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DISTRICT II-ARTESIA O.C.D.

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

5. Lease Serial No.
NMNM138831

6. If Indian, Allotee or Tribe Name

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

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
OAKVILLE FEDERAL COM
1H 326741

2. Name of Operator
MACK ENERGY CORPORATION

9. API Well No.
30-005-64346

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
11344 Lovington HWY, Artesia, NM 88211	(575) 748-1288	ROUND TANK/SAN ANDRES

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface NWNW / 707 FNL / 330 FWL / LAT 33.0068137 / LONG -103.9895433

At proposed prod. zone NWSW / 2644 FSL / 330 FWL / LAT 33.0305694 / LONG -103.9893272

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 24/T15S/R29E/NMP

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State
30 miles	CHAVES	NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
330 feet	640	240

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
1500 feet	3476 feet / 11784 feet	FED: NMB000286

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3937 feet	01/01/2020	25 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	Name *(Printed/Typed)*	Date
(Electronic Submission)	Deana Weaver / Ph: (575) 748-1288	10/11/2019

Title
Production Clerk

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Ruben J Sanchez / Ph: (575) 627-0250	12/02/2019

Title	Office
Assistant Field Manager, Lands & Minerals	Roswell Field Office

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.

APPROVED WITH CONDITIONS

Approval Date: 12/02/2019

Need GCP?

RWP 12-17-19

(Continued on page 2)

*(Instructions on page 2)

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 wen, 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 directionany 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 wen 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 win 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 conects this information to anow 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 Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

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Approval Date: 12/02/2019

Approval Date: 12/02/2019

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	MACK ENERGY CORPORATION
LEASE NO.:	NMNM-138831
WELL NAME & NO.:	OAKVILLE FEDERAL COM #1H
SURFACE HOLE FOOTAGE:	[707] ' F [N] L [330] ' F [W] L
LOCATION:	Section 24, T 15. S., R 29 E., NMPM
COUNTY:	Chaves County, New Mexico

1. GENERAL PROVISIONS

Approval of the APD does not warrant that any party holds equitable or legal title. Any request for a variance shall be submitted to the Authorized Officer on Sundry Notice (Form 3160-5).

For BLM's surface operating standards and guidelines, refer to: The Gold Book , Fourth Edition – Revised 2007. To obtain a copy free of charge contact the Roswell Field Office (575) 627-0272 or visit BLM on the web at:
http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/gold_book.html
All construction, operations, and reclamation shall follow the Onshore Oil and Gas Operations as described in the 43 CFR part 3160.

The Operator shall submit a Sundry Notice (Form 3160-5) to the Bureau of Land Management, Roswell Field Office (address above) for approval prior to beginning any new surface-disturbing activities or operations that are not specifically addressed and approved by this APD.

A site facility diagram and a site security plan shall be filed no later than 60 calendar days following first production (Onshore Order 3, Section III, I. and 43 CFR 3162.7-5).

2. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in

order to allow for an extension of 60 days beyond the expiration date of the APD (Filing of a Sundry Notice is required for this 60 day extension).

3. JURISDICTIONAL WATERS of the U.S.

The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers prior to discharge or dredge and fill material into waters of the United States in accordance with Section 404 of the Clean Water Act. Contact The U.S. Army Corps of Engineers regulatory New Mexico Branch Office, 4101 Jefferson Plaza NE, Albuquerque, NM 87109-3435 at (505) 342-3678 or Email: CESPA-RD-NM@usace.army.mil if you have questions.

4. CULTURAL AND PALEONTOLOGICAL RESOURCES

In the event that any cultural resource (prehistoric and historic period buildings, sites, structures, objects, and landscapes) and/or paleontological resource is discovered on public or Federal land by the holder, or any person working on behalf of the holder, the holder shall immediately halt the disturbance within 100 feet of the post-review discovery. The holder shall contact the BLM Authorized Officer within 24 hours for instructions:

BLM Authorized Officer:
Ruben Sanchez
Assistant Field Manager, Lands & Minerals
575-627-0250

If BLM Authorized Officer is Unavailable:
Courtney Carlson
Archaeologist
575-627-0328

The BLM Authorized Officer will coordinate with the appropriate specialists to ensure that qualified professionals evaluate the discovery, and to decide appropriate actions to prevent the loss of significant cultural or scientific values. The holder shall be responsible for the costs of evaluation, reporting, excavation, treatment, and/or disposition. Project implementation shall not proceed within 100 feet of the location of the inadvertent discovery until the BLM has concluded the post-review discovery process, and the BLM Authorized Officer has provided the holder with a written notice to proceed.

5. HUMAN REMAINS AND NAGPRA ITEMS

In the event that project implementation results in the inadvertent discovery of Native American human remains, funerary objects, sacred objects, and/or objects of cultural patrimony, the holder shall immediately halt the disturbance within 300 feet of the inadvertent discovery. The holder shall contact the BLM Authorized Officer within 24 hours for instructions:

BLM Authorized Officer:
Ruben Sanchez
Assistant Field Manager, Lands & Minerals
575-627-0250

If BLM Authorized Officer is Unavailable:
Quinton Franzoy
Law Enforcement Officer
575-910-0778

The holder shall be held responsible for ceasing activity and protecting the inadvertent discovery as well as for the costs of protection, evaluation, reporting, excavation, treatment, and/or disposition of the inadvertent discovery. The BLM shall use the process identified in the Native American Graves Protection and Repatriation Act (NAGPRA) and in 43 CFR 10.4 to proceed

according to the rights of the culturally affiliated party, as applicable. Project implementation within 300 feet of the location of the inadvertent discovery may resume 30 days after BLM certifies the notification, or when a written Plan of Action following 43 CFR 10.3(b)(1) is approved. In either case, the BLM Authorized Officer will provide the holder with a written notice to proceed.

6. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations (access road and/or well pad). Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

7. CAVE AND KARST

Any Cave or Karst feature discovered by the operator or by any person working on the operator's behalf shall immediately report the feature to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. During drilling, previously unknown cave and karst features could be encountered. If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids.

To mitigate or lessen the probability of impacts associated with the drilling and production of oil and gas wells in karst areas, the guidelines listed in Appendix 3, Practices for Oil and Gas Drilling and Production in Cave and Karst Areas, as approved in the Roswell Resource Management Plan Amendment of 1997, page AP3-4 through AP 3-7 shall be followed.

A more complete discussion of the impacts of oil and gas drilling can be found in the *Dark Canyon Environmental Impact Statement of 1993*, published by the U.S. Department of the Interior, Bureau of Land Management.

8. CONSTRUCTION

NOTIFICATION: The BLM shall administer compliance and monitor construction of the access road and well pad. Notify Natural Resource Specialist, Forrest Mayer at (575) 627-0210 or the Roswell Field Office at (575) 627-0272 **at least three (3) working days prior to commencing construction of the access road and/or well pad.**

A complete copy of the *approved* APD and the attached Conditions of Approval (COAs) **shall be kept on the well's location** for reference upon inspections.

Construction over and/or immediately adjacent to existing pipelines shall be coordinated, and in accordance with, the relevant pipeline companies' policy.

Any trench left open for (8) hours or less is not required to have escape ramps; however, before the trench is backfilled, an agency approved monitor shall walk the entire length of the open trench and remove all trapped fauna. The bottom surface of the trench will be disturbed a minimum of 2 inches in order to arouse any buried fauna. All fauna will be released a minimum of 100 yards from the trench.

For trenches left open for (8) hours or more, earthen escape ramps (built at nor more than a 30 degree slope and spaced no more than 500 feet apart) shall be placed in the trench. Structures will also be authorized within the trench. Metal structures will not be authorized. Structures used as escape ramps will be placed at no more than a 30 degree slope and spaced no more than 500 feet apart.

9. TOPSOIL:

When saturated soil conditions exist on access roads or location, construction shall be halted until soil material dries out or is frozen sufficiently for construction to proceed without undue damage and erosion to soils, roads and locations.

Topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. This shall include all growth medium - at a minimum, the upper 2-6 inches of soil - but shall also include stripping of any additional topsoil present at a site, such as indicated by color or texture. Stripping depth may be specified during the onsite inspection. Stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to interim seedbed preparation. No topsoil shall be stripped when soils are moisture-saturated or frozen below the stripping depth.

The topsoil will not be used to construct the containment structures or earthen dikes that are on the outside boundaries of the constructed well pad, tanks, and storage facilities.

Each construction area is site specific as to topsoil depth. It is the operator's responsibility to ensure that topsoil, caliche, or spoils are not mixed together.

(**Pads**): topsoil will be stripped and stored in separate piles from the spoils pile. They can be stored on opposite or adjacent sides. If topsoil and spoils must be stored on the same pad side together they shall be no closer than toe to toe, not overlapping. Each pile shall be kept within 30 feet of the pad's side. 100% of the topsoil will be used for both interim and final reclamation. 100% of topsoil will be respread over the disturbed areas during reclamation.

(**Roads**): topsoil shall be stripped in such a way to follow the road's edge outside of the surfacing or drivable area. During final reclamation, after removal of surface material and re-contouring, 100% of topsoil will be respread over the disturbed areas during reclamation. Vegetation in the topsoil will help hold re-seeding, moisture content, and reduce erosion.

10. WELL PAD SURFACING:

The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational need. Surfacing of the well pad is not required. If the operator elects to surface the well pad, the surfacing material will be required to be removed at the time of reclamation.

Cattleguards

An appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s). Any existing cattle guard(s) on the access road shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guard(s) that are in place and are utilized during lease operations. Gates or cattle guards on public lands will not be locked or closed to public use unless closure is specifically determined to be necessary and is authorized in writing by the authorized officer. A gate shall be constructed and fastened securely to H-braces.

Fence Requirement

The operator shall notify the private surface landowner or the grazing allotment operator prior to crossing any fence(s). Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

11. PRODUCTION:

Storage

Fiberglass storage tanks are ***not*** permitted for the storage of production.

Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim reclamation and re-vegetation of the well location.

Containment Structures

All production facilities shall have a lined containment structure large enough to contain **110% of the largest Tank (PLUS) 24 hours of production** (43 CFR 3162.5-1) ***Environmental Obligations***, unless more stringent protective requirements are deemed necessary by the Authorized Officer.

Painting Requirement

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **OIL GREEN** (Standard Environmental Color Chart June 2008).

Completion Report

In accordance with 43 CFR 3160, Form 3160-4 (Well Completion or Re-completion Report and Log) must be submitted to the Bureau of Land Management, Roswell Field Office within 30 days after completion of the well or producer. Copies of all open hole and cased hole logs, core descriptions, core analyses, well test data, geologic summaries, sample descriptions, formation test reports, stimulation reports, directional survey (if applicable), and all other surveys or data obtained and compiled during the drilling, completion, and/or work over operations, shall be included with Form 3160-4.

12. INTERIM RECLAMATION:

Reclamation earthwork for interim and/or final reclamation shall be completed within 6 months of well completion or well plugging (weather permitting), and shall consist of: 1) backfilling pits, 2) re-contouring and stabilizing the well site, access road, cut/fill slopes, drainage channels, utility and pipeline corridors, and all other disturbed areas, to approximately the original contour, shape, function, and configuration that existed before construction (any compacted backfilling activities shall ensure proper spoils placement , settling, and stabilization, 3) surface ripping, prior to topsoil placement, to a depth of 18-24 inches deep on 18-24 inch centers to reduce compaction, 4) final grading and replacement of all topsoil so that no topsoil's remains in the stockpile, 5) seeding in accordance with reclamation portions of the APD and these COA's.

Any subsequent re-disturbance of interim reclamation shall be reclaimed within six (6) months by the same means described above.

Prior to conducting interim reclamation, <u>the operator is required to:</u>

- Submit a Sundry Notices and Reports on Wells (Notice of Intent), Form 3160-5, prior to conducting interim reclamation.
- Contact BLM at least three (3) working days prior to conducting any interim reclamation activities, and prior to seeding.

During reclamation, the removal of caliche is important to increasing the success of re-vegetating the site. Removed caliche may be used in road repairs, fire walls or for building other roads and locations. In addition, in order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing re-vegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be re-vegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

Use a certified noxious weed-free seed mixture. Use seed tested for viability and purity in accordance with State law(s) within nine months prior to purchase. Use a commercial seed

mixture certified or registered and tagged in accordance with State law(s). Make the seed mixture labels available for BLM inspection.

13. SEED MIX:

SEE ATTACHED SEED MIX.

WELL NAME	ECOSITE (ACCESS ROAD)	ECOSITE (PAD)
OAKVILLE FEDERAL COM #1H	SHALLOW SD-3	SHALLOW SD-3

14. FINAL ABANDONMENT:

A. Upon abandonment of the well a Notice of Intent for Plug and Abandonment describing plugging procedures. Followed within 30 days you shall file with this office, a Subsequent Report of Abandonment (Form 3160-5). To be included with this report is where the plugs were placed; volumes of cement used and well bore schematic as plugged.

B. On private surface/federal mineral estate land the reclamation procedures on the road and well pad shall be accomplished in accordance with the Private Surface Land Owner agreements and a copy of the release is to be submitted upon abandonment.

C. The Operator shall promptly plug and abandoned each newly completed, re-completed or producing well which is not capable of producing in paying quantities. No well may be temporarily abandoned for more than 30 days without prior approval from this office. When justified by the Operator, BLM may authorize additional delays, no one of which may exceed an additional 12 months. Upon removal of drilling or producing equipment form the site of a well which is to be permanently abandoned, the surface of the lands disturbed shall be reclaimed in accordance with an approved Notice of Intent for final reclamation.

D. Final reclamation shall include: the removal of all solid waste, trash, surfacing materials, storage facilities and all other related equipment, flow lines, and meter housing, power poles, guy wires, and all other related power materials. All disturbed areas, i.e. cuts and fills, shall be re-contoured to their original surroundings. 100% of topsoil shall be used to resurface all disturbed areas including access roads. A label of the seed mix used shall be submitted with the Final Abandonment Notice (FAN) for review once reclamation is complete.

15. PIPELINE PROTECTION REQUIREMENT:

Precautionary measures shall be taken by the operator during construction of the access road to protect existing pipelines that the access road will cross over. An earthen berm; 2 feet high by 3 feet wide and 14 feet across the access road travelway (2' X 3' X 14'), shall be constructed over existing pipelines. The operator shall be held responsible for any damage to existing pipelines. If the pipeline is ruptured and/or damaged the operator shall immediately cease construction operations and repair the pipeline. The operator shall be held liable for any unsafe construction operations that threaten human life and/or cause the destruction of equipment.

16. WILDLIFE PROTECTION MEASURES – Best Management Practices (BMPs)

All pipelines laid on the surface will have sloped dirt berms built over them every 100 yards to allow reptiles, amphibians, small mammals, ground-dwelling birds and their broods access over them. Dirt berms should be no less than 12 inches in width and extend over all surface pipelines within the Right of Way. Berms should be maintained for the life of the project.

Wildlife Mortality - General

The operator will notify the Bureau of Land Management (BLM) authorized officer and nearest Fish and Wildlife Service (FWS) Law Enforcement office within 24 hours, if the operator discovers a dead or injured federally protected species (i.e., migratory bird species, bald or golden eagle, or species listed by the FWS as threatened or endangered) in or adjacent to a pit, trench, tank, exhaust stack, or fence. (If the operator is unable to contact the FWS Law Enforcement office, the operator must contact the nearest FWS Ecological Services office.)

1. **Closed top tanks are required for any containment system.**

All tanks are required to have a closed top tank.

2. **Chemical and Fuel Secondary Containment Systems**

Chemical and Fuel Secondary Containment and Exclosure Screening – The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground.
The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. Closed-top tanks are required for any secondary containment systems.

3. **Open-Vent Exhaust Stacks**

Open-Vent Exhaust Stack Exclosures – The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

17. WASTE, HAZARDOUS AND SOLID:

Waste materials produced during all phases of operation will be disposed of promptly in an approved manner so it will not impact the air, soil, water, vegetation or animals. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products,

ashes and equipment. All liquid waste, completion fluids and drilling products associated with oil and gas operations will be contained and then removed and deposited in an approved disposal site. Portable toilets will remain on site throughout well pad construction, drilling and reclamation.
The operator and contractors shall ensure that all use, production, storage, transportation and disposal of hazardous materials, solid wastes and hazardous wastes associated with the drilling, completion and production of this well will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project related activities involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. A file will be maintained onsite containing current Safety Data Sheets (SDS) for all chemicals, compounds and/or substances which are used in the course of construction, drilling, completion and production operations.

18. SURFACE WATER AND GROUNDWATER PROTECTION MEASURES – Best Management Practices (BMPs)\

If, during any phase of the construction, operation, maintenance, or termination of the authorization, any oil, produced water, or other pollutants, should be discharged, and impacting Federal land, the control and total removal, disposal, and cleaning up of such oil, produced water or other pollutants, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal land, or to repair all damages to Federal land resulting therefrom, the Authorized Officer may take such measures as deemed necessary to control and cleanup the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any liability or responsibility.

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Mack Energy Corporation**
LEASE NO.:	**NMNM-138831**
WELL NAME & NO.:	**Oakville Federal Com 1H**
SURFACE HOLE FOOTAGE:	**0707' FNL & 0330' FWL**
BOTTOM HOLE FOOTAGE	**2644' FSL & 0330' FWL Sec. 12, T. 15 S., R 29 E.**
LOCATION:	**Section 24, T. 15 S., R 29 E., NMPM**
COUNTY:	**Chaves County, New Mexico**

Communitization Agreement

- The operator will submit a Communitization Agreement to the Roswell Field Office, 2909 West 2nd Street Roswell, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.

- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.

- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

The Gamma Ray and Neutron well logs must be run from total depth to surface and e-mailed to Chris Bolen at cbolen@blm.gov or hard copy mailed to 2909 West Second Street Roswell, NM 88201 to his attention.

The BLM is to be notified in advance for a representative to witness:

a. Spudding well (minimum of 24 hours)
b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
c. BOPE tests (minimum of 4 hours)

☒ **Chaves and Roosevelt Counties**
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After hours cll (575) 627-0205.

A. Hydrogen Sulfide

1. **Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) for Water Basin:
After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Possibility of water flows in the Salado and Artesia Group.
Possibility of lost circulation in the Red Beds, Rustler, Artesia Group, and San Andres formations.

1. The **13-3/8** inch surface casing shall be set at approximately **370** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

   ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

3. The minimum required fill of cement behind the **7** inch production casing is:

   ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Operator may need to pump more cement as they have had reoccurring low TOCs.**

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API 53.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi **(Installing 3M BOP, testing to 2,000 psi). BOP specs must be on location for PET inspection.**

3. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

   a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

   b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

d. The results of the test shall be reported to the appropriate BLM office.

e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. WASTE MATERIAL AND FLUIDS

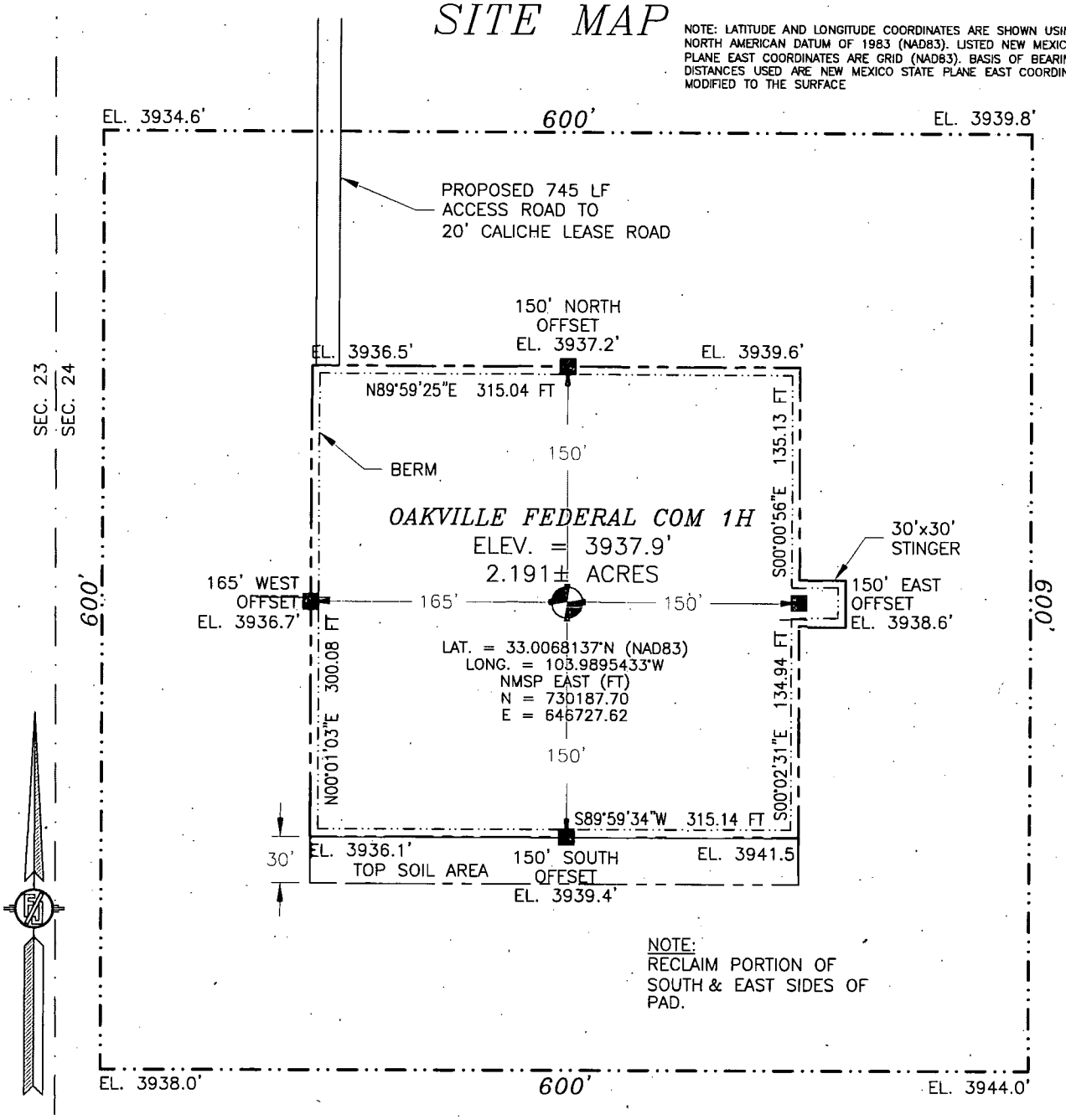
All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

JAM 112219

SECTION 24, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO
SITE MAP

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF STATE HIGHWAY 82 AND CR. 217 (HAGERMAN CUTOFF) GO NORTH ON CR. 217 FOR APPROX. 13.0 MILES, TURN LEFT (WEST) ON 20' CALICHE LEASE ROAD AND GO APPROX. 0.3 OF A MILE TO BEGIN ROAD SURVEY, FOLLOW ROAD SURVEY SOUTH APPROX. 745' TO THE NORTHWEST PAD CORNER FOR THIS LOCATION.

I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

FILIMON F. JARAMILLO, PLS 12797 — 9/10/19 DATE

MACK ENERGY CORPORATION

OAKVILLE FEDERAL COM 1H

LOCATED 707 FT. FROM THE NORTH LINE AND 330 FT. FROM THE WEST LINE OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. CHAVES COUNTY, STATE OF NEW MEXICO

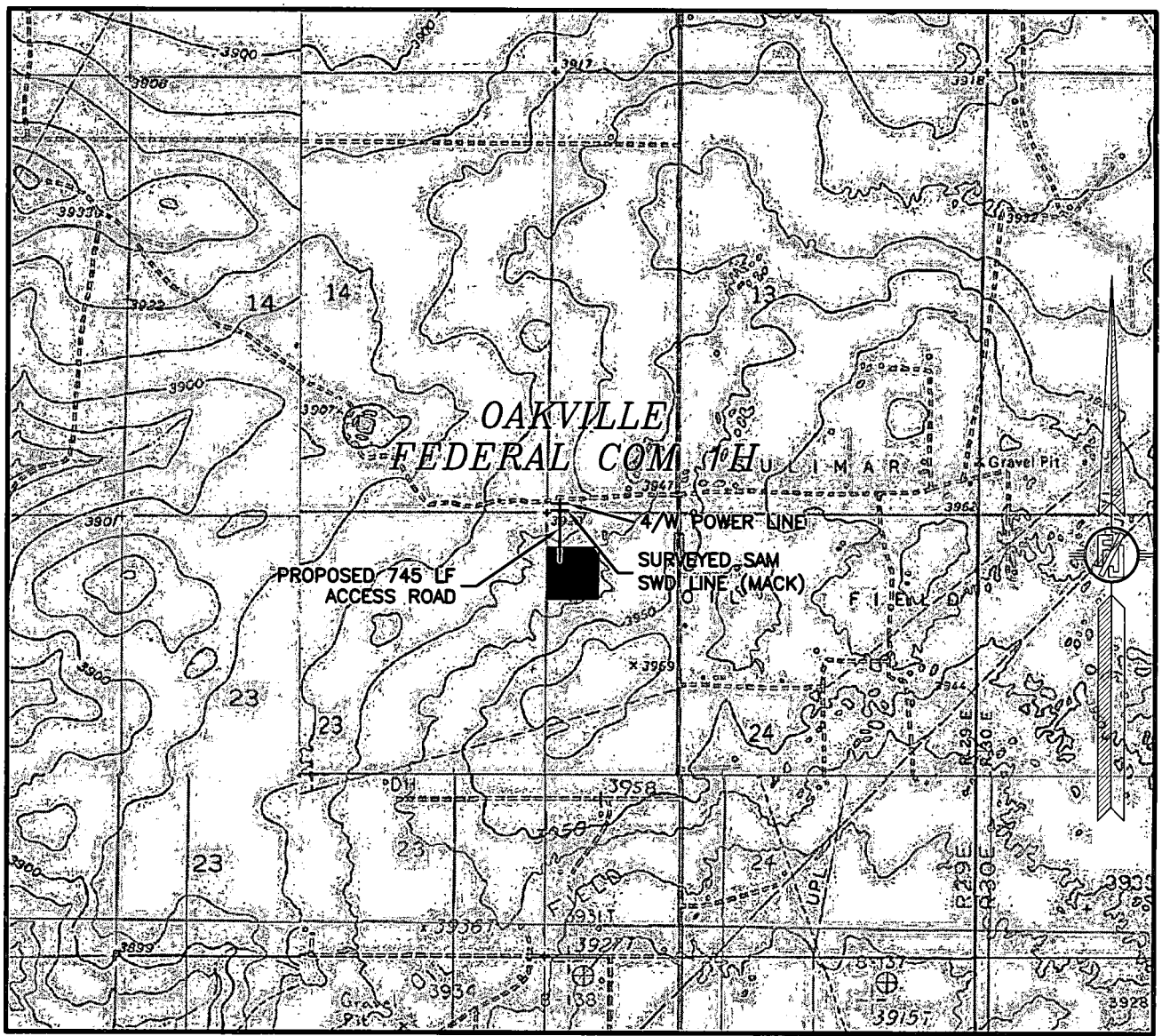
SEPTEMBER 6, 2019

SURVEY NO. 7556

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

SECTION 24, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

LOCATION VERIFICATION MAP



USGS QUAD MAP:
CEDAR POINT

NOT TO SCALE

MACK ENERGY CORPORATION
OAKVILLE FEDERAL COM 1H
LOCATED 707 FT. FROM THE NORTH LINE
AND 330 FT. FROM THE WEST LINE OF
SECTION 24, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

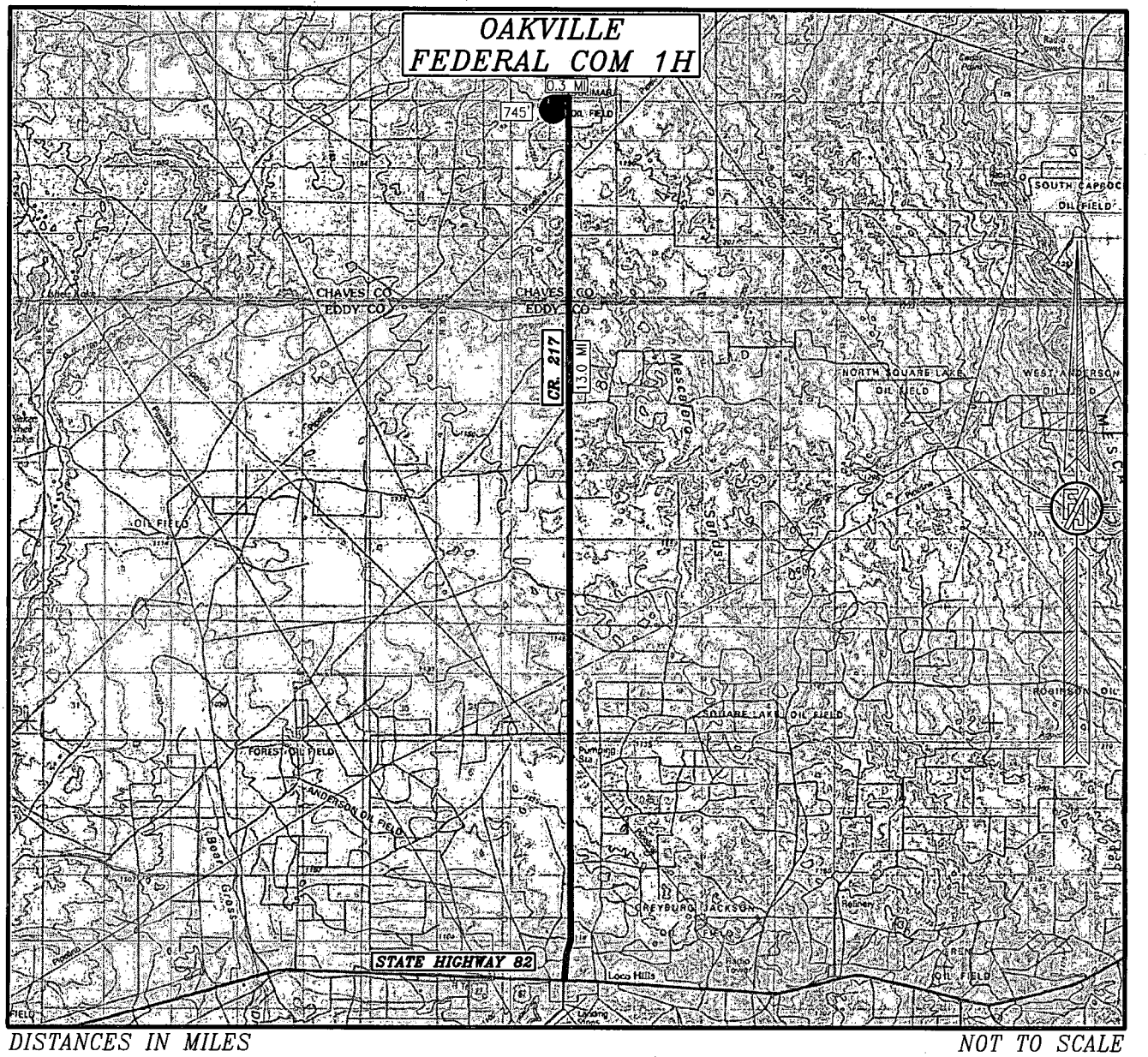
SEPTEMBER 6, 2019

SURVEY NO. 7556

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 24, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

VICINITY MAP



DISTANCES IN MILES

NOT TO SCALE

DIRECTIONS TO LOCATION
FROM THE INTERSECTION OF STATE HIGHWAY 82 AND CR. 217 (HAGERMAN CUTOFF) GO NORTH ON CR. 217 FOR APPROX. 13.0 MILES, TURN LEFT (WEST) ON 20' CALICHE LEASE ROAD AND GO APPROX. 0.3 OF A MILE TO BEGIN ROAD SURVEY, FOLLOW ROAD SURVEY SOUTH APPROX. 745' TO THE NORTHWEST PAD CORNER FOR THIS LOCATION.

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CHAVES COUNTY, STATE OF NEW MEXICO

SEPTEMBER 6, 2019

SURVEY NO. 7556

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 24, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

AERIAL PHOTO

NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
NOVEMBER 2017

MACK ENERGY CORPORATION
OAKVILLE FEDERAL COM 1H
LOCATED 707 FT. FROM THE NORTH LINE
AND 330 FT. FROM THE WEST LINE OF
SECTION 24, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

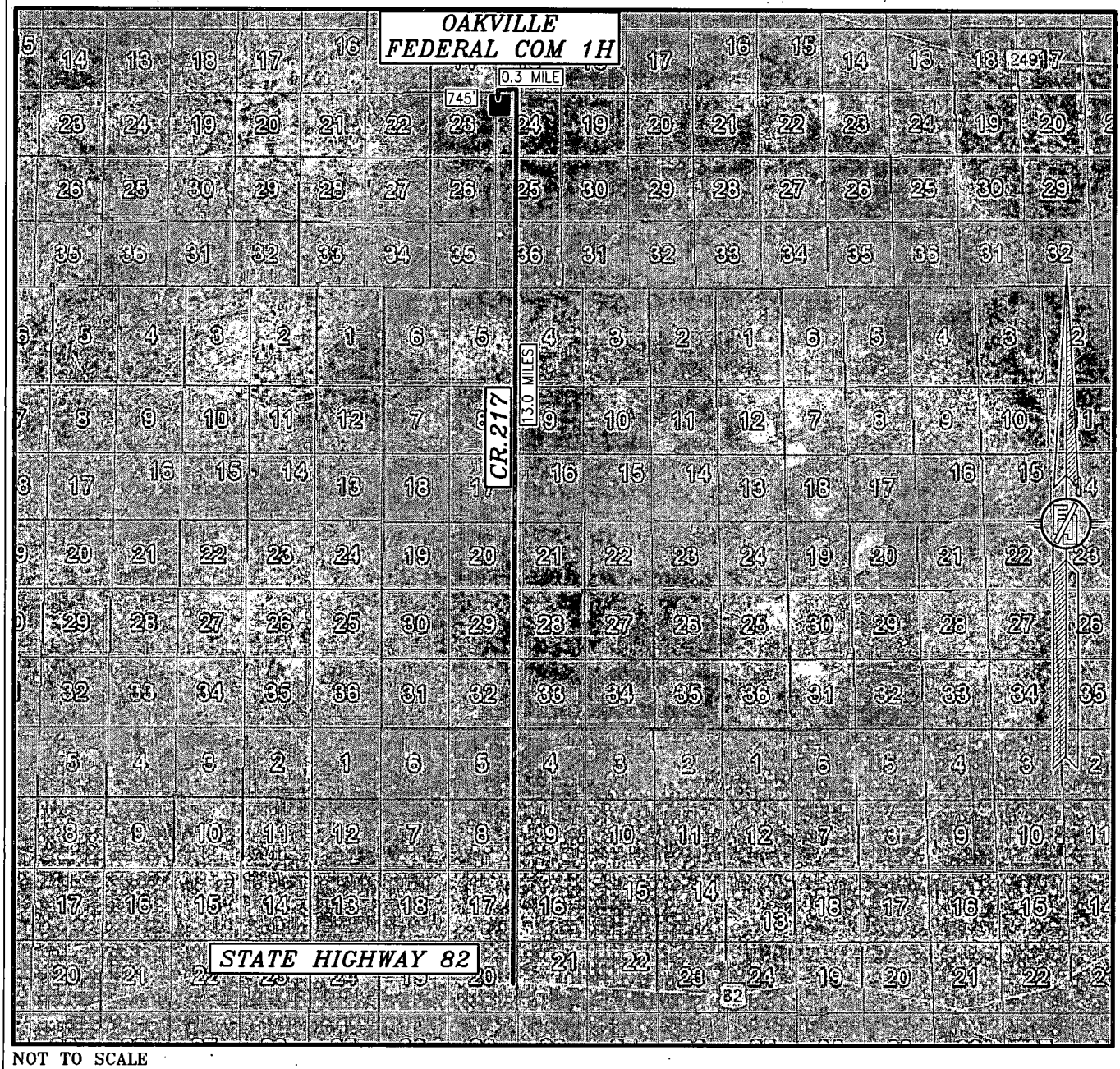
SEPTEMBER 6, 2019

SURVEY NO. 7556

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 24, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

ACCESS AERIAL ROUTE MAP



NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
NOVEMBER 2017

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SEPTEMBER 6, 2019

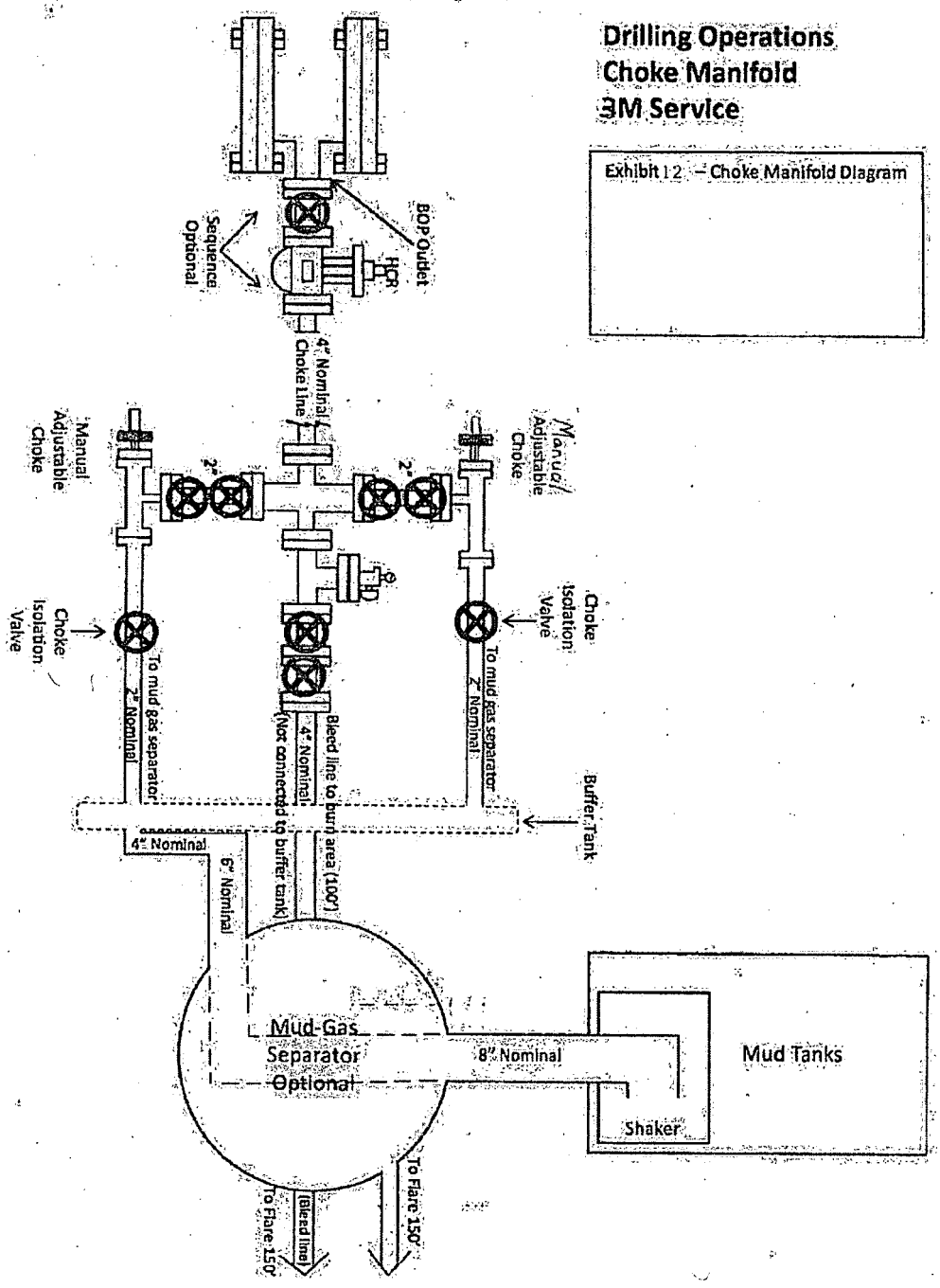
SURVEY NO. 7556

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

Mack Energy Corporation

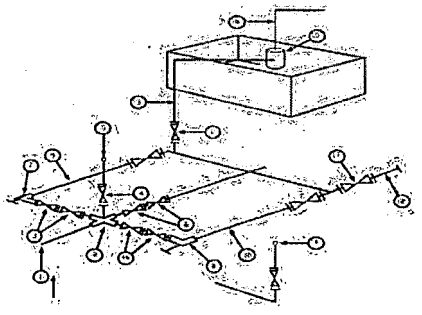
MANIFOLD SCHEMATIC

Exhibit #12



Mack Energy Corporation

Exhibit # 1
MIMIMUM CHOKE MANIFOLD
3,000, 5,000, and 10,000 PSI Working Pressure
3M will be used
3 MWP - 5 MWP - 10 MWP



Mud Pit

Reserve Pit

* Location of separator optional

Below Substructure

Mimimum requirements

No.		3,000 MWP I.D.	3,000 MWP Nominal	3,000 MWP Rating	5,000 MWP I.D.	5,000 MWP Nominal	5,000 MWP Rating	10,000 MWP I.D.	10,000 MWP Nominal	10,000 MWP Rating
1	Line from drilling Spool		3"	3,000		3"	5,000		3"	10,000
2	Cross 3"x3"x3"x2"			3,000			5,000			
2	Cross 3"x3"x3"x2"									10,000
3	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000
4	Valve Gate Plug	1 13/16		3,000	1 13/16		5,000	1 13/16		10,000
4a	Valves (1)	2 1/16		3,000	2 1/16		5,000	2 1/16		10,000
5	Pressure Gauge			3,000			5,000			10,000
6	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000
7	Adjustable Choke (3)	2"		3,000	2"		5,000	2"		10,000
8	Adjustable Choke	1"		3,000	1"		5,000	2"		10,000
9	Line		3"	3,000		3"	5,000		3"	10,000
10	Line		2"	3,000		2"	5,000		2"	10,000
11	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000
12	Line		3"	1,000		3"	1,000		3"	2,000
13	Line		3"	1,000		3"	1,000		3"	2,000
14	Remote reading compound Standpipe pressure guage			3,000			5,000			10,000
15	Gas Separator		2"x5'			2"x5'			2"x5'	
16	Line		4"	1,000		4"	1,000		4"	2,000
17	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000

(1) Only one required in Class 3M
(2) Gate valves only shall be used for Class 10 M
(3) Remote operated hydraulic choke required on 5,000 psi and 10,000 psi for drilling

EQUIPMENT SPECIFICATIONS AND INSTALLATION INSTRUCTION

1. All connections in choke manifold shall be welded, studded, flanged or Cameron clamp of comparable rating.
2. All flanges shall be API 6B or 6BX and ring gaskets shall be API RX or BX. Use only BX for 10 MWP.
3. All lines shall be securely anchored.
4. Chokes shall be equipped with tungsten carbide seats and needles, and replacements shall be available.
5. alternate with automatic chokes, a choke manifold pressure gauge shall be located on the rig floor in conjunction with the standpipe pressure gauge.
6. Line from drilling spool to choke manifold should bee as straight as possible. Lines downstream from chokes shall make turns by large bends or 90 degree bends using bull plugged tees.

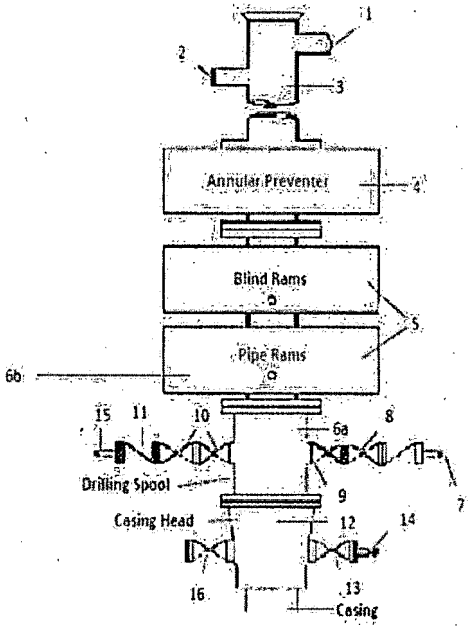
Mack Energy Corporation
Minimum Blowout Preventer Requirements
5000 psi Working Pressure
13 5/8 inch - 5 MWP
11 Inch - 5 MWP

Stack Requirements

NO.	Items	Min. I.D.	Min. Nominal
1	Flowline		2"
2	Fill up line		2"
3	Drilling nipple		
4	Annular preventer		
5	Two single or one dual hydraulically operated rams		
6a	Drilling spool with 2" min. kill line and 3" min choke line outlets		2" Choke
6b	2" min. Kill line and 3" min. choke line outlets in ram. (Alternate to 6a above)		
7	Valve Gate Plug	3 1/8	
8	Gate valve-power operated	3 1/8	
9	Line to choke manifold		3"
10	Valve Gate Plug	2 1/16	
11	Check valve	2 1/16	
12	Casing head		
13	Valve Gate Plug	1 13/16	
14	Pressure gauge with needle valve		
15	Kill line to rig mud pump manifold		2"

OPTIONAL

16	Flanged Valve	1 13/16	



CONTRACTOR'S OPTION TO FURNISH:

1. All equipment and connections above bradenhead or casinghead. Working pressure of preventers to be 2000 psi minimum.
2. Automatic accumulator (80 gallons, minimum) capable of closing BOP in 30 seconds or less and, holding them closed against full rated working pressure.
3. BOP controls, to be located near drillers position.
4. Kelly equipped with Kelly cock.
5. Inside blowout preventer or its equivalent on derrick floor at all times with proper threads to fit pipe being used.
6. Kelly saver-sub equipped with rubber casing protector at all times.
7. Plug type blowout preventer tester.
8. Extra set pipe rams to fit drill pipe in use on location at all times.
9. Type RX ring gaskets in place of type R.

MEC TO FURNISH:

1. Bradenhead or casing head and side valves.
2. Wear bushing, if required.

10.

ME

GENERAL NOTES:

1. Deviations from this drawing may be made only with the express permission of MEC's Drilling Manager.
2. All connections, valves, fittings, piping, etc., subject to well or pump pressure must be flanged (suitable clamp connections acceptable) and have minimum working pressure equal to rated working pressure of preventers up through choke valves must be full opening and suitable for high pressure mud service.
3. Controls to be of standard design and each marked, showing opening and closing position.
4. Chokes will be positioned so as not to hamper or delay changing of choke beans. Replaceable parts for adjustable choke, or bean sizes, retainers, and choke wrenches to be conveniently located for immediate use.
5. All valves to be equipped with hand-wheels or handles ready for immediate use.
6. Choke lines must be suitably anchored.
7. Handwheels and extensions to be connected and ready for use.
8. Valves adjacent to drilling spool to be kept open. Use outside valves except for emergency.
9. All seamless steel control piping (2000 psi working pressure) to have flexible joints to avoid stress. Hoses will be permitted.
10. Casinghead connections shall not be used except in case of emergency.
11. Does not use kill line for routine fill up operations.

Casing Design Well: Oakville Federal Com #1H

String Size & Function: 13 3/8 in surface x intermediate

Total Depth: 200 ft

Pressure Gradient for Calculations (While drilling)

Mud weight, collapse: 9.6 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 9.6 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 9.6 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 99.84 psi Burst: 99.84 psi, joint strength: 99.84 psi

Partially evacuated hole? Pressure gradient remaining: 10 #/gal

Max. Shut in surface pressure: 500 psi

1st segment	200 ft to 0 ft			Make up Torque ft-lbs		Total ft = 200
O.D.	Weight	Grade	Threads	opt.	min.	mx.
13.375 inches	48 #/ft	J-55	ST&C	3,220	2,420	4,030
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift
740	2,370 psi	433 ,000 #		744 ,000 #		12.559

2nd segment	0 ft to 0 ft			Make up Torque ft-lbs		Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.
Inches	#/ft					
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift
psi	psi	,000 #		,000 #		

3rd segment	0 ft to 0 ft			Make up Torque ft-lbs		Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.
Inches	#/ft					
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift
psi	psi	,000 #		,000 #		

4th segment	0 ft to 0 ft			Make up Torque ft-lbs		Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.
Inches	#/ft					
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift
psi	psi	,000 #		,000 #		

5th segment	0 ft to 0 ft			Make up Torque ft-lbs		Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.
Inches	#/ft					
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift
psi	psi	,000 #		,000 #		

6th segment	0 ft to 0 ft			Make up Torque ft-lbs		Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.
Inches	#/ft					
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift
psi	psi	,000 #		,000 #		

Select 1st segment bottom 200

200 ft	to	0 ft	
13.375	0	J-55	ST&C

S.F.	Actual		Desire
collapse	7.411859	>=	1.125
burst-b	4.700889	>=	1.25
burst-t	4.74		

Top of segment 1 (ft) 0

Select 2nd segment from bottom

0 ft	to	0 ft	
0	0	0	0

S.F.	Actual		Desire
collapse	#DIV/0!	>=	1.125
burst-b	0	>=	1.25
burst-t	0		
jnt stngth	52.86986	>=	1.8

Casing Design Well: Oakville Federal Com #1H

String Size & Function: 9 5/8 in surface intermediate x

Total Depth: 1200 ft TVD: 1200 ft

Pressure Gradient for Calculations (While drilling)

Mud weight, collapse: 10 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 10 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 10 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 624 psi Burst: 624 psi, joint strength: 624 psi

Partially evacuated hole? Pressure gradient remaining: 10 #/gal

Max. Shut in surface pressure: 500 psi

1st segment	1200 ft to 0 ft			Make up Torque ft-lbs			Total ft = 1200
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
9.625 inches	36 #/ft	J-55	ST&C	3,940	2,960	4,930	
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
2,020 psi	3,520 psi	394 ,000 #		564 ,000 #		8.765	

2nd segment	ft to ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

3rd segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

4th segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

5th segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

6th segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

Select 1st segment bottom 1200

1200 ft to 0 ft
9.625 0 J-55 ST&C

	S.F.	Actual		Desire
collapse		3.237179	>=	1.125
burst-b		7.04	>=	1.25
burst-t		7.04		

Top of segment 1 (ft) 0

Select 2nd segment from bottom

0 ft to 0 ft
0 0 0 0

	S.F.	Actual		Desire
collapse		#DIV/0!	>=	1.125
burst-b		0	>=	1.25
burst-t		0		
jnt strngth		10.76785	>=	1.8

Casing Design Well: Oakville Federal Com #1H

String Size & Function: 7 x 5.5 in Production X

Total Depth: 11784 ft TVD: 3476 ft

Pressure Gradient for Calculations (While drilling)

Mud weight, collapse: 10 #/gal Safety Factor Collapse: 1.125

Mud weight, burst: 10 #/gal Safety Factor Burst: 1.25

Mud weight for joint strength: 10 #/gal Safety Factor Joint Strength 1.8

BHP @ TD for: collapse: 1807.52 psi Burst: 1807.52 psi, joint strength: 1807.52 psi

Partially evacuated hole? Pressure gradient remaining: 10 #/gal

Max. Shut in surface pressure: 3000 psi

1st segment	11784 ft to 3900 ft			Make up Torque ft-lbs			Total ft = 7884
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
5.5 inches	17 #/ft	HCP-110	Buttress	4,620	3,470	5,780	
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
8,580 psi	10,640 psi-Ircr	568 ,000 #		546 ,000 #		4.767	

2nd segment	2650 ft to 3900 ft			Make up Torque ft-lbs			Total ft = 1250
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
7 inches	26 #/ft	HCP-110	Buttress	6,930	5,200	8,660	
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
7,800 psi	9,950 psi-Ircr	853 ,000 #		830 ,000 #		6.151	

3rd segment	2650 ft to 0 ft			Make up Torque ft-lbs			Total ft = 2650
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
7 inches	26 #/ft	HCP-110	LT&C	6930	5200	8660	
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
7,800 psi	9,950 psi	693 ,000 #		830 ,000 #		6.151	

4th segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

5th segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	000 #		,000 #			

6th segment	0 ft to 0 ft			Make up Torque ft-lbs			Total ft = 0
O.D.	Weight	Grade	Threads	opt.	min.	mx.	
inches	#/ft						
Collapse Resistance	Internal Yield	Joint Strength		Body Yield		Drift	
psi	psi	,000 #		,000 #			

Select 1st segment bottom 11784

11784 ft to 3900 ft
5.5 0 HCP-110 Buttress

S.F.	Actual		Desire
collapse	4.746835	>=	1.125
burst-b	3.546667	>=	1.25
burst-t	3.546667		

Top of segment (ft) 3900

Select 2nd segment from bottom

3900 ft to 2650 ft
7 26 HCP-110 Buttress

S.F.	Actual		Desire
collapse	3.67569	>=	1.125
burst-b	3.316667	>=	1.25
burst-t	3.316667		
jnt strngth	5.003448	>=	1.8

Top of segment 2 (ft)	2650	S.F.	Actual		Desire
Select 3rd segment from bottom		collapse	5.33355	>=	1.125
		burst-b	3.316667	>=	1.25
2650 ft to 0 ft		burst-t	3.316667		
7 26 HCP-110 LT&C		jnt strngth	6.047535	>=	1.8
Top of segment 3 (ft)	0	S.F.	Actual		Desire
Select 4th segment from bottom		collapse	#DIV/0!	>=	1.125
		burst-b	0	>=	1.25
0 ft to 0 ft		burst-t	0		
0 0 0 0		jnt strngth	4.91318	>=	1.8
Top of segment 4 (ft)		S.F.	Actual		Desire
Select 5th segment from bottom		collapse	#DIV/0!	>=	1.125
		burst-b	0	>=	1.25
0 ft to ft		burst-t	0		
0 0 0 0		jnt strngth	0	>=	1.8
Top of segment 5 (ft)		S.F.	Actual		Desire
Select 6th segment from bottom		collapse	#DIV/0!	>=	1.125
		burst-b	0	>=	1.25
0 ft to ft		burst-t	0		
0 0 0 0		jnt strngth	0	>=	1.8
Top of segment 6 (ft)		jnt strngth		>=	1.8

use in colapse calculations across different pressured formations

Three gradient pressure function

Depth of evaluation:	1,200 ft			.516	psi @	1,200 ft
Top of salt:	2,400 ft	fx #1	516			
Base of salt:	3,700 ft	fx #2	900			
TD of intermediate:	4,800 ft	fx #3	540			

Pressure gradient to be used above each top to be used as a function of depth. ex. psi/ft

fx #1	fx #2	fx #3
0.43	0.75	0.45

1) Calculate neutral point for buckling with temperature affects computed also
2) Surface burst calculations & kick tolerance in surface pressure for burst
3) Do a comparison test to determine which value is lower joint strength or body yield to use in tensile strength calculations
4) Raise joint strength safety factor up to next level on page #2
5) Sour service what pipe can be used with proper degrading of strength factors and as function of temp

Adjust for best combination of safety factors

	Secondary
S.F. Collapse bottom of segment:	
S.F. Collapse top of segment:	3.91592
S.F. Burst bottom of segment:	
S.F. Burst top of segment	
S.F. Joint strength bottom of segment:	795.518
S.F. Joint strength top of segment:	
S.F. Body yield strength bottom of segment:	764.706
S.F. Body yield strength top of segment:	4.80965

Collapse calculations for 1st segment - casing evacuated

Buoyancy factor collapse:	0.847	
calculations for bottom of segment @	3476 ft	
hydrostatic pressure collapse - backside:	1807.52 psi	
Axial load @ bottom of section	0 lbs	previous segments
Axial load factor:	0	load/(pipe body yield strength)
Collapse strength reduction factor:	1	Messrs. Westcott, Dunlop, Kemler 1940
Adjusted collapse rating of segment:	8580 psi	
Actual safety factor	4.74684	adjusted casing rating / actual pressure

Oakville Federal Com #1H, Plan 1

Operator Mack Energy Corp	**Units** feet, °/100ft			09:37 Wednesday, September 11, 2019 Page 1 of 6	
Field Round Tank	**County** Chaves			**Vertical Section Azimuth** 0.25	
Well Name Oakville Federal Com #1H	**State** New Mexico			**Survey Calculation Method** Minimum Curvature	
Plan 1	**Country** USA			**Database** Access	
Location SL: 707 FNL & 330 FWL Section 24-T15S-R29E BHL: 2644 FSL & 330 FWL Section 12-T15S-R29E		**Map Zone** UTM		**Lat Long Ref**	
Site		**Surface X** 1950238.6		**Surface Long**	
Slot Name	**UWI**	**Surface Y** 11982575.6		**Surface Lat**	
Well Number 1H	**API**	**Surface Z** 3950.9		**Global Z Ref** Mean Sea Level	
Project	**MD/TVD Ref** KB	**Ground Level** 3937.9		**Local North Ref** Grid	

DIRECTIONAL WELL PLAN

MD* ft	INC* deg	AZI* deg	TVD* ft	N* ft	E* ft	DLS* °/100ft	V. S.* ft	MapE* ft	MapN* ft	SysTVD* ft
*** TIE (at MD = 2617.00)										
2617.00	0.00	0.0	2617.00	0.00	0.00		0.00	1950238.60	11982575.60	1333.90
2650.00	0.00	0.0	2650.00	0.00	0.00	0.00	0.00	1950238.60	11982575.60	1300.90
2700.00	0.00	0.0	2700.00	0.00	0.00	0.00	0.00	1950238.60	11982575.60	1250.90
*** KOP 8 DEGREES (at MD = 2717.00)										
2717.00	0.00	0.0	2717.00	0.00	0.00	0.00	0.00	1950238.60	11982575.60	1233.90
2750.00	2.64	0.3	2749.99	0.76	0.00	8.00	0.76	1950238.60	11982576.36	1200.91
2800.00	6.64	0.3	2799.81	4.80	0.02	8.00	4.80	1950238.62	11982580.40	1151.09
2850.00	10.64	0.3	2849.24	12.31	0.05	8.00	12.31	1950238.65	11982587.91	1101.66
2900.00	14.64	0.3	2898.02	23.25	0.10	8.00	23.25	1950238.70	11982598.85	1052.88
2950.00	18.64	0.3	2945.91	37.57	0.16	8.00	37.57	1950238.76	11982613.17	1004.99
3000.00	22.64	0.3	2992.69	55.19	0.24	8.00	55.19	1950238.84	11982630.79	958.21
3050.00	26.64	0.3	3038.13	76.03	0.33	8.00	76.03	1950238.93	11982651.63	912.77
3100.00	30.64	0.3	3082.00	99.99	0.44	8.00	99.99	1950239.04	11982675.59	868.90
3150.00	34.64	0.3	3124.10	126.95	0.55	8.00	126.95	1950239.15	11982702.55	826.80
3200.00	38.64	0.3	3164.21	156.79	0.68	8.00	156.79	1950239.28	11982732.39	786.69
3250.00	42.64	0.3	3202.14	189.34	0.83	8.00	189.35	1950239.43	11982764.94	748.76
3300.00	46.64	0.3	3237.71	224.47	0.98	8.00	224.47	1950239.58	11982800.07	713.19
3350.00	50.64	0.3	3270.75	261.99	1.14	8.00	261.99	1950239.74	11982837.59	680.15
3400.00	54.64	0.3	3301.08	301.72	1.32	8.00	301.73	1950239.92	11982877.32	649.82
*** 55 DEGREE TANGENT (at MD = 3404.50)										
3404.50	55.00	0.3	3303.67	305.40	1.33	8.00	305.40	1950239.93	11982881.00	647.23
3450.00	55.00	0.3	3329.77	342.67	1.50	0.00	342.67	1950240.10	11982918.27	621.13
3500.00	55.00	0.3	3358.45	383.63	1.67	0.00	383.63	1950240.27	11982959.23	592.45
3550.00	55.00	0.3	3387.13	424.59	1.85	0.00	424.59	1950240.45	11983000.19	563.77
*** 12 DEGREE BUILD (at MD = 3554.50)										
3554.50	55.00	0.3	3389.71	428.27	1.87	0.00	428.28	1950240.47	11983003.87	561.19
3600.00	60.46	0.3	3413.99	466.73	2.04	12.00	466.73	1950240.64	11983042.33	536.91
3650.00	66.46	0.3	3436.33	511.44	2.23	12.00	511.44	1950240.83	11983087.04	514.57
3700.00	72.46	0.3	3453.86	558.24	2.44	12.00	558.24	1950241.04	11983133.84	497.04
3750.00	78.46	0.3	3466.41	606.62	2.65	12.00	606.62	1950241.25	11983182.22	484.49
3800.00	84.46	0.3	3473.83	656.04	2.86	12.00	656.04	1950241.46	11983231.64	477.07
*** LANDING POINT (at MD = 3846.17)										
3846.17	90.00	0.3	3476.06	702.13	3.06	12.00	702.14	1950241.66	11983277.73	474.84
3850.00	90.00	0.3	3476.06	705.97	3.08	0.00	705.97	1950241.68	11983281.57	474.84
3900.00	90.00	0.3	3476.06	755.96	3.30	0.00	755.97	1950241.90	11983331.56	474.84
3950.00	90.00	0.3	3476.06	805.96	3.52	0.00	805.97	1950242.12	11983381.56	474.84
4000.00	90.00	0.3	3476.06	855.96	3.73	0.00	855.97	1950242.33	11983431.56	474.84
4050.00	90.00	0.3	3476.06	905.96	3.95	0.00	905.97	1950242.55	11983481.56	474.84

Oakville Federal Com #1H, Plan 1

Operator Mack Energy Corp	**Units** feet, /100ft	**Vertical Section Azimuth** 0.25	
Field Round Tank	**County** Chaves	**Survey Calculation Method** Minimum Curvature	
Well Name Oakville Federal Com #1H	**State** New Mexico	**Database** Access	
Plan 1	**Country** USA		

Location	SL: 707 FNL & 330 FWL Section 24-T15S-R29E BHL: 2644 FSL & 330 FWL Section 12-T15S-R29E		**Map Zone** UTM	**Lat Long Ref**	
Site			**Surface X** 1950238.6	**Surface Long**	
Slot Name		**UWI**	**Surface Y** 11982575.6	**Surface Lat**	
Well Number	1H	**API**	**Surface Z** 3950.9	**Global Z Ref**	Mean Sea Level
Project		**MD/TVD Ref** KB	**Ground Level** 3937.9	**Local North Ref**	Grid

DIRECTIONAL WELL PLAN

MD* ft	INC* deg	AZI* deg	TVD* ft	N* ft	E* ft	DLS* °/100ft	V. S.* ft	MapE* ft	MapN* ft	SysTVD* ft
4100.00	90.00	0.3	3476.06	955.96	4.17	0.00	955.97	1950242.77	11983531.56	474.84
4150.00	90.00	0.3	3476.06	1005.96	4.39	0.00	1005.97	1950242.99	11983581.56	474.84
4200.00	90.00	0.3	3476.06	1055.96	4.61	0.00	1055.97	1950243.21	11983631.56	474.84
4250.00	90.00	0.3	3476.06	1105.96	4.83	0.00	1105.97	1950243.43	11983681.56	474.84
4300.00	90.00	0.3	3476.06	1155.96	5.04	0.00	1155.97	1950243.64	11983731.56	474.84
4350.00	90.00	0.3	3476.06	1205.96	5.26	0.00	1205.97	1950243.86	11983781.56	474.84
4400.00	90.00	0.3	3476.06	1255.96	5.48	0.00	1255.97	1950244.08	11983831.56	474.84
4450.00	90.00	0.3	3476.06	1305.96	5.70	0.00	1305.97	1950244.30	11983881.56	474.84
4500.00	90.00	0.3	3476.06	1355.96	5.92	0.00	1355.97	1950244.52	11983931.56	474.84
4550.00	90.00	0.3	3476.06	1405.96	6.13	0.00	1405.97	1950244.73	11983981.56	474.84
4600.00	90.00	0.3	3476.06	1455.96	6.35	0.00	1455.97	1950244.95	11984031.56	474.84
4650.00	90.00	0.3	3476.06	1505.96	6.57	0.00	1505.97	1950245.17	11984081.56	474.84
4700.00	90.00	0.3	3476.06	1555.96	6.79	0.00	1555.97	1950245.39	11984131.56	474.84
4750.00	90.00	0.3	3476.06	1605.96	7.01	0.00	1605.97	1950245.61	11984181.56	474.84
4800.00	90.00	0.3	3476.06	1655.96	7.23	0.00	1655.97	1950245.83	11984231.56	474.84
4850.00	90.00	0.3	3476.06	1705.96	7.44	0.00	1705.97	1950246.04	11984281.56	474.84
4900.00	90.00	0.3	3476.06	1755.96	7.66	0.00	1755.97	1950246.26	11984331.56	474.84
4950.00	90.00	0.3	3476.06	1805.95	7.88	0.00	1805.97	1950246.48	11984381.55	474.84
5000.00	90.00	0.3	3476.06	1855.95	8.10	0.00	1855.97	1950246.70	11984431.55	474.84
5050.00	90.00	0.3	3476.06	1905.95	8.32	0.00	1905.97	1950246.92	11984481.55	474.84
5100.00	90.00	0.3	3476.06	1955.95	8.53	0.00	1955.97	1950247.13	11984531.55	474.84
5150.00	90.00	0.3	3476.06	2005.95	8.75	0.00	2005.97	1950247.35	11984581.55	474.84
5200.00	90.00	0.3	3476.06	2055.95	8.97	0.00	2055.97	1950247.57	11984631.55	474.84
5250.00	90.00	0.3	3476.06	2105.95	9.19	0.00	2105.97	1950247.79	11984681.55	474.84
5300.00	90.00	0.3	3476.06	2155.95	9.41	0.00	2155.97	1950248.01	11984731.55	474.84
5350.00	90.00	0.3	3476.06	2205.95	9.63	0.00	2205.97	1950248.23	11984781.55	474.84
5400.00	90.00	0.3	3476.06	2255.95	9.84	0.00	2255.97	1950248.44	11984831.55	474.84
5450.00	90.00	0.3	3476.06	2305.95	10.06	0.00	2305.97	1950248.66	11984881.55	474.84
5500.00	90.00	0.3	3476.06	2355.95	10.28	0.00	2355.97	1950248.88	11984931.55	474.84
5550.00	90.00	0.3	3476.06	2405.95	10.50	0.00	2405.97	1950249.10	11984981.55	474.84
5600.00	90.00	0.3	3476.06	2455.95	10.72	0.00	2455.97	1950249.32	11985031.55	474.84
5650.00	90.00	0.3	3476.06	2505.95	10.93	0.00	2505.97	1950249.53	11985081.55	474.84
5700.00	90.00	0.3	3476.06	2555.95	11.15	0.00	2555.97	1950249.75	11985131.55	474.84
5750.00	90.00	0.3	3476.06	2605.95	11.37	0.00	2605.97	1950249.97	11985181.55	474.84
5800.00	90.00	0.3	3476.06	2655.95	11.59	0.00	2655.97	1950250.19	11985231.55	474.84
5850.00	90.00	0.3	3476.06	2705.95	11.81	0.00	2705.97	1950250.41	11985281.55	474.84
5900.00	90.00	0.3	3476.06	2755.95	12.03	0.00	2755.97	1950250.63	11985331.55	474.84

Oakville Federal Com #1H, Plan 1

Operator Mack Energy Corp
Field Round Tank
Well Name Oakville Federal Com #1H
Plan 1

Units feet, °/100ft
County Chaves
State New Mexico
Country USA

Vertical Section Azimuth 0.25
Survey Calculation Method Minimum Curvature
Database Access

Location SL: 707 FNL & 330 FWL Section 24-T15S-R29E BHL: 2644 FSL & 330 FWL Section 12-T15S-R29E
Site
Slot Name
Well Number 1H
Project

UWI
API
MD/TVD Ref KB

Map Zone UTM
Surface X 1950238.6
Surface Y 11982575.6
Surface Z 3950.9
Ground Level 3937.9

Lat Long Ref
Surface Long
Surface Lat
Global Z Ref Mean Sea Level
Local North Ref Grid

DIRECTIONAL WELL PLAN

MD* ft	INC* deg	AZI* deg	TVD* ft	N* ft	E* ft	DLS* °/100ft	V. S.* ft	MapE* ft	MapN* ft	SysTVD* ft
5950.00	90.00	0.3	3476.06	2805.95	12.24	0.00	2805.97	1950250.84	11985381.55	474.84
6000.00	90.00	0.3	3476.06	2855.94	12.46	0.00	2855.97	1950251.06	11985431.54	474.84
6050.00	90.00	0.3	3476.06	2905.94	12.68	0.00	2905.97	1950251.28	11985481.54	474.84
6100.00	90.00	0.3	3476.06	2955.94	12.90	0.00	2955.97	1950251.50	11985531.54	474.84
6150.00	90.00	0.3	3476.06	3005.94	13.12	0.00	3005.97	1950251.72	11985581.54	474.84
6200.00	90.00	0.3	3476.06	3055.94	13.33	0.00	3055.97	1950251.93	11985631.54	474.84
6250.00	90.00	0.3	3476.06	3105.94	13.55	0.00	3105.97	1950252.15	11985681.54	474.84
6300.00	90.00	0.3	3476.06	3155.94	13.77	0.00	3155.97	1950252.37	11985731.54	474.84
6350.00	90.00	0.3	3476.06	3205.94	13.99	0.00	3205.97	1950252.59	11985781.54	474.84
6400.00	90.00	0.3	3476.06	3255.94	14.21	0.00	3255.97	1950252.81	11985831.54	474.84
6450.00	90.00	0.3	3476.06	3305.94	14.43	0.00	3305.97	1950253.03	11985881.54	474.84
6500.00	90.00	0.3	3476.06	3355.94	14.64	0.00	3355.97	1950253.24	11985931.54	474.84
6550.00	90.00	0.3	3476.06	3405.94	14.86	0.00	3405.97	1950253.46	11985981.54	474.84
6600.00	90.00	0.3	3476.06	3455.94	15.08	0.00	3455.97	1950253.68	11986031.54	474.84
6650.00	90.00	0.3	3476.06	3505.94	15.30	0.00	3505.97	1950253.90	11986081.54	474.84
6700.00	90.00	0.3	3476.06	3555.94	15.52	0.00	3555.97	1950254.12	11986131.54	474.84
6750.00	90.00	0.3	3476.06	3605.94	15.73	0.00	3605.97	1950254.33	11986181.54	474.84
6800.00	90.00	0.3	3476.06	3655.94	15.95	0.00	3655.97	1950254.55	11986231.54	474.84
6850.00	90.00	0.3	3476.06	3705.94	16.17	0.00	3705.97	1950254.77	11986281.54	474.84
6900.00	90.00	0.3	3476.06	3755.94	16.39	0.00	3755.97	1950254.99	11986331.54	474.84
6950.00	90.00	0.3	3476.06	3805.94	16.61	0.00	3805.97	1950255.21	11986381.54	474.84
7000.00	90.00	0.3	3476.06	3855.94	16.82	0.00	3855.97	1950255.42	11986431.54	474.84
7050.00	90.00	0.3	3476.06	3905.93	17.04	0.00	3905.97	1950255.64	11986481.53	474.84
7100.00	90.00	0.3	3476.06	3955.93	17.26	0.00	3955.97	1950255.86	11986531.53	474.84
7150.00	90.00	0.3	3476.06	4005.93	17.48	0.00	4005.97	1950256.08	11986581.53	474.84
7200.00	90.00	0.3	3476.06	4055.93	17.70	0.00	4055.97	1950256.30	11986631.53	474.84
7250.00	90.00	0.3	3476.06	4105.93	17.92	0.00	4105.97	1950256.52	11986681.53	474.84
7300.00	90.00	0.3	3476.06	4155.93	18.13	0.00	4155.97	1950256.73	11986731.53	474.84
7350.00	90.00	0.3	3476.06	4205.93	18.35	0.00	4205.97	1950256.95	11986781.53	474.84
7400.00	90.00	0.3	3476.06	4255.93	18.57	0.00	4255.97	1950257.17	11986831.53	474.84
7450.00	90.00	0.3	3476.06	4305.93	18.79	0.00	4305.97	1950257.39	11986881.53	474.84
7500.00	90.00	0.3	3476.06	4355.93	19.01	0.00	4355.97	1950257.61	11986931.53	474.84
7550.00	90.00	0.3	3476.06	4405.93	19.22	0.00	4405.97	1950257.82	11986981.53	474.84
7600.00	90.00	0.3	3476.06	4455.93	19.44	0.00	4455.97	1950258.04	11987031.53	474.84
7650.00	90.00	0.3	3476.06	4505.93	19.66	0.00	4505.97	1950258.26	11987081.53	474.84
7700.00	90.00	0.3	3476.06	4555.93	19.88	0.00	4555.97	1950258.48	11987131.53	474.84
7750.00	90.00	0.3	3476.06	4605.93	20.10	0.00	4605.97	1950258.70	11987181.53	474.84

Oakville Federal Com #1H, Plan 1

Operator Mack Energy Corp | **Units** feet, °/100ft | **Vertical Section Azimuth** 0.25
Field Round Tank | **County** Chaves | **Survey Calculation Method** Minimum Curvature
Well Name Oakville Federal Com #1H | **State** New Mexico | **Database** Access
Plan 1 | **Country** USA

Location SL: 707 FNL & 330 FWL Section 24-T15S-R29E BHL: 2644 FSL & 330 FWL Section 12-T15S-R29E | **Map Zone** UTM | **Lat Long Ref**
Site | **Surface X** 1950238.6 | **Surface Long**
Slot Name | **UWI** | **Surface Y** 11982575.6 | **Surface Lat**
Well Number 1H | **API** | **Surface Z** 3950.9 | **Global Z Ref** Mean Sea Level
Project | **MD/TVD Ref** KB | **Ground Level** 3937.9 | **Local North Ref** Grid

DIRECTIONAL WELL PLAN

MD* ft	INC* deg	AZI* deg	TVD* ft	N* ft	E* ft	DLS* °/100ft	V. S.* ft	MapE* ft	MapN* ft	SysTVD* ft
7800.00	90.00	0.3	3476.06	4655.93	20.32	0.00	4655.97	1950258.92	11987231.53	474.84
7850.00	90.00	0.3	3476.06	4705.93	20.53	0.00	4705.97	1950259.13	11987281.53	474.84
7900.00	90.00	0.3	3476.06	4755.93	20.75	0.00	4755.97	1950259.35	11987331.53	474.84
7950.00	90.00	0.3	3476.06	4805.93	20.97	0.00	4805.97	1950259.57	11987381.53	474.84
8000.00	90.00	0.3	3476.06	4855.93	21.19	0.00	4855.97	1950259.79	11987431.53	474.84
8050.00	90.00	0.3	3476.06	4905.93	21.41	0.00	4905.97	1950260.01	11987481.53	474.84
8100.00	90.00	0.3	3476.06	4955.92	21.62	0.00	4955.97	1950260.22	11987531.52	474.84
8150.00	90.00	0.3	3476.06	5005.92	21.84	0.00	5005.97	1950260.44	11987581.52	474.84
8200.00	90.00	0.3	3476.06	5055.92	22.06	0.00	5055.97	1950260.66	11987631.52	474.84
8250.00	90.00	0.3	3476.06	5105.92	22.28	0.00	5105.97	1950260.88	11987681.52	474.84
8300.00	90.00	0.3	3476.06	5155.92	22.50	0.00	5155.97	1950261.10	11987731.52	474.84
8350.00	90.00	0.3	3476.06	5205.92	22.72	0.00	5205.97	1950261.32	11987781.52	474.84
8400.00	90.00	0.3	3476.06	5255.92	22.93	0.00	5255.97	1950261.53	11987831.52	474.84
8450.00	90.00	0.3	3476.06	5305.92	23.15	0.00	5305.97	1950261.75	11987881.52	474.84
8500.00	90.00	0.3	3476.06	5355.92	23.37	0.00	5355.97	1950261.97	11987931.52	474.84
8550.00	90.00	0.3	3476.06	5405.92	23.59	0.00	5405.97	1950262.19	11987981.52	474.84
8600.00	90.00	0.3	3476.06	5455.92	23.81	0.00	5455.97	1950262.41	11988031.52	474.84
8650.00	90.00	0.3	3476.06	5505.92	24.02	0.00	5505.97	1950262.62	11988081.52	474.84
8700.00	90.00	0.3	3476.06	5555.92	24.24	0.00	5555.97	1950262.84	11988131.52	474.84
8750.00	90.00	0.3	3476.06	5605.92	24.46	0.00	5605.97	1950263.06	11988181.52	474.84
8800.00	90.00	0.3	3476.06	5655.92	24.68	0.00	5655.97	1950263.28	11988231.52	474.84
8850.00	90.00	0.3	3476.06	5705.92	24.90	0.00	5705.97	1950263.50	11988281.52	474.84
8900.00	90.00	0.3	3476.06	5755.92	25.12	0.00	5755.97	1950263.72	11988331.52	474.84
8950.00	90.00	0.3	3476.06	5805.92	25.33	0.00	5805.97	1950263.93	11988381.52	474.84
9000.00	90.00	0.3	3476.06	5855.92	25.55	0.00	5855.97	1950264.15	11988431.52	474.84
9050.00	90.00	0.3	3476.06	5905.92	25.77	0.00	5905.97	1950264.37	11988481.52	474.84
9100.00	90.00	0.3	3476.06	5955.92	25.99	0.00	5955.97	1950264.59	11988531.52	474.84
9150.00	90.00	0.3	3476.06	6005.91	26.21	0.00	6005.97	1950264.81	11988581.51	474.84
9200.00	90.00	0.3	3476.06	6055.91	26.42	0.00	6055.97	1950265.02	11988631.51	474.84
9250.00	90.00	0.3	3476.06	6105.91	26.64	0.00	6105.97	1950265.24	11988681.51	474.84
9300.00	90.00	0.3	3476.06	6155.91	26.86	0.00	6155.97	1950265.46	11988731.51	474.84
9350.00	90.00	0.3	3476.06	6205.91	27.08	0.00	6205.97	1950265.68	11988781.51	474.84
9400.00	90.00	0.3	3476.06	6255.91	27.30	0.00	6255.97	1950265.90	11988831.51	474.84
9450.00	90.00	0.3	3476.06	6305.91	27.51	0.00	6305.97	1950266.11	11988881.51	474.84
9500.00	90.00	0.3	3476.06	6355.91	27.73	0.00	6355.97	1950266.33	11988931.51	474.84
9550.00	90.00	0.3	3476.06	6405.91	27.95	0.00	6405.97	1950266.55	11988981.51	474.84
9600.00	90.00	0.3	3476.06	6455.91	28.17	0.00	6455.97	1950266.77	11989031.51	474.84

Oakville Federal Com #1H, Plan 1

Operator Mack Energy Corp	**Units** feet, °/100ft	**Vertical Section Azimuth** 0.25	
Field Round Tank	**County** Chaves	**Survey Calculation Method** Minimum Curvature	
Well Name Oakville Federal Com #1H	**State** New Mexico	**Database** Access	
Plan 1	**Country** USA		

Location	SL: 707 FNL & 330 FWL Section 24-T15S-R29E BHL: 2644 FSL & 330 FWL Section 12-T15S-R29E		**Map Zone** UTM		**Lat Long Ref**
Site			**Surface X** 1950238.6		**Surface Long**
Slot Name		**UWI**	**Surface Y** 11982575.6		**Surface Lat**
Well Number	1H	**API**	**Surface Z** 3950.9		**Global Z Ref** Mean Sea Level
Project		**MD/TVD Ref** KB	**Ground Level** 3937.9		**Local North Ref** Grid

DIRECTIONAL WELL PLAN

MD* ft	INC* deg	AZI* deg	TVD* ft	N* ft	E* ft	DLS* °/100ft	V. S.* ft	MapE* ft	MapN* ft	SysTVD* ft
9650.00	90.00	0.3	3476.06	6505.91	28.39	0.00	6505.97	1950266.99	11989081.51	474.84
9700.00	90.00	0.3	3476.06	6555.91	28.61	0.00	6555.97	1950267.21	11989131.51	474.84
9750.00	90.00	0.3	3476.06	6605.91	28.82	0.00	6605.97	1950267.42	11989181.51	474.84
9800.00	90.00	0.3	3476.06	6655.91	29.04	0.00	6655.97	1950267.64	11989231.51	474.84
9850.00	90.00	0.3	3476.06	6705.91	29.26	0.00	6705.97	1950267.86	11989281.51	474.84
9900.00	90.00	0.3	3476.06	6755.91	29.48	0.00	6755.97	1950268.08	11989331.51	474.84
9950.00	90.00	0.3	3476.06	6805.91	29.70	0.00	6805.97	1950268.30	11989381.51	474.84
10000.00	90.00	0.3	3476.06	6855.91	29.91	0.00	6855.97	1950268.51	11989431.51	474.84
10050.00	90.00	0.3	3476.06	6905.91	30.13	0.00	6905.97	1950268.73	11989481.51	474.84
10100.00	90.00	0.3	3476.06	6955.91	30.35	0.00	6955.97	1950268.95	11989531.51	474.84
10150.00	90.00	0.3	3476.06	7005.91	30.57	0.00	7005.97	1950269.17	11989581.51	474.84
10200.00	90.00	0.3	3476.06	7055.90	30.79	0.00	7055.97	1950269.39	11989631.50	474.84
10250.00	90.00	0.3	3476.06	7105.90	31.01	0.00	7105.97	1950269.61	11989681.50	474.84
10300.00	90.00	0.3	3476.06	7155.90	31.22	0.00	7155.97	1950269.82	11989731.50	474.84
10350.00	90.00	0.3	3476.06	7205.90	31.44	0.00	7205.97	1950270.04	11989781.50	474.84
10400.00	90.00	0.3	3476.06	7255.90	31.66	0.00	7255.97	1950270.26	11989831.50	474.84
10450.00	90.00	0.3	3476.06	7305.90	31.88	0.00	7305.97	1950270.48	11989881.50	474.84
10500.00	90.00	0.3	3476.06	7355.90	32.10	0.00	7355.97	1950270.70	11989931.50	474.84
10550.00	90.00	0.3	3476.06	7405.90	32.31	0.00	7405.97	1950270.91	11989981.50	474.84
10600.00	90.00	0.3	3476.06	7455.90	32.53	0.00	7455.97	1950271.13	11990031.50	474.84
10650.00	90.00	0.3	3476.06	7505.90	32.75	0.00	7505.97	1950271.35	11990081.50	474.84
10700.00	90.00	0.3	3476.06	7555.90	32.97	0.00	7555.97	1950271.57	11990131.50	474.84
10750.00	90.00	0.3	3476.06	7605.90	33.19	0.00	7605.97	1950271.79	11990181.50	474.84
10800.00	90.00	0.3	3476.06	7655.90	33.41	0.00	7655.97	1950272.01	11990231.50	474.84
10850.00	90.00	0.3	3476.06	7705.90	33.62	0.00	7705.97	1950272.22	11990281.50	474.84
10900.00	90.00	0.3	3476.06	7755.90	33.84	0.00	7755.97	1950272.44	11990331.50	474.84
10950.00	90.00	0.3	3476.06	7805.90	34.06	0.00	7805.97	1950272.66	11990381.50	474.84
11000.00	90.00	0.3	3476.06	7855.90	34.28	0.00	7855.97	1950272.88	11990431.50	474.84
11050.00	90.00	0.3	3476.06	7905.90	34.50	0.00	7905.97	1950273.10	11990481.50	474.84
11100.00	90.00	0.3	3476.06	7955.90	34.71	0.00	7955.97	1950273.31	11990531.50	474.84
11150.00	90.00	0.3	3476.06	8005.90	34.93	0.00	8005.97	1950273.53	11990581.50	474.84
11200.00	90.00	0.3	3476.06	8055.90	35.15	0.00	8055.97	1950273.75	11990631.50	474.84
11250.00	90.00	0.3	3476.06	8105.89	35.37	0.00	8105.97	1950273.97	11990681.49	474.84
11300.00	90.00	0.3	3476.06	8155.89	35.59	0.00	8155.97	1950274.19	11990731.49	474.84
11350.00	90.00	0.3	3476.06	8205.89	35.81	0.00	8205.97	1950274.41	11990781.49	474.84
11400.00	90.00	0.3	3476.06	8255.89	36.02	0.00	8255.97	1950274.62	11990831.49	474.84
11450.00	90.00	0.3	3476.06	8305.89	36.24	0.00	8305.97	1950274.84	11990881.49	474.84

Oakville Federal Com #1H, Plan 1

Operator Mack Energy Corp
Field Round Tank
Well Name Oakville Federal Com #1H
Plan 1

Units feet, °/100ft
County Chaves
State New Mexico
Country USA

Vertical Section Azimuth 0.25
Survey Calculation Method Minimum Curvature
Database Access

Location SL: 707 FNL & 330 FWL Section 24-T15S-R29E BHL: 2644 FSL & 330 FWL Section 12-T15S-R29E
Site
Slot Name
Well Number 1H
Project

UWI
API
MD/TVD Ref KB

Map Zone UTM
Surface X 1950238.6
Surface Y 11982575.6
Surface Z 3950.9
Ground Level 3937.9

Lat Long Ref
Surface Long
Surface Lat
Global Z Ref Mean Sea Level
Local North Ref Grid

DIRECTIONAL WELL PLAN

MD* ft	INC* deg	AZI* deg	TVD* ft	N* ft	E* ft	DLS* °/100ft	V. S.* ft	MapE* ft	MapN* ft	SysTVD* ft
11500.00	90.00	0.3	3476.06	8355.89	36.46	0.00	8355.97	1950275.06	11990931.49	474.84
11550.00	90.00	0.3	3476.06	8405.89	36.68	0.00	8405.97	1950275.28	11990981.49	474.84
11600.00	90.00	0.3	3476.06	8455.89	36.90	0.00	8455.97	1950275.50	11991031.49	474.84
11650.00	90.00	0.3	3476.06	8505.89	37.11	0.00	8505.97	1950275.71	11991081.49	474.84
11700.00	90.00	0.3	3476.06	8555.89	37.33	0.00	8555.97	1950275.93	11991131.49	474.84
11750.00	90.00	0.3	3476.06	8605.89	37.55	0.00	8605.97	1950276.15	11991181.49	474.84
*** TD (at MD = 11783.17)										
11783.17	90.00	0.3	3476.06	8639.06	37.70	0.00	8639.14	1950276.30	11991214.66	474.84

Mack Energy Corporation

Legal Description:
Mack Energy-San Andres MDP Area
Chaves Co. New Mexico
Various Sections
T-15-S, R-28-E and R-29-E

H2S

"Contingency Plan""

Table of Contents

H2S CONTINGENCY PLAN SECTION

Scope:

This contingency plan provides an organized plan of action for alerting and protecting the public within an area of exposure prior to an intentional release, or following the accidental release of a potentially hazardous volume of hydrogen sulfide. The plan establishes guidelines for all personnel whose work activity may involve exposure to Hydrogen Sulfide Gas (H_2S).

Objective:

Prevent any and all accidents, and prevent the uncontrolled release of H2S into the atmosphere.

Provide proper evacuation procedures to cope with emergencies.

Provide immediate and adequate medical attention should an injury occur.

Discussion of Plan:

Suspected Problem Zones:

Implementation: This plan, with all details, is to be fully implemented 1000' before drilling into the first sour zone.

Emergency Response Procedure: This section outlines the conditions and denotes steps to be taken in the event of an emergency.

Emergency Equipment and Procedure: This section outlines the safety and emergency equipment that will be required for the drilling of this well.

Training Provisions: This section outlines the training provisions that must be adhered to 1000' before drilling into the first sour zone.

Emergency call list: Included are the telephone numbers of all persons that would need to be contacted, should an H2S emergency occur.

Briefing: This section deals with the briefing of all persons involved with the drilling of this well.

Public Safety: Public Safety Personnel will be made aware of the drilling of this well.

Check Lists: Status check lists and procedural check lists have been included to ensure adherence to the plan.

Genera/Information: A general information section has been included to supply support information.

EMERGENCY PROCEDURES SECTION

I. In the event of any evidence of H2S level above 10ppm, take the following steps immediately:

a. Secure breathing apparatus.

b. Order non-essential personnel out of the danger zone.

c. Take steps to determine if the H2S level can be corrected or suppressed, and if so, proceed with normal operations.

II. If uncontrollable conditions occur, proceed with the following:

a. Take steps to protect and/or remove any public downwind of the rig, including partial evacuation or isolation. Notify public safety personnel and the New Mexico Oil Conservation Division or Bureau of Land Management, whichever is appropriate, of the situation.

b. Remove all personnel to the Safe Briefing Area.

c. Notify public safety personnel for help with maintaining roadblocks and implementing evacuation.

d. Determine and proceed with the best possible plan to regain control of the well. Maintain tight security and safety measures.

III. Responsibility:

a. The Company Approved Supervisor shall be responsible for the total implementation of the plan.

b. The Company Approved Supervisor shall be in complete command during any emergency.

c. The Company Approved Supervisor shall designate a back-up Supervisor in the event that he/she is not available.

EMERGENCY PROCEDURE IMPLEMENTATION

I. Drilling or Tripping

a. All Personnel

i. When alarm sounds, don escape unit and report to upwind Safe Briefing Area.

ii. Check status of other personnel (buddy system).

iii. Secure breathing apparatus.

iv. Wait for orders from supervisor.

b. Drilling Foreman

i. Report to the upwind Safe Briefing Area.

ii. Don Breathing Apparatus and return to the point of release with the Tool Pusher or Driller (buddy system).

iii. Determine the concentration of H_2S.

iv. Assess the situation and take appropriate control measures.

c. Tool Pusher

i. Report to the upwind Safe Briefing Area.

ii. Don Breathing Apparatus and return to the point of release with the Drilling Foreman or the Driller (buddy system).

iii. Determine the concentration of H_2S.

iv. Assess the situation and take appropriate control measures.

d. Driller

i. Check the status of other personnel (in a rescue attempt, always use the buddy system).

ii. Assign the least essential person to notify the Drilling Foreman and Tool Pusher, in the event of their absence.

iii. Assume the responsibility of the Drilling Foreman and the Tool Pusher until they arrive, in the event of their absence.

e. *Derrick Man and Floor Hands*

i. Remain in the upwind Safe Briefing Area until otherwise instructed by a supervisor.

f. *Mud Engineer*

i. Report to the upwind Safe Briefing Area.

ii. When instructed, begin check of mud for pH level and H_2S level.

g. *Safety Personnel*

i. Don Breathing Apparatus.

ii. Check status of personnel.

iii. Wait for instructions from Drilling Foreman or Tool Pusher.

II. Taking a Kick

a. All Personnel report to the upwind Safe Briefing Area.

b. Follow standard BOP procedures.

III. Open Hole Logging

a. All unnecessary personnel should leave the rig floor.

b. Drilling Foreman and Safety Personnel should monitor the conditions and make necessary safety equipment recommendations.

IV. Running Casing or Plugging

a. Follow "Drilling or Tripping" procedures.

b. Assure that all personnel have access to protective equipment.

SIMULATED BLOWOUT CONTROL DRILLS

All drills will be initiated by activating alarm devices (air horn). One long blast on the air horn for ACTUAL and SIMULATED Blowout Control Drills. This operation will be performed by the Drilling Foreman or Tool Pusher at least one time per week for each of the following conditions, with each crew.

Drill #1 Bottom Drilling

Drill #2 Tripping Drill Pipe

In each of these drills, the initial reaction time to shutting in the well shall be timed as well as the total time for the crew to complete its entire pit drill assignment. The times must be recorded on the IADC Driller's Log as "Blowout Control Drill".

Drill No.
Reaction Time to Shut-In: minutes, seconds.
Total Time to Complete Assignment: minutes, seconds.

I. **Drill Overviews**

a. Drill No. 1-Bottom Drilling

i. Sound the alarm immediately.

ii. Stop the rotary and hoist Kelly joint above the rotary table.

iii. Stop the circulatory pump.

iv. Close the drill pipe rams.

v. Record casing and drill pipe shut-in pressures and pit volume increases.

b. Drill No. 2-Tripping Drill Pipe

i. Sound the alarm immediately.

ii. Position the upper tool joint just above the rotary table and set the slips.

iii. Install a full opening valve or inside blowout preventer tool in order to close the drill pipe.

iv. Close the drill pipe rams.

v. Record the shut-in annular pressure.

II. **Crew Assignments**

a. Drill No. 1-Bottom Drilling

i. Driller

1. Stop the rotary and hoist Kelly joint above the rotary table.
2. Stop the circulatory pump.
3. Check Flow.
4. If flowing, sound the alarm immediately.
5. Record the shit-in drill pipe pressure.
6. Determine the mud weight increase needed or other courses of action.

ii. Derrick man

1. Open choke line valve at BOP.
2. Signal Floor Man #1 at accumulator that choke line is open.
3. Close choke and upstream valve after pipe tam have been closed.
4. Read the shut-in annular pressure and report readings to Driller.

iii. Floor Man #1

1. Close the pipe rams after receiving the signal from the Derrickman.
2. Report to Driller for further instructions.

iv. Floor Man #2

1. Notify the Tool Pusher and Operator representative of the H2S alarms.
2. Check for open fires and, if safe to do so, extinguish them.
3. Stop all welding operations.
4. Turn-off all non-explosions proof lights and instruments.
5. Report to Driller for further instructions.

v. Tool Pusher

1. Report to the rig floor.
2. Have a meeting with all crews.

3. Compile and summarize all information.

4. Calculate the proper kill weight.

5. Ensure that proper well procedures are put into action.

vi. *Operator Representative*

1. Notify the Drilling Superintendent.

2. Determine if an emergency exists and if so, activate the contingency plan.

b. Drill No 2-Tripping Pipe

i. Driller

1. Sound the alarm immediately when mud volume increase has been detected.

2. Position the upper tool joint just above the rotary table and set slips.

3. Install a full opening valve or inside blowout preventer tool to close the drill pipe.

4. Check flow.

5. Record all data reported by the crew.

6. Determine the course of action.

ii. Derrick man

1. Come down out of derrick.

2. Notify Tool Pusher and Operator Representative.

3. Check for open fires and, if safe to do so, extinguish them.

4. Stop all welding operations.

5. Report to Driller for further instructions.

iii. Floor Man #1

1. Pick up full opening valve or inside blowout preventer tool and stab into tool joint above rotary table (with Floor Man #2).

2. Tighten valve with back-up tongs.

3. Close pipe rams after signal from Floor Man #2.

4. Read accumulator pressure and check for possible high pressure fluid leaks in valves or piping.

5. Report to Driller for further instructions.

iv. Floor Man #2

1. Pick-up full opening valve or inside blowout preventer tool and stab into tool joint above rotary table (with Floor Man #1).

2. Position back-up tongs on drill pipe.

3. Open choke line valve at BOP.

4. Signal Floor Man #1 at accumulator that choke line is open.

5. Close choke and upstream valve after pipe rams have been closed.

6. Check for leaks on BOP stack and choke manifold.

7. Read annular pressure.

8. Report readings to the Driller.

v. Tool Pusher

1. Report to the rig floor.

2. Have a meeting with all of the crews.

3. Compile and summarize all information.

4. See that proper well kill procedures are put into action.

vi. Operator Representative.

1. Notify Drilling Superintendent.

2. Determine if an emergency exists, and if so, activate the contingency plan.

IGNITION PROCEDURES

Responsibility:

The decision to ignite the well is the responsibility of the DRILLING FOREMAN in concurrence with the emergency response officials. In the event the Drilling Foreman is incapacitated, it becomes the responsibility of the RIG TOOL PUSHER. This decision should be made only as a last resort and in a situation where it is clear that:

1. Human life and property are endangered.

2. There is no hope of controlling the blowout under the prevailing conditions.

If time permits, notify the main office, but do not delay if human life is in danger. Initiate the first phase of the evacuation plan.

Instructions for Igniting the Well:

1. Two people are required for the actual igniting operation. Both men must wear self-contained breathing apparatus and must use a full body harness and attach a retrievable safety line to the D-Ring in the back. One man must monitor the atmosphere for explosive gases with the LEL monitor, while the Drilling Foreman is responsible for igniting the well.

2. The primary method to ignite is a 25mm flare gun with a range of approximately 500 feet.

3. Ignite from upwind and do not approach any closer than is warranted.

4. Select the ignition site best suited for protection and which offers an easy escape route.

5. Before igniting, check for the presence of combustible gases.

6. After igniting, continue emergency actions and procedures as before.

7. All unassigned personnel will limit their actions to those directed by the Drilling Foreman.

Note: After the well is ignited, burning Hydrogen Sulfide will convert to Sulfur Dioxide, which is also highly toxic. Do not assume the area is safe after the well is ignited.

TRAINING PROGRAM

When working in an area where Hydrogen Sulfide (H_2S) might be encountered, definite training requirements must be carried out. The Company Supervisor will ensure that all personnel at the well site, have had adequate training in the following consistent with the requirements in ANSI/ASSE Z390.1-2006 (R2010) Accepted Practices for Hydrogen Sulfide (H2S) Training Programs:

1. Physical and Chemical Properties of Hydrogen Sulfide.
2. Sources of Hydrogen Sulfide.
3. Human Physiology and Medical Evaluation.
4. Work Procedures.
5. Personal Protective Equipment.
6. Use of Contingency Plans and Emergency Response.
7. Burning, Flaring and Venting of Hydrogen Sulfide.
8. State and Federal Regulatory Requirements.
9. Hydrogen Sulfide Release Dispersion Models.
10. Rescue Techniques, First Aid and Post-Exposure Evaluation.
11. Methods of Detection and Monitoring.
12. Engineering Controls.
13. Transportation of Hydrogen Sulfide Cargoes.
14. Emerging Technology.

Service company personnel and visiting personnel must be notified if the zone contains H_2S and each service company must provide proof of adequate training and equipment for their employees before they arrive at the well site.

EMERGENCY EQUIPMENT REQUIREMENTS

Lease Entrance Sign:

Should be located at the lease entrance with the following information:

CAUTION- POTENTIAL POISON GAS
HYDROGEN SULFIDE
NO ADMITTANCE WITHOUT AUTHORIZATION

Respiratory Equipment:

- Fresh air breathing equipment should be placed at the safe briefing areas and should include the following:
- Two SCBA's at each briefing area.
- Enough airline units to operate safely, anytime the H_2S concentration reaches the IDLH level (100 ppm).
- Cascade system with enough breathing air hose and manifolds to reach the rig floor, the derrick man and the other operation areas.

Windsocks or Wind Streamers:

- A minimum of two 10" windsocks located at strategic locations so that they may be seen from any point on location.
- Wind streamers (if preferred) should be placed at various locations on the well site to ensure wind consciousness at all times. (Corners of location).

Hydrogen Sulfide Detector and Alarms:

- 1- Four channel H_2S monitor with alarms.
- Four (4) sensors located as follows: #1- Rig Floor, #2- Bell Nipple, #3- Shale Shaker, #4- Mud Pits.
- Gastec or Draeger pump with tubes.
- Sensor test gas.

Well Condition Sign and Flags:

The Well Condition Sign w/flags should be placed a minimum of 150' before you enter the location. It should have three (3) color coded flags (green, yellow and red) that will be used to denote the following location conditions:

GREEN- Normal Operating Conditions
YELLOW- Potential Danger
RED- Danger, H_2S Gas Present

Auxiliary Rescue Equipment:

- Stretcher
- 2- 100' Rescue lines
- First Aid Kit properly stocked

Mud Inspection Equipment:

Garret Gas Train or Hach Tester for inspection of Hydrogen Sulfide in the drilling mud system.

Fire Extinguishers:

Adequate fire extinguishers shall be located at strategic locations.

Blowout Preventer:

- The well shall have hydraulic BOP equipment for the anticipated BHP.
- The BOP should be tested upon installation.
- BOP, Choke Line and Kill Line will be tested as specified by Operator.

Confined Space Monitor:

There should be a portable multi-gas monitor with at least 3 sensors *(O*, LEL H_2S). This instrument should be used to test the atmosphere of any confined space before entering. It should also be used for atmospheric testing for LEL gas before beginning any type of Hot Work. Proper calibration documentation will need to be provided.

Communication Equipment:

- Proper communication equipment such as cell phones or 2-way radios should be available at the rig.
- Radio communication shall be available for communication between the company man's trailer, rig floor and the tool pusher's trailer.

- Communication equipment shall be available on the vehicles.

Special Control Equipment:

- Hydraulic BOP equipment with remote control on the ground.
- Rotating head at the surface casing point.

Evacuation Plan:

- Evacuation routes should be established prior to spudding the well.
- Should be discussed with all rig personnel.

Designated Areas:

Parking and Visitor area:

- All vehicles are to be parked at a pre-determined safe distance from the wellhead.
- Designated smoking area.

Safe Briefing Areas:

- Two Safe Briefing Areas shall be designated on either side of the location at the maximum allowable distance from the well bore so they offset prevailing winds or they are at a 180 degree angle if wind directions tend to shift in the area.
- Personal protective equipment should be stored at both briefing areas or if a moveable cascade trailer is used, it should be kept upwind of existing winds. When wind is from the prevailing direction, both briefing areas should be accessible.

Note:

- Additional equipment will be available at the Alliance Safety office.
- Additional personal H_2S monitors are available for all employees on location.
- Automatic Flare Igniters are recommended for installation on the rig.

CHECK LISTS

Status Check List

Note: Date each item as they are implemented.

1. Sign at location entrance. _____
2. Two (2) wind socks (in required locations). _____
3. Wind Streamers (if required). _____
4. SCBA's on location for all rig personnel and mud loggers. _____
5. Air packs, inspected and ready for use. _____
6. Spare bottles for each air pack (if required). _____
7. Cascade system for refilling air bottles. _____
8. Cascade system and hose line hook up. _____
9. Choke manifold hooked-up and tested. (before drilling out surface casing.) _____
10. Remote Hydraulic BOP control (hooked-up and tested before drilling out surface casing). _____
11. BOP tested (before drilling out surface casing). _____
12. Mud engineer on location with equipment to test mud for H_2S. _____
13. Safe Briefing Areas set-up _____
14. Well Condition sign and flags on location and ready. _____
15. Hydrogen Sulfide detection system hooked -up & tested. _____
16. Hydrogen Sulfide alarm system hooked up & tested. _____
17. Stretcher on location at Safe Briefing Area. _____
18. 2 -100' Life Lines on location. _____
19. 1-20# Fire Extinguisher in safety trailer. _____
20. Confined Space Monitor on location and tested. _____
21. All rig crews and supervisor trained (as required). _____

22. Access restricted for unauthorized personnel. _____

23. Drills on H_2S and well control procedures. _____

24. All outside service contractors advised of potential H_2S on the well. _____

25. NO SMOKNG sign posted. _____

26. H_2S Detector Pump w/tubes on location. _____

27. 25mm Flare Gun on location w/flares. _____

28. Automatic Flare Igniter installed on rig. _____

Procedural Check List

Perform the following on each tour:

1. Check fire extinguishers to see that they have the proper charge.
2. Check breathing equipment to insure that they have not been tampered with.
3. Check pressure on the supply air bottles to make sure they are capable of recharging.
4. Make sure all of the Hydrogen Sulfide detection systems are operative.

Perform the following each week:

1. Check each piece of breathing equipment to make sure that they are fully charged and operational. This requires that the air cylinder be opened and the mask assembly be put on and tested to make sure that the regulators and masks are properly working. Negative and Positive pressure should be conducted on all masks.
2. BOP skills.
3. Check supply pressure on BOP accumulator stand-by source.
4. Check all breathing air mask assemblies to see that straps are loosened and turned back, ready for use.
5. Check pressure on cascade air cylinders to make sure they are fully charged and ready to use for refill purposes if necessary.
6. Check all cascade system regulators to make sure they work properly.
7. Perform breathing drills with on-site personnel.
8. Check the following supplies for availability:
   - Stretcher
   - Safety Belts and Ropes
   - Spare air Bottles
   - Spare Oxygen Bottles (if resuscitator required)
   - Gas Detector Pump and Tubes
   - Emergency telephone lists
9. Test the Confined Space Monitor to verify the batteries are good

EVACUATION PLAN

General Plan

The direct lines of action prepared by Mack Energy Corporation to protect the public from hazardous gas situations are as follows:

1. When the company approved supervisor (Drilling Foreman, Tool Pusher or Driller) determine that Hydrogen Sulfide gas cannot be limited to the well location, and the public will be involved, he will activate the evacuation plan. Escape routes are noted on the area map.

2. Company safety personnel or designee will notify the appropriate local government agency that a hazardous condition exists and evacuation needs to be implemented.

3. Company approved safety personnel that have been trained in the use of the proper emergency equipment will be utilized.

4. Law enforcement personnel (State Police, Local Police Department, Fire Department, and the Sheriff's Department) will be called to aid in setting up and maintaining road blocks. Also, they will aid in evacuation of the public if necessary.

NOTE: Law enforcement personnel will not be asked to come into a contaminated area. Their assistance will be limited to uncontaminated areas. Constant radio contact will be maintained with them.

5. After the discharge of gas has been controlled, "Company" safety personnel will determine when the area is safe for re-entry.

See Specific Site Safety Plan or Job Safety Analysis to be completed during drilling

Emergency Assistance Telephone List

PUBLIC SAFETY	911 or
Pecos Valley Communication Center (Chaves County Police, Fire, EMS)	(575) 624-7590
Central Dispatch (Eddy County Police, Fire, EMS)	(575) 616-7155
Hospitals:	
Roswell	(575) 622-8170
Artesia	(575) 748-3333
Dept. of Public Safety/SE New Mexico	(575) 622-7200
Highway Department	(575) 637-7200
New Mexico Oil Conservation	(575) 748-1283
Bureau of Land Management	(575) 622-5335

Mack Energy Corporation

Company Drilling Supervisor

Jim Krogman	(575) 703-7385

Drilling Foreman

Emilio Martinez	(575) 703-5231

Silver Oak Drilling

Silver Oak Drilling	(575) 746-4405

Tool Pusher:

Darren Mc Bride	(575) 703-6070
Osiel Sanchez	(575) 703-4109

Safety

Lee Hassell (Alliance Safety)
(806) 217-2950
Scott Ford (Mack Energy)
(505) 692-4976
Robbie Houghtaling (Silver Oak)
(575) 703-2122

Intentionally Blank –Space provided for Specific Site Safety Plan or Job Safety Analysis

Affected Notification List

(within a 65' radius of exposure @ 100ppm)

The geologic zones that will be encountered during drilling are known to contain hazardous quantities of H_2S. The accompanying map illustrates the affected areas of the community. The residents within this radius will be notified via a hand delivered written notice describing the activities, potential hazards, conditions of evacuation, evacuation drill siren alarms and other precautionary measures.

Evacuee Description:
Residents: **THERE ARE NO RESIDENTS WITHIN 3000' ROE.**

Notification Process:

A continuous siren audible to all residence will be activated, signaling evacuation of previously notified and informed residents.

Evacuation Plan:
All evacuees will migrate lateral to the wind direction.

The Oil Company will identify all home bound or highly susceptible individuals and make special evacuation preparations, interfacing with the local and emergency medical service as necessary.

Toxic Effects of H_2S Poisoning

Hydrogen Sulfide is extremely toxic. The acceptable ceiling concentration for eight-hour exposure is 10 PPM, which is .001% by volume. Hydrogen Sulfide is heavier than air (specific gravity - 1.192) and is colorless and transparent. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is 5-6 times more toxic than Carbon Monoxide. Occupational exposure limits for Hydrogen Sulfide and other gases are compared below in Table 1. Toxicity table for H_2S and physical effects are shown in Table 2.

Table 1
Permissible Exposure Limits of Various Gases

Common Name	Symbol	Sp. Gravity	TLV	STEL	IDLH
Hydrogen Cyanide	HCN	.94	4.7 ppm	c	
Hydrogen Sulfide	H2S	1.192	10 ppm	15 ppm	100 ppm
Sulfide Dioxide	so2.	2.21	2 ppm	5 ppm	
Chlorine	CL	2.45	.5 ppm	1 ppm	
Carbon Monoxide	CO	.97	25 ppm	200 ppm	
Carbon Dioxide	C02	1.52	5000 ppm	30,000 ppm	
Methane	CH4	.55	4.7% LEL	14% UEL	

Definitions

A. TLV- Threshold Limit Value is the concentration employees may be exposed based on a TWA (time weighted average) for eight (8) hours in one day for 40 hours in one (1) week. This is set by ACGIH (American Conference of Governmental Hygienists) and regulated by OSHA.

B. STEL- Short Term Exposure Limit is the 15 minute average concentration an employee may be exposed to providing that the highest exposure never exceeds the OEL (Occupational Exposure Limit). The OEL for H_2S is 19 PPM.

C. IDLH -Immediately Dangerous to Life and Health is the concentration that has been determined by the ACGIH to cause serious health problems or death if exposed to this level. The IDLH for H_2S is 100 PPM.

D. TWA- Time Weighted Average is the average concentration of any chemical or gas for an eight (8) hour period. This is the concentration that any employee may be exposed based on an TWA.

TABLE 2

Toxicity Table of H_2S

Percent%	PPM	Physical Effects
.0001	1	Can smell less than 1ppm.
.001	10	TLV for 8 hours of exposure.
.0015	15	STEL for 15 minutes of exposure.
.01	100	Immediately Dangerous to Life & Health. Kills sense of smell in 3 to 5 minutes.
.02	200	Kills sense of smell quickly, may burn eyes and throat.
.05	500	Dizziness, cessation of breathing begins in a few minutes.
.07	700	Unconscious quickly, death will result if not rescued promptly.
.10	1000	Death will result unless rescued promptly. Artificial resuscitation may be necessary.

PHYSICAL PROPERTIES OF H2S

The properties of all gases are usually described in the context of seven major categories:

COLOR
ODOR
VAPOR DENSITY
EXPLOSIVE LIMITS
FLAMMABILITY
SOLUBILITY (IN WATER)
BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a fairly complete picture of the properties of the gas.

COLOR- TRANSPARENT

Hydrogen Sulfide is colorless so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence. In fact that makes this gas extremely dangerous to be around.

ODOR- ROTTEN EGGS

Hydrogen Sulfide has a distinctive offensive smell, similar to "rotten eggs". For this reason it earned its common name "sour gas". However, H_2S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

VAPOR DENSITY- SPECIFIC GRAVITY OF 1.192

Hydrogen Sulfide is heavier than air so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H_2S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

EXPLOSIVE LIMITS- 4.3% TO 46%

Mixed with the right proportion of air or oxygen, H_2S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

FLAMMABILITY

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide ($S0_2$), another hazardous gas that irritates the eyes and lungs.

SOLUBILITY- 4 TO 1 RATIO WITH WATER

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H_2S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H_2S may release the gas into the air.

BOILING POINT- (-76 degrees Fahrenheit)

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas.

RESPIRATOR USE

The Occupational Safety and Health Administration (OSHA) regulate the use of respiratory protection to protect the health of employees. OSHA's requirements are written in the Code of Federal Regulations, Title 29, Part 1910, Section 134, Respiratory Protection. This regulation requires that all employees who might be required to wear respirators, shall complete a OSHA mandated medical evaluation questionnaire. The employee then should be fit tested prior to wearing any respirator while being exposed to hazardous gases.

Written procedures shall be prepared covering safe use of respirators in dangerous atmospheric situations, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.

Respirators shall be inspected prior to and after each use to make sure that the respirator has been properly cleaned, disinfected and that the respirator works properly. The unit should be fully charged prior to being used.

Anyone who may use respirators shall be properly trained in how to properly seal the face piece. They shall wear respirators in normal air and then in a test atmosphere. (Note: Such items as facial hair (beard or sideburns) and eyeglass temple pieces will not allow a proper seal.) Anyone that may be expected to wear respirators should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses. Contact lenses should not be allowed.

Respirators shall be worn during the following conditions:

A. Any employee who works near the top or on the top of any tank unless tests reveal less than 20 ppm of H_2S.

B. When breaking out any line where H_2S can reasonably be expected.

C. When sampling air in areas where H_2S may be present.

D. When working in areas where the concentration of H_2S exceeds the Threshold Limit Value for H_2S (10 ppm).

E. At any time where there is a doubt as to the H_2S level in the area to be entered.

EMERGENCY RESCUE PROCEDURES

DO NOT PANIC!!!

Remain Calm -Think

1. Before attempting any rescue you must first get out of the hazardous area yourself. Go to a safe briefing area.

2. Sound alarm and activate the 911 system.

3. Put on breathing apparatus. At least two persons should do this, when available use the buddy system.

4. Rescue the victim and return them to a safe briefing area.

5. Perform an initial assessment and begin proper First Aid/CPR procedures.

6. Keep victim lying down with a blanket or coat, etc., under the shoulders to keep airway open. Conserve body heat and do not leave unattended.

7. If the eyes are affected by H_2S, wash them thoroughly with potable water. For slight irritation, cold compresses are helpful.

8. In case a person has only minor exposure and does not lose consciousness totally, it's best if he doesn't return to work until the following day.

9. Any personnel overcome by H_2S should always be examined by medical personnel. They should always be transported to a hospital or doctor.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 89210
District III
1000 Rio Brazos Road, Aztec, NM 874 1 0
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

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

Submit Original to Appropriate District Office

GAS CAPTURE PLAN

Date: 10/11/2019

☒ Original
☐ Amended - Reason for Amendment:

Operator & OGRID No.: Mack Energy Corporation - 013837

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomplete to new zone, re-frac) activity.

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC)

Well(s)/Production Facility - Name of facility

The well(s) that will be located at the production facility are shown in the table below

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Oakville Federal Com #1H		Sec. 24 T15S R29E	707 FNL & 330 FWL	50		

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is dedicated to DCP Midstream and will be connected to DCP Midstream low/high pressure gathering system located in Chaves County, New Mexico. It will require 0 (existing) of pipeline to connect the facility to low/high pressure gathering system. Mack Energy Corporaiton provides (periodically) to DCP Midstream a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Mack Energy Corporaton and DCP Midstream have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at DCP Midstream Linam Ranch Processing Plant located in Sec. 6, Twn. 19S, Rng. 37E, Lea County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on DCP Midstream system at that time. Based on current information, it is Mack Energy Corporation belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the Use Of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation - On lease
  - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas - On lease
  - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal - On lease
  - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines

Attached to Form 3160-3
Mack Energy Corporation
Oakville Federal Com #1H NMNM-138833
SHL : 707 FNL & 330 FWL, NWNW, Sec. 24 T15S R29E
BHL : 2644 FSL & 330 FWL, NWSW, Sec. 12 T15S R29E
Chaves County, NM

DRILLING PROGRAM

1. **Geologic Name of Surface Formation**

   Quaternary

2. **Estimated Tops of Important Geologic Markers:**

Top Salt	364'
Base of Salt	797'
Yates	951'
Seven Rivers	1184'
Queen	1673'
Grayburg	2067'
San Andres	2364'

3. **Estimated Depths of Anticipated Fresh Water, Oil and Gas:**

Water Sand	150'	Fresh Water
Yates	951'	Oil/Gas
Seven Rivers	1184'	Oil/Gas
Queen	1673'	Oil/Gas
Grayburg	2067'	Oil/Gas
San Andres	2364'	Oil/Gas

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to 200' and circulating cement back to surface will protect the surface fresh water sand. Salt section and shallower zones above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them by cementing 5 ½" production casing, sufficient cement will be pumped to circulate back to surface.

4. **Casing Program:**

Hole Size	Interval	OD Casing	Wt, Grade, Jt, cond, collapse/burst/tension
17 1/2"	0-200'	13 3/8"	48#, J-55, ST&C, New, 7.411859/4.700889/4.74
12 ¼"	0-1200'	9 5/8"	36#, J-55, ST&C, New, 3.237179/7.04/7.04
8 3/4"	0-3900'	7"	26#,HCP-110, LT&C, Buttress,New, 3.67569/3.316667/3.316667
8 ¾"	3900-11784'	5 ½"	17#, HCP-110, Buttress, New, 4.746835/3.546667/3.546667

5. **Cement Program:**

13 3/8" Surface Casing: Lead 250sx, RFC+12% PF53+2% PF1+5pps PF42+.125pps PF29, yld 1.61, wt 14.4 ppg, 7.357 gals/sx, excess 100%. Tail: 200sx, Class C+1% PF1, yld 1.34, wt 14.8 ppg, 6.323 gals/sx, excess 100%

9 5/8" Intermediate Casing: Lead 485sx Class C + 1% PF1, yld 1.34, wt 14.8 ppd, 6.323gal/sx, excess 100%.

7" & 5 ½" Production Casing: Lead 320sx, Class C 4% PF20+4pps PF45+125pps PF29, yld 1.84, wt 13.2 ppg, 9.914 gals/sx, excess 40%, Tail 2230sx, PVL + 1.3 (BWOW) PF44+5% PF174+.5% PF606+.1% PF153+.4pps PF44, yld 1.48, wt 13, 7.57gals/sx, 40% excess.

6. Minimum Specifications for Pressure Control:

The blowout preventer equipment (BOP) shown in Exhibit #10 will consist of a double ram-type (3000 psi WP) minimum preventer. This unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top of 4 1/2" drill pipe rams on bottom. The 11" BOP will be nippled up on the 8 5/8" surface casing and tested by a 3rd party to 2000 psi used continuously until TD is reached. All BOP's and accessory equipment will be tested to 2000 psi before drilling out of intermediate casing. Pipe rams will be operationally checked each 24-hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment (Exhibit #10) will include a Kelly cock and floor safety valve and choke lines and choke manifold (Exhibit #11) with a minimum 2000 psi WP rating

7. Types and Characteristics of the Proposed Mud System:

The well will be drilled to TD with a combination of fresh and cut brine mud system. The applicable depths and properties of this system are as follows:

DEPTH	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-200'	Fresh Water	8.5	28	N.C.
200-1200'	Cut Brine	9.1	29	N.C.
1200'-TD'	Cut Brine	9.1	29	N.C.

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the well site at all times.

8. Auxiliary Well Control and Monitoring Equipment:

A. Kelly cock will be kept in the drill string at all times.
B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

9. Logging, Testing and Coring Program:

A. The electric logging program will consist of GR-Dual Laterolog, Spectral Density, Dual Spaced Neutron, CSNG Log from T.D. to 8 5/8 casing shoe.
B. Drill Stem test is not anticipated.
C. No conventional coring is anticipated.
D. Further testing procedures will be determined at TD.

10. Abnormal Conditions, Pressures, Temperatures and Potential Hazards:

No abnormal pressures or temperatures are anticipated. The estimated bottom hole at TD is 120 degrees and estimated maximum bottom hole pressure is 3193 psig. Low levels of Hydrogen sulfide have been monitors in producing wells in the area, so H2S may be present while drilling of the well; a plan is attached to the Drilling program. No major loss of circulation zones has been reported in offsetting wells.

11. Anticipated Starting Date and Duration of Operations:

Road and location work will not begin until approval has been received from the BLM. The anticipated spud date is January 1, 2020. Once commenced, the drilling operation should be finished in approximately 20 days. If the well is productive, an additional 30 days will be required for completion and testing before a decision is made to install permanent facilities.

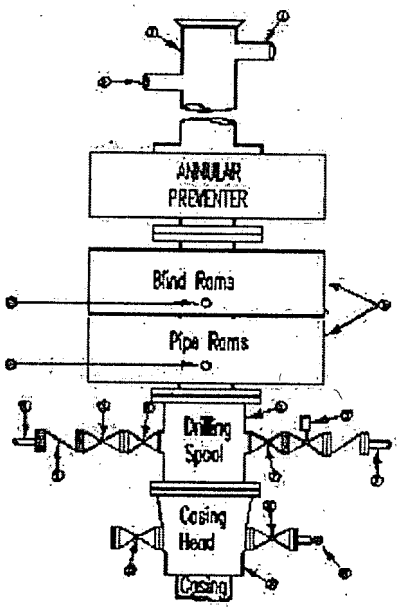
Attachment to Exhibit #10
NOTES REGARDING THE BLOWOUT PREVENTERS
Oakville Federal Com #1H
Chaves County, New Mexico

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

Mack Energy Corporation
Minimum Blowout Preventer Requirements
3000 psi Working Pressure
13 3/8 inch- 3 MWP
11 Inch - 3 MWP
EXHIBIT #10

Stack Requirements

NO.	Items	Min. I.D.	Min. Nominal
1	Flowline		2"
2	Fill up line		2"
3	Drilling nipple		
4	Annular preventer		
5	Two single or one dual hydraulically operated rams		
6a	Drilling spool with 2" min. kill line and 3" min choke line outlets		2" Choke
6b	2" min. kill line and 3" min. choke line outlets in ram. (Alternate to 6a above)		
7	Valve Gate Plug	3 1/8	
8	Gate valve-power operated	3 1/8	
9	Line to choke manifold		3"
10	Valve Gate Plug	2 1/16	
11	Check valve	2 1/16	
12	Casing head		
13	Valve Gate Plug	1 13/16	
14	Pressure gauge with needle valve		
15	Kill line to rig mud pump manifold		2"



OPTIONAL

16	Flanged Valve	1 13/16	

CONTRACTOR'S OPTION TO FURNISH:

1. All equipment and connections above bradenhead or casinghead. Working pressure of preventers to be 2000 psi minimum.
2. Automatic accumulator (80 gallons, minimum) capable of closing BOP in 30 seconds or less and, holding them closed against full rated working pressure.
3. BOP controls, to be located near drillers' position.
4. Kelly equipped with Kelly cock.
5. Inside blowout preventer or its equivalent on derrick floor at all times with proper threads to fit pipe being used.
6. Kelly saver-sub equipped with rubber casing protector at all times.
7. Plug type blowout preventer tester.
8. Extra set pipe rams to fit drill pipe in use on location at all times.
9. Type RX ring gaskets in place of Type R.
10.

ME

MEC TO FURNISH:

1. Bradenhead or casing head and side valves.
2. Wear bushing, if required.

GENERAL NOTES:

1. Deviations from this drawing may be made only with the express permission of MEC's Drilling Manager.
2. All connections, valves, fittings, piping, etc., subject to well or pump pressure must be flanged (suitable clamp connections acceptable) and have minimum working pressure equal to rated working pressure of preventers up through choke valves must be full opening and suitable for high pressure mud service.
3. Controls to be of standard design and each marked, showing opening and closing position
4. Chokes will be positioned so as not to hamper or delay changing of choke beans. Replaceable parts for adjustable choke, or bean sizes, retainers, and choke wrenches to be conveniently located for immediate use.
5. All valves to be equipped with hand-wheels or handles ready for immediate use.
6. Choke lines must be suitably anchored.
7. Handwheels and extensions to be connected and ready for use.
8. Valves adjacent to drilling spool to be kept open. Use outside valves except for emergency.
9. All seamless steel control piping (2000 psi working pressure) to have flexible joints to avoid stress. Hoses will be permitted.
10. Casinghead connections shall not be used except in case of emergency.
11. Does not use kill line for routine fill up operations.

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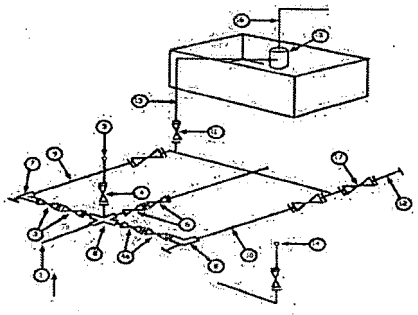
Exhibit #11
MIMIMUM CHOKE MANIFOLD
2,000, 5,000, and 10,000 PSI Working Pressure
3M will be used
2 MWP - 5 MWP - 10 MWP



Mud Pit

Reserve Pit

* Location of separator optional

Below Substructure

Minimum requirements

No.		3,000 MWP			5,000 MWP			10,000 MWP		
		I.D.	Nominal	Rating	I.D.	Nominal	Rating	I.D.	Nominal	Rating
1	Line from drilling Spool		3"	3,000		3"	5,000		3"	10,000
2	Cross 3" x 3" x 3" x 2"			3,000			5,000			
2	Cross 3" x 3" x 3" x 2"									10,000
3	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000
4	Valve Gate Plug	1 13/16		3,000	1 13/16		5,000	1 13/16		10,000
4a	Valves (1)	2 1/16		3,000	2 1/16		5,000	2 1/16		10,000
5	Pressure Gauge			3,000			5,000			10,000
6	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000
7	Adjustable Choke (3)	2"		3,000	2"		5,000	2"		10,000
8	Adjustable Choke	1"		3,000	1"		5,000	2"		10,000
9	Line		3"	3,000		3"	5,000		3"	10,000
10	Line		2"	3,000		2"	5,000		2"	10,000
11	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000
12	Line		3"	1,000		3"	1,000		3"	2,000
13	Line		3"	1,000		3"	1,000		3"	2,000
14	Remote reading compound Standpipe pressure guage			3,000			5,000			10,000
15	Gas Separator		2' x5'			2' x5'			2' x5'	
16	Line		4"	1,000		4"	1,000		4"	2,000
17	Valve Gate Plug	3 1/8		3,000	3 1/8		5,000	3 1/8		10,000

(1) Only one required in Class 2M
(2) Gate valves only shall be used for Class 10 M
(3) Remote operated hydraulic choke required on 5,000 psi and 10,000 psi for drilling.

EQUIPMENT SPECIFICATIONS AND INSTALLATION INSTRUCTION

1. All connections in choke manifold shall be welded, studded, flanged or Cameron clamp of comparable rating.
2. All flanges shall be API 6B or 6BX and ring gaskets shall be API RX or BX. Use only BX for 10 MWP.
3. All lines shall be securely anchored.
4. Chokes shall be equipped with tungsten carbide seats and needles, and replacements shall be available.
5. alternate with automatic chokes, a choke manifold pressure gauge shall be located on the rig floor in conjunction with the standpipe pressure gauge.
6. Line from drilling spool to choke manifold should bee as straight as possible. Lines downstream from chokes shall make turns by large bends or 90 degree bends using bull plugged tees

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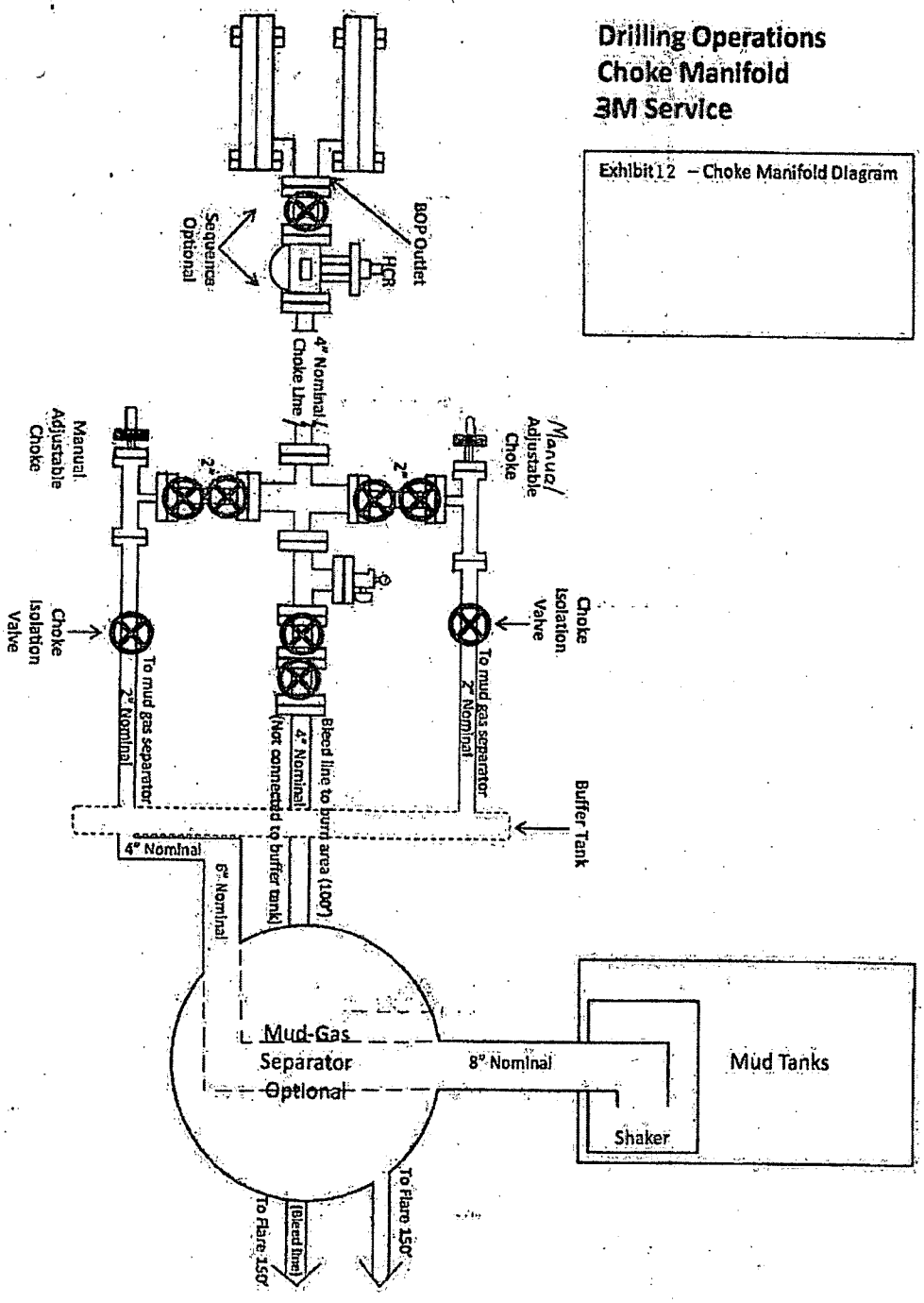
MANIFOLD SCHEMATIC

Exhibit #12



2. **Protective equipment for essential personnel:**

   A. Mark II Survive air 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

3. **H2S detection and monitoring equipment:**

   A. 1 portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

4. **Visual warning systems:**

   A. Wind direction indicators as shown on well site diagram (Exhibit #8).
   B. Caution/Danger signs (Exhibit #7) shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

5. **Mud program:**

   A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.

6. **Metallurgy:**

   A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
   B. All elastomers used for packing and seals shall be H2S trim.

7. **Communication:**

   A. Radio communications in company vehicles including cellular telephone and 2-way radio.
   B. Land line (telephone) communication at Office.

8. **Well testing:**

   A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H2S environment will use the closed chamber method of testing.

Attached to Form 3160-3
Mack Energy Corporation
Oakville Federal Com #1H NMNM-138833
SHL : 707 FNL & 330 FWL, NWNW, Sec. 24 T15S R29E
BHL : 2644 FSL & 330 FWL, NWSW, Sec. 12 T15S R29E
Chaves County, NM

EXHIBIT #7

WARNING

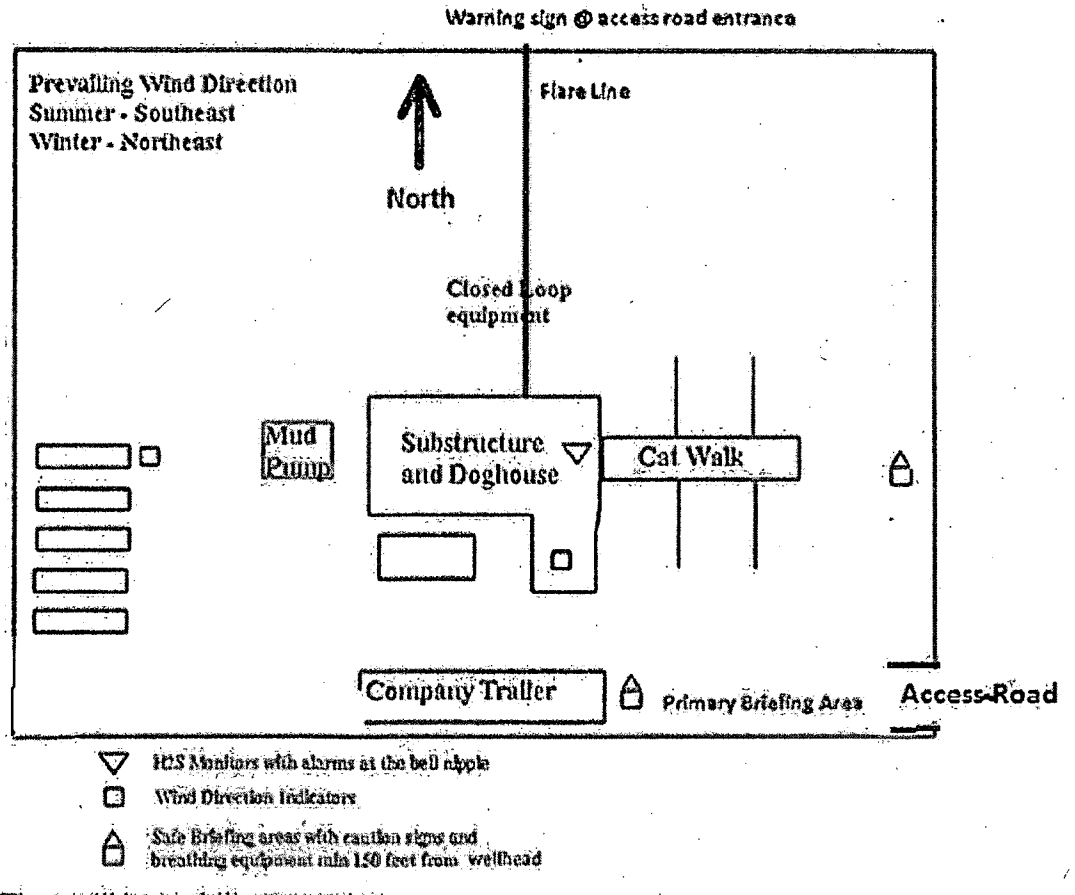
YOU ARE ENTERING AN H2S

AUTHORIZED PERSONNEL ONLY

1. BEARDS OR CONTACT LENSES NOT ALLOWED
2. HARD HATS REQUIRED
3. SMOKING IN DESIGNATED AREAS ONLY
4. BE WIND CONSCIOUS AT ALL TIMES
5. CHECK WITH MACK ENERGY FOREMAN AT OFFICE

MACK ENERGY CORPORATION

1-575-748-1288



B. There will be no drill stem testing.