuation/Casing Test (collapse & burst), 100k overpull (tension)

	Collapse	Burst	Tension
Min Safety Factors	1.125	1.100	1.400

	Size	Weight	Grade	Conn	Collapse	Burst	Tension (Pipe Body)	Tension (Connection)
Production	5.5	20	P110	GBCD	13,300	10,640	546,000	568,000

80% of Burst = 8,512

	Casing Depth TVD	MW in	MW out	Pres in	Pres out	SF	
Collapse	7030	0.00	13.30	0	4862	2.74	Full evacuation with 13.3 ppg c annulus
Burst	7030	9.0	0	1500	0	7.09	1500 psi casing test
		Mud Wt	Air Wt	Bouy Wt	BW +100k		
Tension (Pipe Body)	7030	9.0	140,600	121,281	221,281	2.47	100k over pull
Tension (Connection)	7030	9.0	140,600	121,281	221,281	2.57	
	BF= 1- (MW)/65.5 =		0.8626				

New		Open		Save		Wellbore		Options		?		Hide	
API Recommended Properties of Casing						API Recommended Properties of Casing							

NEBU 604-2H PILOT HOLE WBD

Depths referenced to GL of 6500' & RKB 25' @ 6525'

Marker	TVD	MD
Animas	25	25
Ojo Alamo	2385	2392
Kirtland	2505	2513
Fruitland Coal	3000	3014
Pictured Cliffs	3335	3353
Cliffhouse	5415	5455
Mancos	6180	6220
Sanostee sh	7455	7499
Greenhorn ls	7780	7825
Burro Canyon	8150	8197
Pilot Hole TD	8450	8498



17.5" Hole Size

SURFACE CSG:

13 3/8" J55 54# BTC

Shoe @ 1000' MD - Cmt to surface

12-1/4" Hole Size

INTM. CSG:

9-5/8" P110HC 40# BTC

Shoe @ 6400' MD - Cmt to surface

8-3/4" Hole Size

Prod Csg:

5-1/2" P110 20# GBCD

Shoe @ 17242' MD -

Cmt to overlap 9-5/8" shoe @ ~5400'

Plug Information

75' viscous pill spotted on bottom to provide base for plug one

Plug 1 spotted from 8400' MD to 7700' MD

100' viscous pill placed on top to provide base for plug two

Plug 2 spotted from 7600' MD to 6900' MD

100' viscous pill placed on top to provide base for plug three

Plug 3 spotted from 7800' MD to 6200' MD

Cement plugs will be Class B or G, 15.6 - 15.8 ppg. Plug tops will be adjusted based on log data.

Pilot Coring: After pilot hole has been drilled and open hole logging have been completed three cement plugs with viscous gel spacers will be pumped and the top of cement will be at ~6,300'. Will utilize cement plugs to kick off from and drill the production interval.



Company: B.P.
Project: San Juan County, NM NAD83
Site: NEBU 604 Pad
Well: NEBU 604 COM 2H



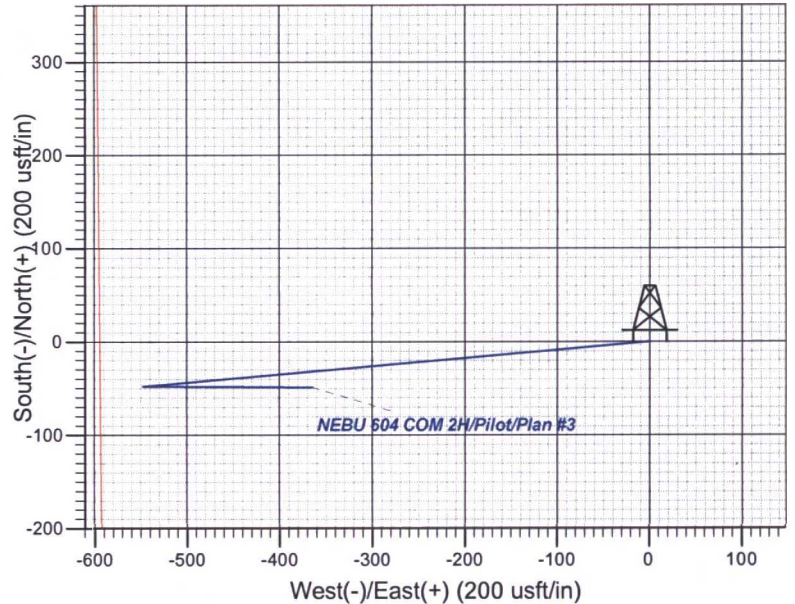
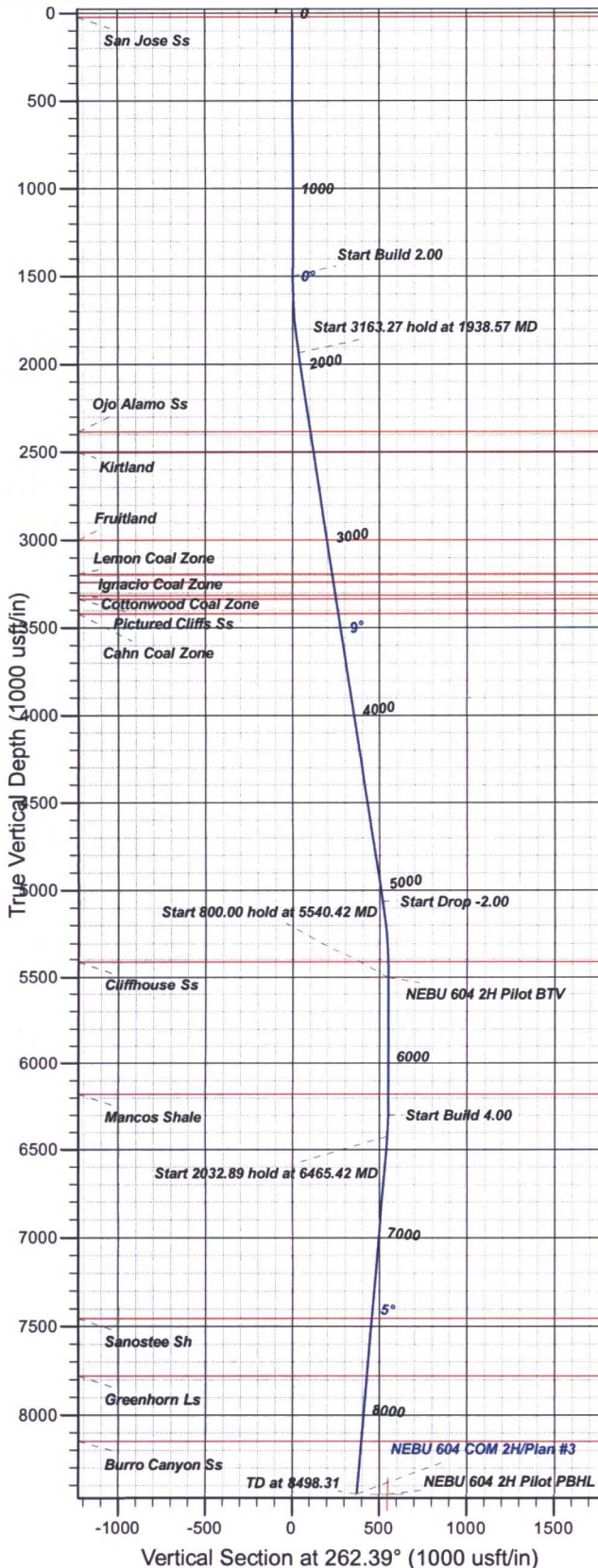
Well Details: NEBU 604 COM 2H

+N/-S 0.00 +E/-W 0.00 Northing 2147644.56 Easting 2812001.96 Latitude 36.9015838 Longitude -107.5292464 Slot



Azimuths to Grid North
True North: -0.18°
Magnetic North: 8.97°

Magnetic Field
Strength: 50137.8snT
Dip Angle: 63.55°
Date: 8/31/2016
Model: HDGM



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
25.00	25.00	San Jose Ss
2385.00	2392.01	Ojo Alamo Ss
2505.00	2513.43	Kirtland
3000.00	3014.29	Fruitland
3195.00	3211.60	Lemon Coal Zone
3240.00	3257.13	Ignacio Coal Zone
3315.00	3333.02	Cottonwood Coal Zone
3335.00	3353.26	Pictured Cliffs Ss
3420.00	3439.26	Cahn Coal Zone
5415.00	5455.41	Cliffhouse Ss
6180.00	6220.42	Mancos Shale
7455.00	7499.51	Sanostee Sh
7780.00	7825.75	Greenhorn Ls
8150.00	8197.17	Burro Canyon Ss

Plan: Plan #3

10:54, May 01 2017
Created By: Janie Collins

PROJECT DETAILS: San Juan County, NM NAD83

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone

System Datum: Mean Sea Level

CASING DETAILS

No casing data is available

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	0.00	
3	1938.57	8.77	265.00	1936.86	-2.92	-33.38	2.00	265.00	33.47	
4	5101.84	8.77	265.00	5063.14	-44.96	-513.92	0.00	0.00	515.35	
5	5540.42	0.00	0.00	5500.00	-47.88	-547.30	2.00	180.00	548.82	NEBU 604 2H Pilot BTM
6	6340.42	0.00	0.00	6300.00	-47.88	-547.30	0.00	0.00	548.82	
7	6465.42	5.00	90.26	6424.84	-47.91	-541.85	4.00	90.26	543.42	
8	8498.31	5.00	90.26	8450.00	-48.71	-364.67	0.00	0.00	367.91	NEBU 604 2H Pilot PBHL

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
NEBU 604 2H Pilot BTM500.00		-47.88	-547.30	2147596.68	2811454.66	36.9014570	-107.5311187	Point
- plan hits target center								
NEBU 604 2H Pilot PBHL50.00		2.40	-549.39	2147646.96	2811452.57	36.9015952	-107.5311253	Point
- plan misses target center by 190.97usft at 8482.19usft MD (8433.94 TVD, -48.70 N, -366.08 E)								



B.P.

San Juan County, NM NAD83

NEBU 604 Pad

NEBU 604 COM 2H

Pilot

Plan: Plan #3

Standard Planning Report

01 May, 2017



www.scientificdrilling.com





Planning Report



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #3		

Project	San Juan County, 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		NEBU 604 Pad			
Site Position:		Northing:	2,147,663.38 usft	Latitude:	36.9016354
From:	Map	Easting:	2,812,008.74 usft	Longitude:	-107.5292230
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.18 °

Well	NEBU 604 COM 2H					
Well Position	+N/-S	-18.82 usft	Northing:	2,147,644.56 usft	Latitude:	36.9015837
	+E/-W	-6.78 usft	Easting:	2,812,001.96 usft	Longitude:	-107.5292464
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,500.00 usft

Wellbore	Pilot				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/31/2016	9.15	63.55	50,138

Design	Plan #3			
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	262.39

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	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,938.57	8.77	265.00	1,936.86	-2.92	-33.38	2.00	2.00	0.00	265.00	
5,101.84	8.77	265.00	5,063.14	-44.96	-513.92	0.00	0.00	0.00	0.00	
5,540.42	0.00	0.00	5,500.00	-47.88	-547.30	2.00	-2.00	0.00	180.00	NEBU 604 2H Pilot B'
6,340.42	0.00	0.00	6,300.00	-47.88	-547.30	0.00	0.00	0.00	0.00	
6,465.42	5.00	90.26	6,424.84	-47.91	-541.85	4.00	4.00	0.00	90.26	
8,498.31	5.00	90.26	8,450.00	-48.71	-364.67	0.00	0.00	0.00	0.00	NEBU 604 2H Pilot PI



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #3		

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
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00
San Jose Ss									
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
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	2.00	265.00	1,599.98	-0.15	-1.74	1.74	2.00	2.00	0.00
1,700.00	4.00	265.00	1,699.84	-0.61	-6.95	6.97	2.00	2.00	0.00
1,800.00	6.00	265.00	1,799.45	-1.37	-15.63	15.68	2.00	2.00	0.00
1,900.00	8.00	265.00	1,898.70	-2.43	-27.77	27.85	2.00	2.00	0.00
1,938.57	8.77	265.00	1,936.86	-2.92	-33.38	33.47	2.00	2.00	0.00
2,000.00	8.77	265.00	1,997.57	-3.74	-42.71	42.83	0.00	0.00	0.00
2,100.00	8.77	265.00	2,096.40	-5.07	-57.90	58.06	0.00	0.00	0.00
2,200.00	8.77	265.00	2,195.23	-6.39	-73.09	73.30	0.00	0.00	0.00
2,300.00	8.77	265.00	2,294.06	-7.72	-88.28	88.53	0.00	0.00	0.00
2,392.01	8.77	265.00	2,385.00	-8.95	-102.26	102.55	0.00	0.00	0.00
Ojo Alamo Ss									
2,400.00	8.77	265.00	2,392.89	-9.05	-103.47	103.76	0.00	0.00	0.00
2,500.00	8.77	265.00	2,491.72	-10.38	-118.67	119.00	0.00	0.00	0.00
2,513.43	8.77	265.00	2,505.00	-10.56	-120.71	121.04	0.00	0.00	0.00
Kirtland									
2,600.00	8.77	265.00	2,590.55	-11.71	-133.86	134.23	0.00	0.00	0.00
2,700.00	8.77	265.00	2,689.38	-13.04	-149.05	149.46	0.00	0.00	0.00
2,800.00	8.77	265.00	2,788.21	-14.37	-164.24	164.70	0.00	0.00	0.00
2,900.00	8.77	265.00	2,887.04	-15.70	-179.43	179.93	0.00	0.00	0.00
3,000.00	8.77	265.00	2,985.87	-17.03	-194.62	195.16	0.00	0.00	0.00
3,014.29	8.77	265.00	3,000.00	-17.22	-196.79	197.34	0.00	0.00	0.00
Fruitland									
3,100.00	8.77	265.00	3,084.71	-18.36	-209.81	210.40	0.00	0.00	0.00
3,200.00	8.77	265.00	3,183.54	-19.69	-225.01	225.63	0.00	0.00	0.00
3,211.60	8.77	265.00	3,195.00	-19.84	-226.77	227.40	0.00	0.00	0.00
Lemon Coal Zone									
3,257.13	8.77	265.00	3,240.00	-20.44	-233.68	234.33	0.00	0.00	0.00
Ignacio Coal Zone									
3,300.00	8.77	265.00	3,282.37	-21.01	-240.20	240.86	0.00	0.00	0.00
3,333.02	8.77	265.00	3,315.00	-21.45	-245.21	245.89	0.00	0.00	0.00
Cottonwood Coal Zone									
3,353.26	8.77	265.00	3,335.00	-21.72	-248.29	248.98	0.00	0.00	0.00
Pictured Cliffs Ss									
3,400.00	8.77	265.00	3,381.20	-22.34	-255.39	256.10	0.00	0.00	0.00
3,439.26	8.77	265.00	3,420.00	-22.87	-261.35	262.08	0.00	0.00	0.00



Database: Grand Junction District
Company: B.P.
Project: San Juan County, NM NAD83
Site: NEBU 604 Pad
Well: NEBU 604 COM 2H
Wellbore: Pilot
Design: Plan #3

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well NEBU 604 COM 2H
 GL 6500' & RKB 25' @ 6525.00usft
 GL 6500' & RKB 25' @ 6525.00usft
 Grid
 Minimum Curvature

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)
Cahn Coal Zone									
3,500.00	8.77	265.00	3,480.03	-23.67	-270.58	271.33	0.00	0.00	0.00
3,600.00	8.77	265.00	3,578.86	-25.00	-285.77	286.57	0.00	0.00	0.00
3,700.00	8.77	265.00	3,677.69	-26.33	-300.96	301.80	0.00	0.00	0.00
3,800.00	8.77	265.00	3,776.52	-27.66	-316.15	317.03	0.00	0.00	0.00
3,900.00	8.77	265.00	3,875.35	-28.99	-331.35	332.27	0.00	0.00	0.00
4,000.00	8.77	265.00	3,974.18	-30.32	-346.54	347.50	0.00	0.00	0.00
4,100.00	8.77	265.00	4,073.01	-31.65	-361.73	362.73	0.00	0.00	0.00
4,200.00	8.77	265.00	4,171.84	-32.98	-376.92	377.97	0.00	0.00	0.00
4,300.00	8.77	265.00	4,270.67	-34.31	-392.11	393.20	0.00	0.00	0.00
4,400.00	8.77	265.00	4,369.50	-35.63	-407.30	408.43	0.00	0.00	0.00
4,500.00	8.77	265.00	4,468.33	-36.96	-422.49	423.67	0.00	0.00	0.00
4,600.00	8.77	265.00	4,567.16	-38.29	-437.68	438.90	0.00	0.00	0.00
4,700.00	8.77	265.00	4,665.99	-39.62	-452.88	454.14	0.00	0.00	0.00
4,800.00	8.77	265.00	4,764.82	-40.95	-468.07	469.37	0.00	0.00	0.00
4,900.00	8.77	265.00	4,863.65	-42.28	-483.26	484.60	0.00	0.00	0.00
5,000.00	8.77	265.00	4,962.48	-43.61	-498.45	499.84	0.00	0.00	0.00
5,100.00	8.77	265.00	5,061.31	-44.94	-513.64	515.07	0.00	0.00	0.00
5,101.84	8.77	265.00	5,063.14	-44.96	-513.92	515.35	0.00	0.00	0.00
5,200.00	6.81	265.00	5,160.38	-46.12	-527.17	528.64	2.00	-2.00	0.00
5,300.00	4.81	265.00	5,259.86	-47.00	-537.26	538.75	2.00	-2.00	0.00
5,400.00	2.81	265.00	5,359.64	-47.58	-543.87	545.38	2.00	-2.00	0.00
5,455.41	1.70	265.00	5,415.00	-47.77	-546.04	547.56	2.00	-2.00	0.00
Cliffhouse Ss									
5,500.00	0.81	265.00	5,459.58	-47.86	-547.02	548.54	2.00	-2.00	0.00
5,540.42	0.00	0.00	5,500.00	-47.88	-547.30	548.82	2.00	-2.00	235.04
NEBU 604 2H Pilot BTV									
5,600.00	0.00	0.00	5,559.58	-47.88	-547.30	548.82	0.00	0.00	0.00
5,700.00	0.00	0.00	5,659.58	-47.88	-547.30	548.82	0.00	0.00	0.00
5,800.00	0.00	0.00	5,759.58	-47.88	-547.30	548.82	0.00	0.00	0.00
5,900.00	0.00	0.00	5,859.58	-47.88	-547.30	548.82	0.00	0.00	0.00
6,000.00	0.00	0.00	5,959.58	-47.88	-547.30	548.82	0.00	0.00	0.00
6,100.00	0.00	0.00	6,059.58	-47.88	-547.30	548.82	0.00	0.00	0.00
6,200.00	0.00	0.00	6,159.58	-47.88	-547.30	548.82	0.00	0.00	0.00
6,220.42	0.00	0.00	6,180.00	-47.88	-547.30	548.82	0.00	0.00	0.00
Mancos Shale									
6,300.00	0.00	0.00	6,259.58	-47.88	-547.30	548.82	0.00	0.00	0.00
6,340.42	0.00	0.00	6,300.00	-47.88	-547.30	548.82	0.00	0.00	0.00
6,400.00	2.38	90.26	6,359.56	-47.89	-546.06	547.59	4.00	4.00	0.00
6,465.42	5.00	90.26	6,424.84	-47.91	-541.85	543.42	4.00	4.00	0.00
6,500.00	5.00	90.26	6,459.29	-47.92	-538.84	540.44	0.00	0.00	0.00
6,600.00	5.00	90.26	6,558.91	-47.96	-530.12	531.80	0.00	0.00	0.00
6,700.00	5.00	90.26	6,658.53	-48.00	-521.40	523.17	0.00	0.00	0.00
6,800.00	5.00	90.26	6,758.15	-48.04	-512.69	514.54	0.00	0.00	0.00
6,900.00	5.00	90.26	6,857.77	-48.08	-503.97	505.90	0.00	0.00	0.00
7,000.00	5.00	90.26	6,957.39	-48.12	-495.26	497.27	0.00	0.00	0.00
7,100.00	5.00	90.26	7,057.01	-48.16	-486.54	488.64	0.00	0.00	0.00
7,200.00	5.00	90.26	7,156.63	-48.20	-477.83	480.00	0.00	0.00	0.00
7,300.00	5.00	90.26	7,256.25	-48.24	-469.11	471.37	0.00	0.00	0.00
7,400.00	5.00	90.26	7,355.87	-48.28	-460.40	462.73	0.00	0.00	0.00
7,499.51	5.00	90.26	7,455.00	-48.32	-451.72	454.14	0.00	0.00	0.00
Sanostee Sh									
7,500.00	5.00	90.26	7,455.49	-48.32	-451.68	454.10	0.00	0.00	0.00



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #3		

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)
7,600.00	5.00	90.26	7,555.11	-48.36	-442.96	445.47	0.00	0.00	0.00
7,700.00	5.00	90.26	7,654.73	-48.40	-434.25	436.83	0.00	0.00	0.00
7,800.00	5.00	90.26	7,754.34	-48.44	-425.53	428.20	0.00	0.00	0.00
7,825.75	5.00	90.26	7,780.00	-48.45	-423.29	425.98	0.00	0.00	0.00
Greenhorn Ls									
7,900.00	5.00	90.26	7,853.96	-48.47	-416.82	419.57	0.00	0.00	0.00
8,000.00	5.00	90.26	7,953.58	-48.51	-408.10	410.93	0.00	0.00	0.00
8,100.00	5.00	90.26	8,053.20	-48.55	-399.39	402.30	0.00	0.00	0.00
8,197.17	5.00	90.26	8,150.00	-48.59	-390.92	393.91	0.00	0.00	0.00
Burro Canyon Ss									
8,200.00	5.00	90.26	8,152.82	-48.59	-390.67	393.67	0.00	0.00	0.00
8,300.00	5.00	90.26	8,252.44	-48.63	-381.96	385.03	0.00	0.00	0.00
8,400.00	5.00	90.26	8,352.06	-48.67	-373.24	376.40	0.00	0.00	0.00
8,482.19	5.00	90.26	8,433.94	-48.70	-366.08	369.30	0.00	0.00	0.00
NEBU 604 2H Pilot PBHL									
8,498.31	5.00	90.26	8,450.00	-48.71	-364.67	367.91	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
NEBU 604 2H Pilot BTV	0.00	0.00	5,500.00	-47.88	-547.30	2,147,596.68	2,811,454.66	36.9014570	-107.5311188
- plan hits target center									
- Point									
NEBU 604 2H Pilot PBH	0.00	0.00	8,450.00	2.40	-549.39	2,147,646.96	2,811,452.58	36.9015951	-107.5311253
- plan misses target center by 190.97usft at 8482.19usft MD (8433.94 TVD, -48.70 N, -366.08 E)									
- Point									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
25.00	25.00	San Jose Ss		0.00	0.00
2,392.01	2,385.00	Ojo Alamo Ss		0.00	0.00
2,513.43	2,505.00	Kirtland		0.00	0.00
3,014.29	3,000.00	Fruitland		0.00	0.00
3,211.60	3,195.00	Lemon Coal Zone		0.00	0.00
3,257.13	3,240.00	Ignacio Coal Zone		0.00	0.00
3,333.02	3,315.00	Cottonwood Coal Zone		0.00	0.00
3,353.26	3,335.00	Pictured Cliffs Ss		0.00	0.00
3,439.26	3,420.00	Cahn Coal Zone		0.00	0.00
5,455.41	5,415.00	Cliffhouse Ss		0.00	0.00
6,220.42	6,180.00	Mancos Shale		0.00	0.00
7,499.51	7,455.00	Sanostee Sh		0.00	0.00
7,825.75	7,780.00	Greenhorn Ls		0.00	0.00
8,197.17	8,150.00	Burro Canyon Ss		0.00	0.00



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot		
Design:	Plan #3		



Company: B.P.
Project: San Juan County, NM NAD83
Site: NEBU 604 Pad
Well: NEBU 604 COM 2H
Wellbore: Lateral
Design: Plan #4

PROJECT DETAILS: San Juan County, NM NAD83

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone
System Datum: Mean Sea Level
Local North: Grid



Plan: Plan #4 (NEBU 604 COM 2H/Lateral)

Created By: Janie Collins Date: 14:43, April 26 2017

WELL DETAILS: NEBU 604 COM 2H

+N/-S	+E/-W	GL 6500' & RKB 25' @ 6525.00usft	6500.00	Latitude	Longitude	Slot
		Northing	Easting			
0.00	0.00	2147644.56	2812001.96	36.9015838	-107.5292464	

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
6547.87	5.00	90.26	6506.98	-47.94	-534.66	0.00	0.00	-534.44	
7397.87	90.00	89.99	7030.00	-48.03	36.11	10.00	-0.27	36.34	
17242.24	90.00	89.99	7030.00	-45.73	9880.48	0.00	0.00	9880.59	NEBU 604 2H PBHL



Azimuths to Grid North
True North: -0.18°
Magnetic North: 8.97°

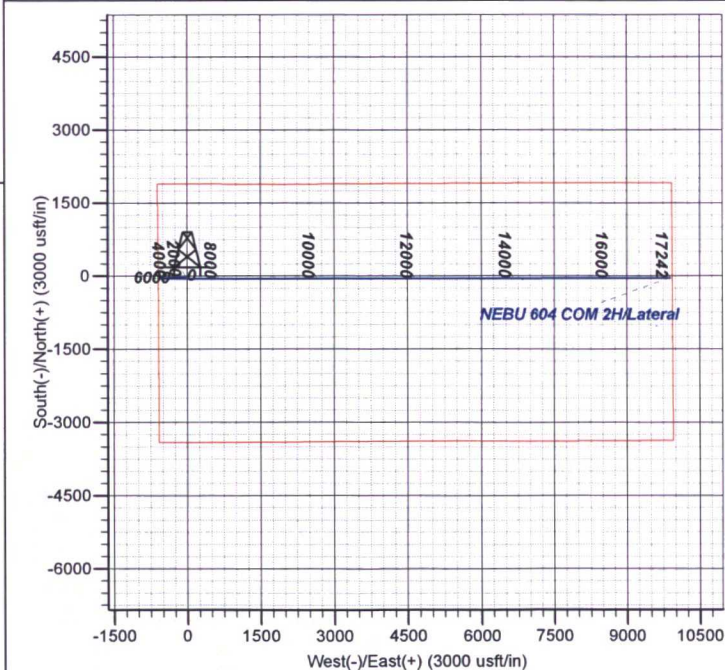
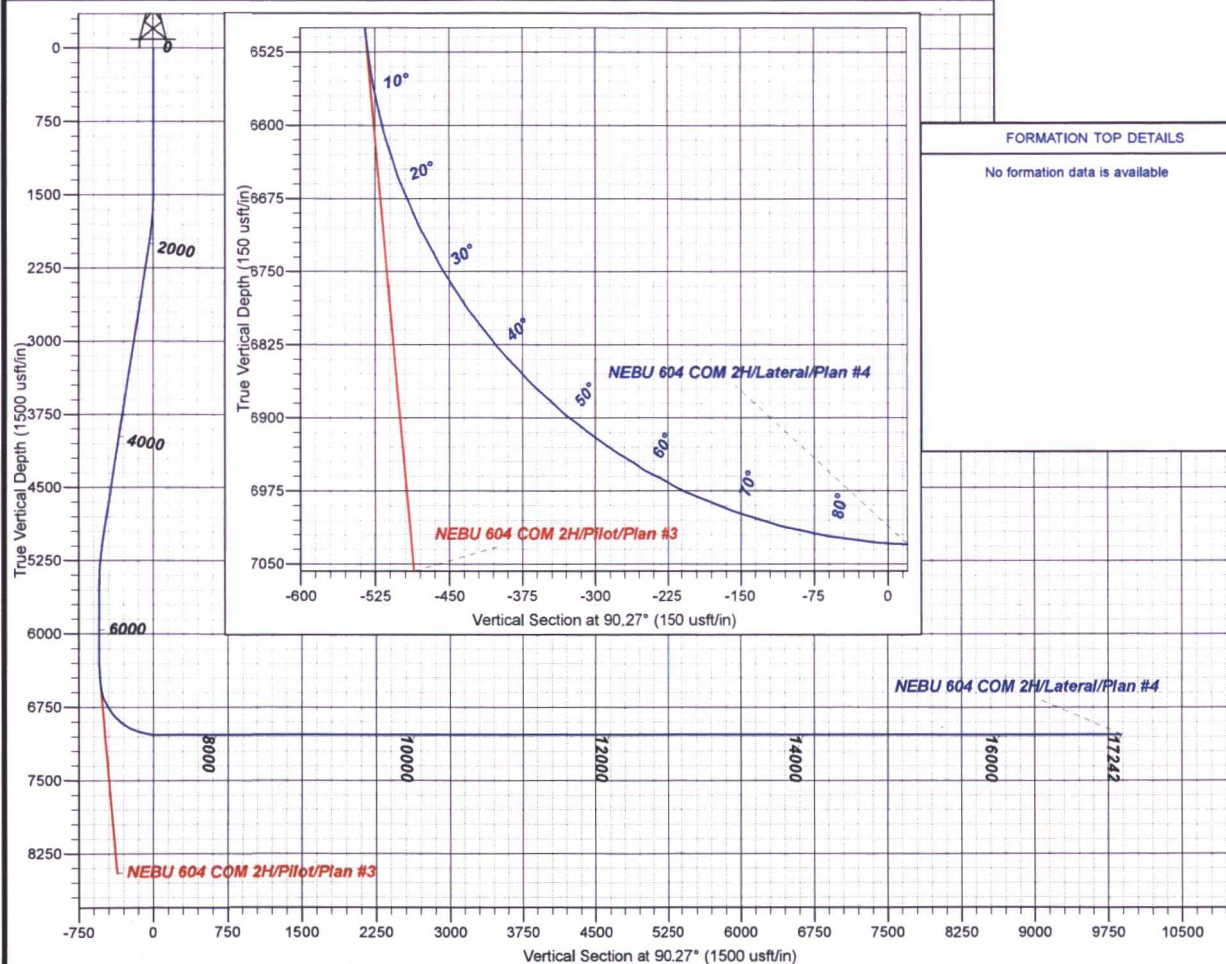
Magnetic Field
Strength: 50150.5anT
Dip Angle: 63.55°
Date: 7/21/2016
Model: HDGM

FORMATION TOP DETAILS

No formation data is available

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
NEBU 604 2H PBHL	7030.00	-45.73	9880.48	2147598.83	2821882.44	36.9013669	-107.4954547
NEBU 604 2H LP	7110.00	0.53	215.83	2147645.09	2812217.79	36.9015833	-107.5285082





B.P.

San Juan County, NM NAD83

NEBU 604 Pad

NEBU 604 COM 2H

Lateral

Plan: Plan #4

Standard Planning Report

26 April, 2017



www.scientificdrilling.com



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #4		

Project	San Juan County, 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	NEBU 604 Pad		
Site Position:		Northing:	2,147,663.38 usft
From:	Map	Easting:	2,812,008.74 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in
		Latitude:	36.9016354
		Longitude:	-107.5292230
		Grid Convergence:	0.18 °

Well	NEBU 604 COM 2H		
Well Position	+N/-S	-18.82 usft	Northing:
	+E/-W	-6.78 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	36.9015837
		Longitude:	-107.5292464
		Ground Level:	6,500.00 usft

Wellbore	Lateral		
Magnetics	Model Name	Sample Date	Declination
			(°)
	HDGM	7/21/2016	9.15
			Dip Angle
			(°)
			63.55
			Field Strength
			(nT)
			50,151

Design	Plan #4		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			6,547.87
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			90.27

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
6,547.87	5.00	90.26	6,506.98	-47.94	-534.66	0.00	0.00	0.00	0.00	
7,397.87	90.00	89.99	7,030.00	-48.03	36.11	10.00	10.00	-0.03	-0.27	
17,242.24	90.00	89.99	7,030.00	-45.73	9,880.48	0.00	0.00	0.00	0.00	NEBU 604 2H PBHL



Planning Report



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #4		

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)
6,547.87	5.00	90.26	6,506.98	-47.94	-534.66	-534.44	0.00	0.00	0.00
6,600.00	10.21	90.12	6,558.63	-47.96	-527.77	-527.54	10.00	10.00	-0.27
6,700.00	20.21	90.05	6,655.01	-47.99	-501.56	-501.33	10.00	10.00	-0.07
6,800.00	30.21	90.03	6,745.36	-48.02	-459.01	-458.79	10.00	10.00	-0.02
6,900.00	40.21	90.01	6,826.96	-48.04	-401.42	-401.20	10.00	10.00	-0.01
7,000.00	50.21	90.01	6,897.32	-48.06	-330.54	-330.32	10.00	10.00	-0.01
7,100.00	60.21	90.00	6,954.30	-48.06	-248.52	-248.29	10.00	10.00	-0.01
7,200.00	70.21	90.00	6,996.17	-48.06	-157.85	-157.62	10.00	10.00	-0.01
7,300.00	80.21	89.99	7,021.66	-48.04	-61.28	-61.06	10.00	10.00	0.00
7,397.87	90.00	89.99	7,030.00	-48.03	36.11	36.34	10.00	10.00	0.00
7,400.00	90.00	89.99	7,030.00	-48.02	38.24	38.47	0.00	0.00	0.00
7,500.00	90.00	89.99	7,030.00	-48.00	138.24	138.46	0.00	0.00	0.00
7,577.60	90.00	89.99	7,030.00	-47.98	215.84	216.06	0.00	0.00	0.00
NEBU 604 2H LP									
7,600.00	90.00	89.99	7,030.00	-47.98	238.24	238.46	0.00	0.00	0.00
7,700.00	90.00	89.99	7,030.00	-47.95	338.24	338.46	0.00	0.00	0.00
7,800.00	90.00	89.99	7,030.00	-47.93	438.24	438.46	0.00	0.00	0.00
7,900.00	90.00	89.99	7,030.00	-47.91	538.24	538.46	0.00	0.00	0.00
8,000.00	90.00	89.99	7,030.00	-47.88	638.24	638.46	0.00	0.00	0.00
8,100.00	90.00	89.99	7,030.00	-47.86	738.24	738.46	0.00	0.00	0.00
8,200.00	90.00	89.99	7,030.00	-47.84	838.24	838.46	0.00	0.00	0.00
8,300.00	90.00	89.99	7,030.00	-47.81	938.24	938.46	0.00	0.00	0.00
8,400.00	90.00	89.99	7,030.00	-47.79	1,038.24	1,038.45	0.00	0.00	0.00
8,500.00	90.00	89.99	7,030.00	-47.77	1,138.24	1,138.45	0.00	0.00	0.00
8,600.00	90.00	89.99	7,030.00	-47.74	1,238.24	1,238.45	0.00	0.00	0.00
8,700.00	90.00	89.99	7,030.00	-47.72	1,338.24	1,338.45	0.00	0.00	0.00
8,800.00	90.00	89.99	7,030.00	-47.70	1,438.24	1,438.45	0.00	0.00	0.00
8,900.00	90.00	89.99	7,030.00	-47.67	1,538.24	1,538.45	0.00	0.00	0.00
9,000.00	90.00	89.99	7,030.00	-47.65	1,638.24	1,638.45	0.00	0.00	0.00
9,100.00	90.00	89.99	7,030.00	-47.63	1,738.24	1,738.45	0.00	0.00	0.00
9,200.00	90.00	89.99	7,030.00	-47.60	1,838.24	1,838.44	0.00	0.00	0.00
9,300.00	90.00	89.99	7,030.00	-47.58	1,938.24	1,938.44	0.00	0.00	0.00
9,400.00	90.00	89.99	7,030.00	-47.56	2,038.24	2,038.44	0.00	0.00	0.00
9,500.00	90.00	89.99	7,030.00	-47.54	2,138.24	2,138.44	0.00	0.00	0.00
9,600.00	90.00	89.99	7,030.00	-47.51	2,238.24	2,238.44	0.00	0.00	0.00
9,700.00	90.00	89.99	7,030.00	-47.49	2,338.24	2,338.44	0.00	0.00	0.00
9,800.00	90.00	89.99	7,030.00	-47.47	2,438.24	2,438.44	0.00	0.00	0.00
9,900.00	90.00	89.99	7,030.00	-47.44	2,538.24	2,538.44	0.00	0.00	0.00
10,000.00	90.00	89.99	7,030.00	-47.42	2,638.24	2,638.44	0.00	0.00	0.00
10,100.00	90.00	89.99	7,030.00	-47.40	2,738.24	2,738.43	0.00	0.00	0.00
10,200.00	90.00	89.99	7,030.00	-47.37	2,838.24	2,838.43	0.00	0.00	0.00
10,300.00	90.00	89.99	7,030.00	-47.35	2,938.24	2,938.43	0.00	0.00	0.00
10,400.00	90.00	89.99	7,030.00	-47.33	3,038.24	3,038.43	0.00	0.00	0.00
10,500.00	90.00	89.99	7,030.00	-47.30	3,138.24	3,138.43	0.00	0.00	0.00
10,600.00	90.00	89.99	7,030.00	-47.28	3,238.24	3,238.43	0.00	0.00	0.00
10,700.00	90.00	89.99	7,030.00	-47.26	3,338.24	3,338.43	0.00	0.00	0.00
10,800.00	90.00	89.99	7,030.00	-47.23	3,438.24	3,438.43	0.00	0.00	0.00
10,900.00	90.00	89.99	7,030.00	-47.21	3,538.24	3,538.42	0.00	0.00	0.00
11,000.00	90.00	89.99	7,030.00	-47.19	3,638.24	3,638.42	0.00	0.00	0.00
11,100.00	90.00	89.99	7,030.00	-47.16	3,738.24	3,738.42	0.00	0.00	0.00
11,200.00	90.00	89.99	7,030.00	-47.14	3,838.24	3,838.42	0.00	0.00	0.00
11,300.00	90.00	89.99	7,030.00	-47.12	3,938.24	3,938.42	0.00	0.00	0.00
11,400.00	90.00	89.99	7,030.00	-47.09	4,038.24	4,038.42	0.00	0.00	0.00
11,500.00	90.00	89.99	7,030.00	-47.07	4,138.24	4,138.42	0.00	0.00	0.00



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #4		

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)
11,600.00	90.00	89.99	7,030.00	-47.05	4,238.24	4,238.42	0.00	0.00	0.00
11,700.00	90.00	89.99	7,030.00	-47.02	4,338.24	4,338.42	0.00	0.00	0.00
11,800.00	90.00	89.99	7,030.00	-47.00	4,438.24	4,438.41	0.00	0.00	0.00
11,900.00	90.00	89.99	7,030.00	-46.98	4,538.24	4,538.41	0.00	0.00	0.00
12,000.00	90.00	89.99	7,030.00	-46.95	4,638.24	4,638.41	0.00	0.00	0.00
12,100.00	90.00	89.99	7,030.00	-46.93	4,738.24	4,738.41	0.00	0.00	0.00
12,200.00	90.00	89.99	7,030.00	-46.91	4,838.24	4,838.41	0.00	0.00	0.00
12,300.00	90.00	89.99	7,030.00	-46.88	4,938.24	4,938.41	0.00	0.00	0.00
12,400.00	90.00	89.99	7,030.00	-46.86	5,038.24	5,038.41	0.00	0.00	0.00
12,500.00	90.00	89.99	7,030.00	-46.84	5,138.24	5,138.41	0.00	0.00	0.00
12,600.00	90.00	89.99	7,030.00	-46.81	5,238.24	5,238.40	0.00	0.00	0.00
12,700.00	90.00	89.99	7,030.00	-46.79	5,338.24	5,338.40	0.00	0.00	0.00
12,800.00	90.00	89.99	7,030.00	-46.77	5,438.24	5,438.40	0.00	0.00	0.00
12,900.00	90.00	89.99	7,030.00	-46.74	5,538.24	5,538.40	0.00	0.00	0.00
13,000.00	90.00	89.99	7,030.00	-46.72	5,638.24	5,638.40	0.00	0.00	0.00
13,100.00	90.00	89.99	7,030.00	-46.70	5,738.24	5,738.40	0.00	0.00	0.00
13,200.00	90.00	89.99	7,030.00	-46.67	5,838.24	5,838.40	0.00	0.00	0.00
13,300.00	90.00	89.99	7,030.00	-46.65	5,938.24	5,938.40	0.00	0.00	0.00
13,400.00	90.00	89.99	7,030.00	-46.63	6,038.24	6,038.40	0.00	0.00	0.00
13,500.00	90.00	89.99	7,030.00	-46.60	6,138.24	6,138.39	0.00	0.00	0.00
13,600.00	90.00	89.99	7,030.00	-46.58	6,238.24	6,238.39	0.00	0.00	0.00
13,700.00	90.00	89.99	7,030.00	-46.56	6,338.24	6,338.39	0.00	0.00	0.00
13,800.00	90.00	89.99	7,030.00	-46.53	6,438.24	6,438.39	0.00	0.00	0.00
13,900.00	90.00	89.99	7,030.00	-46.51	6,538.24	6,538.39	0.00	0.00	0.00
14,000.00	90.00	89.99	7,030.00	-46.49	6,638.24	6,638.39	0.00	0.00	0.00
14,100.00	90.00	89.99	7,030.00	-46.46	6,738.24	6,738.39	0.00	0.00	0.00
14,200.00	90.00	89.99	7,030.00	-46.44	6,838.24	6,838.39	0.00	0.00	0.00
14,300.00	90.00	89.99	7,030.00	-46.42	6,938.24	6,938.38	0.00	0.00	0.00
14,400.00	90.00	89.99	7,030.00	-46.39	7,038.24	7,038.38	0.00	0.00	0.00
14,500.00	90.00	89.99	7,030.00	-46.37	7,138.24	7,138.38	0.00	0.00	0.00
14,600.00	90.00	89.99	7,030.00	-46.35	7,238.24	7,238.38	0.00	0.00	0.00
14,700.00	90.00	89.99	7,030.00	-46.32	7,338.24	7,338.38	0.00	0.00	0.00
14,800.00	90.00	89.99	7,030.00	-46.30	7,438.24	7,438.38	0.00	0.00	0.00
14,900.00	90.00	89.99	7,030.00	-46.28	7,538.24	7,538.38	0.00	0.00	0.00
15,000.00	90.00	89.99	7,030.00	-46.25	7,638.24	7,638.38	0.00	0.00	0.00
15,100.00	90.00	89.99	7,030.00	-46.23	7,738.24	7,738.38	0.00	0.00	0.00
15,200.00	90.00	89.99	7,030.00	-46.21	7,838.24	7,838.37	0.00	0.00	0.00
15,300.00	90.00	89.99	7,030.00	-46.18	7,938.24	7,938.37	0.00	0.00	0.00
15,400.00	90.00	89.99	7,030.00	-46.16	8,038.24	8,038.37	0.00	0.00	0.00
15,500.00	90.00	89.99	7,030.00	-46.14	8,138.24	8,138.37	0.00	0.00	0.00
15,600.00	90.00	89.99	7,030.00	-46.11	8,238.24	8,238.37	0.00	0.00	0.00
15,700.00	90.00	89.99	7,030.00	-46.09	8,338.24	8,338.37	0.00	0.00	0.00
15,800.00	90.00	89.99	7,030.00	-46.07	8,438.24	8,438.37	0.00	0.00	0.00
15,900.00	90.00	89.99	7,030.00	-46.04	8,538.24	8,538.37	0.00	0.00	0.00
16,000.00	90.00	89.99	7,030.00	-46.02	8,638.24	8,638.36	0.00	0.00	0.00
16,100.00	90.00	89.99	7,030.00	-46.00	8,738.24	8,738.36	0.00	0.00	0.00
16,200.00	90.00	89.99	7,030.00	-45.97	8,838.24	8,838.36	0.00	0.00	0.00
16,300.00	90.00	89.99	7,030.00	-45.95	8,938.24	8,938.36	0.00	0.00	0.00
16,400.00	90.00	89.99	7,030.00	-45.93	9,038.24	9,038.36	0.00	0.00	0.00
16,500.00	90.00	89.99	7,030.00	-45.90	9,138.24	9,138.36	0.00	0.00	0.00
16,600.00	90.00	89.99	7,030.00	-45.88	9,238.24	9,238.36	0.00	0.00	0.00
16,700.00	90.00	89.99	7,030.00	-45.86	9,338.24	9,338.36	0.00	0.00	0.00
16,800.00	90.00	89.99	7,030.00	-45.83	9,438.24	9,438.36	0.00	0.00	0.00
16,900.00	90.00	89.99	7,030.00	-45.81	9,538.24	9,538.35	0.00	0.00	0.00



Database:	Grand Junction District	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Company:	B.P.	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Project:	San Juan County, NM NAD83	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site:	NEBU 604 Pad	North Reference:	Grid
Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #4		

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)
17,000.00	90.00	89.99	7,030.00	-45.79	9,638.24	9,638.35	0.00	0.00	0.00
17,100.00	90.00	89.99	7,030.00	-45.76	9,738.24	9,738.35	0.00	0.00	0.00
17,200.00	90.00	89.99	7,030.00	-45.74	9,838.24	9,838.35	0.00	0.00	0.00
17,242.24	90.00	89.99	7,030.00	-45.73	9,880.48	9,880.59	0.00	0.00	0.00
NEBU 604 2H PBHL									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
NEBU 604 2H PBHL - plan hits target center - Point	0.00	0.00	7,030.00	-45.73	9,880.48	2,147,598.83	2,821,882.44	36.9013668	-107.4954547
NEBU 604 2H LP - plan misses target center by 93.56usft at 7577.60usft MD (7030.00 TVD, -47.98 N, 215.84 E) - Point	0.00	0.00	7,110.00	0.53	215.83	2,147,645.09	2,812,217.79	36.9015833	-107.5285082

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,388.98	2,382.00	Ojo Alamo Ss	Empty	0.00	0.00
2,510.40	2,502.00	Kirtland	Empty	0.00	0.00
3,011.26	2,997.00	Fruitland	Empty	0.00	0.00
3,208.56	3,192.00	Lemon Coal Zone	Empty	0.00	0.00
3,254.10	3,237.00	Ignacio Coal Zone	Empty	0.00	0.00
3,329.98	3,312.00	Cottonwood Coal Zone	Empty	0.00	0.00
3,350.22	3,332.00	Pictured Cliffs Ss	Empty	0.00	0.00
3,436.23	3,417.00	Cahn Coal Zone	Empty	0.00	0.00
5,452.40	5,412.00	Cliffhouse Ss	Empty	0.00	0.00
6,212.42	6,172.00	Mancos Shale	Empty	0.00	0.00



B.P.

San Juan County, NM NAD83

NEBU 604 Pad

NEBU 604 COM 2H

Lateral

Plan #4

Anticollision Report

26 April, 2017



www.scientificdrilling.com





Anticollision Report



Company:	B.P.	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Project:	San Juan County, NM NAD83	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Reference Site:	NEBU 604 Pad	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Lateral	Database:	Grand Junction District
Reference Design:	Plan #4	Offset TVD Reference:	Reference Datum

Reference	Plan #4
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD Interval 100.00usft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 30,000.00 usft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic
Casing Method:	Not applied

Survey Tool Program		Date	4/26/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	6,547.87	Plan #3 (Pilot)	Gyro		
6,547.87	17,242.24	Plan #4 (Lateral)	SDI MWD	SDI MWD - Standard ver 1.0.1	

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						
NEBU 604 Pad						
NEBU 208 - OH - OH	1,500.00	1,525.56	2,813.17	2,754.15	47.663	CC
NEBU 208 - OH - OH	1,700.00	1,725.40	2,816.35	2,749.37	42.046	ES
NEBU 208 - OH - OH	3,700.00	3,675.00	2,962.89	2,818.36	20.500	SF
NEBU 221 - OH - OH	100.00	84.17	429.01	427.33	254.813	CC, ES
NEBU 221 - OH - OH	17,242.24	100.00	11,966.50	11,888.94	154.292	SF
NEBU 221J - OH - OH	1,988.72	1,941.28	2,289.08	2,213.43	30.258	CC
NEBU 221J - OH - OH	3,700.00	3,632.49	2,303.95	2,160.67	16.080	ES, SF
NEBU 229J - OH - OH	10,941.36	3,680.00	4,441.70	4,275.54	26.731	CC
NEBU 229J - OH - OH	11,000.00	3,680.00	4,442.09	4,274.90	26.570	ES
NEBU 229J - OH - OH	13,000.00	3,680.00	4,895.58	4,693.37	24.209	SF
NEBU 230 - OH - OH	100.00	98.12	3,603.81	3,601.85	1,836.241	CC, ES
NEBU 230 - OH - OH	17,242.24	100.00	9,382.95	9,304.92	120.251	SF
NEBU 230J - OH - OH	122.08	79.30	3,718.61	3,717.02	2,344.290	CC, ES
NEBU 230J - OH - OH	17,242.24	100.00	9,973.30	9,849.31	80.433	SF
NEBU 239 - OH - OH	13,625.20	3,675.00	4,641.88	4,417.83	20.718	CC
NEBU 239 - OH - OH	13,700.00	3,675.00	4,642.49	4,417.06	20.594	ES
NEBU 239 - OH - OH	15,400.00	3,675.00	4,969.61	4,713.00	19.366	SF
NEBU 240 - OH - OH	0.00	54.55	6,034.14			
NEBU 240 - OH - OH	100.00	100.00	6,034.39	6,032.39	3,016.893	ES
NEBU 240 - OH - OH	17,242.24	100.00	8,034.30	7,953.33	99.222	SF
NEBU 241 - OH - OH	16,434.94	3,550.00	3,853.57	3,623.83	16.774	CC
NEBU 241 - OH - OH	16,500.00	3,550.00	3,854.12	3,623.47	16.710	ES
NEBU 241 - OH - OH	17,242.24	3,550.00	3,937.22	3,694.08	16.194	SF
NEBU 252 - OH - OH	14,888.31	100.00	7,156.74	7,077.20	89.979	CC
NEBU 252 - OH - OH	15,000.00	100.00	7,157.61	7,076.97	88.755	ES
NEBU 252 - OH - OH	17,242.24	100.00	7,533.92	7,431.05	73.239	SF
NEBU 252H - OH - OH	14,888.31	100.00	7,155.79	7,076.25	89.963	CC
NEBU 252H - OH - OH	15,000.00	100.00	7,156.66	7,076.01	88.739	ES
NEBU 252H - OH - OH	17,242.24	100.00	7,533.01	7,430.14	73.227	SF
NEBU 311 - OH - OH	1,500.00	1,485.26	477.75	420.34	8.322	CC
NEBU 311 - OH - OH	7,545.74	7,015.26	488.94	193.47	1.655	ES, SF
NEBU 311M - OH - OH	7,434.84	6,985.69	2,223.81	1,929.13	7.547	CC
NEBU 311M - OH - OH	7,500.00	6,985.69	2,224.77	1,928.48	7.509	ES
NEBU 311M - OH - OH	8,000.00	6,985.69	2,294.51	1,982.87	7.363	SF
NEBU 318M - OH - OH	10,902.88	7,032.97	2,946.14	2,565.33	7.737	CC
NEBU 318M - OH - OH	11,000.00	7,032.97	2,947.74	2,564.48	7.691	ES

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



Anticollision Report



Company:	B.P.	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Project:	San Juan County, NM NAD83	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Reference Site:	NEBU 604 Pad	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Lateral	Database:	Grand Junction District
Reference Design:	Plan #4	Offset TVD Reference:	Reference Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
NEBU 604 Pad						
NEBU 318M - OH - OH	11,500.00	7,032.97	3,006.04	2,610.15	7.593	SF
NEBU 319 - OH - OH	13,702.55	7,018.58	3,150.62	2,699.63	6.986	CC
NEBU 319 - OH - OH	13,800.00	7,018.58	3,152.12	2,698.67	6.951	ES
NEBU 319 - OH - OH	14,300.00	7,018.58	3,206.76	2,740.67	6.880	SF
NEBU 321 - OH - OH	14,833.95	6,868.34	2,484.75	1,965.93	4.789	CC
NEBU 321 - OH - OH	14,900.00	6,868.34	2,485.63	1,965.14	4.776	ES
NEBU 321 - OH - OH	15,200.00	6,868.34	2,511.57	1,981.79	4.741	SF
NEBU 321M - OH - OH	15,245.72	6,926.71	854.84	368.51	1.758	CC, ES
NEBU 321M - OH - OH	15,300.00	6,926.71	856.56	368.86	1.756	SF
NEBU 321N - OH - OH	16,540.47	100.00	7,065.74	6,955.62	64.160	CC
NEBU 321N - OH - OH	16,600.00	100.00	7,065.99	6,955.28	63.824	ES
NEBU 321N - OH - OH	17,242.24	100.00	7,100.51	6,982.48	60.162	SF
NEBU 322M - OH - OH	13,789.42	7,092.65	924.17	468.02	2.026	CC
NEBU 322M - OH - OH	13,800.00	7,092.65	924.23	467.81	2.025	ES, SF
NEBU 33 - OH - OH	1,500.00	1,512.66	3,061.33	3,002.83	52.325	CC
NEBU 33 - OH - OH	8,400.00	5,885.00	3,163.93	2,910.84	12.501	ES
NEBU 33 - OH - OH	9,300.00	5,885.00	3,302.06	3,027.69	12.035	SF
NEBU 400 - OH - OH	13,015.79	3,715.00	4,427.19	4,222.55	21.635	CC
NEBU 400 - OH - OH	13,100.00	3,715.00	4,427.99	4,221.87	21.483	ES
NEBU 400 - OH - OH	14,700.00	3,715.00	4,736.73	4,502.43	20.216	SF
NEBU 438 - OH - OH	15,985.12	3,382.00	3,637.08	3,526.54	32.905	CC
NEBU 438 - OH - OH	16,000.00	3,382.00	3,637.11	3,526.44	32.866	ES
NEBU 438 - OH - OH	17,100.00	3,382.00	3,804.11	3,683.52	31.544	SF
NEBU 438A - OH - OH	14,765.65	100.00	7,217.65	7,113.95	69.601	CC
NEBU 438A - OH - OH	14,900.00	100.00	7,218.90	7,113.51	68.495	ES
NEBU 438A - OH - OH	17,242.24	100.00	7,630.73	7,494.62	56.064	SF
NEBU 458 - OH - OH	1,500.00	1,488.35	3,619.14	3,561.60	62.904	CC
NEBU 458 - OH - OH	1,600.00	1,588.33	3,620.87	3,559.37	58.879	ES
NEBU 458 - OH - OH	3,500.00	3,441.00	3,888.89	3,754.81	29.005	SF
NEBU 458A - OH - OH	1,500.00	1,455.83	3,900.48	3,844.25	69.362	CC
NEBU 458A - OH - OH	1,700.00	1,655.67	3,905.66	3,841.52	60.892	ES
NEBU 458A - OH - OH	12,800.00	3,470.00	4,805.44	4,622.96	26.334	SF
NEBU 460A - OH - OH	15,956.94	100.00	7,479.83	7,370.90	68.667	CC
NEBU 460A - OH - OH	16,000.00	100.00	7,479.95	7,370.51	68.346	ES
NEBU 460A - OH - OH	17,242.24	100.00	7,589.45	7,465.16	61.063	SF
NEBU 492A - OH - OH	1,500.00	1,500.76	4,552.03	4,494.00	78.442	CC
NEBU 492A - OH - OH	1,600.00	1,600.74	4,553.45	4,491.45	73.437	ES
NEBU 492A - OH - OH	13,200.00	3,453.00	5,217.92	5,022.58	26.711	SF
NEBU 496A - OH - OH	13,690.77	3,615.00	3,593.18	3,491.16	35.220	CC
NEBU 496A - OH - OH	13,700.00	3,615.00	3,593.19	3,491.08	35.189	ES
NEBU 496A - OH - OH	14,900.00	3,615.00	3,791.20	3,677.51	33.346	SF
NEBU 498 - OH - OH	1,500.00	1,433.39	1,861.94	1,806.60	33.648	CC
NEBU 498 - OH - OH	3,500.00	3,385.00	1,887.26	1,753.90	14.152	ES, SF
NEBU 498A - OH - OH	1,500.00	1,497.72	737.25	679.34	12.731	CC
NEBU 498A - OH - OH	1,800.00	1,797.17	742.18	672.34	10.626	ES
NEBU 498A - OH - OH	3,500.00	3,477.75	859.91	723.32	6.296	SF
NEBU 58 - OH - OH	11,025.08	7,031.31	1,015.77	631.94	2.646	CC, ES
NEBU 58 - OH - OH	11,100.00	7,031.31	1,018.53	632.81	2.641	SF
NEBU 58M - OH - OH	10,323.52	6,987.84	2,215.66	1,831.66	5.770	CC
NEBU 58M - OH - OH	10,400.00	6,987.84	2,216.98	1,831.05	5.745	ES
NEBU 58M - OH - OH	10,700.00	6,987.84	2,247.41	1,852.20	5.687	SF
NEBU 604 COM 1H - OH - Plan #4	1,000.00	1,000.00	20.00	17.90	9.492	CC, ES
NEBU 604 COM 1H - OH - Plan #4	17,242.24	17,370.78	1,320.00	800.69	2.542	SF

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



Anticollision Report



Company:	B.P.	Local Co-ordinate Reference:	Well NEBU 604 COM 2H
Project:	San Juan County, NM NAD83	TVD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Reference Site:	NEBU 604 Pad	MD Reference:	GL 6500' & RKB 25' @ 6525.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	NEBU 604 COM 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Lateral	Database:	Grand Junction District
Reference Design:	Plan #4	Offset TVD Reference:	Reference Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
NEBU 604 Pad						
NEBU 604 COM 2H - Pilot - Plan #3	6,547.87	6,547.86	1.04	1.04	10,000.000	CC, ES
NEBU 604 COM 2H - Pilot - Plan #3	6,600.00	6,599.93	2.37	2.30	32.675	SF
NEBU 604 COM 3H - OH - Plan #2	1,000.00	1,000.00	19.99	17.89	9.488	CC, ES
NEBU 604 COM 3H - OH - Plan #2	17,242.24	17,402.66	1,255.47	739.73	2.434	SF
NEBU 604 COM 4H - Lateral - Plan #1	1,055.65	1,052.98	38.41	36.20	17.380	CC
NEBU 604 COM 4H - Lateral - Plan #1	16,600.00	16,580.17	433.27	-35.66	0.924	Stop Drilling, ES, SF
NEBU 604 COM 5H - OH - Plan #1	1,000.00	997.00	59.99	57.89	28.560	CC, ES
NEBU 604 COM 5H - OH - Plan #1	16,600.00	16,745.13	390.11	67.92	1.211	Shut In Offsets, SF
NEBU 604 COM 6H - OH - Plan #1	800.00	797.00	80.00	78.35	48.451	CC, ES
NEBU 604 COM 6H - OH - Plan #1	16,600.00	16,636.27	910.06	428.37	1.889	SF
NEBU 604 COM 7H - OH - Plan #1	1,000.00	997.00	100.00	97.90	47.607	CC, ES
NEBU 604 COM 7H - OH - Plan #1	16,800.00	16,969.28	1,607.03	1,124.38	3.330	SF
NEBU 604 COM 8H - OH - Plan #1	800.00	797.00	120.00	118.35	72.678	CC, ES
NEBU 604 COM 8H - OH - Plan #1	16,900.00	17,048.46	2,247.59	1,753.63	4.550	SF

Offset Design NEBU 604 Pad - NEBU 208 - OH - OH												Offset Site Error:	0.00 usft
Survey Program:		100-UNKNOWN										Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	25.56	0.00	0.00	0.51	22.04	2,607.63	1,055.56	2,813.17				
100.00	100.00	125.56	100.00	0.00	3.02	22.04	2,607.63	1,055.56	2,813.17	2,810.15	3.02	930.713	
200.00	200.00	225.56	200.00	0.00	7.02	22.04	2,607.63	1,055.56	2,813.17	2,806.15	7.02	400.588	
300.00	300.00	325.56	300.00	0.00	11.02	22.04	2,607.63	1,055.56	2,813.17	2,802.15	11.02	255.219	
400.00	400.00	425.56	400.00	0.00	15.02	22.04	2,607.63	1,055.56	2,813.17	2,798.15	15.02	187.263	
500.00	500.00	525.56	500.00	0.00	19.02	22.04	2,607.63	1,055.56	2,813.17	2,794.15	19.02	147.886	
600.00	600.00	625.56	600.00	0.00	23.02	22.04	2,607.63	1,055.56	2,813.17	2,790.15	23.02	122.192	
700.00	700.00	725.56	700.00	0.00	27.02	22.04	2,607.63	1,055.56	2,813.17	2,786.15	27.02	104.104	
800.00	800.00	825.56	800.00	0.00	31.02	22.04	2,607.63	1,055.56	2,813.17	2,782.15	31.02	90.681	
900.00	900.00	925.56	900.00	0.00	35.02	22.04	2,607.63	1,055.56	2,813.17	2,778.15	35.02	80.324	
1,000.00	1,000.00	1,025.56	1,000.00	0.00	39.02	22.04	2,607.63	1,055.56	2,813.17	2,774.15	39.02	72.091	
1,100.00	1,100.00	1,125.56	1,100.00	0.00	43.02	22.04	2,607.63	1,055.56	2,813.17	2,770.15	43.02	65.388	
1,200.00	1,200.00	1,225.56	1,200.00	0.00	47.02	22.04	2,607.63	1,055.56	2,813.17	2,766.15	47.02	59.826	
1,300.00	1,300.00	1,325.56	1,300.00	0.00	51.02	22.04	2,607.63	1,055.56	2,813.17	2,762.15	51.02	55.136	
1,400.00	1,400.00	1,425.56	1,400.00	0.00	55.02	22.04	2,607.63	1,055.56	2,813.17	2,758.15	55.02	51.128	
1,500.00	1,500.00	1,525.56	1,500.00	0.00	59.02	22.04	2,607.63	1,055.56	2,813.17	2,754.15	59.02	47.663	CC
1,600.00	1,599.98	1,625.54	1,599.98	0.00	63.02	117.06	2,607.63	1,055.56	2,813.97	2,750.95	63.01	44.656	
1,700.00	1,699.84	1,725.40	1,699.84	0.00	67.02	117.11	2,607.63	1,055.56	2,816.35	2,749.37	66.98	42.046	ES
1,800.00	1,799.45	1,825.01	1,799.45	0.00	71.00	117.19	2,607.63	1,055.56	2,820.34	2,749.42	70.92	39.768	
1,900.00	1,898.70	1,924.26	1,898.70	0.00	74.97	117.31	2,607.63	1,055.56	2,825.96	2,751.14	74.82	37.771	
2,000.00	1,997.57	2,023.13	1,997.57	0.00	78.93	117.53	2,607.63	1,055.56	2,832.92	2,754.19	78.73	35.983	
2,100.00	2,096.40	2,121.96	2,096.40	0.00	82.88	117.80	2,607.63	1,055.56	2,840.07	2,757.40	82.67	34.355	
2,200.00	2,195.23	2,220.79	2,195.23	0.00	86.83	118.07	2,607.63	1,055.56	2,847.28	2,760.67	86.61	32.875	
2,300.00	2,294.06	2,319.62	2,294.06	0.00	90.78	118.34	2,607.63	1,055.56	2,854.55	2,764.00	90.55	31.526	
2,400.00	2,392.89	2,418.45	2,392.89	0.00	94.74	118.61	2,607.63	1,055.56	2,861.89	2,767.40	94.49	30.289	
2,500.00	2,491.72	2,517.28	2,491.72	0.00	98.69	118.87	2,607.63	1,055.56	2,869.28	2,770.86	98.42	29.152	
2,600.00	2,590.55	2,616.11	2,590.55	0.00	102.64	119.13	2,607.63	1,055.56	2,876.74	2,774.38	102.36	28.104	
2,700.00	2,689.38	2,714.94	2,689.38	0.00	106.60	119.40	2,607.63	1,055.56	2,884.27	2,777.97	106.30	27.134	
2,800.00	2,788.21	2,813.77	2,788.21	0.00	110.55	119.66	2,607.63	1,055.56	2,891.85	2,781.61	110.24	26.233	

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