

July 16, 2007

Fluid Minerals Group
Bureau of Land Management
Salt Lake Field Office
2370 South 2300 West,
Salt Lake City, Utah 84119;

RE: Application for Permit to Drill—Fortuna (US) LP
Hogback Ridge 17-13N-7E
Surface Location: 1,040' FSL & 704' FEL, SE/4 SE/4,
Target Location: 1,850' FNL & 295' FEL, SE/4 NE/4,
Section 17, T13N, R7E, SLB&M. Rich County, Utah

Dear Fluid Minerals Group:

On behalf of Fortuna (US) LP (Fortuna), Buys & Associates, Inc. respectfully resubmits the enclosed original and three copies of the Application for Permit to Drill (APD) for the above referenced Federal surface / mineral administered directional well. A request for exception to spacing (R649-3-11) is hereby requested based on topography since the well is located within 460' of the drilling unit boundary. Fortuna is the only owner and operator within 460' of the proposed well and all points along the intended well bore path. Included with the APD is the following supplemental information:

- Exhibit "A" - Survey plats for the proposed well site;
- Exhibit "B" - Layouts and cross-sections of the proposed well site;
- Exhibit "C" - Proposed location maps with access corridor;
- Exhibit "D" - Deviated Drilling Program with Attachments;
- Exhibit "E" - Surface Use Plan with Weed and Fire Management Plans;
- Exhibit "F" - Typical BOP and Choke Manifold diagram.

Please accept this letter as Fortuna's, written request for confidential treatment of all information contained in and pertaining to this application.

Thank you very much for your timely consideration of this application. Please feel free to contact myself or Len Moriarity of Fortuna at 403-237-1448 if you have any questions or need additional information.

Sincerely,

Don Hamilton

Don Hamilton
Agent for Fortuna

cc: Len Moriarity, Fortuna
Carlos Jallo, Buys & Associates, Inc.

RECEIVED
JUL 19 2007
DIV. OF OIL, GAS & MINING

FILE COPY

CONFIDENTIAL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires March 31, 2007

5. Lease Serial No. 1004-0137 FEL	
6. If Indian, Allottee or Tribe Name N/A	
7. If Unit or CA Agreement, Name and No. N/A	
8. Lease Name and Well No. Hogback Ridge 17-13N-7E	
9. API Well No. 43033-30059	
1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER	10. Field and Pool, or Exploratory Exploratory Wildcat
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone <input checked="" type="checkbox"/> Multiple Zone	11. Sec., T. R. M. or Blk. and Survey or Area Section 17, T13N, R7E, SLB&M
2. Name of Operator Talisman (Canada) Fortuna (US) LP	12. County or Parish Rich
3a. Address 3400, 888 3rd Street S.W. Calgary, Alberta, Canada T2P 5C5	13. State UT
3b. Phone No. (include area code) 403-237-1448	14. Distance in miles and direction from nearest town or post office* 8.53 miles northeast of Laketown, Utah.
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 1,040' FSL & 704' FEL, SE/4 SE/4, At proposed prod. zone 1,850' FNL & 295' FEL, SE/4 NE/4	15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 704'
14. Distance in miles and direction from nearest town or post office* 8.53 miles northeast of Laketown, Utah.	16. No. of acres in lease 2,032.760
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 704'	17. Spacing Unit dedicated to this well 40 acres
16. No. of acres in lease 2,032.760	18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. N/A
17. Spacing Unit dedicated to this well 40 acres	19. Proposed Depth 11,960' TVD(12,335 MD)
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. N/A	20. BLM/BIA Bond No. on file WYB 000397
19. Proposed Depth 11,960' TVD(12,335 MD)	21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6,603' Ungraded Ground
20. BLM/BIA Bond No. on file WYB 000397	22. Approximate date work will start* 09/15/2007
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6,603' Ungraded Ground	23. Estimated duration 100 days drilling and completion

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

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

25. Signature Don Hamilton	Name (Printed/Typed) Don Hamilton	Date 07/16/2007
--------------------------------------	---	---------------------------

Title
Agent for Fortuna (US) LP

Approved by (Signature) 	Name (Printed/Typed) BRADLEY G. HILL	Date 11-08-07
-----------------------------	--	-------------------------

Title
ENVIRONMENTAL MANAGER

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.

*(Instructions on page 2)

**Federal Approval of this
Action is Necessary**

Sur f
485966x
4634462Y
41.863862
- 111.169890

BHL
486108X
4635225Y
41.870758
- 111.167399

RECEIVED
JUL 19 2007

DIV. OF OIL, GAS & MINING

CONFIDENTIAL

T13N, R7E, S.L.B.&M.

FORTUNA (US) L.P.

Well location, HOGBACK RIDGE #17-13N-7E, located as shown in the SE 1/4 SE 1/4 of Section 17, T13N, R7E, S.L.B.&M., Rich County, Utah.

5339.40' (G.L.O.)

Set Marked Stone,
Steel Post, E-W
Fenceline

90°00'
(G.L.O.)

1850'

Bottom
Hole

295'

17

5410.55' (Meas.)

N102°56' E
2533.60'

HOGBACK RIDGE #17-13N-7E

Elev. Ungraded Ground = 6603'

N311°13' W
1255.72'

1040'
(Comp.)

Set Marked Stone,
Pile of Stones,
Steel Post

270°00'
(G.L.O.)

5313.00' (G.L.O.)

BASIS OF BEARINGS

BASIS OF BEARINGS IS A G.P.S. OBSERVATION.

(NAD 83)

LATITUDE = 41°51'49.89" (41.863858)

LONGITUDE = 111°10'11.02" (111.169728)

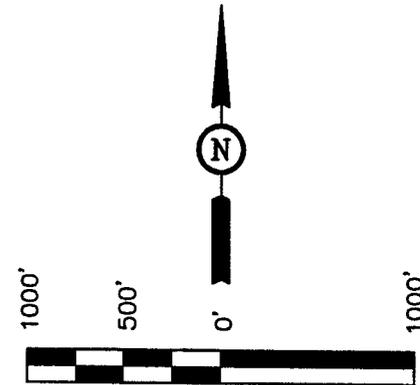
(NAD 27)

LATITUDE = 41°51'50.11" (41.863919)

LONGITUDE = 111°10'08.31" (111.168975)

BASIS OF ELEVATION

SPOT ELEVATION LOCATED IN THE NW 1/4 OF SECTION 16, T13N, R7E, 6th P.M., TAKEN FROM THE SAGE CREEK QUADRANGLE, UTAH, RICH COUNTY, 7.5 MINUTE SERIES (TOPOGRAPHICAL MAP) PUBLISHED BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY. SAID ELEVATION IS MARKED AS BEING 6686 FEET.



SCALE

CERTIFICATE

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Robert McKay
REGISTERED LAND SURVEYOR
REGISTRATION NO. 161319
STATE OF UTAH

Revised: 7-13-07
Revised: 7-3-07

UNTAH ENGINEERING & LAND SURVEYING
85 SOUTH 200 EAST - VERNAL, UTAH 84078
(435) 789-1017

SCALE 1" = 1000'	DATE SURVEYED: 5-7-07	DATE DRAWN: 5-17-07
PARTY J.F. C.B. K.G.	REFERENCES G.L.O. PLAT	
WEATHER WARM	FILE FORTUNA (US) L.P.	

LEGEND:

└─┘ = 90° SYMBOL

● = PROPOSED WELL HEAD.

▲ = SECTION CORNERS LOCATED.

NORTH - 5280.00' (G.L.O.)

Fortuna Energy Inc.
Hogback Ridge
Deviated Drilling Program
 17-13N-7E
 Rich County, Utah

*Rec'd Aug 10, 2007
 via email to HSM*

Location: 17-13N-7E, Rich County Utah. Surface: 41.863840°N, 111.171242°W
 Bottom hole TD 4635436m N and 485857m E

Field: Hogback Ridge

Elevation: 6450' Ground Elevation; 6450' Graded Elevation; 6480' Kelly Bushing

API Number:

Objective: Directional drilled in the Mission Canyon, Total depth 20' in the Lodgepole.

1. Electric Log Formation Tops:

A complete geologic prognosis will be attached.

FORMATION	TVD	MD
Surface Wasatch	0	0
Twin Creek	817	817
Gypsum Springs	2350	2350
Nuggut**	2625	2625
Ankareh	3850	3856.3
Thaynes	5525	5606.3
Fault	6950	8981.9
Thaynes	6950	8981.9
Woodside	8760	8989.1
Dinwoody**	9375	9632.2
Phosphoria	10025	10311.9
Weber	10475	10782.5
Mission Canyon*	11330	11676.6
Lodgepole	11940	12314.4
TD	11960	12335.4

CONFIDENTIAL

2. ESTIMATED DEPTHS OF ANTICIPATED WATER, OIL-GAS BEARING FORMATIONS:

Surface to NUGGET 2325'+/-, MD	Water
Nugget 2325'-3850', MD	Gas/Oil bearing (sweet)
Dinwoody 9375'-10025', MD	Gas bearing
Mission Canyon 11300'-11940', MD	Gas bearing

3. OPERATOR'S MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL:

- A. Surface BOPE requirements (minimum): 13-5/8" 5000 psig rated BOPE including double gate with blind and pipe rams, drilling spool with 3" outlets (choke and kill lines configured as per the attached diagram), spherical. Closing unit will comply with BLM specifications. BOP kill line (2 inch minimum) shall run to the outer edge of the substructure and be unobstructed. All lines will be staked down prior to drilling the surface casing plug. BOPE will be tested with a registered pressure testing company to 250 psig low and 5000 psig high (annular to 2500 psig). Casing will be tested to 70% of rated burst pressure. Testing of BOPE will be after 10hours WOC time, drill out to be after 24 hours WOC. Testing of BOPE every 30 days and if any seal is broken.

Intermediate BOPE requirements (minimum): ^{9 5/8"} 11" 5,000 psig rated BOPE including double gate with blind and pipe rams, drilling spool with 3" outlets (choke and kill lines configured as per the attached diagram), double gate with blind and pipe rams, spherical. A hydraulic valve and a remote, operated hydraulic choke are required. Closing unit will comply with BLM specifications. BOPE will be tested with a registered pressure testing company to 250 psig low and 5,000 psig high (annular to 2500psig). Casing will be tested to 70% of rated burst pressure. Testing of BOPE will be after 10hours WOC time, drill out to be after 24 hours WOC. Retest the BOPE every 30 days and if any seal is broken.

Both choke manifold and BOPE accumulator will be in compliance with Onshore Order Number 2

- B. All pressure control equipment will be installed, tested and operated in compliance with 43 CFR Part 3160 of the Federal Register.
- C. Pit volumes will be visually monitored. A flow indicator with a floor monitor panel will be utilized. PVT will be installed by 1500'.
- D. See Exhibit "C".

CONFIDENTIAL

4. CASING AND CEMENTING PROGRAM:

- A. All casing run and set will be new or used inspected. Laboratory tests will be run on the water and cement prior to the cementing operations. BLM will be notified 24 hours prior to running and cementing all casing. All joints will be inspected for damaged threads and full length drift run. Threads will be cleaned and a thread compound applied as the casing is run. Wet and dry cement samples of the cement will be obtained.
- B. All casing strings below the conductor shall be pressure tested to 0.22 psi/ft or 1500 psi whichever is greater, but not to exceed 70% of the internal yield of the casing.

C. Surface Casing: Set Depth 0-1500' +/-

1500' +/-, 13-3/8", 682#/ft. K-55. BT&C. Collapse 1950 PSI Burst 3450 PSI
Tension 1,069K

WATER SPACER:

Water Spacer, Fluid Density 8.34 lbm/gal, Fluid Volume 40 bbl.

LEAD CEMENT: 590sks Varocem (TM) Cement 94lb/sks, 0.125 lmb/sk Poly-E-Flake, 0.25 lmb/sk Kwik Seal (12.3 ppg, yield 2.36 ft3/sk)

TAIL CEMENT: 630sks Class G Cement 94lb/sks, and 2% Calcuim Chloride, (15.8 ppg, yield 1.17 ft3/sk)

MUD: Mud Displacement, Fluid Density 8.3 lbm/gal, Fluid Volume 218 bbl.

As Per Halliburton cementing program

D. Intermediate Casing: Set Depth 0-4000' +/-

4,000'+/-, 9-5/8", 43.5#/ft., L-80. LT&C. Collapse 3810 PSI. Burst 6330 PSI
Tension 691K

NOTE: Plan on cement returns to surface with 50% excess

WATER SPACER: Fresh Water. Fluid Density 8.4lbm/gal, Fluid Volume 40bbl.

LEAD CEMENT: 240sks Varocem (TM) Cement SR4, 94lb/sks, 0.125 lmb/sk Poly-E-Flake, 0.25 lmb/sk Kwik Seal (10.4 ppg, yield 4.12 ft3/sk)

TAIL CEMENT: 580sks Varocem (TM) Cement SR2, 94lb/sks, 0.7% HaladR-322, 0.15% Versaset, 0.2% HR-5 retarder, and 3 lmb/sk Silicalite (14.2 ppg, yield 1.26 ft3/sk)

MUD: Mud Displacement, Fluid Density 8.34 ppg, Fluid Volume 294.56 bbl.

As Per Halliburton cementing program

E. **Production Liner Casing #1: Set Depth 3800'-10450' +/-**

Cement volume will be calculated to fill 400 feet into the intermediate casing at 4000' MD.

6,700'±, 7", 26lb/ft., L-80, BT&C, Collapse 5410 PSI, Burst 7240 PSI, Tension 604K

NOTE: Set 200' inside the 9 5/8" intermediate casing shoe to 4,000' MD.

WATER SPACER: Fresh Water. Fluid Density 10.5 lbm/gal, Fluid Volume 40bbl.

LEAD CEMENT: 1055 Econocem (TM) Cement RS3, 94lb/sks, 0.5%HR-5 (retarder), (14.2 ppg, yield 1.31 ft³/sk)

Push Mud, Fluid Density 8.34 ppg, Fluid Volume 318.88 bbl.

NOTE: The actual cement volume will be based on hole caliper plus 20% excess.

As Per Halliburton cementing program

F. **Production Liner Casing #2: Set Depth 10250'-12335' +/-**

Cement volume will be calculated to fill 400 feet into the production liner #1 at 10450'.

576 Hall: 16 cement + prog 14 lb/ft
2,100'±, 5", 26lb/ft., L-80, VAM FJL, Collapse 10,490 PSI, Burst 10,140 PSI, Tension 422K

NOTE: Set 200' inside the 7" production casing #1 shoe to 10,450' MD

Spacer: 11.0 ppg, fluid volume 20 bbls

LEAD CEMENT: 170sks Expandacem (TM) Cement RS1, 94lb/sks, 0.5%HR-5 (retarder), (15.6 ppg, yield 1.56 ft³/sk)

Water Spacer: 8.34 ppg, fluid volume 41 bbl

Push Mud, Fluid Density 9.5ppg, Fluid Volume 176.67 bbl.

NOTE: The actual cement volume will be based on hole caliper plus 40% excess.

As Per Halliburton cementing program

5. **DRILLING MUD PROGRAM:**

A. A fresh water system will be used to drill the surface. The rig will then switch the system to an oil based mud system for drilling the intermediate hole. The main hole will be drilled with water/polymer system. The mud system will employ solids control with mechanical cleaning. A centrifuge will be used with a mud cleaner, de-sander and de-silter to mechanically remove drill solids. Fluid retained on the drill cuttings will be pumped back into the active system after the cuttings are allowed to separate the fluid off. Adjustments will be

CONFIDENTIAL

made as the well bore conditions dictate and for anticipated drilling activities such as running casing, logging, testing, etc. Maximum anticipated mud weight is 8.5 ppg with formation pressures to be 8.3 ppg or 0.43 psi/ft gradient. Barite will be used for weighting material and adequate stocks of will be stored on site to support a 2 ppg increase at all times during the drilling operation. Sack barite will be used for weight up, also will be used for pills. The primary concern is with lost circulation and potential for H₂S in the system.

B. A pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more that 20 feet of new hole.

C. A mechanical device as a backup as well as electronic mud monitoring of PVT, stroke counter and flow show will be used.

6. TESTING, LOGGING AND CEMENTING PROGRAM:

A. The primary objective is the Nugget and Dinwoody formation and the secondary formation is the Mission Canyon.

B. One or two 60' core will be cut in the Nugget and Dinwoody. If core look good a DST will be run on the Nugget; No other DST are expected, however an unexpected show of interest may dictate otherwise. Fortuna Energy will inform the authorized official of any DST.

C. Intermediate hole: Dip meter (Hex Dip), Gamma Ray, Sonic and Neutron-Density from intermediate casing point to surface casing

Main hole: Dip meter (FMI), Laterlog, Sonic, Gamma Ray and Neutron-Density from TD to intermediate casing.

7. ABNORMAL PRESSURE OR TEMPERATURE:

A. The drilling supervisor will monitor for drilling breaks, mud losses or gains, gas increases, and drilling mud temperature increases to anticipate potential increases in bottom hole pressures. If significant increases in bottom hole pressures are anticipated; all drilling breaks greater than 5 feet will be circulated and observed for flow prior to drilling ahead. Kill procedures best suited for the abnormal pressure situation will be employed. After setting surface casing, pit drills will be held to ensure the rig crews are familiar with their individual responsibilities and achieve a closed in time of less than 2 minutes. Periodic pit drills will be held thereafter and if new crew members are hired. All detection devices will be in place and working from 1500' to TD.

B. Anticipated bottom hole pressure is 4200 psig or 0.405 psig/ft based on offset DST's from American Quasar, #1-20 Hogback Ridge, 20-13N-7E.

C. A detailed H₂S Contingency Plan is attached.

8. OTHER INFORMATION:

A. Anticipated starting date will be upon approval. The drilling and completion operations should be completed within 115 days after spudding the well.

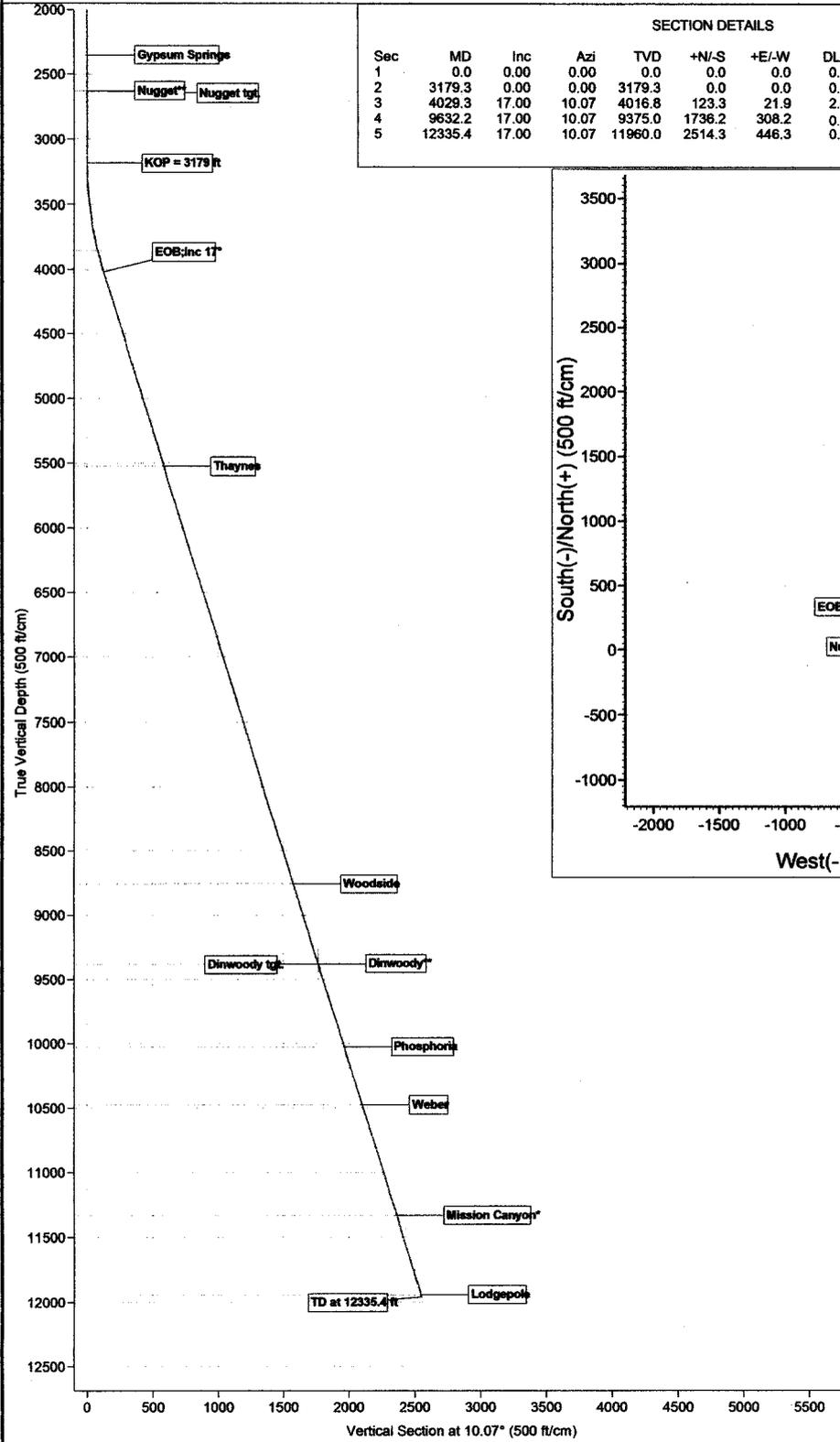
Attachments:

1. Drilling Mud Program
2. Drilling bit proposals
3. Directional Drilling Plan
4. Well head schematic and installation
5. H2S Contingency plan and Safety Program
6. Geological prognosis and geological report
7. Vendor list and telephone numbers
8. Fortuna telephone list and emergency numbers
9. Regulatory agency personnel and telephone numbers
10. Offset well information and Drilling Records Information

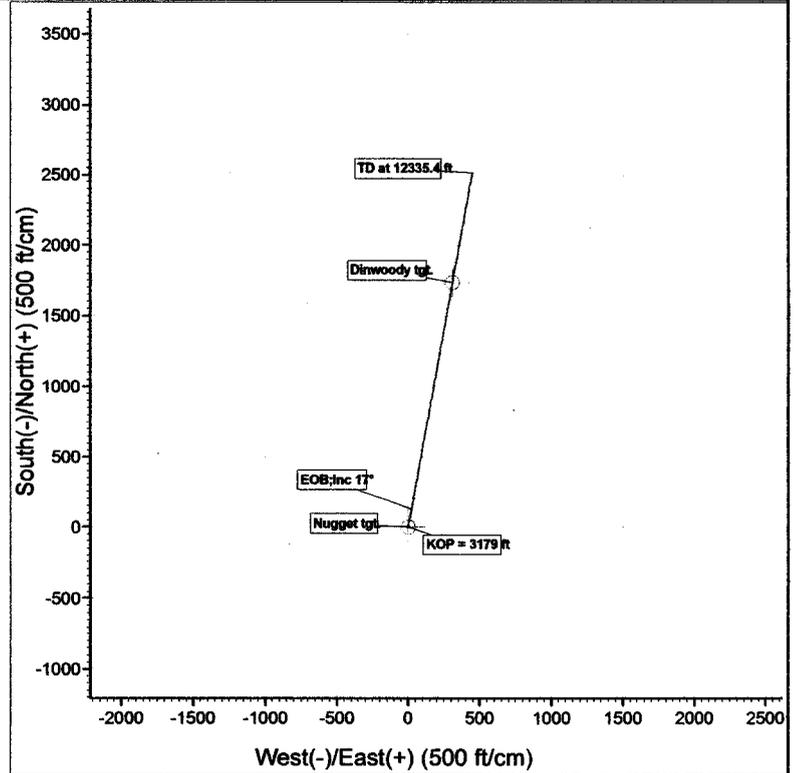
Fortuna (US) L.P.



Project: Hogback Ridge
Site: Fortuna Hogback Ridge 17-13N-7E
Well: 17-13N-7E
Wellbore: DD
Plan: Plan #1



SECTION DETAILS											
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0		
2	3179.3	0.00	0.00	3179.3	0.0	0.0	0.00	0.00	0.0		
3	4029.3	17.00	10.07	4016.8	123.3	21.9	2.00	10.07	125.2		
4	9632.2	17.00	10.07	9375.0	1736.2	308.2	0.00	0.00	1763.3	Dinwoody tgt.	
5	12335.4	17.00	10.07	11960.0	2514.3	446.3	0.00	0.00	2553.6		



Azimuths to True North
Magnetic North: 12.63°

Magnetic Field
Strength: 53521.5nT
Dip Angle: 67.17°
Date: 14/02/2007
Model: IGRF200510

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
817.0	817.0	Twin Creek
2350.0	2350.0	Gypsum Springs
2625.0	2625.0	Nugget**
3850.0	3856.3	Ankareh
5525.0	5606.3	Theynes
8760.0	8989.1	Woodside
9375.0	9632.2	Dinwoody**
10025.0	10311.9	Phosphoria
10475.0	10782.5	Weber
11330.0	11676.6	Mission Canyon*
11940.0	12314.4	Lodgepole

DESIGN DETAILS: Plan #1

SQ
KBE @ 6780.0ft (Original Well Elev)

Target	Azimuth	Origin	N/S	E/W	From TVD
Dinwoody tgt.	1810°	0.0	0.0	0.0	0.0

Cathedral Energy Services

Planning Report

Database: EDM 2003.16 SQL Multi User Db
Company: Fortuna (US) L.P.
Project: Hogback Ridge
Site: Fortuna Hogback Ridge 17-13N-7E
Well: 17-13N-7E
Wellbore: DD
Design: Plan #1

Local Co-ordinate Reference: Well 17-13N-7E
TVD Reference: KBE @ 6780.0ft (Original Well Elev)
MD Reference: KBE @ 6780.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Project Hogback Ridge	
Map System: Universal Transverse Mercator	System Datum: Mean Sea Level
Geo Datum: North American Datum 1983	
Map Zone: Zone 12N (114 W to 108 W)	

Site Fortuna Hogback Ridge 17-13N-7E		
Site Position:	Northing: 4,634,670.00 m	Latitude: 41° 51' 49.726 N
From: Map	Easting: 485,724.00 m	Longitude: 111° 10' 19.245 W
Position Uncertainty: 0.0 ft	Slot Radius: in	Grid Convergence: -0.11 °

Well 17-13N-7E		
Well Position +N-S 0.0 ft	Northing: 4,634,670.00 m	Latitude: 41° 51' 49.726 N
+E-W 0.0 ft	Easting: 485,724.00 m	Longitude: 111° 10' 19.245 W
Position Uncertainty 0.0 ft	Wellhead Elevation: ft	Ground Level: 6,750.0 ft

Wellbore DD					
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF200510	14/02/2007	(°) 12.63	(°) 67.17	(nT) 53,522

Design Plan #1					
Audit Notes:					
Version:	Phase: PLAN	Tie On Depth: 0.0			
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	10.07	

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Dogleg Rate (°/100ft)	Build Rate ("/100ft)	Turn Rate ("/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,179.3	0.00	0.00	3,179.3	0.0	0.0	0.00	0.00	0.00	0.00	
4,029.3	17.00	10.07	4,016.8	123.3	21.9	2.00	2.00	0.00	10.07	
9,632.2	17.00	10.07	9,375.0	1,736.2	308.2	0.00	0.00	0.00	0.00	0.00 Dinwoody tgt.
12,335.4	17.00	10.07	11,960.0	2,514.3	446.3	0.00	0.00	0.00	0.00	

Cathedral Energy Services

Planning Report

Database: EDM 2003.16 SQL Multi User Db
Company: Fortuna (US) L.P.
Project: Hogback Ridge
Site: Fortuna Hogback Ridge 17-13N-7E
Well: 17-13N-7E
Wellbore: DD
Design: Plan #1

Local Co-ordinate Reference: Well 17-13N-7E
TVD Reference: KBE @ 6780.0ft (Original Well Elev)
MD Reference: KBE @ 6780.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Sub-Sea Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	-6,780.00	0.0	0.0	0.0	0.00	
817.0	0.00	0.00	817.0	-5,963.00	0.0	0.0	0.0	0.00	0.00 Twin Creek
2,350.0	0.00	0.00	2,350.0	-4,430.00	0.0	0.0	0.0	0.00	0.00 Gypsum Springs
2,625.0	0.00	0.00	2,625.0	-4,155.00	0.0	0.0	0.0	0.00	0.00 Nugget**
3,179.3	0.00	0.00	3,179.3	-3,600.73	0.0	0.0	0.0	0.00	0.00 KOP = 3179 ft
3,200.0	0.41	10.07	3,200.0	-3,580.00	0.1	0.0	0.1	2.00	
3,300.0	2.41	10.07	3,300.0	-3,480.04	2.5	0.4	2.5	2.00	
3,400.0	4.41	10.07	3,399.8	-3,380.22	8.4	1.5	8.5	2.00	
3,500.0	6.41	10.07	3,499.3	-3,280.67	17.7	3.1	17.9	2.00	
3,600.0	8.41	10.07	3,598.5	-3,181.51	30.4	5.4	30.8	2.00	
3,700.0	10.41	10.07	3,697.1	-3,082.86	46.5	8.2	47.2	2.00	
3,800.0	12.41	10.07	3,795.2	-2,984.85	66.0	11.7	67.0	2.00	
3,856.3	13.54	10.07	3,850.0	-2,930.00	78.4	13.9	79.6	2.00	2.00 Ankareh
3,900.0	14.41	10.07	3,892.4	-2,887.58	88.8	15.8	90.2	2.00	
4,000.0	16.41	10.07	3,988.8	-2,791.18	115.0	20.4	116.8	2.00	
4,029.3	17.00	10.07	4,016.8	-2,763.15	123.3	21.9	125.2	2.00	2.00 EOB; Inc 17°
4,100.0	17.00	10.07	4,084.5	-2,695.51	143.6	25.5	145.9	0.00	
4,200.0	17.00	10.07	4,180.1	-2,599.88	172.4	30.6	175.1	0.00	
4,300.0	17.00	10.07	4,275.8	-2,504.25	201.2	35.7	204.3	0.00	
4,400.0	17.00	10.07	4,371.4	-2,408.62	230.0	40.8	233.6	0.00	
4,500.0	17.00	10.07	4,467.0	-2,312.99	258.8	45.9	262.8	0.00	
4,600.0	17.00	10.07	4,562.6	-2,217.36	287.5	51.0	292.0	0.00	
4,700.0	17.00	10.07	4,658.3	-2,121.72	316.3	56.2	321.3	0.00	
4,800.0	17.00	10.07	4,753.9	-2,026.09	345.1	61.3	350.5	0.00	
4,900.0	17.00	10.07	4,849.5	-1,930.46	373.9	66.4	379.8	0.00	
5,000.0	17.00	10.07	4,945.2	-1,834.83	402.7	71.5	409.0	0.00	
5,100.0	17.00	10.07	5,040.8	-1,739.20	431.5	76.6	438.2	0.00	
5,200.0	17.00	10.07	5,136.4	-1,643.57	460.3	81.7	467.5	0.00	
5,300.0	17.00	10.07	5,232.1	-1,547.94	489.1	86.8	496.7	0.00	
5,400.0	17.00	10.07	5,327.7	-1,452.31	517.8	91.9	525.9	0.00	
5,500.0	17.00	10.07	5,423.3	-1,356.68	546.6	97.0	555.2	0.00	
5,600.0	17.00	10.07	5,518.9	-1,261.05	575.4	102.1	584.4	0.00	
5,606.3	17.00	10.07	5,525.0	-1,255.00	577.2	102.5	586.3	0.00	0.00 Thaynes
5,700.0	17.00	10.07	5,614.6	-1,165.42	604.2	107.3	613.7	0.00	
5,800.0	17.00	10.07	5,710.2	-1,069.79	633.0	112.4	642.9	0.00	
5,900.0	17.00	10.07	5,805.8	-974.16	661.8	117.5	672.1	0.00	
6,000.0	17.00	10.07	5,901.5	-878.53	690.6	122.6	701.4	0.00	
6,100.0	17.00	10.07	5,997.1	-782.90	719.4	127.7	730.6	0.00	
6,200.0	17.00	10.07	6,092.7	-687.27	748.1	132.8	759.8	0.00	
6,300.0	17.00	10.07	6,188.4	-591.64	776.9	137.9	789.1	0.00	
6,400.0	17.00	10.07	6,284.0	-496.01	805.7	143.0	818.3	0.00	
6,500.0	17.00	10.07	6,379.6	-400.38	834.5	148.1	847.6	0.00	
6,600.0	17.00	10.07	6,475.3	-304.75	863.3	153.2	876.8	0.00	
6,700.0	17.00	10.07	6,570.9	-209.12	892.1	158.4	906.0	0.00	
6,800.0	17.00	10.07	6,666.5	-113.48	920.9	163.5	935.3	0.00	
6,900.0	17.00	10.07	6,762.1	-17.85	949.7	168.6	964.5	0.00	
7,000.0	17.00	10.07	6,857.8	77.78	978.4	173.7	993.7	0.00	
7,100.0	17.00	10.07	6,953.4	173.41	1,007.2	178.8	1,023.0	0.00	
7,200.0	17.00	10.07	7,049.0	269.04	1,036.0	183.9	1,052.2	0.00	
7,300.0	17.00	10.07	7,144.7	364.67	1,064.8	189.0	1,081.4	0.00	
7,400.0	17.00	10.07	7,240.3	460.30	1,093.6	194.1	1,110.7	0.00	
7,500.0	17.00	10.07	7,335.9	555.93	1,122.4	199.2	1,139.9	0.00	

Cathedral Energy Services

Planning Report

Database: EDM 2003.16 SQL Multi User Db
Company: Fortuna (US) L.P.
Project: Hogback Ridge
Site: Fortuna Hogback Ridge 17-13N-7E
Well: 17-13N-7E
Wellbore: DD
Design: Plan #1

Local Co-ordinate Reference: Well 17-13N-7E
TVD Reference: KBE @ 6780.0ft (Original Well Elev)
MD Reference: KBE @ 6780.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Sub Sea Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Comments / Formations
7,600.0	17.00	10.07	7,431.6	651.56	1,151.2	204.4	1,169.2	0.00	
7,700.0	17.00	10.07	7,527.2	747.19	1,179.9	209.5	1,198.4	0.00	
7,800.0	17.00	10.07	7,622.8	842.82	1,208.7	214.6	1,227.6	0.00	
7,900.0	17.00	10.07	7,718.5	938.45	1,237.5	219.7	1,256.9	0.00	
8,000.0	17.00	10.07	7,814.1	1,034.08	1,266.3	224.8	1,286.1	0.00	
8,100.0	17.00	10.07	7,909.7	1,129.71	1,295.1	229.9	1,315.3	0.00	
8,200.0	17.00	10.07	8,005.3	1,225.34	1,323.9	235.0	1,344.6	0.00	
8,300.0	17.00	10.07	8,101.0	1,320.97	1,352.7	240.1	1,373.8	0.00	
8,400.0	17.00	10.07	8,196.6	1,416.60	1,381.5	245.2	1,403.1	0.00	
8,500.0	17.00	10.07	8,292.2	1,512.23	1,410.2	250.3	1,432.3	0.00	
8,600.0	17.00	10.07	8,387.9	1,607.86	1,439.0	255.5	1,461.5	0.00	
8,700.0	17.00	10.07	8,483.5	1,703.49	1,467.8	260.6	1,490.8	0.00	
8,800.0	17.00	10.07	8,579.1	1,799.12	1,496.6	265.7	1,520.0	0.00	
8,900.0	17.00	10.07	8,674.8	1,894.76	1,525.4	270.8	1,549.2	0.00	
8,989.1	17.00	10.07	8,760.0	1,980.00	1,551.1	275.3	1,575.3	0.00	Woodside
9,000.0	17.00	10.07	8,770.4	1,990.39	1,554.2	275.9	1,578.5	0.00	
9,100.0	17.00	10.07	8,866.0	2,086.02	1,583.0	281.0	1,607.7	0.00	
9,200.0	17.00	10.07	8,961.6	2,181.65	1,611.8	286.1	1,637.0	0.00	
9,300.0	17.00	10.07	9,057.3	2,277.28	1,640.5	291.2	1,666.2	0.00	
9,400.0	17.00	10.07	9,152.9	2,372.91	1,669.3	296.3	1,695.4	0.00	
9,500.0	17.00	10.07	9,248.5	2,468.54	1,698.1	301.4	1,724.7	0.00	
9,600.0	17.00	10.07	9,344.2	2,564.17	1,726.9	306.6	1,753.9	0.00	
9,632.2	17.00	10.07	9,375.0	2,595.00	1,736.2	308.2	1,763.3	0.00	Dinwoody** - Dinwoody tgt.
9,700.0	17.00	10.07	9,439.8	2,659.80	1,755.7	311.7	1,783.1	0.00	
9,800.0	17.00	10.07	9,535.4	2,755.43	1,784.5	316.8	1,812.4	0.00	
9,900.0	17.00	10.07	9,631.1	2,851.06	1,813.3	321.9	1,841.6	0.00	
10,000.0	17.00	10.07	9,726.7	2,946.69	1,842.1	327.0	1,870.9	0.00	
10,100.0	17.00	10.07	9,822.3	3,042.32	1,870.8	332.1	1,900.1	0.00	
10,200.0	17.00	10.07	9,918.0	3,137.95	1,899.6	337.2	1,929.3	0.00	
10,300.0	17.00	10.07	10,013.6	3,233.58	1,928.4	342.3	1,958.6	0.00	
10,311.9	17.00	10.07	10,025.0	3,245.00	1,931.9	342.9	1,962.1	0.00	Phosphoria
10,400.0	17.00	10.07	10,109.2	3,329.21	1,957.2	347.4	1,987.8	0.00	
10,500.0	17.00	10.07	10,204.8	3,424.84	1,986.0	352.5	2,017.0	0.00	
10,600.0	17.00	10.07	10,300.5	3,520.47	2,014.8	357.7	2,046.3	0.00	
10,700.0	17.00	10.07	10,396.1	3,616.10	2,043.6	362.8	2,075.5	0.00	
10,782.5	17.00	10.07	10,475.0	3,695.00	2,067.3	367.0	2,099.6	0.00	Weber
10,800.0	17.00	10.07	10,491.7	3,711.73	2,072.3	367.9	2,104.7	0.00	
10,900.0	17.00	10.07	10,587.4	3,807.36	2,101.1	373.0	2,134.0	0.00	
11,000.0	17.00	10.07	10,683.0	3,903.00	2,129.9	378.1	2,163.2	0.00	
11,100.0	17.00	10.07	10,778.6	3,998.63	2,158.7	383.2	2,192.5	0.00	
11,200.0	17.00	10.07	10,874.3	4,094.26	2,187.5	388.3	2,221.7	0.00	
11,300.0	17.00	10.07	10,969.9	4,189.89	2,216.3	393.4	2,250.9	0.00	
11,400.0	17.00	10.07	11,065.5	4,285.52	2,245.1	398.5	2,280.2	0.00	
11,500.0	17.00	10.07	11,161.1	4,381.15	2,273.9	403.6	2,309.4	0.00	
11,600.0	17.00	10.07	11,256.8	4,476.78	2,302.6	408.8	2,338.6	0.00	
11,676.6	17.00	10.07	11,330.0	4,550.00	2,324.7	412.7	2,361.0	0.00	Mission Canyon*
11,700.0	17.00	10.07	11,352.4	4,572.41	2,331.4	413.9	2,367.9	0.00	
11,800.0	17.00	10.07	11,448.0	4,668.04	2,360.2	419.0	2,397.1	0.00	
11,900.0	17.00	10.07	11,543.7	4,763.67	2,389.0	424.1	2,426.4	0.00	
12,000.0	17.00	10.07	11,639.3	4,859.30	2,417.8	429.2	2,455.6	0.00	
12,100.0	17.00	10.07	11,734.9	4,954.93	2,446.6	434.3	2,484.8	0.00	
12,200.0	17.00	10.07	11,830.6	5,050.56	2,475.4	439.4	2,514.1	0.00	

Cathedral Energy Services

Planning Report

Database: EDM 2003.16 SQL Multi User Db
Company: Fortuna (US) L.P.
Project: Hogback Ridge
Site: Fortuna Hogback Ridge 17-13N-7E
Well: 17-13N-7E
Wellbore: DD
Design: Plan #1

Local Co-ordinate Reference: Well 17-13N-7E
TVD Reference: KBE @ 6780.0ft (Original Well Elev)
MD Reference: KBE @ 6780.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	Sub Sea Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Comments / Formations
12,300.0	17.00	10.07	11,926.2	5,146.19	2,504.2	444.5	2,543.3	0.00	
12,314.4	17.00	10.07	11,940.0	5,160.00	2,508.3	445.3	2,547.5	0.00	Lodgepole
12,335.4	17.00	10.07	11,960.0	5,180.00	2,514.3	446.3	2,553.6	0.00	TD at 12335.4 ft

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Dinwoody tgt. - hit/miss target - Shape	0.00	0.00	9,375.0	1,736.2	308.2	4,635,199.00	485,819.00	41° 52' 6.885 N	111° 10' 15.170 W
Nugget tgt. - plan hits target - Circle (radius 50.0)	0.00	0.00	2,625.0	0.0	0.0	4,634,670.00	485,724.00	41° 51' 49.726 N	111° 10' 19.245 W

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
817.0	817.0	Twin Creek		0.00	
2,350.0	2,350.0	Gypsum Springs		0.00	
2,625.2	2,625.0	Nugget**		0.00	
3,882.9	3,850.0	Ankareh		0.00	
5,617.0	5,525.0	Thaynes		0.00	
8,966.1	8,760.0	Woodside		0.00	
9,602.8	9,375.0	Dinwoody**		0.00	
10,275.8	10,025.0	Phosphoria		0.00	
10,741.6	10,475.0	Weber		0.00	
11,626.8	11,330.0	Mission Canyon*		0.00	
12,258.3	11,940.0	Lodgepole		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
3,179.3	3,179.3	0.0	0.0	KOP = 3179 ft
4,029.3	4,016.8	123.3	21.9	EOB; Inc 17°
12,335.4	11,960.0	1,736.2	308.2	TD at 12335.4 ft

Wellhead 13 5/8" slip on x 9 5/8" drill through, 5000psi, sour service

17 1/2" surface hole
Surface Casing 1500 ft

12 1/4" Intermediate hole
9 5/8" Int Casing 4000 ft

8 1/2" Main hole 10450 ft
7" Liner 10450 ft

6 1/8" Prod Hole 12335 ft

TD 12335 ft MD

General Information			
Rig	?	API #	
FORTUNA Interest		AFE	AF 61397
Ground Level	6750.0 ft	Amount	US \$7,250,000
K.B. to ground	30.0 ft	Days	95
Kelly Bushing	6780.0 ft		
Base of Ground water protection: AMSL =			

Formation Tops						
(Primary **, Secondary *)	ftKB TVD	ftKB MD	Angle/Az.	H2S %	Formation Pressure	EMD
Surface Wasatch	0	0	0 / 0			
Twin Creek	817	817	0 / 0		355 psi	8.3 ppg
Gypsum Springs	2350	2350	0 / 0		1020 psi	8.3 ppg
Nuggut**	2625	2625	0 / 0	sweet	1139 psi	8.3 ppg
Ankareh	3850	3856.3	13.5/10.07		1671 psi	8.3 ppg
Thaynes	5525	5606.3	17/10.07		2398 psi	8.3 ppg
Fault	6950	8981.9	17/10.07		3016 psi	8.3 ppg
Thaynes	6950	8981.9	17/10.07		3016 psi	8.3 ppg
Woodside	8760	8989.1	17/10.07		3802 psi	8.3 ppg
Dinwoody**	9375	9632.2	17/10.07	2%	4069 psi	8.3 ppg
Phosphoria	10025	10311.9	17/10.07		4351 psi	8.3 ppg
Weber	10475	10782.5	17/10.07		4546 psi	8.3 ppg
Mission Canyon*	11330	11676.6	17/10.07	5%	4917 psi	8.3 ppg
Lodgepole	11940	12314.4	17/10.07		5182 psi	8.3 ppg
TD	11960	12335.4	17/10.07		5191 psi	8.3 ppg

**Primary target formations
*Secondary target formation

Casing Design				
Hole Size	17 1/2"	12 1/4"	8 1/2"	6 1/8"
Hole Depth	0-1500 ft	0-4000 ft	3800-10450 ft	10300-12335 ft
Casing Size	13 3/8"	9 5/8"	7"	5" flush joint
Drift				
Casing Weight	68 lb/ft	43.5 lb/ft	26 lb/ft	18 lb/ft
Casing Grade	K-55	L-80	L-80	L-80
Coupling	BTC	LTC	BTC	VAM FJL
Burst Pressure	3450 psi	6330 psi	7240 psi	10140 psi
Collapse Pressure	1950 psi	3810 psi	5410 psi	10490 psi
Pipe Strength	1069000 LB	691000 LB	604000 LB	422000 LB
Joint Strength				

Directional Profile - HZ Hole						
MD	Inc	Azm	N/S	E/W	Dogleg	Tooface
3179.3	0	0	0	0	0	0
4029.3	17.0 degrees	10.07	123.3	21.9	2 / 100	10.07
12335.4	17.0 degrees	10.07	2514.3	446.3	0 / 100	0.00

See attached directional plan for detailed directional profile

Drilling Fluids		
Surface	0-1500	Gel Chem Vis 33-58 sec/qt, pH 8.0-9.0,
Intermediate Hole #1	1500-4000	Oil Mud 95:5, keep weight below 8.5ppg, LGS <4%
Intermediate Hole #2	4000-10450	Clay free Polymer. Vis 42-57 sec/qt, pH 9.0-9.5 weight 8.5ppg or lower if H2S raise pH to 10.5-11.0
Main production hole	10450-12335	Same as Intermediate hole #2

Geological Evaluation	
Samples	From surface casing to TD full gas chromatograph Mud logging unit from surface to TD
Cores/DST's	Nuggut** 60 ft Core may DST depending on Cores Dinwoody** 60 ft Core

Drilling Superintendent		Drilling Engineer	
Ron MacDonald	Office: 237-1461 Cell:	Rod Schnell	Office: 237-1413 Cell: 813-3041

Logs	
Surface	None
Intermediate	Density-Neutron, Sonic, Resistivity, DiP(see detailed logging prog)
Main	Density-Neutron, Sonic, Resistivity, DiP(see detailed logging prog)
Production	Density-Neutron, Sonic, Resistivity, DiP(see detailed logging prog)



Telephone: 1-403-269-8266 - 24 hrs.

MUD PROGRAM - FORTUNA HOGBACK RIDGE 17-13N-7E (Directional)



March 2, 2007

FORMATIONS NAME	DEPTH (m) TVD MD	MUD TYPE / MUD PROPERTIES	ESTIMATED MUD COST and USAGE	ANSA PROBLEMS	DRILLING FLUID MAINTENANCE AND RECOMMENDATIONS
Wasatch		GEL CHEMICAL Vis: 33-56 sec/qt or as required to clean the hole optimally pH: 8.0 - 9.0 Dens: as low as possible F.L: natural (<15 ml/30 min)	Product Est. Usage Bentonite 300 Soda Ash 3 Sawdust 250 Drilling Detergent 3 Caustic Soda 5 Cellulose 20 Nutshell 20 ESTIMATED COST FOR SURFACE: \$ 4,843.91	Possible gravel and boulders As per two offsets (see attached offset sheet), losses were reported at 249 ft, 276 ft, 298 ft and 1200 ft Minor reaming reported on one offset at 554 ft	Surface Hole - Gel Chemical (17.5" hole, 0 to 1590 ft, 13.375" casing) Clean mud tanks thoroughly and fill 50 to 75% full with water. Check makeup water for Calcium and reduce to less than 60 mg/L with Soda Ash if necessary. Add Bentonite through the hopper at 4 - 6 minutes per sack for an initial funnel viscosity of 38 - 43 sec/qt. For Mud Rings: add 1 - 2 vis cups of Drilling Detergent per connection. For Gravel or Boulders: increase viscosity 19 sec/qt. For Lost Circ: spot LCM pills containing a minimum 0.5 - 1.0 ppg of LCM. Note: Due to the possibility of losses on surface, ProDrill recommends having LCM stocked on location prior to spudding the well.
Twin Creek	817				
Surface Casing	1500				
Gypsum Springs	2350/2350	PRODRILL OIL MUD Oil Water Ratio: ± 95:5 E.S: ≥ 1000 mV Dens: as low as possible or as hole conditions dictate <i>Note: Pressure data from Talisman indicates EMD's of 8.5 ppg for this section of the well. Offset data (see attached sheet) shows that offsets encountered losses when the mud weight exceeded 8.5 ppg.</i>	Product Est. Usage ProMul (20 L) 80 ProVet (20 L) 80 Bentonite #10 (viscosifier) 80 Mix II (seepage losses) 50 Ultrasal 50 Lime 85 Barite (pills) 200 Calcium Chloride 100 Safe Carb (seepage) 50 Sawdust (rig use) 80 Clean Up 2 ESTIMATED COST FOR INT. HOLE #1: \$ 49,555.45 ESTIMATED CONTINGENCY COST FOR INTERMEDIATE HOLE #1: \$ 16,575.80	Offset 24-23N-118W lost 250 bbls at 1519 ft, mud weight was 9.1 ppg (see attached offset sheet) Offset 20-13N-7E lost 140 bbls from 2192 - 2197 ft, mud weight was 9.0 ppg (see attached offset sheet) As per Talisman, the Nugget formation is sweet Minor reaming and cleaning to bottom possible on trips: Offset 24-23N-118W spent 24 hrs reaming at 1526 ft, 1785 ft, 2029 ft and 2882 ft As per Talisman, one core (60 ft) to be cut in the Nugget formation Offset 17-13N-7E spent 260 hrs reaming in the Nugget formation (see attached offset sheet) Deviation problems may be encountered	Intermediate Hole #1 - ProDrill Oil Mud (12.75" hole, 1500 to 4000 ft, 9.625" casing) The first intermediate hole section will be drilled with the ProDrill Oil Mud, a Calcium Chloride Invert. As more volume is required for increased hole volume or to replace mud lost to seepage, new mud from storage or straight Distillate 622 should be added to the main system slowly over a number of calculations to obtain an even blending and a minimum of rheology changes. Keep tanks well agitated at all times, since the emulsified fluid will slowly separate and settle. Note: While waiting on cement, dump and clean the mud tanks thoroughly to make sure no contamination occurs from the surface mud. Prior to drilling out with the Distillate 622, ensure that all the surface handling equipment is properly set-up and running. Drill out, maintaining the following properties: VISCOSITY CONTROL Hole conditions will determine what viscosity and Yield Point parameters are required to obtain optimum hole cleaning. In order to maximize penetration rates, it is suggested to initially maintain funnel viscosities in the 38 - 40 sec/qt. Maintain or increase the Yield Point with additions of Bentonite #10. DENSITY CONTROL and ABNORMAL PRESSURES Maintain the mud weight as low as possible or as hole conditions dictate. Pressure data from Talisman indicates that overpressures are not expected (EMD = 8.5 ppg). Area wells show that losses were encountered when the mud weight exceeded 8.5 ppg. Therefore, safe drilling practices should be strictly adhered to when drilling into and through the potential production zones and ensure all solids control equipment are running efficiently. Weighting Up the ProDrill-Oil Mud System (IF REQUIRED) The following procedures should be followed if weighting up becomes necessary. 1) Ensure that the Yield Point of the active system is > 6 lbf/100 ft ² with additions of Bentonite #10. ProDrill's field representative will advise the rig crews on specific amounts. 2) Once the Yield Point is at the desired level, mix Barite as required to achieve the necessary fluid density. ProVet will be added at 1 gal / 0.13 ppg the density is increased with Barite. HIGH TEMPERATURE HIGH PRESSURE FLUID LOSS CONTROL The high temperature / high pressure fluid loss will be controlled at 10-15 ml/30min by maintaining the emulsion stability of the invert at ≥ 1000mV or above and additions of seepage loss products (i.e. Safe Carb, Gilsonite, UltraSeal, Sawdust and Mix II). The ProDrill field representative will advise the rig crews on the appropriate additions if deemed necessary. OIL WATER RATIO Maintain the Oil/Water Ratio at ± 95/5 as drilling proceeds. Add straight Distillate or water as required. PHASE STABILITY Maintain the emulsion stability of the invert ≥ 1000mV. The ProDrill field representative will indicate if ProMul additions are required. If any free water is noted in the HTHP filtrate, additional ProMul should be added to the system. CALCIUM CHLORIDE Maintain the Chloride level of the internal phase water at 250,000 ppm with additions of Calcium Chloride. ProDrill's field representative will advise on the necessary additions.
Ankareh	3850/3850.3				
Int. Casing Point #1	4000				
Theynea	5525/5600.3	PRODRILL CLAY FREE H.T.H.P: 10 - 15 ml/30 min LGS: < 4% PV: 4 - 12 cp YP: 9 - 8 lb/100H ²	Product Est. Usage Ultrapac 150 Stardril 300 Caustic Soda 75 Soda Ash 5 Ultrasal 50 Kelzan XCD 60 Desco CF 4 Bentonite 50 Safe Carb (leaked) 300 Sodium Bicarbonate 20 ESTIMATED COST FOR INT. HOLE #2 & MAIN HOLE: \$ 105,131.43 ESTIMATED CONTINGENCY COST FOR INTERMEDIATE HOLE #2 & MAIN HOLE: \$ 9,458.86 ESTIMATED TOTAL WELL COST w/o CONTINGENCIES: \$ 199,441.79	Offset 17-13N-7E spent 224 hrs reaming in the Theynea formation (see attached offset sheet) Offset 20-13N-7E lost 30 bbls at 4020 ft (see attached offset sheet) Offset 20-13N-7E lost 75 bbls at 9578 ft (Dimwoody) - see attached offset sheet As per Talisman, H ₂ S is expected in the Dimwoody (2%) and Mission Canyon (5%). Offset 24-23N-118W spent 220 hrs reaming in the Weber formation (see attached offset sheet)	Intermediate Hole #2 - ProDrill Clay Free (8.75" hole, 4000 to 10450 ft, 7.9" casing) Main Hole - ProDrill Clay Free (6.125" hole, 10450 to 12335 ft (MD): 6.9" casing or Openhole) NOTE: It is recommended to drill out the shoe with water. Once through the shoe begin mud-up operations. In preparation for mud-up, it is recommended to have the mud premixed in the rig tanks prior to mud-up. This will ensure that the polymers are fully hydrated. NOTE: If possible, use the mud from the intermediate section to drill the main hole section. VISCOSITY CONTROL Hole conditions will determine what viscosity and Yield Point parameters are required to obtain optimum hole cleaning. If it becomes necessary to raise the Yield Point for hole cleaning, do so with Kelzan XCD. pH CONTROL To help maintain stable hole conditions and to minimize hole washout, a maximum pH of 9.5 is recommended. If H ₂ S is detected increase the pH to 10.5 - 11.0 with additions of Caustic Soda. If adding Caustic Soda do so slowly. DENSITY CONTROL As per offsets (see attached offset sheet), the mud weights did not exceed 9.2 ppg. Pressure data from Talisman does not indicate the need for mud weights to exceed 8.5 ppg. Therefore, ensure safe drilling practices are strictly adhered to when drilling into and through the potential production zones. As a contingency, ProDrill suggests stocking Safe Carb and Barite on location if weighting up is required. FLUID LOSS CONTROL Once mud-up, the fluid loss will be lowered & maintained in the 8.0 ml/30 min range. Ultrapac and Stardril will be mixed as required. FOR LOGGING A funnel viscosity ≥ 85 sec/qt is recommended for logging. If required small amounts of polyhydrated bentonite can be used to increase viscosity for logging.
Woodside	8790/8989.1				
Dimwoody*	9375/9633.2				
Phosphoria	10025/10311.9				
Int. Casing Point #2	10450				
Weber	10475/10792.5				
Mission Canyon**	11330/11678.4				
Lodgepole	11940/12314.4				
Total Depth	11980/12335.4				
* Primary Target * Secondary Target					
Lithology Sandstone / Siltstone Limestone Dolomite Anhydrite Shale Chert					
F.L: 8.0 ml/30 min to minimize the potential for differential sticking Rheology: P.V: 10 - 20 cp Y.P: 10 - 20 lb/100H ²					

OFFSET INFORMATION

PROPOSED LOCATION: FORTUNA HOGBACK RIDGE 17-13N-7E
TVD: 11980 ft / MD: 12335.4

OFFSETS

- American Quasar Petroleum Hogback Ridge 17-13N-7E (Mar/78) TD: 10737ft Total Days: 123 (Drilling Record reviewed)
- American Quasar Petroleum Hogback Ridge 20-13N-7E (Jan/77) TD: 10910ft Total Days: 224 (Well History reports reviewed)
- Chevron Bear Canyon 24-23N-118W (Sept/80) TD: 18329ft Total Days: 272 (Drilling Record reviewed)
- Exxon Rockslide Unit #1 12-23N-118W (Sept/89) TD: 16760ft Total Days: 152 (Drilling Record reviewed)

SEE ATTACHED OFFSET SHEET FOR MORE INFORMATION ON THE ABOVE MENTIONED WELLS

LOST CIRCULATION GUIDELINES

PREVENTATIVE LCM
Add 1 sack of Ultrasal XP at 1 sack/hour.
Note: If hole is tight on connections add 2 sacks of Ultrasal XP at 20 min/sack (Confirm with the ProDrill field representative)

LOST CIRCULATION PILL FORMULATIONS
Minor Losses: (0.8 - 1.3 Bigal LCM pill)
Severe Losses: (2.1 - 2.5 Bigal LCM pill)

4 parts Safe Carb (sized)
2 parts Ultrasal

For minor losses:
-spot pill
-calculate LCM through the mud system

For severe losses:
-trip in with open-ended drill pipe
-spot pill
-pump coarse bridging material first, followed by sealing material

(Confirm with the ProDrill field representative)

IF THE ABOVE PROCEDURES ARE INEFFECTIVE IN CURING LOSSES, DISCUSS WITH TALISMAN PERSONNEL REGARDING PUMPING CEMENT PLUGS.

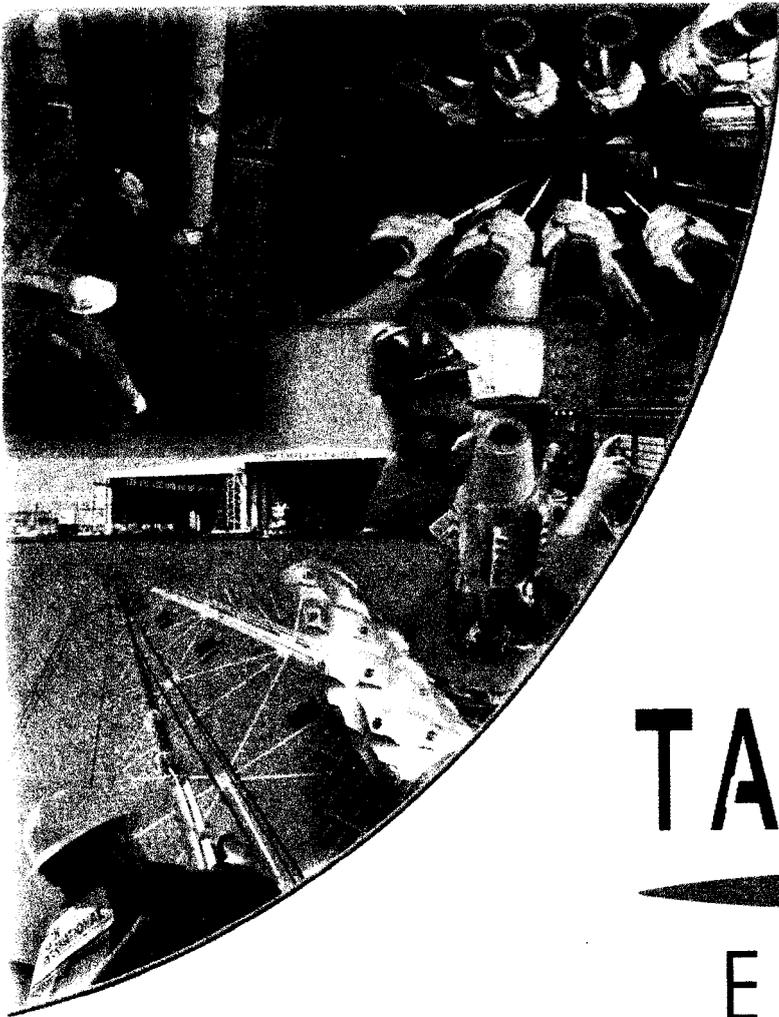
ACCOUNT REPRESENTATIVE: COLIN MANN
PHONE: (403) 269-8250 / FAX: (403) 269-8277

OPERATIONS: BRIAN LARKHAM
PHONE: (403) 269-8266

DRILLING FLUIDS PROGRAMMER: RUSS LILJA
PHONE: (403) 269-8260 / FAX: (403) 269-8277

WAREHOUSE: RED DEER, AB
PHONE: (403) 885-5151 FAX: (403) 885-5454

WAREHOUSE: FEDERAL - EVANSTON, WY
PHONE: (307) 789-0908



SMITH SERVICES

COMPLETION SYSTEMS

TALISMAN

ENERGY

Technology

Liner Proposal

Customer Name: Talisman Energy
Well Name: Fortuna (US) LP-Rich County Utah Hogback 17-13N-7E
Prepared For: Mr. Rod Schnell
Quotation #: 07235-PSH-DK

Customer: **Talisman Energy**
 Attention: **Mr. Rod Schnell**
 Date: **April 27, 2007**

 Quote No: **07235-PSH-DK**
 Procedure No:

Proposed Liner System

Run, hang and cement ~6650ft of 7" 26# BTC liner casing in a 8.5" directional well bore, with a hydraulic set Rotating Pocket Slip hanger system. System includes an integral 10' tieback receptacle and high pressure anti-swab liner top packer element rated up to 10,000psi at 350°C.

Well Data

Well Name:	Fortuna (US) LP – Rich County, Utah, Hogback Ridge 17-13N-7E	
#1 Liner Specs:	3,800' – 10,450'	7" 26# L-80 BTC
Intermediate Specs:	0 – 4,000'	9.62" 43.5# L-80 LTC
Total Depth:	10,450' MD	
Open Hole Size:	8.5"	

Section A: Equipment Purchase

Item	Description Hydraulic set Rotating Pocket Slip Liner Hanger	Total
1	7" 26# x 9.62" 43.5# P-110 Model PSHR rotating hydraulic set pocket slip hanger - hydraulic and mechanical setting capabilities - recessed flush pocket slips	\$10,750.00
2	7" 26# x 9.62" 43.5# L-80 Model FSP pocket slip integral liner top packer & tieback receptacle - 10' TBR - 7.25" ID on TBR - self energizing, non-extruding element	\$16,825.00
3	7" 26# L-80 BTC Model PSRT Retrievable Cement Bushing sub - RCB cementing profile - honed seal bore to maximize seal pressure performance	\$2,725.00
4	7" 26# L-80 BTC Model BC ball catch landing collar - complete with shear down assembly and plug receiver landing collar. - ball catch seat for setting of hanger	\$3,665.00
5	Model SB hydraulic setting ball	\$150.00
6	7" 26# L-80 BTC Model 402 float collar. - Sure-Seal spring loaded cement set poppet valve.	\$675.00

Customer: **Talisman Energy**
Attention: **Mr. Rod Schnell**
Date: **April 27, 2007**Quote No: **07235-PSH-DK**
Procedure No:**Section C: Accessory Equipment - if required**

Item	Description	Total
1	Model CFS plug launch indicator flag sub for the cement head (rental) 4.5" IF	\$290.00/job
2	Drill Pipe Rabbit (drift)	\$50.00/job
3	Pal-mix 110-R	\$130.00/ltr
4	Thread lock kit purchase	\$40.00/ea
5	A seal replacement and rental re-dress charge will be applicable following the completion of each job.	\$600.00/job
6	A thread inspection charge per connection will be applicable following the completion of each job.	\$55.00/ea
7	An assembly charge is applicable for liners assembled and not run.	\$ 800.00

Section D: Service Charges

1	Operator's supervision for liner installation; per supervisor	\$1,750.00/day
2	Operator's subsistence	N/C

COMPLETION SYSTEMS1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077Customer: **Talisman Energy**
Attention: **Mr. Rod Schnell**
Date: **April 27, 2007**Quote No: **07235-PSH-DK**
Procedure No:**Section E: Additional Notes and charges if applicable**

- Please allow a minimum of **5 weeks** for delivery of the liner system.
- All handling tools, slip elevators etc. supplied by Smith will be invoiced at published prices plus 25%
- Equipment manufactured with premium connections cannot be returned for credit.
- Additional cross over subs may be needed to match equipment to customer drill string. These cross over subs will be invoiced accordingly
- Overtime charges may be incurred for premium connections that are cut during overtime hours.
- Overtime charges may be incurred for jobs assembled during overtime hours.
- All liner systems 7" or larger must be transported to the rig by a third party transportation company
- Our general terms and conditions are attached for your review.
- **Our Operations personnel can be reached at 307-472-1011.**

We thank you for the opportunity to submit this pricing quotation and proposal and look forward to working with you on the completion of this project. Please contact me at **403-585-8771** if you have any questions or concerns.

Per:

Dave Kemick
Completion Systems
Smith Services

Fortuna (US) LP

Hogback Ridge

17 – 13 N – 7 E

Rich County, Utah

Sour Gas Well

Emergency Response Plan

(Addendum to H₂S Contingency Plan)

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Table of Contents

1.0 Introduction

2.0 Program and Well Specific Information

- 2.1 Well Drilling and Completion Information**
- 2.2 On-Site Personnel**
- 2.3 Communication Equipment**
- 2.4 Emergency Planning Zone (EPZ)**
- 2.5 Area Land Use and Public Information**
- 2.6 Directions to Well Location**
- 2.7 Well Location Survey Plan**
- 2.8 Emergency Response Map for EPZ**

3.0 Emergency Preparedness

- 3.1 Purpose**
- 3.2 Emergency Response Documents**
- 3.3 Public Safety and Emergency Planning Zone (EPZ)**
- 3.4 Well Location Safety and Emergency Equipment**
- 3.5 Training**

4.0 Operations Personnel Responsibilities

- 4.1 Purpose**
- 4.2 Plan/Response Activation**
- 4.3 Personnel Responsibilities**

5.0 Command Organization and Responsibilities

- 5.1 Command and Control**
- 5.2 Command Organizational Overview**
- 5.3 Organizational Responsibilities**
- 5.4 On-Scene Command Post**
- 5.5 On-Scene Command Roles and Responsibilities**

6.0 Emergency Classifications

- 5.1 Purpose**
- 5.2 Level of Emergencies**

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

7.0 Notification and Communication Process

7.1 Protocol

7.2 Table 1: Notification/Communication for Emergencies

8.0 Emergency Response Action Plan

8.1 Overall Response Action Plan

8.2 Injury/Fatality Response Plan

8.3 Public Protection Action Plan

8.4 Ignition Action Plan

9.0 Contact Information/Telephone Numbers

9.1 Fortuna

9.2 Government/Regulatory Agencies

9.3 Contractors/Service Company

10.0 Safety Equipment

11.0 Forms

12.0 Survey Plans and Map

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

1.0 Introduction

It is the policy of Fortuna (US) LP “Fortuna” to provide a safe and healthy work environment for all its employees as well as contractors that work on Fortuna (US) LP leases. It is Fortuna’s intent to protect from harm any neighboring Public to any well operational activities.

The following is a Sour Gas Emergency Response Plan (ERP) for the Fortuna (US) LP 17 – 13N – 7E well. The ERP document provides the personnel working on the project directions on what emergency response process and actions to follow in the event of an emergency situation including a well control problem that could lead to an uncontrolled gas release. Personnel with response roles must review and be familiar with their response duties as well as the emergency safety equipment.

All personnel and visitors on site need to be familiar with the potential hazards and emergency warning system on site and be familiar with what protective actions and/or response action might need to be taken in the event of an emergency situation.

The purpose of this plan is to act as a guideline for personnel working on the wellsite in the event of potential or actual sour gas release and to comply with the “Onshore Oil and Gas Order # 6, Hydrogen Sulfide Operations”.

The Site Specific well ERP will be supported by Fortuna (US) LP Corporate ERP.

Terminology

- Sour Gas is also referred to as Hydrogen Sulfide Gas or H₂S Gas

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

2.0 Program and Well Specific Information

2.1 Well Information

- Classification: H₂S Gas Well:
-
- Target Formation (s): Dinwoody

- Maximum H₂S Concentration:
 - Weber up to 21.5%

- Sour Gas Formation Names and H₂S Concentration:

○ Dinwoody	02.00%
○ Phosphoria	12.59%
○ Weber	21.5%
○ Mission Canyon	19.5%
○ Lodgepole	Not expected to be productive

- Total Maximum H₂S Release Rate: 2.48 m³/sec

- True Vertical Depth: 11960 Feet (Estimated)

- Measure Hole Depth: 12,335.4 Feet (Estimated)

- Rig Move Date: Early November

- Drilling Spud Date: Mid November (Approximately)

- Drilling Rig: TBD

- Drilling Program Duration: TBD Days (Estimated)

- Number of Days in H₂S Formations +/- 30 Days

- Completion Date: TBD

- Completion and Testing: TBA

- Completion Program Duration: TBA

(TBA=To Be Announced, TBD=To Be Determined)

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

2.2 On-Site Personnel

On-Site Personnel numbers may vary but at a minimum while drilling and working in the sour formation will include the following:

Position	Numbers
Drilling On-Site Supervisor	1
Tool-Pusher	1
Rig Crew	5
Geologist	1
Drilling Mud Technician	1
Safety Representative(s)	1

2.3 Communication Equipment

Wellsite will be equipped with satellite phone(s) as cell communication is limited in certain areas. On-Site Supervisor vehicle could also be equipped with satellite phone.

Cell phones will also be available on site but user will have to travel down the access road to receive a signal

2.4 Emergency Planning Zone (EPZ)

The Emergency Planning Area/Emergency Planning Zone is 2.66 Miles, which defines the 100-ppm H₂S radius around the wellsite.

The EPZ is:

- Calculated for a continuous, un-ignited release of sour gas at the highest release rate formation
- The area within pre-defined radius around the well that could be affected by a sour gas release.
- The area that will be managed under unified command for Public safety and could require restricting access to the area by roadblocks, sheltering or evacuation.
- Pre-determined area of planning where the Public use, residence and facilities locations within the area has been pre-determined.

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

Emergency Planning Zone (EPZ) (Cont'd)

Area of actual impact from Hydrogen Sulfide (H₂S) or Sulfur Dioxide (SO₂) can verify and has to be determined by gas monitoring. Concentration levels will vary depending on actual release rates, H₂S concentration, terrain/topographic features, atmospheric conditions, and wind direction.

If the sour gas releasing from a well is ignited than the potential risk to Public and responders health is the SO₂ concentration.

2.2 Area Land Use and Public Information

Primary land use within the EPZ is for grazing leases and recreational use by the Public.

Public Conditions:

None of the following conditions apply as per Onshore Oil and Gas Operations Order # 6; Hydrogen Sulfide Operations, Public Protection Applicable Criteria

- a. The 100 ppm radius of exposure is greater than 50 feet and includes any occupied residence, school, church, park, school bus stop, place of business, or other areas where Public could reasonably be expected to frequent; or
- b. The 500 ppm radius of exposure is greater than 50 feet and includes any part of a Federal, State, County, or municipal road or highway owned and principally maintained for Public use; or
- c. The 100 ppm radius of exposure is equal to or greater than 3,000 feet where facilities or roads are principally maintained for Public use

2.3 Directions to Well Location

Well is located in the NE corner of Utah in Rich County.

Directions to location are from Evanston, Wyoming, traveling north on Highway # 16 40.5 miles across Utah State Line to the Sage Creek Junction/Highway # 30 intersection. Continue North on Highway # 16 for 5.1 miles and turn right or westerly direction on to gravel road. Drive 4 miles and enter onto lease road and travel approximately 2 miles to Hogback Ridge well location.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

2.4 Well Site Survey Plan and Top Map
(See Section 12: Survey Plans and Maps)

2.5 Emergency Response Map for the EPZ Area
(See Section 12: Survey Plans and Maps)

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

3.0 Emergency Preparedness

3.1 Purpose

Preparedness means any and all measures taken to prevent, prepare for, respond, mitigate, and recover from an emergency, crisis incident, and/or accident.

This Preparedness section will focus on the step to be taken to prepare for and be ready to manage operational potential emergencies situations with an effective response. The steps to be managed in this section will support the readiness and effectiveness of the Response Action Plans outline in the following section.

3.2 Emergency Response Documents

Have the following documents on the jobsite/wellsite for reference and training purpose.

- Hogback Ridge Emergency Response Plan (ERP)
- MSDS' forms for all controlled products on site

3.3 Public Safety and Emergency Planning Zone (EPZ)

Personnel working on and traveling to and from the location need to assist in Public Protection by being aware of the Transient (Public recreational users, and industry) activities both on roads and off-road areas within the Emergency Planning Zone (EPZ).

A gate will be located at the start of the lease access road and will be locked to prevent Public from using road.

The Public activities should be monitored daily before entering and while drilling or working in the sour formation that could result in exposures off site in the event of a sour gas release.

The Emergency Planning Zone may be varied in radius size depending on the formations potential release rate and sour gas content. For this location the maximum EPZ is 2.66-mile radius and includes the area with this radius.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

3.4 Well Location Layout and Safety Setup

1. All respiratory protective equipment and H₂S detection equipment will be rigged up prior to 1000 feet above the first anticipated sour zone. The rig crews and other service personnel will be trained prior to this time. All rig crews will be trained and all safety equipment in place and functioning, (See section: 3.5 Training)
2. The drilling rig will be situated on location to allow for the prevailing winds to blow across the rig toward the circulation tanks or at right angles to the lines from the Blowout Preventer (B.O.P.s) to the circulation tanks.
3. The entrance to the location is designed so that it can be barricaded if a hydrogen sulfide emergency condition arises. An auxiliary exit route will be available so that in case of emergency, a shift in wind direction would not prevent escape from the location.
4. A minimum of 2 safe briefing areas (SBA) shall be designated for assembly of personnel during emergency conditions. These will be located at least 150 ft. or as practical, from the wellbore and in such a location that at least one area will be upwind of the well at all times. Upon recognition of an emergency situation, all personnel will be trained to assemble at the designated briefing area for instructions.
5. Smoking areas will be established and "No Smoking" signs will be posted around the location.
6. Reliable 24 hour telephone communications will be available at the drilling foremen's office.
7. A mud-gas separator will be rigged up and manifold to the choke system.
8. All equipment that might come in to contact with hydrogen sulfide - drill pipe, drill stem test tools, blowout preventers, casing, choke system will meet Fortuna (US) LP metallurgy requirements for H₂S service.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Well Location Layout and Safety Setup (Cont'd)

9. The drilling rig will have a continuous electronic H₂S detection system that automatically will activate visible and audible alarms if hydrogen sulfide is detected. The visible light will activate if 10 ppm H₂S is present. The audible siren will activate if 15 ppm H₂S or higher concentration is present. There will be at least 4 H₂S sensors in place on the drilling rig. They will be located to detect the presence of hydrogen sulfide in areas where it is most likely to come to surface. The sensor head locations will be: 1) rig floor by driller's console, 2) substructure area near the bell nipple, 3) the shale shaker, 4) the mud mixing area. Additional sensors will be positioned at the discretion of the drilling foreman. At least 1 light and 1 siren will be placed on the rig to indicate the presence of hydrogen sulfide. The light and siren will be strategically placed to be visible to all personnel on the drill site. Additional alarm lights & sirens may be added to ensure that all personnel on the drill site are able to notice the alarms at any time.

10. The H₂S detection equipment will be calibrated as recommended by the manufacturer. Calibration records will be maintained on location.

11. At least 4 windsocks will be placed around the drill site to ensure that everyone on the drilling location can readily determine wind direction. One windsock will be mounted on or near the rig floor to be readily visible to rig crews when tripping pipe.

12. All respiratory protective equipment will be NIOSH/MSHA approved positive pressure type and maintained according to manufacturer's guidelines. All breathing air used for this equipment will be Compressed Gas Association (CGA) type Grade D type breathing air.

13. Both 30-minute self-contained breathing apparatuses (SCBA) and workline units with escape cylinders will be available on location. There will be sufficient numbers of this supplied air breathing equipment on location to ensure that all essential personnel on location have 1 piece of equipment available to them. All respiratory protective equipment will use nose cups to prevent fogging in temperatures below 32 F. Spectacle kits will be available for personnel that require corrective lenses when working under mask.

14. Electric explosion- proof ventilating fans (bug blowers) will be available to provide air movement in enclosed areas where gas might accumulate.

15. H₂S drills will be conducted at least weekly to ensure that all well site personnel are competent in emergency donning procedures. These drills will be recorded in the driller's log, as well as in the safety trailer logbook.

16. Electronic voice-mikes will be available upon request for essential personnel to use when working under mask to facilitate communication.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Well Location Layout and Safety Setup (Cont'd)

17. Additional breathing equipment will be provided upon request for non routine operations that require additional service personnel on the well location to ensure that all personnel on the well location have a dedicated supplied air respirator.

18. Location access will be monitored and controlled during "non-routine" operations such as perforating, pressurized pumping, and well testing. The number of personnel on location will be restricted to "essential" personnel only.

19. The site set up and equipment will comply with the Onshore Oil and Gas order #6, Hydrogen Sulfide Operations

20. Workers on site have access to the color flag warning system to be set up in the event of an emergency situation and is used to notify personnel approaching the drill site to warn of operating conditions on the wellsite and access restriction. System is in compliance with BLM Order #6. Hydrogen Sulfide Operations.

Flag meaning:

Green Flag - Potential Danger

Yellow Flag – Moderate Danger

Red Flag – Extreme Danger/ Do not approach if red flag is flying.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

3.5 Training

All personnel who come onto the location must be properly trained in hydrogen sulfide, nitrogen, oxygen deficient atmospheres safety. The personnel shall carry documentation with them indicating that the training has occurred within the previous 12 months. All training will comply with federal and state regulatory guidelines.

Training topics shall include at a minimum:

1. Hazards and characteristics of hydrogen sulfide, nitrogen, and oxygen deficient atmospheres and symptoms of exposure to these gases.
2. Proper use, care and limitations of respiratory protective equipment with hands on practice.
3. Use of both fixed and portable detection toxic gas equipment.
4. Work practices to reduce opportunities for toxic gas exposure as well as confined space procedures.
5. First aid for toxic gas exposure and resuscitation equipment
6. The Buddy System
7. Flag Warning System
8. Site Emergency warning system/Sirens
9. Emergency evacuation procedures/Muster Point Location
10. A review of the emergency response plan for the well

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

4.0 Operations Personnel Responsibilities

4.1 Purpose

In order to assure proper execution of the emergency response plan, it is essential that the Fortuna (US) LP On-Site Supervisor, Drilling and Completion Representatives and Personnel are aware of their operational responsibility as it relates to potential emergency situations and response requirements.

4.2 Plan/Response Activation

Supervisor(s) are clear on who has the authority to activate the ERP. The Fortuna (US) LP On-Site Supervisor or designate will activate the ERP and will assume the role of On-Scene Commander.

Fortuna On-Site Supervisor/Representative or alternates:

1. Fortuna (US) LP representative on location – if unable to perform his/her duties
2. Alternate Fortuna (US) LP representative - if unable to perform his/her duties
3. Rig Tool-Pusher/Supervisor –if unable to perform his/ her duties
4. Safety consultant representative- if available

4.3 Personnel Responsibilities

A. All Personnel

1. Always be alert for possible H₂S alarms- both audible and visual.
2. Be familiar with location of Safe Briefing Areas (SBA) and protective breathing equipment.
3. Develop a continuous awareness of wind direction. Be aware of prevailing wind direction as well as nearby uphill areas, should there be no wind.
4. Familiarize yourself with nearest escape routes for safe evacuation
5. Should H₂S alarm sound, DON'T PANIC - Remain calm and follow instructions of person in charge.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

All Personnel (Cont'd)

6. If the H₂S alarms sound:

- a) Essential personnel shall don the appropriate respiratory protective equipment and follow company procedures. Essential personnel will continue to wear respiratory protective equipment until the area is deemed safe (H₂S concentration less than 10 PPM).
- b) Non-essential personnel shall evacuate to the appropriate safe briefing area using escape-breathing systems. Wait there for further instructions from Fortuna (US) LP drilling representative.
- c) Initiate rescue protocol if necessary - following training procedures.

B. Fortuna (US) LP Foreman

1. The Fortuna (US) LP Supervisor will confirm that all personnel on location at any time are trained in H₂S safety and aware of above list of duties.
2. The Fortuna (US) LP Supervisor will ensure that all personnel observe all safety and emergency procedures.
3. The Fortuna (US) LP Supervisor will make an effort to keep the number of personnel on location to a minimum and to ensure that only essential personnel are on location during sour gas and critical operations.
4. Should an emergency situation exist, the Fortuna (US) LP foreman will:
 - a) Assess the situation and advise all personnel by appropriate means of communication.
 - b) Be responsible for determining that the extreme danger condition is warranted and the red flag shall be posted at location entrance.
 - c) Go to safe briefing area and give clear instructions relative to hazard on location, and actions for personnel to follow.
 - d) Notify company and regulatory groups of current situation outlined in company protocol. Follow appropriate emergency procedures for emergency services notification.
 - e) Instruct Toolpusher/Rig Supervisor to take action to control and reduce the H₂S hazard.
 - f) Ensure that essential personnel are properly protected with supplied air breathing equipment and that non-essential personnel are in a "poison gas free" area.
 - g) Be responsible for authorizing evacuation of persons/ residents in the area surrounding the drilling location.
 - h) Commence on any ignition procedures if ignition criteria are met.
 - i) Assume the role of the On-Scene Commander.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

C. Rig Supervisor- Tool-Pusher

1. If the Fortuna (US) LP foreman is unable to perform his/ her duties, and the alternate foreman is unable or unavailable to perform his duties, the drilling rig tool-pusher will assume command of wellsite operations and all responsibilities listed above for drilling foreman.
2. Ensure that all rig personnel are properly trained to work in H₂S environment and fully understand purpose of H₂S alarms, and actions to take when alarms activate. Ensure that all crew personnel understand the buddy system, safe briefing areas, and individual duties as well as emergency evacuation procedures.
3. Should an extreme danger operational condition arise, the rig tool-pusher shall assist the Fortuna (US) LP foreman by:
 - a) Proceeding to the rig floor and assist in supervising rig operations.
 - b) Ensure that only essential working personnel remain hazardous area.
 - c) Ensure that all crewmembers that remain in hazardous area, wear respiratory protective equipment until notified that area is clear of "toxic" gases.
 - d) Assign rig crewmember or other service representative to block entrance to location. No unauthorized personnel will be allowed entry to location.
 - e) Help to determine hazardous "danger zones" on location using portable detection equipment and position electric fans to move gas in any high concentration areas.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

D. Safety Consultant

1. During normal operations (no H₂S present), the safety consultant will be responsible for the following:
 - a) Ensure that all wellsite safety equipment is in place and operational.
 - b) Ensure that all wellsite personnel are familiar with location safety layout and operation of all safety equipment.
 - c) Assist the Fortuna (US) LP foreman in performing weekly H₂S drills for location personnel.

2. When an operational condition is classified as extreme danger, the safety consultant will be responsible for the following:
 - a) Account for all wellsite personnel
 - b) Assess any injuries and direct first aid measure.
 - c) Ensure that all safety and monitoring equipment is functioning properly and available.
 - d) Monitor the safety of wellsite personnel
 - e) Maintain a close communication with Fortuna (US) LP foreman.
 - f) Be prepared to assist Fortuna (US) LP foreman with support for rig crew or other personnel using breathing equipment.
 - g) Be prepared to assist Fortuna (US) LP foreman with emergency procedures including possible well ignition.
 - h) Be prepared to assist with the evacuation of any area residents; or other personnel working in the immediate area.
 - i) Be prepared to assume role as Site Safety as part of the response organization
 - j) Have gas monitoring and SCBA equipment ready and be prepared to assist with implementing a safe ignition if required.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

E. Off-Site Manager (Drilling or Completion)

1. The Fortuna (US) LP Off-Site Manger will be responsible for notifying and maintaining contact with Drilling/Completion Manager as well as other company supervisory personnel.
2. Maintain communication with the Fortuna (US) LP foreman to proceed with any other assistance that might be required.
3. Travel to wellsite if appropriate.
4. Assist Fortuna (US) LP foreman with all other notifications - both company and regulatory.

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

5.0 Command Organization and Responsibilities

5.1 Command and Control

The Fortuna command and control system follows the criteria similar to the Incident Command System (ICS):

- An all-risk system that is flexible and adaptable to any level of emergency.\
- Assigns overall authority to one individual
- Provides structured authority, roles and responsibility during emergencies
- Consist of actions that provide command and control of personnel, facilities, equipment and communication
- Designed to be activated for all emergencies, regardless of size, from the time an incident occurs until the requirement for management and operations no longer exists
- Can be expanded or contracted depending on the changing conditions of the emergency
- Fortuna Site Forman in the event of an emergency situation assumes the role On-Scene Commander and takes command and control of the Command Post and response requirements

5.2 Organizational Overview

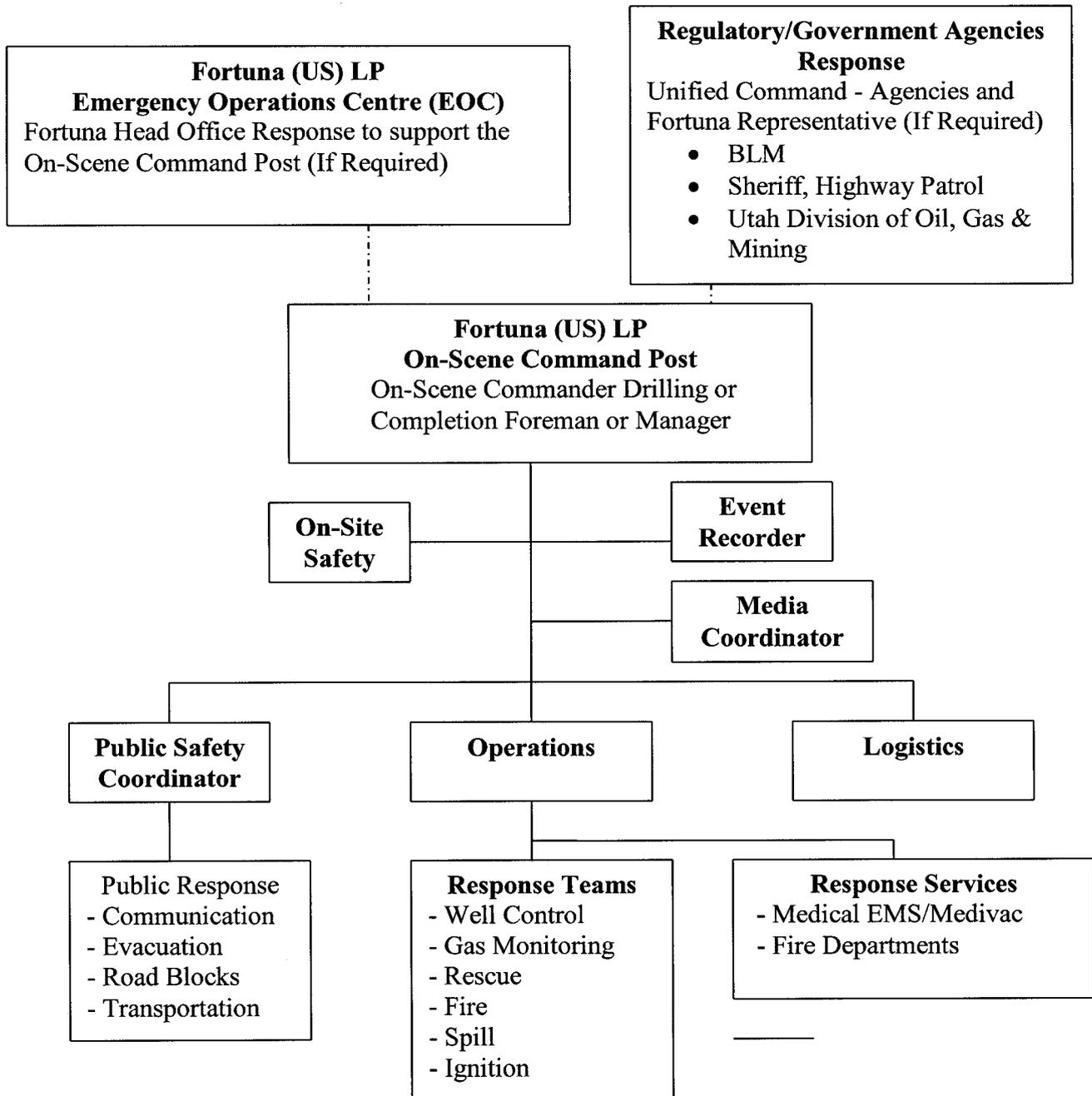
Chart 1: Provides an overview of the potential response organization, roles and services that could be activated to support any type of emergency situation that could during drilling and completion operations. (See Chart 1: on next page)

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

Chart 1: Potential Command Organizations for a Sour Gas Well



Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

5.3 Organizational Responsibilities

Fortuna Emergency Operations Centre (EOC)

Provide support to the On-Scene Command Post including technical information, health and safety information, personnel and equipment as required. The Fortuna (US) LP EOC is activated depending on the emergency response requirements. Initially the support is provided by the Fortuna (US) LP Off-Site Manager

Regulatory/Government Agencies Response

Response could be activated to support response requirements off-site or could include the wellsite if the agencies determine the company is not demonstrating a response capable of dealing with the emergency situation.

The agencies work with the industry operator under Unified Command/Joint Command.

The agencies response could include access restriction, highway closures, law enforcement, Public safety (Shelter/Evacuation), medical/medivac service, off site emergencies such as Search and Rescue, Wild Fire Control etc.

5.4 On-Scene Command Post (OSCP)

OSCP is established by the On-Scene Commander and is the location of the On-Scene Command and Control Organization. The OSCP is located in a safe secure area near the incident site.

It has the responsibility to manage all on-scene tactical response actions.

There can be only one OSCP to provide a safe centralized location to manage the emergency incident under a unified/joint command system with appropriate government agencies.

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

5.5 On-Scene Command Roles and Responsibilities

On-Scene Commander (OSC)

The Drilling or Completion On-Site Supervisor assumes the On-Scene Commander (OSC) role. For a Level II or III emergencies the Off-Site Manager could be activated to site to take over the OSC role and allow the Drilling or Completion to focus on well control issues.

The On-Scene Commander (OSC) is responsible to manage the On-Scene Command Post (OSCP) activities and the implementation of a safe and effective on-scene tactical response.

- Assess Situation
- Assign reconnaissance of incident
- Classifies incident as Alert or Level I, II or III
- Makes appropriate internal and external notification
- Establishes OSCP in a safe location near incident site
- Establishes a safe staging area
- Appoints a Safety Person
- Assign personnel i.e. rig crew to continue with source control such as managing the well control situation.
- Appoint Command Staff and co-ordinate staff activities
- Establish Unified/Joint Command with government agencies
- Conduct scheduled briefing session with Command Staff and the Head Office EOC Command or Off-Site Manager
- Ensure adequate planning meeting are conducted
- Ensure completion of Site Specific Safety Plan
- Develop and Incident Action Plan
- Initiates/approve request for resources, personnel and equipment, early on to address potential emergency situations
- Initiate Public communication and safety response
- Ensure adequate air monitoring capability
- Address media requirements with Off-Site Manager and/or Public Affairs Representative.

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

Safety

The On-Site Safety Person will be assumed by the Safety Representative. This position could be complemented with the Fortuna (US) LP safety person if activated to site.

The On-Site Safety Person responsibility is to focus on the safety aspects of the response and monitors and corrects unsafe acts including halting unsafe activities if necessary.

- Obtain briefing from OSC
- Keep OSC updated on activities
- Attend Briefing and Planning sessions Review Incident Action Plan from a safety perspective
- Identify hazards and hazardous situation
- Identify unsafe situations
- Stop unsafe acts/responses
- Establishes hazard zones, access and egress routes and alternate muster points
- Ensure scene integrity is maintained for follow up investigation(s)
- Complete and administer the Site Specific Safety Plan
- Maintain a detailed activity log

Event Recorder

The Event Recorder role can be assumed by any person available on site. If no one is available than the OSC completes role as required.

The Event Recorder responsibilities are to document the overall OSCP information including recording of the Command Staff and Head Office EOC briefing sessions. This position is appointed by and reports to OSC.

- Records response information regarding incident details and Command Staff activities
- Support status board and map information
- Maintain a detailed activity log

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

Staging

The Staging Leader role can be assumed by any person available on site and will usually not be activated unless a significant amount of resources (personnel, equipment and/or supplies) have been ordered to site.

The Staging Leader is responsible to manage all emergency stand-by resources located at the staging area.

- Assigned by and obtain briefing from OSC or Operations Section Chief if established
- Establishes staging area and layout
- Initiate staging check in/out logs
- Stages resources in an orderly condition
- Report resource status changes as required
- Direct resources to the scene as requested
- Maintain a detailed activity log

Media Coordinator

The Media Coordinator is usually activated from head office only in the event that the incident/event has local or state news implications.

The Media Coordinator also referred to as the Public Information Officer is a member of the Command Staff and is responsible for all media associated activities.

- Obtain briefing from OSC
- Liaison with Public agency Public Information Officer(s)
- Establish a media reception location if required
- Co-ordinates news media releases and activities with the Head Office Public Affairs Representative.
- Maintain a detailed activity log

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

Public Safety

The Public Safety Coordinator position can be assumed by the geologist or be carried out by the OSC if there is minimum Public activities, residents, and/or facilities near the operating site or within the EPZ area.

The Public Safety Coordinator is responsible for communicating and directing Public response activities. Also to address Public concerns as it relates to their well being and the health and safety issues and to keep On-Scene Commander briefed on activities

- Assigned by and obtain briefing from the OSC
- Co-ordinates activities with potential impacted Public
- Co-ordinates activities with other Public safety government agencies
- Informs Public of all situations that could be perceived to be harm full
- Contacts Public by phone and/or face to face
- Co-ordinates safe search and evacuation of potential Public residence and transients in the area
- Notifies and direct Public to shelter or evacuate
- Ensures evacuation receiving centers have been established if required
- Inform school and school transportation companies attended by children living near the incident site
- Maintain detail Public status tracking record
- Maintain a detail activity log

Logistics

Logistics can be assumed by any person available on site and will usually not be activated unless a significant amount of resources (personnel, equipment and/or supplies) have been order to site.

The Logistics Person is responsible for providing resources to support the emergency response. Logistics helps to develop and implement the Incident Action Plan.

- Obtain briefing from OSC
- Orders resources as requested by Command Staff
- Tracks progress of ordered resources transport to staging area
- Brief Command Staff on status of resources ordered and availability i.e. estimated time of arrival (ETA)
- Estimated needs to support an ongoing emergency response
- Maintain a detailed activity log

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well - Rich County, Utah

Operations

The Operations Role is activated in the event that the response personnel reporting to the OSC exceed the span of control (3 to 5 reports). An alternate Drilling/Completion On-Site Supervisor may assume this position.

The Operations Person is responsible for the management of all on-scene emergency response and cleanup activities. Initiates and directs scene activities within the boundaries of the Incident Action Plan. Operations keeps the On-Scene Commander informed of all activities, and pro-actively orders resources.

- Assigned by and obtain briefing from OSC
- Work closely with Safety Officer to ensure that hazard zones are established before taking emergency action
- Create and supervises all operational/tactical response and clean up activities
- Initiate request for operational resources via Logistic Section Chief
- Brief OSC and staff on operational response and incident status
- Maintain a detailed activity log

Response Services

Out-side services such as Medical/Medivac, Fire Departments, Spill Service Contractors, Hazmat Services and Environment Clean Up Services that could be required to support an emergency response.

Response Teams

Hands on tactical response to control well control problems, fire response, high angle rescue, rescue of injured person(s), medical/first aid to injured person(s), spill product containment and recovery, and scene security.

Emergency Response Plan (ERP) Fortuna Hogback Ridge 17 – 13N – 7E Sour Gas Well - Rich County, Utah

6.0 Classification of Emergencies

6.1 Purpose

Classifying incidents provides a phases approach to an emergency. It also aligns with the Fortuna Corporate Plan and is familiar with head office drilling and completion management who will be activated to support the site emergency response. The Level of Emergency outlines the severity of the incident and its potential impact on People, Property, Environment and Reputation. It is important that the On-Site Supervisor or On-Scene Commander determine the Level of Incident and its potential Level early on in the response. The Levels need to be adjusted depending on the emergency situation/status.

When the On-Site Supervisor is unsure of the situation then the communication should take place with the Off-Site Manager.

The complexity of the response or the response duration is determined by the classification of an incident but also by the incident situation and the emergency issues and tactical response requirements and the availability of resources both personnel and equipment.

6.2 Emergency Alert and Levels Overview

Corporate Levels of Emergencies are levels that provide the Corporation an understanding on the emergency and its potential impacts due to any emergency situation both Corporate Business and Reputation impacts and Operational impacts.

The location, involvement of particular stakeholders, and timing could cause the incident to be to be defined at a higher level.

Potential incident impacts need to consider both “actual” and/or “perceived” impacts when responding to peoples needs.

TABLE 1: CRITERIA MATRIX FOR CLASSIFYING INCIDENTS

Provides a guide for how to classify the emergency situation and type of emergencies into Alert or Levels of emergencies

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

TABLE 1: CRITERIA MATRIX FOR CLASSIFYING INCIDENTS

CRITERIA	ALERT: MINIMAL	EMERGENCY*		
		LEVEL 1: LOW	LEVEL 2: MEDIUM	LEVEL 3: HIGH
Risk Control	<ul style="list-style-type: none"> ■ Immediate control of hazard, with progressive resolution of the situation. 	<ul style="list-style-type: none"> ■ Immediate control of hazard is becoming progressively more complex because of deteriorating conditions. 	<ul style="list-style-type: none"> ■ Immediate and/or intermittent control of the hazard is possible. 	<ul style="list-style-type: none"> ■ Imminent control of the hazard is not possible.
Type of Incidents				
-Well Control Situation	<ul style="list-style-type: none"> ■ <i>Unusual odor.</i> ■ <i>Unexpected flaring required.</i> ■ <i>Unscheduled heavy traffic as a result of a down hole problem.</i> 	<ul style="list-style-type: none"> ■ <i>A problem during drilling a well, when the gas zone is open and the well is encountering a significant loss of circulation, significant continuous gas out mud or a significant kick.</i> ■ <i>Gas zone is open and an event occurs that has the potential to lead to well control problems during Completions.</i> - <i>Equipment dropped into the well (e.g.: tubing string) with potential down hole damage to the well.</i> - <i>Inabilities to pump kill fluid into the well as a result of a pump malfunction or no kill fluid available on location.</i> 	<ul style="list-style-type: none"> ■ <i>Equipment malfunction while circulating a kick or an inability to maintain required volumes of circulating fluid, barite or lost circulation material while drilling a well.</i> ■ <i>Equipment malfunctions during Completions, Well Stimulation /Testing restricting the ability to manage any Level 1 Emergency.</i> 	<ul style="list-style-type: none"> ■ <i>Well is experiencing an uncontrolled flow and the well effluent has reached the surface; or</i> ■ <i>Well is flowing small volumes of gas to surface and is partially controlled but Public safety cannot be assured.</i>
- Containment Failure	<ul style="list-style-type: none"> ■ Control and relief systems functioning correctly. 	<ul style="list-style-type: none"> ■ Control and relief systems functioning correctly. 	<ul style="list-style-type: none"> ■ Some control and/or relief systems not operational. 	<ul style="list-style-type: none"> ■ Key control and relief systems not operational.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

TABLE 1: CRITERIA MATRIX FOR CLASSIFYING INCIDENTS (CONT'D)

CRITERIA	ALERT: MINIMAL	EMERGENCY*		
		LEVEL 1: LOW	LEVEL 2: MEDIUM	LEVEL 3: HIGH
- <i>Fire/Explosion</i>	<ul style="list-style-type: none"> ■ Small gas leak or fuel spill that can be immediately contained 	<ul style="list-style-type: none"> ■ Gas or Fuel Leak with some risk of Fire 	<ul style="list-style-type: none"> ■ Contained equipment fire i.e. camp, trailers or rig equipment /No risk to life 	<ul style="list-style-type: none"> ■ Major Equipment/rig fire and/or explosion
- <i>Hazardous Spill (Chemicals, Hydrocarbons or Produced Water)</i>	<ul style="list-style-type: none"> ■ Spill but with in a containment system. No fire hazard 	<ul style="list-style-type: none"> ■ Onsite spill but outside containment system 	<ul style="list-style-type: none"> ■ Spill migrates offsite an/or potential of fire and/or explosion 	<ul style="list-style-type: none"> ■ Offsite into Sensitive Environment i.e. Wild Life wet lands, river or major water body
- <i>Transportation Danger goods</i>	<ul style="list-style-type: none"> ■ TDG violation 	<ul style="list-style-type: none"> ■ Accident no damage to container and no product release 	<ul style="list-style-type: none"> ■ Accident with damage to container with potential of failure and/or fuel spill 	<ul style="list-style-type: none"> ■ Accident with fire and or significant loss of product
- Natural Event				
- Wildfires	Extreme dry conditions	<ul style="list-style-type: none"> ■ Small fire near site that can be contained 	<ul style="list-style-type: none"> ■ Uncontrolled fire that could cause a hazard to the operations 	<ul style="list-style-type: none"> ■ Uncontrolled fires that are a safety hazard and potential loss of equipment
- Severe Weather	<ul style="list-style-type: none"> ■ Severe weather warning for area 	<ul style="list-style-type: none"> ■ Travel becoming hazardous 	<ul style="list-style-type: none"> ■ Restriction of travel 	<ul style="list-style-type: none"> ■ No visibility, roads are impassible, significant build up of ice in equipment and hydro-lines
- Tornado	<ul style="list-style-type: none"> ■ Warning for area 	<ul style="list-style-type: none"> ■ Significant Tornado clouds in area 	<ul style="list-style-type: none"> ■ Touching down in area 	<ul style="list-style-type: none"> ■ Approaching or has touched down on site

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

TABLE 1: CRITERIA MATRIX FOR CLASSIFYING INCIDENTS (CONT'D)

CRITERIA	ALERT: MINIMAL	EMERGENCY*		
		LEVEL 1: LOW	LEVEL 2: MEDIUM	LEVEL 3: HIGH
-External Event <ul style="list-style-type: none"> - Third Party Emergency - Sabotage - Bomb Threat 	<ul style="list-style-type: none"> Operating in Sour Gas Field Targeting industry in area Targeting industry in area 	<ul style="list-style-type: none"> Notification of an emergency situation from industrial operator Unconfirmed Unsubstantiated Threat 	<ul style="list-style-type: none"> Evacuation of site/Shutting down operations Onsite Damage Credible Threat 	<ul style="list-style-type: none"> Risk of exposure to workers Severe damage that disrupt the safety of the operations Explosive located on site and or has detonated
Impact <ul style="list-style-type: none"> - Worker Safety - Public Safety - Environment 	<ul style="list-style-type: none"> ■ Near Miss ■ On-site only. No risk to Public but Public has a perception that they are at risk. ■ On-site only. 	<ul style="list-style-type: none"> ■ Injury ■ On-site, with possible impact off-site. ■ On-site, with some potential off-site. Minor or short term. 	<ul style="list-style-type: none"> ■ Multiple Worker Injury and/or a life threatening Worker Injury ■ On-site, with possible impact off-site. ■ On-site, with some potential off-site. Minor or short term. 	<ul style="list-style-type: none"> ■ Worker Fatality ■ Potential for Public safety to be jeopardized. ■ On-site, with significant off-site. Long term

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

7.0 Notification and Communication

7.1 Protocol

To be effective, an emergency response requires a timely and effective notification process/system. The appropriate company personnel and government/regulatory agencies must be informed of the potential for a serious incident or the occurrence of a significant event requiring emergency support and response. The appropriate notification must start immediately when declaring an Alert Stage or Emergency Level for an incident.

Only communicate factual information about the emergency situation that has been substantiated, without speculation about cause or other undetermined details.

7.2 Table 2: Notification/Communication for Emergencies

Outlines who and when communicating should be completed with Fortuna (US) LP personnel, Public and with government and regulatory agencies.
(See Table # 2 NOTIFICATION/COMMUNICATION FOR EMERGENCIES)

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

TABLE 2: NOTIFICATION/COMMUNICATION FOR EMERGENCIES

RESPONSES	ALERT	EMERGENCY		
		LEVEL 1	LEVEL 2	LEVEL 3
COMMUNICATIONS				
- Internal	<ul style="list-style-type: none"> ▪ Discretionary of Fortuna Site Supervisor. 	<ul style="list-style-type: none"> ▪ Fortuna Site Supervisor notification of off-site management 	<ul style="list-style-type: none"> ▪ Fortuna Site Supervisor immediate notification of off-site management. 	<ul style="list-style-type: none"> ▪ Fortuna Site Supervisor immediate notification of off-site management
- External Public	<ul style="list-style-type: none"> ▪ Required for un-planned flaring or possible perception of risk by Public 	<ul style="list-style-type: none"> ▪ Mandatory for individuals within the EPZ requiring notification. 	<ul style="list-style-type: none"> ▪ Planned and instructive as per the site specific ERP. 	<ul style="list-style-type: none"> ▪ Planned and instructive as per the site specific ERP.
- Media	<ul style="list-style-type: none"> ▪ Reactive, as required. 	<ul style="list-style-type: none"> ▪ Reactive, as required. 	<ul style="list-style-type: none"> ▪ Proactive media management to local or regional interest. 	<ul style="list-style-type: none"> ▪ Proactive media management to national interest.
- Government	<ul style="list-style-type: none"> ▪ <i>Notify BLM and Utah Oil, Gas and Mining when Public is being contacted.</i> 	<ul style="list-style-type: none"> ▪ Notify BLM, Sheriff, <i>Utah Oil, Gas and Mining</i> and local authority, if required for initial response. 	<ul style="list-style-type: none"> ▪ Notify BLM, Sheriff a <i>Utah Oil, Gas and Mining</i> and local authority. UOSH for serious injuries 	<ul style="list-style-type: none"> ▪ Notify BLM, Sheriff, <i>Utah Oil, Gas and Mining</i> and local authority.
ACTIONS				
- Internal	<ul style="list-style-type: none"> ▪ On-site, as required by Fortuna (US) LP operational processes. 	<ul style="list-style-type: none"> ▪ On-site, as required by company. Initial response undertaken in accordance with the site specific ERP. 	<ul style="list-style-type: none"> ▪ Predetermined Public safety actions are under way. Corporate management team alerted and may be appropriately engaged to support on-scene responders. 	<ul style="list-style-type: none"> ▪ Full implementation of emergency management system.
- External	<ul style="list-style-type: none"> ▪ On-site, as required by Fortuna operational processes. 	<ul style="list-style-type: none"> ▪ On-site, as required by company. 	<ul style="list-style-type: none"> ▪ Potential for multi-agency (operator, municipal, county, state or federal) response. 	<ul style="list-style-type: none"> ▪ Immediate multi-agency (operator, municipal, county, state or federal) response.

**Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah**

TABLE 2: POSSIBLE RESPONSES FOR SPECIFIED INCIDENTS (CONT'D)

RESPONSES	ALERT	EMERGENCY		
		LEVEL 1	LEVEL 2	LEVEL 3
RESOURCES				
- Internal	<ul style="list-style-type: none"> ▪ Immediate and local. No additional personnel required. 	<ul style="list-style-type: none"> ▪ Establish what resources would be required. 	<ul style="list-style-type: none"> ▪ Limited supplemental resources or personnel required. 	<ul style="list-style-type: none"> ▪ Significant incremental resources required.
- External	<ul style="list-style-type: none"> ▪ None. 	<ul style="list-style-type: none"> ▪ Begin to establish resources that may be required. 	<ul style="list-style-type: none"> ▪ Possible assistance from government agencies, as required. 	<ul style="list-style-type: none"> ▪ Assistance from government agencies and external support services, as required.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

8.0 Emergency Response Actions Plan

8.1 All Risk Action Plan

Objective: To protect and minimize impacts on **People** (Workers/ Responders/ Public), **Property** (Assets, Business and Operations), **Environment** and **Reputation**.

Strategy: To quickly initiate emergency mitigation measures, determine potential for escalation of situation and commence emergency remedial measures to contain, isolate and minimize human and environmental impacts. Response action checklist provides a guide to follow to assist with implementing response actions but response actions are not limited to this list.

Response Actions for Level I, II and III Emergency

None Fortuna Operational Emergency

- Notification of an Offsite Incident - Fortuna Site Supervisor when notified of an incident off-site determines it is not a result of the projects activities and assumes a support role and provides response assistance as can safely be provided without compromising the operational activities. Examples could be an incident near the well site such as a wild fire, Public accident on road or off road etc.

Level I Emergency

Fortuna Operational Emergency

Level I Response Actions

- Well control situation - Fortuna Site Supervisor initiate well control measures with drilling or completion personnel.
- Fortuna (US) LP Site Supervisor assumes role of On-Scene Commander (OSC).
- On-Scene Commander establish and activate an On-Scene Command Post (OSCP) in a safe strategic location near the emergency scene (e.g. wellsite trailer, off-site vehicle)
- Request that all none essential operation is terminated or cancelled such as delivery of none emergency or none well control materials.

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well – Rich County, Utah

Level I Response Actions (Cont'd)

- ❑ OSC establish Unified Command/Joint Command with government agencies as directed or required
- ❑ OSC activates response personnel and assigns personnel to Command Staff Roles and Response Roles as required
- ❑ OSC activate staging and a Staging Leader for the control of arriving responders, response services, and equipment. OSC inform Command Post Staff of the location.
- ❑ Conduct preliminary Hazard Assessment to determine actual or potential hazards associated with existing incident scene conditions.
- ❑ OSC briefs all site personnel about the emergency situation including wind sock locations, wind direction, safe egress routes, muster/briefing points and evacuation signals/sirens.
- ❑ Directs all non-essential personnel and vehicle of site
- ❑ Ensures all onsite vehicles are park in the direction of the egress road.
- ❑ Considers the requirement to park vehicle(s) with communication equipment off site to assist in evacuation and alternate communication incase the situation escalated rapidly preventing the removal of vehicles from the site.
- ❑ Establish the communication emergency channel
- ❑ Activates wellsite access Colored Flag warning system
- ❑ OSC informs Fortuna (US) LP Head Office Off-Site Manager of the emergency, hazards, proposed action plan and required response services.
- ❑ OSC or Logistics Person activates necessary response resources to implement established action plans.
- ❑ OSC or Logistics Person activates necessary response early on to support response requirements.
- ❑ OSC activates the following specific response depending on the emergency and response requirements and follow with specific Action Plan:
 - Worker Injury/Fatality
 - Public Protection
 - Ignition Plan
- ❑ OSC and Command Staff complete the following response processes:
 - Incident Action Plan. (OSC or Logistics Person pro-actively and early on orders required Response Resources (Personnel and Equipment))
 - Site Safety Plan.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

Level I Response Actions (Cont'd)

- OSC, or activate Media Coordinator to manage and coordinates media representatives and manages media requirements which include communication strategy and information with the Fortuna head office and regulatory agencies.(If applicable)
- OSC to provide the following information to Fortuna Off-Site Manager and government agencies which is outlined as follow and by completing Emergency Incident Notification and Status Form which addresses (See Form):
 - Type of Emergency – Well Control, Injury/Fatality, Gas Release, Spill, Fire/Explosion, and Transportation.
 - Type of Containment.
 - Type of Product and Product Hazards.

Head Office Response

- Fortuna Off-Site Manager activates personnel to site, as required, to assist with the Command, Control, management and implementation of incident mitigation measure and/or to assist with maintaining and protecting wellsite assets.

Level II Emergency

Level II Response Actions

- Complete all actions established for Level I Response Actions
- OSC makes request to Fortuna (US) LP Off-Site Manager to activate the Head Office Emergency Operations Centre(EOC) (If required)
- Establish potential hazard and Emergency Planning Zone (EPZ) area.
- Activate Air Monitoring resources to record air quality readings and determine the hazard impact area. (If applicable)
- OSC or Operations Section Chief activates resources in conjunction with emergency response services (e.g. Sheriff Department, Highway State Troopers) to isolation potential hazards areas and/or the pre established EPZ.
- Request activation of Mutual Aid Agreement resources i.e. other Industry personnel with operations in the area. (if applicable)

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

Head Office Response

- Fortuna (US) LP Off-Site Manager activates the Head Office EOC as required to support the OSC and its response.
- EOC Emergency Manager assigns personnel to Command Staff Roles as required to support the On-Scene response and to respond to any business impacts.
- Emergency Manager/ review requirement for a Fortuna (US) LP representative to be involved with Unified Command/Joint Command by attending the Regional/Local Government Command Post and/or EOC (If activated)

Level III Response Actions

- Complete all actions established for Level II Response Actions
- Increase extent of off-site air monitoring to record air quality readings and determine the area of hazard and safe areas where evacuation routes can be established. (If required)
- If required, protect the Public by:
 - Restricting access to the EPZ.
 - Initiating evacuation;
 - Implementing “sheltering in place” if applicable
 - Implementing full Public Response Action Plan
- Isolating or extinguishing on-site and off-site ignition sources if hazard is flammable
- OSC to authorize well ignition if Public is at risk from a well control issue which results in the uncontrolled release of a gas from the well

Head Office Response

- Continue with response actions as outlined for Level I and II Response Actions

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

Down Grading Emergency

Response Actions

- OSC in consultation with government agencies will review emergency incident and down grade or call down the Emergency if response actions have been effective in reducing or eliminating the emergency hazards and risks
- OSC informs Emergency Manager/EOC of Emergency status
- OSC commander and Emergency Manager follow through with Post-Emergency activities such as Response Evaluation and Critical Incident Stress Debriefing (CISD)

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well – Rich County, Utah

8.2 Injury/Fatality Response Action Plan

Objective: To preserve Personnel/Worker Health and Safety

Strategy: To provide a timely and effective response to preserve the life of an injured person, due to an on-site or off-site emergency.

Injury/Fatality Response Actions

- On-Scene Commander (OSC) or Operations Person follows through with All Risk Action Plan Section 8.1 steps and activates the following response personnel:
 - Medical Leader if a person is known or suspected to be injured
 - Rescue Team when a person is missing or knocked down due to an emergency situation
 - Municipal emergency response services providers i.e. Medivac/EMS
- OSC to conduct Hazard Assessment, consider potential consequences and establish risk reduction measures prior to initiating any assistance.
- Response personnel don appropriate personal protective equipment (PPE)
- Rescue victim (s) if safe to do so, remove the victim to a safe location to prevent further harm.
- Provide resuscitation immediately to a person exposed to hydrogen sulfide gas
- Preserve emergency/accident site to allow for follow up investigations to be conducted.
- Provide Medical Aid/First as soon as safe to do so.
- Never assume Death: First Aid must be administered until a Professional takes over.
- For patient/victim confidentiality, only use landlines to communicate number of victim, names and conditions. Be prepared to provide the following information:
 - Mechanism of injury (What happened)- crushed by object, fall from height, fire/explosion, electrocution, toxic gas atmosphere or others.
 - Number of patients
 - Location, road directions and site longitude and latitude.
 - Patient Condition
 - Treatment given.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

Injury/Fatality Response Actions (Cont'd)

- Minor injury - stabilized victim(s) may be transport to hospital with conveyance vehicle. If in doubt discuss with medical profession by contacting - Dialing 911 or Local Hospital or Emergency Services for instructions on handling of the injured. Professional Medical Services will make final decision on transportation of patient by conveyance vehicle, ambulance or Air-Medivac Helicopter.
- Pro-actively orders Medical Service such as Ambulance/Medivac through Sheriff Dispatch.
- OSC makes appropriate notification as soon as possible. Serious Injury or Fatality contact UOSH (See Section 9: Contact Information)
- OSC contacts Fortuna (US) LP to make appropriate Next of Kin Notification for Fortuna personnel or to inform the contractor(s) of contract personnel to make the appropriate notifications.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

8.3 Public Protection Action

Objective: To protect and minimize impacts on Public – people not directly part of work activities on the wellsite.

Strategy: To proactively address health and safety concerns and to take appropriate response actions to protect the Public from harm through removing or reducing the hazards and to shelter and/or evacuate as required.

Definition:

- Public includes Residents and Transients
- Transient is anyone that could be in the area for farming, ranching, trapping, recreational use, or work that is not at a fixed facility (plant or residence).
- Industry

Public Perception of Risk/Concern

Response Actions

- OSC assume or activates the Public Safety Coordinator to manage the Public Safety issues and response requirements
- Public Safety Coordinator is responsibility is to communicate with concerned Public and/or manage Public protection response actions.
- Attend Command Staff briefing and continuously keep OSC informed of the Public status.
- Works with local government agencies, counties, municipality, law enforcement, local industry to manage Public Safety
- Request resources from OSC and/or Logistics Section Chief.
- Actions outlined are followed except when not applicable as per the event or emergency incident situation.
- OSC or Public Safety Coordinator understands Public Perception of Risk as outlined:
Public maybe perceive they are at risk due to unplanned/unscheduled event or emergency situation that has no off-site risks/hazards. Events such as:
 - Sound - Noise heard off-site from explosion, impact accident, emergency sirens.
 - Sight – Visible off-site smoke or flame from fire or un-scheduled flaring, un-scheduled heavy traffic for the movement of materials.
 - Smell – Odors from site that are unusual and could be irritating or cause minor health effects (i.e. Asthma – breathing difficulties).

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

Response Actions (Cont'd)

- ❑ Communicate with Public by phone or visit to inform of emergency situation. (See Appendix Forms: Public Notification for Un-planned Flaring or Truck Traffic)
- ❑ Advise Public they may go indoors to reduce odors.
- ❑ Routinely keep Public updated as to the status of the incident and when the event/incident is over.
- ❑ Ensure applicable government agencies are notified

Public Safety and Health Risk

An emergency situation that potential could affect the Public's health and safety that requires immediate response actions.

Response Actions

- ❑ Contact Public by Phone and/or dispatch response personnel to inform the Public (Residents and Transients) of the situation and potential risk and if required what protective action to be taken.
- ❑ Level I Emergencies response actions are for:
 - Residents may voluntarily precautionary evacuate or shelter in place
 - Transients to voluntarily evacuate the potential designated hazard area or EPZ
 - Industry including, local rail companies and local utility companies to be aware of incident situation and to keep communication lines open. (If applicable)
 - Notify all identified hypersensitive individuals in EPZ if applicable when H₂S concentration are 1 part per million for 1 hour average (See Appendix Forms: Public Precautionary Evacuation Message)
- ❑ Level II and III Emergency response actions to notify residents to shelter or evacuate area if safe to do so. (See Appendix Forms: Public Evacuation Message and/or Public Shelter Message)
- ❑ Any Public contacted need to be updated on a regular basis to the status of the emergency situation and to be contacted when situation is over and conditions are safe.
- ❑ Dispatch response personnel to assist with transportation as requested
- ❑ Request the activation of Evacuee Reception Facility if required
- ❑ Dispatch personnel and helicopter(s) equipped with loud hailer(s) to locate Transients and direct them to leave the hazard area or EPZ

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

Response Actions (Cont'd)

- ❑ Contact Local Industry and including local rail lines and utility companies to inform of the emergency situation and if required what protective actions to be taken. (If applicable)
- ❑ Ensure egress roads are maintained to allow for Public vehicles evacuate the area.
- ❑ Ensure local/regional government agencies have been notified and if required activated to assist in the response for Public protection.
- ❑ Jointly coordinate all Public response actions with the applicable Local government agency(s)
- ❑ Issue Public advisory with coordination with local government agency - for Public that could be in the hazard area, Emergency Awareness Zone (EAZ) or beyond. The EPZ if required.
- ❑ Isolate area by activating Road Blocks or local law enforcement..
- ❑ Public medical aid assist requests coordinate response with local health authority and ambulance services or by dialing 911 or Sheriff Emergency Dispatch Numbers..
- ❑ Ensure that the evacuated residences properties are secured.
- ❑ Identify pets and live stock that needs to be cared for due to the evacuation and jointly coordinate animal care activities with the appropriate government agency and/or local veterinarian(s).
- ❑ Identify potential hazards and hazard area by requesting the OSC to dispatch air-monitoring teams and to inform of any areas with Lower Explosive Limit (LEL) and/or toxic gas reading such as H₂S and SO₂.
- ❑ If local air traffic is at risk or interference to the response efforts s request the regulatory agencies to issue a Notice to Airman (NOTAM) to close the air space around the incident site.
- ❑ Coordinate with local authority to provide Public monitory assistance for out of pocket expenses.
- ❑ Evacuee return to area needs to be jointly coordinated with the appropriate government agencies.
- ❑ Coordinate a debriefing with the affected Public to identify any concerns and learning's.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well – Rich County, Utah

7.3 Well Ignition Action Plan

Objective: To complete a safe and quick ignition of a sour gas release from a sour gas well when Public safety is at risk.

Strategy: Two reasons to ignite an un-controlled from a well are:

- Worker Safety, if during well control operations worker safety can not be assured due to excessive flammability/explosive risk from self ignition or excessive sour gas exposure, Fortuna may choose to ignite the well and adapt its well control operations appropriately.
- Public Safety, if igniting the well would provide a higher degree of Public safety to response to a H₂S vs. SO₂ release

Hydrogen Sulfide (H₂S) vs. Sulfur Dioxide (SO₂)

- H₂S is heavier than air, an H₂S plume disperses close to the ground surfaces and into low laying areas as flow rate and weather conditions dictate. H₂S dispersing low to the ground creates a more immediate hazard to Public in the vicinity of the wellsite and possible within the EPZ
- Igniting the H₂S gas convert gas to SO₂ and the resulting fire and heat of combustion causes the SO₂ plume to disperse higher into the atmosphere which would likely reduce the H₂S concentration and result in a delay for the SO₂ to reach ground level.
- Responders will have more time to evacuate Public near the wellsite and within the EPZ. Responders will have time to set up air monitoring and to evacuate Public in a wider area depending on the SO₂ concentrations.

Authority for Well Ignition

- The Fortuna (US) LP Site Foreman or On-Scene Commander has the authority to initiate a sour gas well release if conditions warrant immediate ignition.
- If time permits the decision for ignition would be made jointly with the regulatory agency and be discussed with the Fortuna (US) LP Off-Site Manager.

Emergency Response Plan (ERP)

Fortuna Hogback Ridge 17 – 13N – 7E

Sour Gas Well – Rich County, Utah

Response Action

- OSC determines and authorizes the initiation of a gas release when all personnel on site have safely evacuated from the site to at least 200 or further of site up wind and up hill/slope and all personnel have been accounted for.
- OSC organizes an ignition team (minimum four people including Ignition Leader and site safety person) and briefs them on the safety plan, ignition process and equipment requirements.
- The OSC will monitor the gas release to determine if changing conditions warrant a delay of gas release ignition.
- OSC or Ignition Leader will stay in continuous communication.
- Equipment requirements are
 - 1-12 gauge shot gun or flare gun with 24 flare shells
 - 1 portable gas detector for combustible gas and H₂S
 - Fire Retardant PPE
 - Self contained breathing apparatus (SCBA) for each member of the ignition and back up team
 - 4 (Minimum) – SCBA air cylinders
 - Vehicle with communication equipment
- Back Up members of the Ignition Team must don/wearing the SCBA but not go on air until they have to conduct a rescue. This is to preserve air for rescue operation.
- Ignition Team Back Up personnel will monitor the time Ignition Team is on air conducting the ignition process. Call Team back when air supply could be running low which will depend on the SCBA capacity.
- Safety person check gas detector and conducts a bump test to ensure gas detector is function properly.
- Two person of Ignition Team will stay in continuous communication with Ignition Team Back Up personnel while approaching the plume for ignition.
- Two Ignition Team members one with the ignition device (person familiar with the operations and capabilities of the flare device) and the safety person carrying the portable gas monitoring meter with SCBA and PPE will approach the well gas release from a up hill, up wind and conduct continuous gas readings. If gas reading show it is safe to proceed toward the well the team will stop approximately 160 meters from the gas plume and start firing flares at an angle of 45 to 70 degrees to the gas plume. Continue to advance forward to the well 5 steps as long as the gas monitoring show it safe to do so and fire flares again at gas plume. Continue the forward approach and firing flares at 5 step increments until ignition is achieved.
- After gas ignition the Ignition Team will back up to a safe distance to ensure ignition is sustained.
- After ignition the response teams have to monitor for SO₂ concentrations.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

9.0 Contact Information

9.1 Fortuna Contact

Fortuna (US) LP

888-3rd ST SW, Calgary Alberta, Canada T2P 5C5

<u>Title</u>	<u>Name</u>	<u>Numbers</u>
Drilling Superintendent	Stu Cameron	Office: 403-237-1178 Mobil: 403-968-0473
Drilling Engineer	Rod Schnell	Office: 403-237-1413 Mobil: 403-813-3041
Drilling Foreman	Rick Harless	Mobil: 713-725-2389 Satellite:
Completions Foreman	Bob Kooyman	Office: 403-231-2918 Mobil:
Safety	Inter-Mountain Safety	Office: 307-789-3882 Mobil:
On-Site Trailer	Rick Harless	Cell: 713-725-2389 Satellite:

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

9.2 Government/Regulatory Agencies

Bureau of Land Management (BLM)

- **Contact for all incidence**

Salt Lake Field Office: Phone 801-586-2401

2370 South 2300 West

Salt Lake City, UT 84119

BLM Ranger Mike Nelson: Cell _____

Rich County Sheriff

Emergency Dispatch Numbers: 935-793-2285

Randolph, Utah 935-793-2295

935-793-1011

or 911

Recommend to use the contact numbers. Contacting 911 # could result with being connecting with Wyoming Emergency Services. This well is located in Utah so request to be transferred to the Utah 911 or Emergency Services.

Emergency Dispatch will activated the following services as requested

- Rich County Sheriff
- State Trooper
- Ambulance Service
- Medical Helicopter - Air Med - Salt Lake City, UT
- Fire Department Police (Laketown and/or Randolph)
- Search and Rescue

Hospital

HCL Memorial Hospital Evanston, WY 307-789-3636

(Closest Hospital in Evanston, Wyoming is approximately 51.6 miles from wellsite)

Medical Helicopter

Air Med - Salt Lake City, UT (800) 453-0120

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Utah Division of Oil, Gas and Mining

(801) 538-5340

(Web site: <http://ogm.utah.gov/oilgas/>)

After Hours (801) 243-9466

IMMEDIATE NOTIFICATION - MAJOR EVENTS*

THE DIVISION DOES NOT PROVIDE EMERGENCY RESPONSE FOR UNDESIRABLE EVENTS. ACTIVATE YOUR LOCAL EMERGENCY RESPONSE SYSTEM FIRST AS NEEDED.

Thereafter...

The division shall be notified immediately of all fires, leaks, breaks, spills, blowouts, and other undesirable events occurring at any oil or gas drilling, producing, or transportation facility, or at any injection or disposal facility. CALL 801-538-5340.

AFTER HOURS...

For the reporting of MAJOR undesirable events* after DOGM office hours, CALL 801-243-9466. Minor events can be reported to the division the following morning (call 801-538-5340).

WRITTEN REPORT

Complete written reports of undesirable events should be submitted electronically on the Incident Report eForm ^{NEW} OR on a Form 9, Sundry Notices and Report on Wells OR by using the division's Incident Report Form, as soon as conclusive information is available.

***Definition of Major Event**

- Leaks, breaks or spills which result in the discharge of more than 100 barrels of liquid.
- Equipment failures or accidents which result in the flaring, venting, or wasting of more than 500 Mcf of gas.
- Any fire which consumes the volumes shown above.
- Any spill, venting, or fire, regardless of the volume involved, which occurs in a sensitive area stipulated on the approval notice of the initial APD for a well, e.g., parks, recreation sites, wildlife refuges, lakes, reservoirs, streams, urban or suburban areas.
- Each accident which involves a fatal injury.
- Each blowout; loss of control of a well.

Rule Reference

Rule R649-3-32, Reporting of Undesirable Events (links to the Division of Administrative Rules web site)

Roles of the Division of Oil, Gas and Mining

The Division does not provide emergency response for undesirable events. During an undesirable event, the division's Oil and Gas Program -- so far as possible -- will perform the following roles:

- Be a central gathering point of information.
- Provide short-term guidance to operators and citizens.
- Provide long-term oversight to assure that remediation of the undesirable event is accomplished.

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

10.0 Safety Equipment

Item Amount Description

Item	Amount	Description
1	1	Safety trailer with a cascade system of 10-300 cu. ft bottles of compressed breathing air complete with high-pressure regulators
		Low-pressure airline equipped with Hanson locking fittings. This airline will be rigged up with manifolds to supply breathing air to the rig floor, Substructure, derrick, shale shaker area, and mud mixing areas. Three high-pressure refill hoses will be attached to cascade systems
3	12	Scott 30 minute self-contained breathing apparatuses (SCBA).
4	12	Scott airline units with emergency escape cylinders.
5	1	4- Channel continuous electronic H ₂ S monitor with audible and visual alarms. 10 ppm for the low alarm and 15 ppm for The high alarm.
6	1	Sensitive potable hand operated pump type detection units with tubes for Hydrogen sulfide and sulfur dioxide.
7	1	oxygen resuscitator
8	1	trauma first aid kit
9	1	Stokes stretcher and one (1) KED.
10	4	windsocks
11	at least 1000 ft	well condition sign with 3 flag system
12	2	Safe Briefing Area (SBA) signs
13	1	fire blanket
14	1	set air splints
15	2	electric explosion proof fans (Upon Request) monitor calibration kit
16	1	monitor calibration kit
17	2	300 cu. ft. air bottles for the safe briefing area. 30 # fire extinguishers
18	2	30 # fire extinguishers
19	1	cellular phone for emergency response(upon request)
20	1	battery powered combustible gas meter

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

11.0 Forms

Emergency Incident Notification and Status Report Form

Incident Name: _____
Person Completing Document: Name _____
Position/Role _____, Contact # _____, Location _____
Report Date: _____, Time: _____ (24 hour or am/pm), Report # _____

Notification of Incident Situation

Date: _____ Time: _____ (24 hour or am/pm)
Caller Name: _____ Contact Number: _____
Is Caller Safe? : _____ Does Caller Need Medical Attention? : _____
Callers Location: _____
Purpose of Call: _____
Type of Caller/Position (On-Scene Commander, Public, Resident within an EPZ, Industry Representative, Government, Employee/Company etc.)

Have you contacted anyone else? If so who? : _____
(Note: Caller can be anyone reporting incident by Phone, Field Radio or in Person)

Incident Location and Access Route(s)

Location of Incident: LSD. ___ Section ___ Township ___ Range ___ W ___ Mer.
Longitude _____ Latitude _____
Safe Access Route(s) Directions to Incident Site: _____

Location of On-Scene Command Post (OSCP) _____
Location of Staging Area: _____
Location of Heli-pad: _____

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Worker Safety

Is Accident Scene Isolated and Secured? _____
 Are Site Workers Safe: _____ Yes, _____ No (Explain) _____

 Has the accident site been evacuated? _____
 Are All Worker Accounted For? _____ Yes, If No:
 (Note: Do not report any numbers of missing, names of missing or injured persons over an un-secured communication system. Use phone line or runners to report information)
 How many are still missing: _____ #s
 How many fatalities: _____ #s
 How many are injured: _____ #
 Status of Injured Medical Care (On-Site First Aid, On-site Professional Care, Medi-vac by Air/Ambulance, Conveyance Vehicle): _____

 How is scene secured: (Barriers, Road Blocks, Response Personnel or Others)

 (Note: Attach a Site Map with drawing of Scene)

Public Safety

Public at risk from incident hazards (Toxic Gas H₂S etc, Explosive Gas HVP, LPG, Explosion (Describe): _____ #s
 What is the Potential Hazard Area: _____ meters
 What is the size of the EPZ (if applicable): _____ meters
 How many Residences could be involved?: _____ #s
 Access Roads been Secured (Road Barriers, Road Blocks Secured by Industry, RCMP, Highway Maintenance Contractor(s): _____
 Have Public been Notified of incident?: _____
 Have members of Public been Notified with a Precautionary Voluntary Evacuation Message (if applicable)?: _____ #s
 Have Public/Residents been Evacuated: _____ #s
 Have Public/Residents been Sheltered?: _____ #s
 Has Local Industry been Notified?: _____ #s
 Response Team(s) been Activated for Public Protection: _____ #s
 Has Air Monitoring been Activated: _____ # of units
 (Note: Attach an Emergency Response Map of Potential Impacted Area or EPZ.)

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Emergency Incident Description

Type of Operations:

- Well Control (Drilling Rig/ Service Rig) (Sweet/Sour): _____
- Well Control (Testing/Completion)(Sweet/Sour): _____
- Facility (Sweet/Sour): _____
- Field Facility Pipeline (Sweet/Sour/HVP): _____
- Storage Cavern: _____
- Distribution Terminal: _____
- Office Facility: _____ Camp Facility: _____
- Transportation Incident (Land, Air or Water) (Type of Dangerous Goods and Type of Container, Crew Vehicle, Passenger Vehicle, Supply/Equipment Transportation)

Type of Emergency

Type of Emergency:

- Gas Release:
 - Source (well, Pipeline, Vessel): _____
 - Type of Product(s): _____
 - Volumes: _____
 - Pressures and Release Rates: _____
- Product Spill:
 - Type of Container: _____
 - Type of Product: _____
 - Original Volume: _____
 - Estimated Spill Volume: _____
- Fire/Explosion: _____
- Injury/Fatality: _____
- Natural Event (Extreme Weather, Brush Fire, Tornado etc): _____
- External Event (Bomb Threat, Sabotage, Act of Terrorism etc.) _____

➤ Overall Description of Emergency Incident (Describe accident/incident scene, Areas being impacted, Type of Impacts, General Topography and Demographics and provide Drawing of Site Map): _____

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Classification of Incident

Level Of Incident:

- Alert: _____
- Level Of Emergency (I, II or III): _____

Type of Impacts: Public (Worker, Responder, Public), Environmental (Soil, Water, Air),
Property/Business or Reputation: _____

Command and Control

- On-Scene Command Post (OSCP) Established and Location: _____

- On-Scene Commander (OSC)/OSCP Name and Contact #: _____

- OSCP Organization and Contract #s (**Note:** See attached OSCP Organization Diagram)
- Head Office Emergency Operations Centre (EOC) Established and Location: _____

- Head Office Off-Site Manager/Head Office EOC Name and Contact #: _____

- Corporate EOC Organization and Contact #s (**Note:** See attached Corporate EOC Organization Diagram)
- Local/Regional Government EOC Established and Location: _____

- Local/Regional Government EOC Leader Name and Contact #: _____

- State/Government EOC Established: _____

(Note: Attach a Site Map as Showing Location of OSCP and Staging Area, Hot , Warm and Cold Zone Locations)

Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah

Notification/Activation Status

Are All required Notification Completed <input type="checkbox"/> Company: _____ <input type="checkbox"/> Contractor: _____ <input type="checkbox"/> Government: _____ (Note: Complete Attach Notification Report)

Weather Status and Forecast

Parameters	Current	6 Hours	12 Hours	24 –48 Hour	Comments
Temperature (Celsius)					
Wind Speed					
Wind Direction					
Characteristics (Sunny, Overcast, Raining, Foggy, Snow)					
Visibility					
Relative Humidity					
Precipitation					
Additional Information: _____ _____ _____ _____					

**Emergency Response Plan (ERP)
Fortuna Hogback Ridge 17 – 13N – 7E
Sour Gas Well - Rich County, Utah**

12.0 Survey plans and Maps

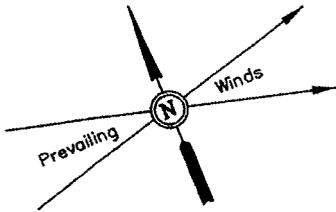
FORTUNA (US) L.P.

LOCATION LAYOUT FOR

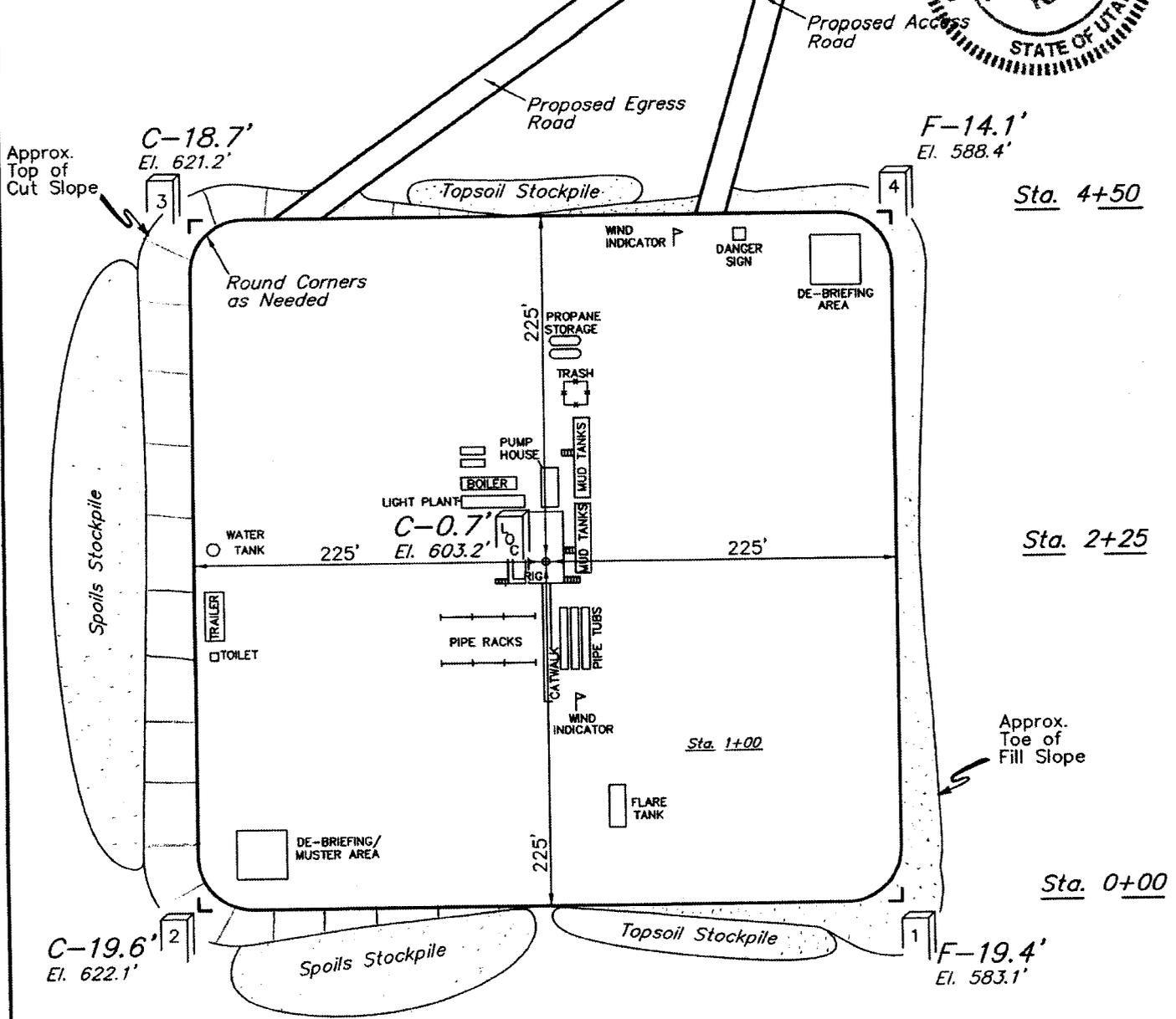
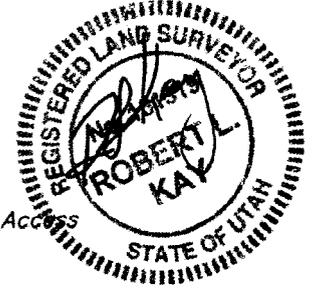
HOGBACK RIDGE #17-13N-7E
SECTION 17, T13N, R7E, S.LB.&M.

1040' FSL 704' FEL

FIGURE #1

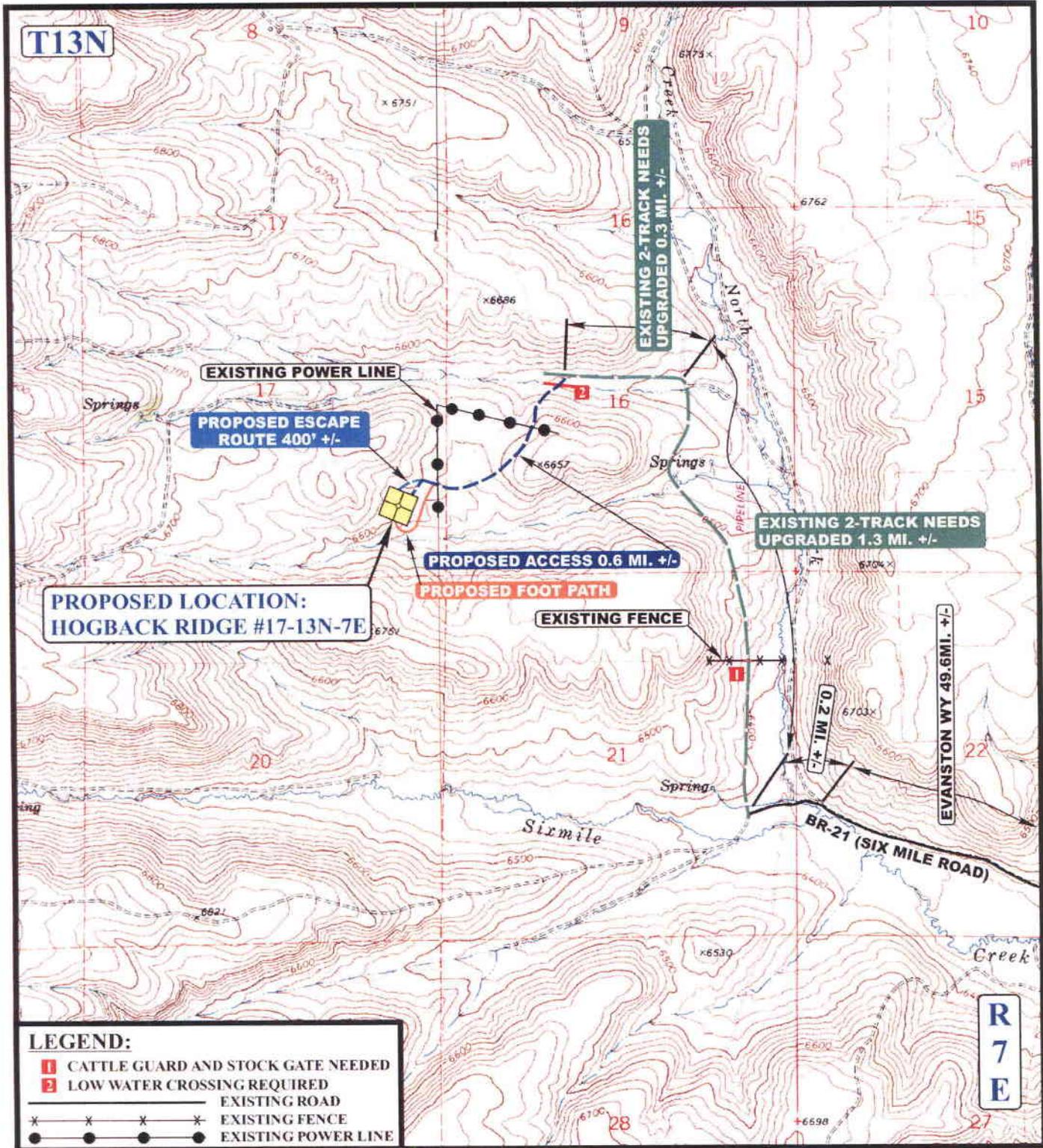


SCALE: 1" = 100'
DATE: 5-17-07
Drawn By: K.G.
REVISED: 09-12-07 S.L.



Elev. Ungraded Ground at Location Stake = 6603.2'
Elev. Graded Ground at Location Stake = 6602.5'

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East • Vernal, Utah 84078 • (435) 788-1017



LEGEND:

- 1 CATTLE GUARD AND STOCK GATE NEEDED
- 2 LOW WATER CROSSING REQUIRED
- EXISTING ROAD
- x x x x EXISTING FENCE
- ● ● ● EXISTING POWER LINE

LEGEND:

- PROPOSED ACCESS ROAD
- EXISTING 2-TRACK NEEDS UPGRADED
- PROPOSED ESCAPE ROUTE
- PROPOSED FOOT PATH



Uintah Engineering & Land Surveying
 85 South 200 East Vernal, Utah 84078
 (435) 789-1017 * FAX (435) 789-1813



FORTUNA (US) L.P.

HOGBACK RIDGE #17-13N-7E
SECTION 17, T13N, R7E, S.L.B.&M.
1040' FSL 704' FEL

TOPOGRAPHIC MAP

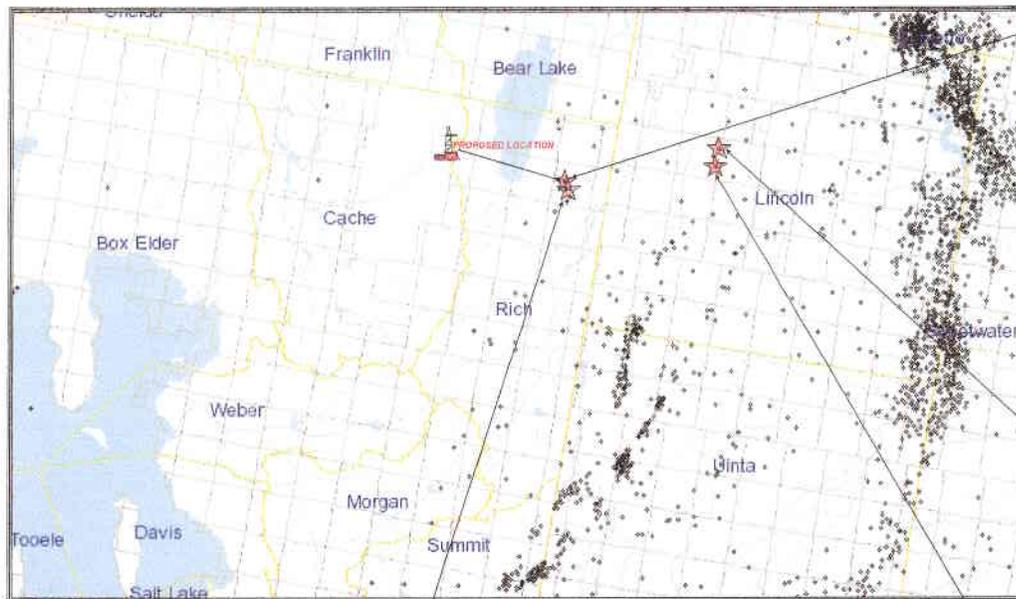
05 18 07
 MONTH DAY YEAR

B
TOPO

SCALE: 1" = 2000'

DRAWN BY: B.C.

REV: 09-28-07 C.C.



American Quasar Petroleum, Hogback Ridge 17-13N-7E

Spud: March 5, 1978
TD: 10722 R (2271 m)
Formation at TD: Triassic
Total Days: (Spud to RR) 123
Well Type: Directional
Raming Hours: 82.3 net including the 25 hrs reaching 12.25 m hole to 47.8 m on surface

Surface: 598 R (182 m) / 17.5 m (444.5 min) / 13.275 m (339.7 mm) cap
Mud System: Spud Mud (Gel Slurry)
Highest MW: 10.0 ppg (1198 kg/m³) at 434 R (132 m)
Comments: Fractured at 12.25 m (41.2 mm) to 19.5 m (444.0 mm) from 631 - 620 R (19 - 183 m)
Mud weight was 8.8-9.2 ppg (1158 - 1192 kg/m³) for ramming hole deeper
Run and cemented casing to 598 R (182 m)
Maximum Inclination: 1.0° at 128 R (39 m), 444 R (148 m) and 548 R (167 m)
Days: 5

Intermediate: 595 - 6077 R (182 - 1832 m) - 12.25 m (311.2 mm) / 8.629 m (244.5 mm) cap
Mud System: Dispersed Gel System
Highest MW: 9.3 ppg (1103 kg/m³) at 1030R (205 m) and 1000 - 1750 R (487 - 533 m)
Comments: Kickout of at 2250 R (762 m) - TWIN CREEK FORMATION
At 624 R (191 m), topped, logged for hole in pipe and logged (16.5 hrs)
Reamed (4.2 hrs) from 643 - 669 R (1525 - 1725 m) - MW was 9.1 ppg (1020 kg/m³) - NUGGET FORMATION
Reamed (1.2 hrs) from 530 - 580 R (1612 - 1777 m) - MW was 9.1 ppg (1040 kg/m³) and stopped for cement (8.5 hrs) - NUGGET FORMATION
Changed out EHA at 597 R (182 m) and reamed (2.2 hrs) from 550 - 599 R (1700 - 1827 m) - NUGGET FORMATION
Drilled to 6277 R (1820m), logged with no problems, run and cemented casing
Maximum Inclination: 16.9° at 6010 R (1832 m)
Days: 4

Intermed: 6077 - 10732 R (1832 - 3271 m) - 8.75 m (223.3 mm) / abandoned
Mud System: Dispersed Gel System - Topset added at 495 - 5732 R (2676 - 3271 m) and Diesel added at 1050 - 10732 R (2331 - 3271 m)
Highest MW: 9.3 ppg (1103 kg/m³) at 8550 R (2591 m), 9020 R (2743 m) and 10000 R (3048 m)
Comments: Reamed (1.4 hrs) from 885 - 773 R (2592 - 2354 m) - MW was 9.0 ppg (1078 kg/m³) - NUGGET FORMATION
Treated off while reaming, bailed and recovered (16 hrs)
At 8010 R (2457m), stopped pH, looked for hole in pipe and reamed (2 hrs) from 7972 - 8082 R (2430 - 2457 m) - NUGGET FORMATION
At 8432 R (2578 m), failed with joint with, worked through bridge at 8900 R (2698 m) and reamed (1.5 hrs) from 8850 - 8452 R (2608 - 2578m)
At 8432 R (2587 m), lost roller bar in hole, reamed (1 hr) from 8850 - 8452 R (2608 - 2587 m) and drilled ahead with Dyna Drill
Reamed (3.5 hrs) from 8271 - 8158 R (2521 - 2781 m) - THAYVES FORMATION
Picked up EHA at 8745 R (2684 m) and reamed (1.2 hrs) from 9000 - 8349 R (2743 - 2488 m)
At 8271 R (2512 m), lost cover pipe and picked up BHA and reamed (1.5 hrs) from 8074 - 8248 R (2548 - 2510 m) - THAYVES FORMATION
Drilled to TD, logged, stopped at 8750 R (2657 m), reamed light spot at 8750 R (2657 m), attempted to rig, stopped at 8991 R (2706m) and logged (7.4 hrs)

h/c
Max on orders (12 hrs) and abandoned (42 hrs)
Maximum Inclination: 35.0° at 10622 R (3258 m)
Days: 65

Exxon Rockledge Unit #1 12-93N-18W

Spud: September 9, 1996
TD: 15716 R (5116 m)
Formation at TD: Bighorn
Total Days: (Spud to RR) 192
Well Type: Directional
Raming Hours: 133

Surface: 2392 R (887 m) / 14.78 m (375 min) / 10.75 m (273.1mm) cap
Mud System: Spud Mud (Gel Slurry) - LCM added from 100 - 2268 R (30 - 691 m)
Highest MW: 9.0 ppg (1078 kg/m³) at 2020 R (618 m)
Comments: Last production (7 hrs) at 208 R (61 m), mixed and pumped LCM pill - mud weight was 8.5 ppg (1018 kg/m³)
Last production (1 hr) at 1205 R (368m), mixed and pumped LCM pill - mud weight was 8.5 ppg (1021 kg/m³)
and production (1.8 hrs) at 208 R (61m), mixed and pumped LCM pill - mud weight was 15.0 ppg (1578 kg/m³)
Drilled to 2268 R (691 m), logged (8.5 hrs), run and cemented casing (20 hrs) to 2265 R (687 m)
Maximum Inclination: 1.2° at 2248 R (685 m)
Days: 10

Intermed: 2265 - 16780 R (687 - 5119m) - 8.5 m (241 mm) / abandoned
Mud System: Low-Solids Ion-Dispersed from 2268 - 15716 R (691 - 4787 m)
Reamed from 15738 - 16732 R (4797 - 5113 m) - MW was 7.9 - 8.0 ppg (847 - 858 kg/m³)
Highest MW: 8.9 ppg (1058 kg/m³) at 8790 R (2667m) - COMMISSARY THRUST FORMATION
Comments: At 2268 R (691 m), WOC, rig up, lost BOP and 6H out (71 hrs), leaked to BSW of 2.2 ppg (1102 kg/m³)
Reamed (1.5 hrs) underweight hole from 4893 - 4885 R (1488 - 1514 m) - DINKWOODY FORMATION
Drilled to 5122 R (1564 m), FIB alarm went off and removed a Barite pill
Reamed (2 hrs) from 5100 - 5240 (1587 - 1602 m) - MADISON FORMATION
At 6487 R (1977 m), L/D directional equipment, PU magnet, failed, mixed on top, worked and reamed (2 hrs) from 6445 - 6487 R (1964 - 1977 m) - 34 hrs
At 6549 R (2027 m), checked surface equipment for pressure loss and reamed from 6597 - 6649 R (1989 - 2027 m) - MADISON FORMATION
At 6780 R (2079 m), pumped Barite pill, lost BOP's, make up hole and lost (28 hrs) and reamed (2.5 hrs) from 6240 - 6780 R (1902 - 2079 m) - MADISON/COMMISSARY
Drilled to 9202 R (2815 m), worked stuck pipe, spot Diesel and worked (1 - 1.5 hrs) - COMMISSARY THRUST
At 10891 R (3286 m), laid down structural equipment (7 hrs), lost BOP's (9.5 hrs), worked and reamed (6.5 hrs) from 8731 - 10861 R (2691 - 3286 m) - COMMISSARY THRUST
At 11208 R (3431 m), stuck at 11622 R (3482 m) on pipe, reamed and reamed (6.5 hrs) from 11110 - 11208 (3386 - 3431 m) - COMMISSARY THRUST
Reamed (2.7 hrs) from 10884 - 11524 R (3256 - 3513 m) - COMMISSARY THRUST
Drilled to 11951 R (3643 m), rig repair (1 hr) and reamed (3.7 hrs) from 11881 - 11951 R (3591 - 3643 m) - COMMISSARY THRUST/TANBER FORMATION
Drilled to 15738 R (4797 m), stopped, stuck at 14247 R (4336 m) - MADISON FORMATION, aimed attempt to back off, using slip, logged, abandoned at 15738 R (4797 m)
Reamed at 4838 R (1461 m) and drilled back to 14190 R (4325 m) - 37.1 days
Refrilled from 14100 - 15738 R (4325 - 4797 m) - 16 days
Drilled to TD, logged with no problem (81.5 hrs) and abandoned (84.8 hrs)
Maximum Inclination: 23.8° at 15101 R (4602 m)
Days: 152

American Quasar Petroleum, Hogback Ridge #1 20-13N-7E

Spud: January 9, 1977
TD: 10910 R (3325 m)
Formation at TD: Top Wells/Weber (Pennsylvanian)
Total Days: (Spud to RR) 209
Well Type: Directional
Raming Hours: Not specified

Surface: 1022 R (311 m) / 10.9 m (268 min) / 13.375 m (339.7 mm) cap
Mud System: Spud Mud (Gel Slurry)
Highest MW: 8.8 ppg (1030 kg/m³) at 814 R (278 m)
Comments: Run and cemented casing to 749 R (228 m)
Maximum Inclination: 1.9° at 1022 R (311 m)
Days: 5

Intermediate: 749 - 3716 R (228 m - 1132 m) - 12.25 m (311.2 mm) / 8.629 m (244.5 mm) cap
Mud System: Not available
Highest MW: 9 ppg (1078 kg/m³) at 2592 R (780 m)
Comments: Trip-out at 218 R (66 m) - BLADENBURG MEMBER FORMATION, Lost 140 bags (22 m³) mud from 2192 - 2197 R (668 - 669 m) - BLADENBURG MEMBER FORMATION - MW 8 ppg (1078 kg/m³). Retrieved fish at 1899 R (578 m)
FORMATION - MW 8 ppg (1078 kg/m³). Retrieved fish at 1899 R (578 m)
Drilled to 3718 R (1132 m), logged with no problems, run and cemented casing
Maximum Inclination: 4.0° at 3888 R (1194 m)
Days: 14

Liner 5: 3583 - 6142 R (1096 - 2481 m) - 7.62 m (193 mm)
Mud System: Not available. Diesel added at 1853 - 10793 R (2332 - 3271 m)
Highest MW: 8.1 ppg (1020 kg/m³) at 4936 R (1412 m)
Comments: Trip-out at 1504 R (457 m) - TOP THAYVES FORMATION, failed to fix. Added 12 bags (2 m³) diesel to the mud. Lost (30 hrs) mud at 6220 R (1922 m), recovered bridge at 6201 - 4231 R (1934 - 1217 m) & at 4471 - 4511 R (1383 - 1375 m) - occurred - TOP ANAVANNA (TRASSIC) FORMATION
Lost at 8142 R (2481 m). Backed off at 4140 R (1261 m) and fished successfully.
Drilled to 6142 R (2481 m), logged with no problems, run and cemented liner with 150 R (46 m) work.
Maximum Inclination: 25.0° at 5132 R (1578 m)
Days: 31

Liner 6: 7858 - 8858 R (2394 - 2697 m) - 5 m (127 mm). Test back 7.42 m (158 mm) from back from 3583 R (1096 m) to surface
Mud System: Not available
Highest MW: 8.3 ppg (1102 kg/m³) at 8812 R (2690 m)
Comments: Drilled to 9378 R (2881 m) & lost (15 hrs) (13 m³) - TOP DINKWOODY FORMATION. Drilled to 8812 R (2690 m) and logged hole with no problems
Run liner to 8808 R (2690 m) with no problems
Maximum Inclination: 32.9° at 9070 R (2784 m)
Days: 30

Liner 8: 9581 - 10107 R (2945 - 3034 m) - 2.875 m (73 mm)
Mud System: Not available
Highest MW: 10.3 ppg (1234 kg/m³) at 10098 R (3141 m)
Comments: Drilled to 10022 R (3031 m) & lost (0 hrs) (8.4 m³) and MW being - BASE REX CHEM. Drilled to 10910 R (3325 m) and logged hole with no problems
Run liner to 1007 R (3024 m) - TOP WELLS - WEBER (PENNSYLVANIAN) with no problems and abandoned the well
Maximum Inclination: none
Days: 43

Chevron Bear Canyon 24-23N-18W

Spud: September 14, 1985
TD: 15329 R (4697 m)
Formation at TD: Cretaceous
Total Days: (Spud to RR) 272
Well Type: Vertical
Raming Hours: 40.5

Surface: 3025 R (922 m) / 17.3 m (444.5 mm) / 13.375 m (339.7 mm) cap
Mud System: Spud Mud (Gel Slurry)
Highest MW: 9.1 ppg (1060 kg/m³) at 1250 R (381 m)
Comments: Lost circulation (35 hrs) at 276 R (84 m) - mud weight was 8.7 ppg (1042 kg/m³)
Last production - 250 bbls (40m³) at 1519 R (463 m), mixed and pumped LCM - mud weight was 9.1 ppg (1090 kg/m³)
Tripped off at 2168 R (658 m), fished and recovered (16.5 hrs)
Drilled to 3030 R (922 m), logged (27 hrs) with no problems, run and cemented casing (18.5 hrs) to 3030 R (925 m)
Intermediate: 13.375 m (339.7 mm) / 8.629 m (244.5 mm) cap
Maximum Inclination: 2.0° at 2987 R (894 m), 2982 R (890m) and 3035 R (925 m)
Days: 46

Intermediate: 3035 - 11733 R (923 - 3582 m) - 12.25 m (311.2 mm) / 8.629 m (244.5 mm) cap
Mud System: Light Dispersed Gel System
Highest MW: 9.0 ppg (1078 kg/m³) at 10208 (262m) - THAYVES FORMATION
Comments: Reamed (2.5 hrs) from 4187 - 4287 R (1275 - 1340 m) - MW was 8.1 ppg (1054 kg/m³) - PHOSPHORIA FORMATION
Treated off at 4615 R (1407 m), fished, recovered (18.5 hrs) and reamed (1.5 hrs) from 4289 - 4615 R (1370 - 1407 m) - WEBER FORMATION
Intermediate: 12.25 m (339.7 mm) / 8.629 m (244.5 mm) cap
Lapud hole (31 hrs) at 8161 R (2732 m) - THAYVES FORMATION
Drilled to 11788 R (3587 m), logged (16 hrs) with no problems, run and cemented casing (43 hrs) to 11752 R (3582 m) - PHOSPHORIA FORMATION
Maximum Inclination: 3.0° at 3030 R (924 m) and 9472 R (2898 m)
Days: 118

Liner 1: 11752 - 19328 R (3582 - 4977m) - 8.50 m (213.4 mm) / 7.0 m (177.8 mm) cap
Mud System: Light Dispersed Gel System
Highest MW: 8.9 ppg (1078 kg/m³) from 15795 - 19328 R (4801 - 4977 m) - CRETACEOUS FORMATION
Comments: At 11752 R (3587 m) WOC, rig up, lost BOP and 6H out (70 hrs) - WEBER FORMATION
Fished for core (27 hrs) at 12191 R (3716 m) - WEBER FORMATION
Intermediate: 12.25 m (339.7 mm) / 8.629 m (244.5 mm) cap
Reamed (2 hrs) underweight hole from 12450 - 13025 R (3785 - 3912 m) - WEBER FORMATION
Intermediate: 12.25 m (339.7 mm) / 8.629 m (244.5 mm) cap
Reamed from 13038 - 12918 R (3958 - 4852 m) - MW was 8.7 - 8.8 ppg (1042 - 1064 kg/m³)
Drilled to 19200 R (4538 m) and logged (80.3 hrs) with no problems - CRETACEOUS FORMATION
Drilled to TD, logged (26 hrs) with no problems, abandoned to run casing (70 hrs), run and cemented casing (27 hrs)
Prestressed, pumped string and completed (58.4 days)
Maximum Inclination: 2.0° at 12154 R (4612 m)
Days: 110

SURFACE USE PLAN

Attachment to the Application for Permit to Drill

Name of Operator: Fortuna (US) LP
Address: 3400, 888 - 3rd. Street S.W.,
Calgary, AB. T2P 5C5
Well Location: Hogback Ridge 17-13N-7E
Surface Location: 1,040' FSL & 704' FEL, SE/4 SE/4,
Target Location: 1,850' FNL & 295' FEL, SE/4 NE/4
Section 17, T13N, R7E, SLB&M
Rich County, Utah

The dirt contractor will be provided with an approved copy of the surface use plan of operations before initiating construction.

A private surface use agreement is required and pending at this time for use of the existing road from the six-mile creek road and construction of half of the new road to the east line of Section 17, T13N, R7E.

The BLM onsite inspection for the referenced well was conducted on Thursday, September 29, 2007 between 10:40 am and 12:30 pm. In attendance at the onsite inspection were the following individuals:

Len Moriarity – Fortuna (US), LP
Terry Forkheim – Fortuna (US), LP
Rod Schnell– Fortuna (US), LP
Mike Ford – Bureau of Land Management
Larry Garahana - Bureau of Land Management
Mike Gates - Bureau of Land Management
Allen Bass - Bureau of Land Management
Holly Roberts - Bureau of Land Management
Mike Nelson - Bureau of Land Management
Tyler Staggs - Bureau of Land Management
John Floyd – Uintah Engineering & Land Surveying
Chad Bigelow – Uintah Engineering & Land Surveying
Carlos Jallo – Buys & Associates, Inc.
Don Hamilton - Buys & Associates, Inc.

1. Existing Roads:

- a. The proposed well site is located approximately 8.53 miles northeast of Laketown, Utah.
- b. The use of roads under State Road Department maintenance is necessary to access the Hogback Ridge project area. An encroachment to leave the County maintained six-mile creek road is necessary and will be applied for and approved during with the federal approval process.
- c. The existing P&A well access road will be utilized from the six-mile creek road to a point where new access begins crossing entirely private lands. Surface use to mow, re-shape, re-gravel and utilize the private roads is being applied for at this time and will be in place prior to any construction activities.

- d. All existing roads will be maintained and kept in good repair during all phases of operation.
- e. Some mowing, re-shaping and re-graveling with 2-3" crushed gravel is required for the existing road.
- f. Existing access roads will be water sprayed if necessary to enhance compaction and dust control.
- g. Vehicle operators will obey posted speed restrictions and observe safe speeds commensurate with road and weather conditions.
- e. An off-lease federal right-of-way is not necessary for the existing access road since they cross private lands.

2. Planned Access Roads:

- a. From the existing P&A well road a new access is proposed trending southwest approximately 0.4 miles. The access spur consists of entirely new disturbance and crosses no significant drainages.
- b. A secondary egress road is also being proposed as shown within Exhibit 'B' and will only be used in the event of an emergency evacuation of the well site.
- c. A road design plan for either road is not anticipated at this time.
- d. The proposed access road will consist of a 14' minimum travel surface within a 30' disturbed area across entirely BLM (Section 17) and private (Section 16) managed lands.
- e. The secondary egress road will consist of a 10' wide by 300' long mowed path and will not be bladed.
- f. BLM approval to construct the new access corridor is requested with this application.
- g. A maximum grade of 10% will be maintained throughout the project.
- h. No turnouts are proposed since the access road is only 0.4 miles long.
- i. One low water / 18" culvert combination is required where the access road crosses the existing drainage. Adequate drainage structures will be incorporated into the remaining proposed road.
- j. No surfacing material will come from federal lands.
- k. No gates or cattle guards are anticipated at this time.
- l. The proposed access road does cross the Rocky Mountain Power maintained single phase powerlines. Approval to cross the powerlines is being applied for and will be in place prior to any construction activities.
- m. Surface disturbance and vehicular travel will be limited to the approved location access road.
- n. All access roads and surface disturbing activities will conform to the standards outlined in the Surface operating standards for oil and gas exploration and development (2006) and all designs will follow BLM manual 9113.

- o. The operator will be responsible for all maintenance of the access road including drainage structures.

3. Location of Existing Wells:

- a. One plugged and abandon well is located within a one mile radius of the proposed well. The well is a Dinwoody producer that was drilled in 1978 and 1979 and plugged and abandon in 1986.

4. Location of Production Facilities:

- a. All permanent structures will be painted a flat, non-reflective Olive Black to match the standard environmental colors. All facilities will be painted within six months of installation. Facilities required to comply with the Occupational Safety and Health Act (OSHA) may be excluded.
- b. Site security guidelines identified in 43 CFR 3163.7-5 and Onshore Oil and Gas Order No. 3 will be adhered to.
- c. A gas meter run will be constructed and located on lease within 500 feet of the wellhead. Meter runs will be housed and/or fenced. All gas production and measurement shall comply with the provisions of 43 CFR 3162. 7-3, Onshore Oil and Gas Order No. 5, and American Gas Association (AGA) Report No. 3.
- d. A two-tank battery will be constructed on this lease if production is achieved, it will be surrounded by a dike of sufficient capacity to contain the storage capacity of the largest tank. All loading lines and valves will be placed inside the berm surrounding the tank battery. All liquid hydrocarbons production and measurement shall conform to the provisions of 43 CFR 3162.7-3 and Onshore Oil and Gas Order No. 4 and Onshore Oil and Gas Order No. 5 for natural gas production and measurement.
- e. Any necessary pits will be properly fenced to prevent any wildlife and livestock entry.
- f. The site will require periodic maintenance to ensure that drainages are kept open and free of debris, ice, and snow, and that surfaces are properly treated to reduce erosion, fugitive dust, and impacts to adjacent areas.
- g. No gas pipeline is proposed with this application but will be requested once production is achieved.

5. Location and Type of Water Supply:

- a. Water to be used for drilling will be obtained through a direct purchase from Larry D. Johnson, P.O. Box 177 ; Randolph UT 84064 out of Six Mile Creek at the existing Six Mile Creek stock watering pond diversion.
- b. Water Right # 23-3785 (Change # pending)
- c. A temporary change of water has been applied for with the Utah State Engineers Office and is pending approval at this time.
- d. Fortuna proposes to utilize up to 3 acre feet of water from this diversion under the existing water right that has a May 2000 priority date.
- e. No water pipelines will be laid for this well. Water for this will be hauled by truck on the road(s) shown in Exhibit B.
- f. No water well will be drilled for this well.

6. Source of Construction Material:

- a. The use of materials will conform to 43 CFR 3610.2-3.
- b. No construction materials will be removed from BLM lands.
- c. If any gravel is used, it will be obtained from a state approved gravel pit.

7. Methods of Handling Waste Disposal:

- a. All wastes associated with this application will be contained and disposed of utilizing approved facilities.
- b. Drill cuttings will be contained within a closed-loop drilling system.
- c. No reserve pit will be constructed on this location.
- d. No chemicals subject to reporting under SARA Title III (hazardous materials) in an amount greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the drilling, testing, or completion of the well. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, will be used, produced, stored, transported, or disposed of in association with the drilling, testing, or completion of the well.
- e. Trash will be contained in a trash cage and hauled away to an approved disposal site as necessary but no later than at the completion of drilling operations. The contents of the trash container will be hauled off periodically to the approved Rich County Landfill near Randolph, Utah.
- f. Produced fluids from the well other than water will be produced into a test tank until such time as construction of production facilities is completed. Any spills of oil, gas, salt water or other produced fluids will be cleaned up and removed.
- g. After initial clean-up, a 400 bbl tank will be installed to contain produced waste water. This water will be transported from the tank to an approved disposal well in southwest Wyoming.
- h. Any salts and/or chemicals, which are an integral part of the drilling system, will be disposed of in the same manner as the drilling fluid.
- i. Sanitary facilities will be on site at all times during operations. Sewage will be placed in a portable chemical toilet and the toilet replaced periodically utilizing a licensed contractor to transport by truck the portable chemical toilet so that its contents can be delivered to the Kemmerer Wastewater Treatment Facility in accordance with state and county regulations.

8. Ancillary Facilities:

- a. A drilling crew camp is not proposed with this application.

9. Well Site Layout: (See Exhibit B)

- a. The well will be properly identified in accordance with 43 CFR 3162.6.
- b. Access to the well pad will be from the northeast.

- c. The pad and road designs are consistent with BLM specification
- d. A pre-construction meeting with responsible company representative, contractors and the BLM will be conducted at the project site prior to commencement of surface-disturbing activities. The pad and road will be construction-staked prior to this meeting.
- e. The pad has been staked at its maximum size of 450' X 450'; however it will be constructed smaller if possible, depending upon rig availability. Should the layout change, this application will be amended and approved utilizing a sundry notice.
- f. All surface disturbing activities, will be supervised by a qualified, responsible company representative who is aware of the terms and conditions of the APD and specifications in the approved plans.
- g. All cut and fill slopes will be such that stability can be maintained for the life of the activity.
- h. Diversion ditches will be constructed as shown around the well site to prevent surface waters from entering the well site area.
- i. The site surface will be graded to drain away from the pit to avoid pit spillage during large storm events.
- j. The stockpiled topsoil (first 6 to 12 inches or maximum available) will be stored in a windrow on the uphill side of the location to prevent any possible contamination. All topsoil will be stockpiled for reclamation in such a way as to prevent soil loss and contamination.
- k. Pits will remain fenced until site cleanup.
- l. The blooie line will be located at least 100 feet from the well head.
- m. Water injection may be implemented if necessary to minimize the amount of fugitive dust.

10. Plans for Restoration of the Surface (Interim Reclamation and Final Reclamation):

- a. Site reclamation for a producing well will be accomplished for portions of the site not required for the continued operation of the well.
- b. Upon well completion, any hydrocarbons at the well site shall be removed in accordance with 43 CFR 3162.7-1. The portion of the location not needed for production facilities/operations will be re-contoured to the approximate natural contours.
- c. Following BLM published Best Management Practices the interim reclamation will be completed within 90 days of completion of the well to reestablish vegetation, reduce dust and erosion and compliment the visual resources of the area.
 - a. All equipment and debris will be removed from the area proposed for interim reclamation and the pit area will be backfilled and re-contoured.
 - 1. The area outside of the rig anchors and other disturbed areas not needed for the operation of the well will be re-contoured to blend with the surrounding area and reseeded as prescribed by the BLM.
 - b. Reclaimed areas receiving incidental disturbance during the life of the producing well will be re-contoured and reseeded as soon as practical.
- d. The Operator will control noxious weeds along access road use authorizations, well sites, or other applicable facilities by spraying or mechanical removal. A list of noxious weeds may be obtained from the BLM or the appropriate County Extension Office. On BLM administered land, it is required that a Pesticide Use Proposal be submitted and approved

prior to the application of herbicides, pesticides or possibly hazardous chemicals.

- e. Prior to final abandonment of the site, all disturbed areas, including the access road, will be scarified and left with a rough surface. The site will then be seeded and/or planted as prescribed by the BLM. The BLM recommended seed mix will be detailed within their approval documents.

11. Surface and Mineral Ownership:

- a. Surface Ownership – Federal under the management of the Bureau of Land Management – Salt Lake Field Office, 2370 South 2300 West, Salt Lake City, Utah 84119; Phone: 801-977-4300.
- b. Mineral Ownership – Federal under the management of the Bureau of Land Management – Salt Lake Field Office, 2370 South 2300 West, Salt Lake City, Utah 84119; Phone: 801-977-4300.

12. Other Information:

- a. Buys & Associates, Inc. will conduct a Class III archeological survey. A copy of the report will be submitted under separate cover to the appropriate agencies by Buys & Associates, Inc.
- b. Buys & Associates, Inc will conduct a T&E, Sage Grouse and Pigmy Rabbit survey. A copy of the report will be submitted under separate cover to the appropriate agencies by Buys & Associates, Inc.
- c. Our understanding of the results of the onsite inspection are:
 - a. No drainage crossings that require additional State or Federal approval are being crossed.
 - b. No road engineering is required for the existing or proposed access roads.
 - c. A deer and elk wintering seasonal closure restriction will apply.
 - d. A weed and fire management plan are being included with this APD.

13. Operator's Representative and Certification

<u>Title</u>	<u>Name</u>	<u>Office Phone</u>
Supervisor, Surface Land Acquisition	Len Moriarity	1-403-237-1448
Drilling Engineer	Rod Schnell	1-403-237-1413
Agent for Fortuna (US) LP	Don Hamilton	1-435-719-2018

Certification:

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which currently exists; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by Fortuna (US) LP and its contractors and subcontractors in conformity with this APD package and the terms and conditions under which it is approved. I also certify responsibility for the operations conducted on that portion of the leased lands associated with this application, with bond coverage being provided under Fortuna's BLM bond. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Signature: Don Hamilton Date: 7-16-07

Fortuna (US), LP

Hogback Ridge Project

Noxious Weed Management Plan

July 2007

Table of Contents

- 1.0 Introduction
 - 1.1 Plan Purpose
 - 1.2 Goals and Objectives
- 2.0 Noxious Weed Inventory
- 3.0 Noxious Weed Management
 - 3.1 Preventative Measures
 - 3.2 Treatment Methods
 - 3.3 Education
- 4.0 Monitoring
- 5.0 Herbicide Application, Handling, Spills and Cleanup
 - 5.1 Herbicide Application and Handling
 - 5.2 Herbicide Spills and Cleanup
 - 5.3 Worker Safety and Spill Reporting

1.0 Introduction

This plan was developed to identify noxious weed control practices that would be implemented for the Hogback Ridge Project. Noxious weeds have the potential to invade areas disturbed by construction and may spread along the cleared areas of the development. Soil disturbance may also allow weed seed already present to germinate and grow. Several laws, regulations, and policies govern the management of noxious weeds on public and private lands. Under the Noxious Weed Act, county, state, and federal agencies are charged with the responsibility to identify and control invasive plant species that are harmful to public health, crops, livestock, land, or other property. Utah specifies that each property owner has the responsibility to control noxious weeds on lands in their possession or under their control. County weed boards may issue individual notices requiring control of noxious weeds on a particular property, and can cause weeds to be controlled with all expenses to be paid by the person in possession of the property.

1.1 Plan Purpose

The purpose of this plan is to prescribe methods to prevent and control and spread of noxious weeds during the proposed project. Fortuna (US) LP, (Fortuna) and the Contractors would be responsible for carrying out the methods described in this plan.

This plan is applicable to the construction of well locations, access roads and pipeline corridors, improved access roads, extra workspaces and Contractor laydown and staging areas.

1.2 Goal and Objectives

The goals of weed control are to implement measures to prevent the spread of noxious weeds during drilling operations and to implement prescribed treatments to eliminate, to the extent possible, the invasion of noxious weeds from surrounding lands. Monitoring during the construction and operational phases will ensure that the weed management goals are achieved.

2.0 Noxious Weed Inventory

Prior to work commencement, BLM or County Weed Control personnel will identify known existing noxious weed infestations in the project area where clearing will be required. The results of this knowledge will be reported as one of the following: 1) areas that are weed free; 2) areas that are weed free, but where noxious weed populations have been identified within 200 feet of the proposed disturbance areas; and 3) areas that contain noxious weed populations within the areas proposed for disturbance. Early identification of existing infestations will help to minimize the spread of noxious weeds by identifying sites where preventative measures will need to be implemented. Information available through the

County will include species identified within or adjacent to the project area, locations of infestations, and extent of infestations.

3.0 Noxious Weed Management

Weeds are spread by a variety of means including vehicles, construction equipment, construction and reclamation materials, livestock, wildlife and recreational activities. Implementation of preventative measures to control and spread of noxious weeds is the most cost-effective management approach.

3.1 Preventative Measures

All known concentrations of noxious weeds will be identified prior to the clearing of vegetation. Any infestations will be recorded for reference in clearing for construction and for post-construction monitoring.

At appropriate growth stages for the specific species present in a given location, Fortuna will conduct pre-construction noxious weed control by herbicide spraying to kill and weaken weeds, and prevent seed formation. Other methods such as hand-pulling may be necessary adjacent to water resources, or rare or sensitive plant populations, etc. All herbicide spraying will be completed by a State/County-approved and licensed applicator. All spraying on federal lands will be completed in accordance with an herbicide application plan approved by the appropriate land management agency. The application plans will be prepared and approved by the land management agency and will conform to county noxious weed treatment requirements. Proposed weed control programs on private lands will be reviewed and approved by the landowner and local weed control districts.

All project vehicles, including personal vehicles and equipment will arrive at the work site clean and weed-free.

In areas where weed infestations have been identified, Fortuna Contractor will stockpile cleared vegetation and salvaged topsoil adjacent to the area from which they are stripped to eliminate transport of soil-borne noxious weed seeds, roots, or rhizomes. During reclamation, the stripped soil will be treated and returned to the same infestation site where they were stripped.

Fortuna Contractor will thoroughly clean the equipment for clearing, topsoil salvage and topsoil redistribution to remove seeds, roots, and rhizomes prior to transport from the weed-infested site.

Noxious weed free certification will be required for all straw or hay bales used on the project for erosion control, any mulches, and seed applied in reclamation. Certification must be valid for the state in which it will be used.

Fortuna will implement a noxious weed control program on all disturbed areas that will continue over the life of the project.

Any noxious weed program conducted within the project area will be conducted in cooperation with neighboring landowners. On non-federal lands, Fortuna may be responsible for control of new weed invasions on areas cleared in association with the project, depending on agreements made among private landowners, weed control districts, and other entities. On federal lands, Fortuna is responsible for all noxious weed control on new areas of disturbance, regardless of origin.

3.2 Treatment Methods

Fortuna will implement noxious weed control measures as determined in consultation with the affected agencies. The appropriate duration of control measures carried out by Fortuna and how those measures will be coordinated with adjacent landowners and the Weed Control Districts will be provided by the regulatory agencies. The noxious weed controls will be in accordance with existing regulations and jurisdictional land management agency or landowner agreements. When identified weed populations are in their appropriate growth stage for effective herbicide control, appropriate herbicides will be applied to the identified weed infestations prior to initiation of construction to reduce the spread or proliferation of weeds. Post-construction control measures may include one or more of the following methods.

Mechanical methods rely on equipment that is used to disc weed populations. If disking is used, subsequent seeding will be conducted to reestablish a desirable vegetative cover to stabilize soils and slow potential re-invasion of noxious weeds. In the event an area is not seeded until the following spring because of weather or scheduling constraints, all annuals and undesirable vegetation that have become established will be eradicated prior to seeding.

Herbicide application can be an effective means of reducing the size of or eradicating noxious weed populations. Applications will follow a strict adherence to label specifications and will be controlled, as described in Section 5.1, to minimize the impacts on the surrounding, desired vegetation. In areas of dense weed infestation, a broad application may be appropriate, followed by a seeding program. Supplemental seeding will be based on the criteria in the Reclamation Plan contained in this application. The timing of subsequent revegetation efforts will be based on the persistence of the selected herbicide.

The Contractor will inspect areas proposed for disturbance and then conduct pre-construction noxious weed control using herbicide spray as appropriate. Herbicide treatment is designed to kill or weaken weeds, and prevent seed formation if site conditions are acceptable. All herbicide application will be completed by a state-approved and licensed applicator. Proposed weed control programs on private lands will be reviewed and approved by the landowner and local weed control districts.

Post-construction treatment methods for areas with continuing weed infestations will be based on species-specific conditions (e.g., proximity to water or wetlands, agricultural areas, time of year) and will be coordinated with the local regulatory offices.

The importance of timing of control methods for each species should be emphasized. When methods are implemented at the wrong time, they may be ineffective or stimulate additional growth or seed production by the noxious weed. Also note that some species are so persistent that a combination of methods potentially in multiple years may be necessary for successful control. A one-time application of a control method is rarely sufficient to control a noxious weed population. Follow-up applications, combined with sustained monitoring, is necessary to control, contain, and in some cases, eradicate populations of noxious weeds. The duration and long-term responsibility of monitoring and noxious weed management by Fortuna will be provided by the regulatory agencies.

3.3 Education

The Contractor and Fortuna will provide information to their employees regarding noxious weed identification, management, and impacts on agriculture, livestock and wildlife. The critical importance of preventing the spread of noxious weeds in areas not infested, and controlling the proliferation of weeds already present will be explained. The importance of adhering to measures to prevent the spread of noxious weeds will be stressed (e.g., not driving off road, cleaning vehicles that collect soil and seeds and quickly identifying new infestations of noxious weeds).

4.0 Monitoring

Fortuna will monitor for noxious weeds after completion of each project for a period specified by the affected agencies. The appropriate duration of monitoring to be carried out by Fortuna will be provided by the regulatory agencies. Surveys will be conducted as early in the year as feasible to identify and treat noxious weeds before they produce seed. Areas where field surveys will be conducted every year include: 1) invasion or infestation sites on newly disturbed and/or reclaimed land identified during post-project monitoring surveys, by local agencies, or by the environmental inspector; 2) sites adjacent to existing noxious weed infestations; and 3) areas previously treated for noxious weeds. Field survey information, including species identified, locations of infestations, and extent of infestations, will be submitted to the local regulatory office involved (e.g. BLM or Weed Control District).

5.0 Herbicide Application, Handling, Spills and Cleanup

5.1 Herbicide Application and Handling

Herbicide selection will be based on information gathered from the Weed Control Districts and land management agency. Prior to herbicide application, Fortuna or the Contractor will obtain any required permits from the local authorities. The herbicide application will be performed by a licensed contractor in accordance with all applicable laws and regulations.

Herbicide EPS label instructions will be strictly adhered to. Application of herbicides will be suspended when any of the following conditions exists:

- Wind velocity exceeds 6 miles per hour for application of liquids or 15 miles per hour for application of granular herbicides;
- Snow or ice covers the foliage of noxious weeds;
- Precipitation is occurring or is imminent.

Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used primarily in open areas that are readily accessible by vehicles. Hand application methods (e.g., backpack spraying) that target individual plants will be used to treat small, scattered weed populations in rough terrain or within the boundaries of the two WSA's. Calibration checks of equipment will be conducted at the beginning of spraying and periodically to ensure that proper application rates are being achieved.

Herbicides will be transported daily to the project site with the following provisions:

- Only the quantity needed for that day's work will be transported;
- Concentrate will be transported only in containers and in a manner that will prevent tipping or spilling, and in a compartment that is isolated from food, clothing and safety equipment; and
- Mixing will only be conducted on-site and only at a distance greater than 200 feet from open or flowing water, wetlands, or other sensitive resources.

All herbicide equipment and containers will be inspected daily for leaks.

5.2 Herbicide Spills and Cleanup

All reasonable precautions will be taken to avoid spilling herbicides. In the event of an herbicide spill, cleanup required immediate action that is based on adequate preparation. A spill kit carried on Contractor vehicles and kept in herbicide storage areas will allow quick and effective response to spills. Items to be included in a spill kit are:

- Protective clothing and gloves
- Absorbent clay, "kitty litter" or other commercial absorbent
- Plastic bags and bucket
- Shovel
- Fiber brush and screw-in handle
- Dust pan
- Caution tape
- Highway flares (use on established roads only) and
- Detergent

Response to a herbicide spill will vary with the size and location of the spill, but general procedures include:

- Traffic control
- Dressing the cleanup team with protective clothing
- Stopping the leaks
- Containing the spilled material
- Cleaning up and removing the spilled herbicide and contaminated absorptive material and soil, and
- Transporting the spilled pesticide and contaminated material to an authorized disposal site.

5.3 Worker Safety and Spill Reporting

All herbicide contractors will obtain and have readily available copies of the appropriate EPA Material Safety Data Sheets (MSDS) for the herbicides being used. Herbicide spills will be reported in accordance with all applicable laws and requirements.

Fortuna (US), LP

Hogback Ridge Project

Fire Prevention and Control Plan

July 2007

TABLE OF CONTENTS

- 1.0 Introduction
- 2.0 Purpose
- 3.0 Standard Fire Prevention Measures
 - 3.1 Training
 - 3.2 Fire Guard
 - 3.3 Smoking
 - 3.4 Burning
 - 3.5 Spark Arresters
 - 3.6 Vehicle Parking, Operation And Refueling
 - 3.7 Blasting
 - 3.8 Fire Control Equipment
 - 3.9 Restricted Operators
- 4.0 Extreme Fire Prevention Measures
- 5.0 Fire Control Measures

LIST OF TABLES

- Table F-1 Emergency Fire Control Contacts

1.0 INTRODUCTION

This Fire Prevention and Control Plan identifies measures to be taken by Fortuna (US) LP (Fortuna) and its construction contractor, to prevent and suppress all fires in accordance with federal, state and local regulations. Measures identified in this plan, apply to work within the project area defined as the Hogback Ridge Project Area. It is the Contractor's responsibility and obligation to take the initial and independent action to control and suppress all fires resulting from its operations regardless of the location or extent of such fires.

2.0 PURPOSE

The risk of fire danger during pipeline construction operations are related to smoking, spark arresters, catalytic converters, vehicle fires, and normal operation and refueling of equipment. This plan described standard fire prevention measures, prevention measures to be taken during extreme fire hazard conditions, as well as procedures to be taken to control a fire in the event one is accidentally started. The fire prevention and suppression measures described in this plan will be in effect from the beginning to the end of the project.

3.0 STANDARD FIRE PREVENTION MEASURES

3.1 Training

The contractor will ensure that all personnel are familiar with the measures and procedures of this plan. The contractor will also inform each construction crew member of fire dangers, locations of extinguishers and equipment, and inform individuals of their responsibilities for fire prevention and suppression during regular safety briefings.

3.2 Fire Guard

During field activities, the contractor will have a designated representative in charge of fire control on the job at all times. The contractor will designate a Fire Guard for each component of the project. The Fire Guard must be physically able, vigilant, and suitably trained to detect fires and use required fire-fighting equipment. The Fire Guard may perform other functions during implementation in addition to their Fire Guard responsibilities. The Fire Guard will be identified by a hard-hat decal and/or other appropriate/alternative designation.

3.3 Smoking

Smoking will be prohibited, except in designated areas. Designated areas will consist of an area cleared of flammable materials, in vehicles or other designated locations identified by the fireguard.

3.4 Burning

Burning of slash, brush, stumps, trash, or other project debris will be prohibited on the project, unless written authorization and approval is given by the appropriate land management agency or owner.

3.5 Spark Arresters

Internal combustion engines will be equipped with spark arresters unless it is:

1. Equipped with a turbine-driven exhaust supercharger.
2. A passenger vehicle or light truck equipped with a factory designed muffler and exhaust system in good working condition.
3. A heavy truck or other vehicle used for heavy hauling, equipped with a factory designed muffler and with a vertical stack exhaust system extending above the cab.

3.6 Vehicle Parking, Operation And Refueling

No motorized equipment, including worker transportation vehicles, will be driven or parked outside of the designated and approved working areas. Gasoline, oil and lubricants will be transported in approved containers in accordance with the National Fire Protection Association Code. Glass containers will not be used to store gasoline or other flammable materials.

3.7 Blasting

If blasting is required, blasting-related fire prevention measures will be included in a blasting plan that will be developed and approved by the appropriate state agencies.

3.8 Fire Control Equipment

Each crew will have fire tools, including extinguishers, shovels and axes, available in the event a fire occurs. All motorized vehicles operated off roads on project sites will be equipped with a minimum 10-pound ABC extinguisher. All motorized equipment operated off roads will be equipped with a fire shovel and axe.

The Contractor shall have on-site and available for use, within 1 to 1.5-hour response time, a water tanker having a capacity of 500 gallons. The tanker will have a pressure pump, an adjustable nozzle, and a minimum of 200-feet of hose and/or a helicopter water drop apparatus for immediate response.

3.9 Restricted Operators

The Contractor will comply with all fire restrictions on federal lands at the direction of the Authorized Officer. Restrictions may vary from stopping specific operations at a given time or completely shutting down operations. The Company may obtain a written waiver, to continue some or all operations if acceptable precautions are approved and implemented. A list of precautions that will be taken during a fire restriction is provided in Section 4.0.

4.0 EXTREME FIRE PREVENTION MEASURES

In the event of extreme fire conditions, fire closures may result in all or part of the construction operations being suspended. Depending on site specific fire danger and hazards, the local land management agency may elect to waive all or part of the prohibitions in the fire closure. Conditions that shall be met in the event a waiver is granted shall be specified by the local land management agency. The following measures may be implemented, if approved by the appropriate land management agency, in order to be granted a waiver to some or all restrictions.

1. All work areas will be inspected one hour after the end of authorized activities each day to ensure no ignitions have occurred.

2. A mobile water tank, containing a minimum of 200-gallons of water, with 200-feet of hose line will be located within the general area and in communication of any type of machine that is powered by an internal combustion engine and any motor vehicles (including heavy equipment) being operated off roads.
3. All helicopters associated with the project or concurrent projects will be equipped with a drop apparatus (bucket) to facilitate fire-fighting efforts. Each pilot will be familiar with the use of the equipment and the closest available water source (the Green River).
4. All personnel familiar with operations will be instructed to watch for fire ignitions and have communication to both the helicopters and/or the water truck.

5.0 FIRE CONTROL MEASURES

The Company will notify the Authorized Officer of any fires during implementation of the project. The Contractor will comply with all rules and regulations administered by the Authorized Officer concerning the use, prevention and suppression of fires on federal lands. In the event of a fire, the following actions will be taken:

1. The Contractor will take the initial fire suppression action in the work area and the Fire Guard will be notified.
2. The Fire Guard will direct the suppression activities, contact the Company and appropriate Authorized Officer and fire dispatch center, and determine whether or not to request the assistance from the local fire emergency response agency (see Table 1). The Company or Authorized Officer may also determine to contact a fire emergency response agency.

July 2007
CONTINGENCY AND COMMUNICATIONS CONTACTS

Fortuna (US) LP

888-3rd ST SW, Calgary Alberta, Canada T2P 5C5

Title	Name	Numbers
Drilling Superintendent	Ron MacDonald	Office: 403-237-1461 Mobil: 403-998-5799
Drilling Engineer	Rod Schnell	Office: 403-237-1413 Mobil: 403-813-3041
Drilling Foreman	TBA	Office: Mobil:
Completions Foreman	TBA	Office: Mobil:
Safety Engineer	TBA	Office: Mobil:

B. Emergency Services Phone List

Notify BLM Law Enforcement Immediately

BLM Ranger Dave Gibbins

307-828-4544

Cell

307-727-6177

If BLM Law Enforcement cannot be contacted, notify Wyoming Highway Patrol:

Division Office, Rock Spring

307-352-3110

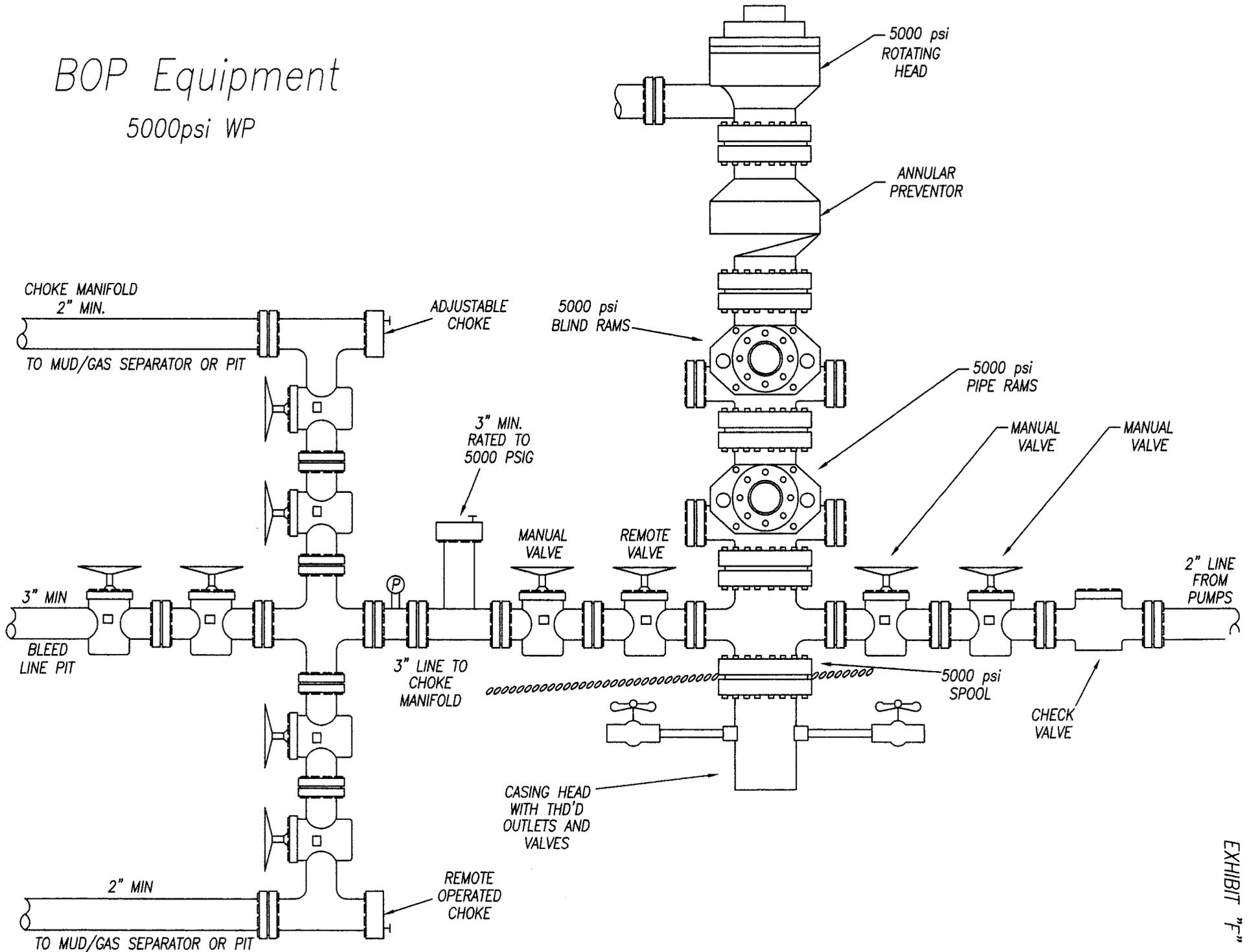
Emergency & Accident Information

800-442-9090

Lincoln County:

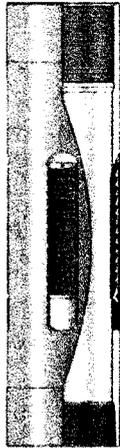
BOP Equipment

5000psi WP

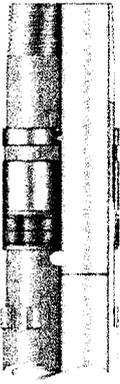


Customer: **Talisman Energy**
Attention: **Mr. Rod Schnell**
Date: **April 27, 2007**

Quote No: **07235-PSH-DK**
Procedure No:



PSHR
Pocket Slip
liner hanger



FSP
Tieback/packer



PSRT
Retrievable
Cementing Bushing
profile



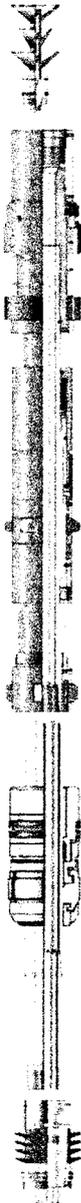
BC
Ball Catch



402 Float Collar



303
Float Shoe

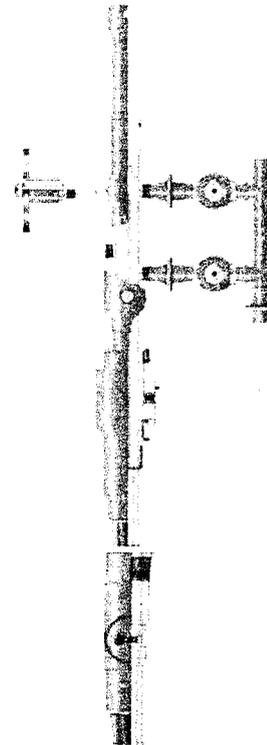


PDPC
Pump down plug

STPR
Setting Tool

RCB
Retrievable
Cement
Bushing

LWPC
Liner wiper plug



CHMD heavy
duty plug
dropping cement
head c/w
manifold and
swivel

CSF
Flag Sub

Equipment Specifications:

Hanger OD:	8.37"
Hanger ID:	7.31"
Tieback OD:	8.00"
Tieback ID:	7.25"
Liner Hanging Capacity:	845,731lbs
Bypass at Hanger Unset:	7.762" ²
Bypass at Hanger Set:	6.299" ²

Customer: **Talisman Energy**
Attention: **Mr. Rod Schnell**
Date: **April 27, 2007**

Quote No: **07235-PSH-DK**
Procedure No:

*** GENERAL TERMS AND CONDITIONS ***

- 1) All equipment and service prices listed in US Dollars.
- 2) All prices are guaranteed for 30 days unless otherwise specified.
- 3) A thread inspection charge for all rental equipment will be invoiced following the completion of each job.
- 4) Smith Services hereby limits it's liability for costs associated with or as a direct result of material defects, misapplication or operator error for products and services supplied by Smith Services. Liability will be limited to the quoted or published price of such products and services.

*** GENERAL RENTAL TERMS ***

- 1) Rental rates are quoted on a **per job** basis.
- 2) Minimum rental applies to each tool and will be charged per 30 day period unless otherwise specified.
- 3) Purchase items not returned to Smith Services in new and saleable condition will be charged to Lessee's account at current published prices.
- 4) Upon completion of the terms of this agreement, after the rental equipment has been returned to Smith Services facility, inspection, repairs, replacement parts or labour required to return the tools to a serviceable condition will be charged to Lessee's account at current published prices.
- 5) All rental equipment that is lost in the well or is damaged beyond repair will be replaced by Smith Services and also charged to Lessee's account at current published prices.
- 6) All equipment inspection charges will be charged to Lessee's account.

*** GENERAL SERVICE TERMS ***

- 1) Operator's day rate commences on the day the Operator departs from our Casper, Wyoming facility and will continue until his return to same. Day rate will be charged for each calendar day or any portion thereof.
- 2) Operator's day rate does not include any cost for transportation, vehicle rental, hotels, meals, incidentals or airfares. Any such expenses will be charged to Lessee's account at quoted prices.



COMPLETION SYSTEMS
1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

LINER EQUIPMENT QUOTATION

Customer: **Talisman Energy**
Attention: **Mr. Rod Schnell**
Date: **April 27, 2007**

Quote No: **07235-PSH-DK**
Procedure No:

Liner Equipment Order Form

For Smith Office Use Only

ATTENTION (SMITH EDM.):
SALESMAN:
DATE ORDERED (m/d/y):
DATE REQUIRED:

WELL INFORMATION
LOCATION:
RIG NAME & No.:
FIELD CONTACT:
FIELD NUMBER:
CONFIRM DRILL STRING DATA: (SIZE,WT,GR)

SPECIAL INSTRUCTIONS/INSPECTIONS ETC.:



SMITH SERVICES

COMPLETION SYSTEMS

TALISMAN ENERGY

Wellbore
Technology

Liner Proposal

Customer Name: Talisman Energy
Well Name: Fortuna (US) LP-Rich County Utah Hogback
17-13N-7E
Prepared For: Mr. Rod Schnell
Quotation #: 07234-PSH-DK



LINER EQUIPMENT QUOTATION

COMPLETION SYSTEMS

1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

Customer: **Talisman Energy**
Attention: Mr. Rod Schnell

Date: April 27, 2007
Quote No: 07234-PSH-CS

Proposed Liner System

Run, hang and cement ~2035ft of 5" 18# VAM FJL liner in directional well bore with a hydraulically set standard pocket slip liner hanger system. This liner will be run below and set in an existing 7" liner.

Well Data

Well Name:	Fortuna (US) LP – Rich County, Utah, Hogback Ridge 17-13N-7E	
New Liner Specs:	10,300' – 12,335'	5" 18# L-80 VAM FJL
Existing Liner Specs:	3,800' – 10,450'	7" 26# L-80 BTC
Intermediate Specs:	0 – 4,000'	9.62" 43.5# L-80 LTC
Total Depth:	12,335' MD	
Hole Size:	6.125"	

Section A: Equipment Purchase

Item	Description	Total
1	5" 18# x 7" 26# P-110 Model PSH standard hydraulic set pocket slip hanger - hydraulic and mechanical setting capabilities - recessed flush pocket slips	\$8,850.00
2	5" 18# x 7" 26# L-80 Model PSTBR polish bore tieback receptacle - 6' TBR	\$7,335.00
3	5" 18# L-80 VAM FJL Model PSRT Retrievable Cement Bushing sub - RCB cementing profile - honed seal bore to maximize seal pressure performance	\$2,615.00
4	5" 18# L-80 VAM FJL Model BC ball catch landing collar - complete with shear down assembly and plug receiver landing collar. - ball catch seat for setting of hanger	\$3,250.00
5	Model SB Hydraulic setting ball	\$150.00
6	5" 18# L-80 VAM FJL Model 402 float collar - Sure-Seal spring loaded cement set poppet valve	\$1,425.00
7	5" 18# L-80 VAM FJL Model 303 float shoe - Sure-Seal spring loaded cement set poppet valve - cement filled rounded nose	\$1,150.00



LINER EQUIPMENT QUOTATION

COMPLETION SYSTEMS
1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

Customer: **Talisman Energy**
Attention: Mr. Rod Schnell

Date: April 27, 2007
Quote No: 07234-PSH-CS

Section A: Equipment Purchase

8	5" 18# Model LWPC liner wiper plug	\$850.00
9	3.5" Model PDPC running string pump down plug	\$490.00
Total for Equipment Purchase:		\$26,115.00

Note: The above prices do not include pricing for any premium connections.
5" 18# VAM FJL threads \$900.00each, 6 required = \$5,400.00

Section B: Rental Equipment

Item	Description	Total
1	Medium Base Model STP hydraulically activated Pocket Slip liner setting tool c/w 3.5" IF connection setting tool components: - locked in retrievable cement bushing sub and slick joint assembly	\$2,000.00/job Included
2	Model CHMD heavy duty plug dropping cement head - complete with manifold and swivel - 3.5" IF connection	\$1,500.00/job
Total for Equipment Rental		\$3,500.00 /job



LINER EQUIPMENT QUOTATION

COMPLETION SYSTEMS
1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

Customer: **Talisman Energy**
Attention: Mr. Rod Schnell

Date: April 27, 2007
Quote No: 07234-PSH-CS

Section C: Accessory Equipment - if required

Item	Description	Total
1	Circulating safety sub rental Must match the liner size, weight and connection	\$240.00/job
2	Model CFS plug launch indicator flag sub for the cement head (rental) 3.5" IF	\$265.00/job
3	Drill pipe rabbit (drift)	\$50.00/job
4	Pal-mix 110-R	\$130.00/ltr
5	Thread lock kit purchase	\$40.00/ea
6	A seal replacement and rental re-dress charge will be applicable following the completion of each job.	\$600.00/job
7	A thread inspection charge per connection will be applicable following the completion of each job.	\$55.00/ea
8	An assembly charge is applicable for liners assembled and not run.	\$ 800.00

Section D: Service Charges

1	Operator's supervision for liner installation	\$1,750.00/day
2	Operator's subsistence	N/C



LINER EQUIPMENT QUOTATION

COMPLETION SYSTEMS

1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

Customer: **Talisman Energy**
Attention: Mr. Rod Schnell

Date: April 27, 2007
Quote No: 07234-PSH-CS

Section E: Additional Notes and charges if applicable

- Please allow a minimum of 5 weeks for delivery of the liner system.
- All handling tools, slip elevators etc. supplied by Smith will be invoiced at published prices plus 25%
- Equipment manufactured with premium connections cannot be returned for credit.
- Additional cross over subs may be needed to match equipment to customer drill string. These cross over subs will be invoiced accordingly
- Overtime charges may be incurred for premium connections that are cut during overtime hours.
- Overtime charges may be incurred for jobs assembled during overtime hours.
- All liner systems 7" or larger must be transported to the rig by a third party transportation company
- Our general terms and conditions are attached for your review.
- **Our Operations personnel can be reached at 307-472-1011.**

We thank you for the opportunity to submit this pricing quotation and proposal and look forward to working with you on the completion of this project. Please contact me at **403-585-8771** if you have any questions or concerns.

Per:

Dave Kemick
Smith Services – Completion Systems

Customer: **Talisman Energy**
 Attention: **Mr. Rod Schnell**

Date: **April 27, 2007**
 Quote No: **07234-PSH-CS**



PSH
 Rotating Pocket Slip
 liner hanger



PSTBR
 Tie Back
 Receptacle



PSRT
 Retrievable
 Cementing Bushing
 profile



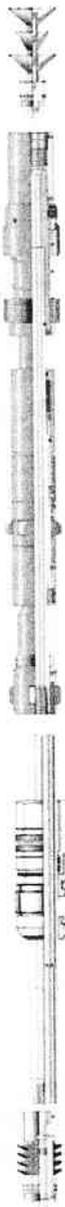
BC
 Ball Catch



402 Float Collar



303
 Float Shoe

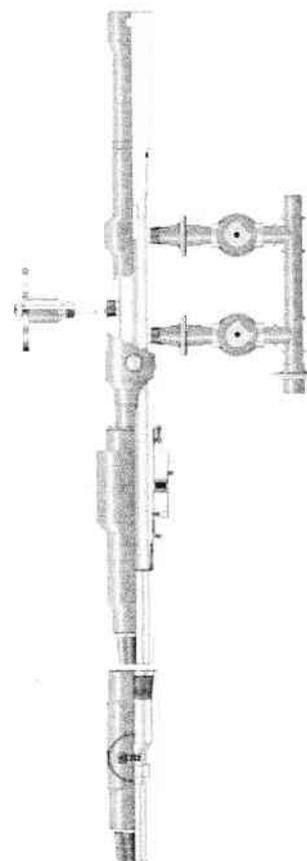


PDPC
 Pump down plug

STP
 Setting Tool

RCB
 Retrievable
 Cement
 Bushing

LWPC
 Liner wiper plug



CHMD heavy
 duty plug
 dropping
 cement head
 c/w manifold
 and swivel

CSF
 Flag Sub

Equipment Specifications:	
Hanger OD:	6.03"
Hanger ID:	5.12"
Tieback OD:	5.75"
Tieback ID:	5"
Liner Hanging Capacity:	545,971lbs.
Bypass at Hanger Unset:	4.168 ^{nZ}
Bypass at Hanger Set:	3.628 ^{nZ}



LINER EQUIPMENT QUOTATION

COMPLETION SYSTEMS
1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

Customer: **Talisman Energy**
Attention: Mr. Rod Schnell

Date: April 27, 2007
Quote No: 07234-PSH-CS

* GENERAL TERMS AND CONDITIONS *

- 1) All equipment and service prices listed in US Dollars.
- 2) All prices are guaranteed for 30 days unless otherwise specified.
- 3) A thread inspection charge for all rental equipment will be invoiced following the completion of each job.
- 4) Smith Services hereby limits its liability for costs associated with or as a direct result of material defects, misapplication or operator error for products and services supplied by Smith Services. Liability will be limited to the quoted or published price of such products and services.

* GENERAL RENTAL TERMS *

- 1) Rental rates are quoted on a **per job** basis.
- 2) Minimum rental applies to each tool and will be charged per 30 day period unless otherwise specified.
- 3) Purchase items not returned to Smith Services in new and saleable condition will be charged to Lessee's account at current published prices.
- 4) Upon completion of the terms of this agreement, after the rental equipment has been returned to Smith Services facility, inspection, repairs, replacement parts or labour required to return the tools to a serviceable condition will be charged to Lessee's account at current published prices.
- 5) All rental equipment that is lost in the well or is damaged beyond repair will be replaced by Smith Services and also charged to Lessee's account at current published prices.
- 6) All equipment inspection charges will be charged to Lessee's account.

* GENERAL SERVICE TERMS *

- 1) Operator's day rate commences on the day the Operator departs from our Casper, Wyoming facility and will continue until his return to same. Day rate will be charged for each calendar day or any portion thereof.
- 2) Operator's day rate does not include any cost for transportation, vehicle rental, hotels, meals, incidentals or airfares. Any such expenses will be charged to Lessee's account at quoted prices.



LINER EQUIPMENT QUOTATION

COMPLETION SYSTEMS

1600, 335 – 8th Avenue SW
Calgary, AB T2P 3C9 (403) 264-6077

Customer: **Talisman Energy**
Attention: Mr. Rod Schnell

Date: April 27, 2007
Quote No: 07234-PSH-CS

Liner Equipment Order Form

For Smith Office Use Only

ATTENTION (SMITH EDM.):
SALESMAN:
DATE ORDERED (m/d/y):
DATE REQUIRED:

WELL INFORMATION
LOCATION:
RIG NAME & No.:
FIELD CONTACT:
FIELD NUMBER:
CONFIRM DRILL STRING DATA: (SIZE,WT,GR)
KOP:
HOLE SIZE:

SPECIAL INSTRUCTIONS/INSPECTIONS ETC.:
--

HALLIBURTON

Talisman Energy Inc.
3400, 888-3rd St Sw
Calgary, Alberta T2P 5C5
Canada

Hogback Ridge #1

Rich County, Utah
United States of America

Cementing Recommendation

Prepared for: Mr. Rod Schnell
August 9, 2007
Version: 121451-2

Submitted by:
Matt Collins
Halliburton Energy Services
1125 17th Street #1900
Denver, Colorado 80202
303.501.9557

HALLIBURTON

Halliburton appreciates the opportunity to present this proposal and looks forward to being of service to you.

Foreword

Enclosed is our recommended procedure for cementing the casing strings in the referenced well. The information in this proposal includes well data, calculations, materials requirements, and cost estimates. This proposal is based on information from our field personnel and previous cementing services in the area.

Halliburton Energy Services recognizes the importance of meeting society's needs for health, safety, and protection of the environment. It is our intention to proactively work with employees, customers, the public, governments, and others to use natural resources in an environmentally sound manner while protecting the health, safety, and environmental processes while supplying high quality products and services to our customers.

We appreciate the opportunity to present this proposal for your consideration and we look forward to being of service to you. Our Services for your well will be coordinated through the Service Center listed below. If you require any additional information or additional designs, please feel free to contact myself or our field representative listed below.

Prepared by: _____
Sally Kroger
Procedure Analyst

Submitted by: _____
Matt Collins
Technical Advisor

SERVICE CENTER:	Rock Springs, Wy
PSL DISTRICT MANAGER:	Zane Cox
SERVICE COORDINATOR:	Randy Moore
PDC:	Cheyenne Scharf
CEMENT ENGINEERS:	Matt Lang
	Mark Husman
	Bridget Lawrence
PHONE NUMBER:	(307) 352.8600

Cementing Best Practices

1. Cement quality and weight: You must choose a cement slurry that is designed to solve the problems specific to each casing string.
2. Waiting time: You must hold the cement slurry in place and under pressure until it reaches its' initial set without disturbing it. A cement slurry is a time-dependent liquid and must be allowed to undergo a hydration reaction to produce a competent cement sheath. A fresh cement slurry can be worked (thickening or pump time) as long as it is in a plastic state and before going through its' transition phase. If the cement slurry is not allowed to transition without being disturbed, it may be subjected to changes in density, dilution, settling, water separation, and gas cutting that may lead to a lack of zonal isolation and possible bridging in the annulus.
3. Pipe movement: Pipe movement may be one of the single most influential factors in mud removal. Reciprocation and/or rotation mechanically breaks up gelled mud and changes the flow patterns in the annulus to improve displacement efficiency.
4. Mud properties (for cementing):
Rheology:
Plastic Viscosity (PV) < 15 centipoise (cp)
Yield Point (YP) < 10 lb/100 ft²
These properties should be reviewed with the Mud Engineer, Drilling Engineer, and Company Representative(s) to ensure no hole problems are created.
Gel Strength:
The 10-second/10-minute gel strength values should be such that the 10-second and 10-minute readings are close together or flat (i.e., 5/6). The 30-minute reading should be less than 20 lb/100 ft². Sufficient shear stress may not be achieved on a primary cement job to remove mud left in the hole if the mud were to develop more than 25 lb/100 ft² of gel strength.
Fluid Loss:
Decreasing the filtrate loss into a permeable zone enhances the creation of a thin, competent filter cake. A thin, competent filter cake created by a low fluid loss mud system is desirable over a thick, partially gelled filter cake. A mud system created with a low fluid loss will be more easily displaced. The fluid loss value should be < 15 cc's (ideal would be 5 cc's).
5. Circulation: Prior to cementing circulate full hole volume twice, or until well conditioned mud is being returned to the surface. There should be no cutting in the mud returns. An annular velocity of 260 feet per minute is optimum (SPE/IADC 18617), if possible.
6. Flow rate: Turbulent flow is the most desirable flow regime for mud removal. If turbulence cannot be achieved pump at as high a flow rate that can practically and safely be used to create the maximum flow energy. The highest mud removal is achieved when the maximum flow energy is obtained.
7. Pipe Centralization: The Cement will take the path of least resistance, therefore proper centralization is important to help prevent the casing from contacting the borehole wall. A minimum standoff of 70% should be targeted for optimum displacement efficiency.
8. Rat hole: A weighted viscous pill placed in the rat hole prior to cementing will minimize the risk of higher density cement mixing with lower density mud when the well is static.
9. Top and Bottom plugs: A top and bottom plug are recommended to be run on all primary casing jobs. The bottom plug should be run after the spacer and ahead of the first cement slurry.
10. Spacers and flushes: Spacers and/or flushes should be used to prevent contamination between the cement slurry and the drilling fluid. They are also used to clean the wellbore and aid with bonding. To determine the volume, either a minimum of 10 minutes contact time or 1000 ft. of annular fill, whichever is greater, is recommended.

Job Information

13 3/8 Surface Casing

Hogback Ridge #1	121451-1
17 1/2" Surface Open Hole	0 - 1500 ft (MD)
Inner Diameter	17.500 in
Job Excess	100 %
13 3/8" Surface Casing	0 - 1500 ft (MD)
Outer Diameter	13.375 in
Inner Diameter	12.415 in
Linear Weight	68 lbm/ft
Casing Grade	K-55
Mud Type	Water Based Mud
Mud Weight	8.50 lbm/gal
BHST	85 degF

Job Recommendation

13 3/8 Surface Casing

Fluid Instructions

Fluid 1: Water Spacer

FRESH WATER

Fluid Density: 8.34 lbm/gal

Fluid Volume: 40 bbl

Fluid 2:

VeriCem RS1

0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

Fluid Weight 12.30 lbm/gal

Slurry Yield: 2.36 ft³/sk

Total Mixing Fluid: 13.46 Gal/sk

Top of Fluid: 0 ft

Calculated Fill: 1000 ft

Volume: 247.44 bbl

Calculated Sacks: 588.93 sks

Proposed Sacks: 590 sks

Fluid 3:

Premium Cement

94 lbm/sk Premium Cement (Cement)

2 % Calcium Chloride (Accelerator)

Fluid Weight 15.80 lbm/gal

Slurry Yield: 1.17 ft³/sk

Total Mixing Fluid: 5.02 Gal/sk

Top of Fluid: 1000 ft

Calculated Fill: 500 ft

Volume: 130.31 bbl

Calculated Sacks: 628.01 sks

Proposed Sacks: 630 sks

Fluid 4: Water Spacer

Water Displacement

Fluid Density: 8.34 lbm/gal

Fluid Volume: 218.00 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	Spacer	8.3		40 bbl
2	Cement	Lead Cement	12.3		590 sks
3	Cement	Tail Cement	15.8		630 sks
4	Spacer	Displacement Fluid	8.3		218.00 bbl

HALLIBURTON

Cost Estimate

13 3/8 Surface Casing

Mtrl Nbr	Description	Qty	U/M	Base Amt	Unit Price	Gross Amt	Net Amt
7521	CMT SURFACE CASING BOM	1	JOB	0.00	0.00	0.00	0.00
	CEMENT EQUIPMENT & SERVICES						
2	MILEAGE FOR CEMENTING CREW,ZI Number of Units	300 1	MI	0.00	5.76	1,728.00	656.64
1	ZI-MILEAGE FROM NEAREST HES BASE,/UNIT Number of Units	300 1	MI	0.00	9.79	2,937.00	1,116.06
16091	ZI - PUMPING CHARGE DEPTH FEET/METERS (FT/M)	1 1500 FT	EA	0.00	4,935.00	4,935.00	1,875.30
74038	ZI PLUG CONTAINER RENTAL-1ST DAY DAYS OR FRACTION (MIN1)	1 1	EA	1,322.00	0.00	1,322.00	502.36
139	ADC (AUTO DENSITY CTRL) SYS, /JOB,ZI NUMBER OF UNITS	1 1	JOB	0.00	2,275.00	2,275.00	864.50
114	R/A DENSOMETER W/CHART RECORDER,/JOB,ZI NUMBER OF UNITS	1 1	JOB	0.00	1,285.00	1,285.00	488.30
132	PORT. DAS W/CEMWIN;ACQUIRE W/HES, ZI NUMBER OF DAYS	1 1	JOB	0.00	1,649.00	1,649.00	626.62
90	ZI QUICK LATCH ATTACHMENT SIZE IN INCHES/MILLIMETER INCHES/MILLIMETERS (IN/MM)	1 13.375 IN	JOB	0.00	616.00	616.00	234.08
101235693	PLUG,CMTG,TOP,13 3/8,HWE,11.79 MIN/12.72	1	EA	0.00	998.00	998.00	379.24
16115	FIELD STORAGE BIN ON SITE >8 HRS,DAY,ZI DAYS OR PARTIAL DAY(WHOLE NO.)	1 1	EA	0.00	1,344.00	1,344.00	510.72
11941	FIELD STORAGE BIN DELIVERY, ZI Number of Units	150 1	MI	0.00	9.79	1,468.50	558.03
	CEMENT SURCHARGES						
8	IRON SAFETY INSPECTION SURCHARGE /JOB ZI	1	JOB	0.00	83.00	83.00	83.00
7	ENVIRONMENTAL SURCHARGE,/JOB,ZI	1	JOB	0.00	134.00	134.00	134.00
86954	ZI FUEL SURCHG-CARS/PICKUPS<1 1/2TON Number of Units	300 1	MI	0.00	0.15	45.00	45.00
86955	ZI FUEL SURCHG-HEAVY TRKS >1 1/2 TON Number of Units	300 2	MI	0.00	0.45	270.00	270.00
87605	ZI FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS	150 61.16	MI	0.00	0.15	1,376.10	1,376.10
372867	Cmt PSL - DOT Vehicle Charge, CMT	5	EA	0.00	241.00	1,205.00	1,205.00
432487	CMT, Bulk Cement Surcharge	1220	EA	0.00	1.38	1,683.60	1,683.60
	CEMENTING MATERIALS						
452009	VARICEM (TM) CEMENT	590	JOB	0.00	0	39,901.70	15,162.65
101216940	POLY-E-FLAKE	74	LB	0.00	7.84	580.16	220.46
100064010	KWIK SEAL,FINE	148	LB	0.00	5.57	824.36	313.26
100003685	CLASS G / PREMIUM	630	SK	0.00	43.48	27,392.40	10,409.11
100005053	CALCIUM CHLORIDE HI TEST PLT	15	SK	0.00	251.00	3,765.00	1,430.70
76400	ZI MILEAGE,CMT MTLs DEL/RET MIN NUMBER OF TONS	150 61.16	MI	0.00	3.35	30,732.90	11,678.50
3965	HANDLE&DUMP SVC CHRg, CMT&ADDITIVES,ZI NUMBER OF EACH	1352 1	CF	0.00	5.49	7,422.48	2,820.54
	Total				USD		135,973.20
	Discount				USD		81,329.43

HALLIBURTON

<u>Mtrl Nbr</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Base Amt</u>	<u>Unit Price</u>	<u>Gross Amt</u>	<u>Net Amt</u>
	Discounted Total				USD		54,643.77

Primary Plant: Rock Springs, WY, USA
 Secondary Plant: Rock Springs, WY, USA

Price Book Ref: 01 Western US
 Price Date: 1/1/2007

<u>Mtrl Nbr</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Base Amt</u>	<u>Unit Price</u>	<u>Gross Amt</u>	<u>Net Amt</u>
7521	CMT SURFACE CASING BOM	1	JOB	0.00	0.00	0.00	0.00
	13 3/8" Float Equipment						
100004730	SHOE,GID,13 3/8 8RD,CEM	1	EA	0.00	1,004.00	1,004.00	381.52
100004487	CENTRALIZER-13 3/8"-CSG-17 1/2"-HINGED	10	EA	0.00	283.00	2,830.00	1,075.40
100005045	KIT,HALL WELD-A	3	EA	0.00	74.30	222.90	84.70
100004705	V ASSY,INSR FLOAT,13 3/8,8RD	1	EA	0.00	1,426.00	1,426.00	541.88
100004631	CLAMP - LIMIT - 13-3/8 - HINGED -	2	EA	0.00	80.00	160.00	60.80
	Total				USD		5,642.90
	Discount				USD		3,498.60
	Discounted Total				USD		2,144.30

Primary Plant: Rock Springs, WY, USA
 Secondary Plant: Rock Springs, WY, USA

Price Book Ref: 01 Western US
 Price Date: 1/1/2007

Job Information

9 5/8" Intermediate Casing

Hogback Ridge #1	121451-1
13 3/8" Surface Casing	0 - 1500 ft (MD)
Outer Diameter	13.375 in
Inner Diameter	12.415 in
Linear Weight	68 lbm/ft
Casing Grade	K-55
12 1/4" Open Hole	1500 - 4000 ft (MD)
Inner Diameter	12.250 in
Job Excess	50 %
9 5/8" Intermediate Casing	0 - 4000 ft (MD)
Outer Diameter	9.625 in
Inner Diameter	8.755 in
Linear Weight	43.50 lbm/ft
Casing Grade	L-80
Mud Type	Water Based Mud
Mud Weight	8.90 lbm/gal
BHST	125 degF

Job Recommendation

9 5/8" Intermediate Casing

Fluid Instructions

Fluid 1: Water Based Spacer
MUD FLUSH

Fluid Density: 8.40 lbm/gal
Fluid Volume: 40 bbl

Fluid 2:

EconCem RS4
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)
0.25 lbm/sk Kwik Seal (Lost Circulation Additive)

Fluid Weight 10.50 lbm/gal
Slurry Yield: 4.12 ft³/sk
Total Mixing Fluid: 26.01 Gal/sk
Top of Fluid: 0 ft
Calculated Fill: 2500 ft
Volume: 173.27 bbl
Calculated Sacks: 236.30 sks
Proposed Sacks: 240 sks

Fluid 3:

EconCem RS2
0.7 % Halad(R)-322 (Low Fluid Loss Control)
0.15 % Versaset (Additive Material)
3 lbm/sk Silicalite Compacted (Additive Material)
0.2 % HR-5 (Retarder)

Fluid Weight 14.20 lbm/gal
Slurry Yield: 1.26 ft³/sk
Total Mixing Fluid: 5.54 Gal/sk
Top of Fluid: 2500 ft
Calculated Fill: 1500 ft
Volume: 128.78 bbl
Calculated Sacks: 573.41 sks
Proposed Sacks: 580 sks

Fluid 4: Water Spacer
Water Displacement

Fluid Density: 8.34 lbm/gal
Fluid Volume: 294.56 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	Spacer	8.4		40 bbl
2	Cement	Lead Cement	10.5		240 sks
3	Cement	Tail Cement	14.2		580 sks
4	Spacer	Displacement Fluid	8.3		294.56 bbl

HALLIBURTON

Cost Estimate

9 5/8" Intermediate Casing

Mtrl Nbr	Description	Qty	U/M	Base Amt	Unit Price	Gross Amt	Net Amt
7522	CMT INTERMEDIATE CASING BOM	1	JOB	0.00	0.00	0.00	0.00
	CEMENTING EQUIPMENT AND SERVICES						
2	MILEAGE FOR CEMENTING CREW,ZI Number of Units	300 1	MI	0.00	5.76	1,728.00	656.64
1	ZI-MILEAGE FROM NEAREST HES BASE,/UNIT Number of Units	300 1	MI	0.00	9.79	2,937.00	1,116.06
16091	ZI - PUMPING CHARGE DEPTH FEET/METERS (FT/M)	1 4000 FT	EA	0.00	6,114.00	6,114.00	2,323.32
139	ADC (AUTO DENSITY CTRL) SYS, /JOB,ZI NUMBER OF UNITS	1 1	JOB	0.00	2,275.00	2,275.00	864.50
114	R/A DENSOMETER W/CHART RECORDER,/JOB,ZI NUMBER OF UNITS	1 1	JOB	0.00	1,285.00	1,285.00	488.30
132	PORT. DAS W/CEMWIN;ACQUIRE W/HES, ZI NUMBER OF DAYS	1 1	JOB	0.00	1,649.00	1,649.00	626.62
90	ZI QUICK LATCH ATTACHMENT SIZE IN INCHES/MILLIMETER INCHES/MILLIMETERS (IN/MM)	1 9.625 IN	JOB	0.00	616.00	616.00	234.08
16115	FIELD STORAGE BIN ON SITE >8 HRS,DAY,ZI DAYS OR PARTIAL DAY(WHOLE NO.)	1 1	EA	0.00	1,344.00	1,344.00	510.72
11941	FIELD STORAGE BIN DELIVERY, ZI Number of Units	300 1	MI	0.00	9.79	2,937.00	1,116.06
101214575	PLUG,CMTG, TOP,9 5/8,HWE,8.16 MIN/9.06 MA	1	EA	0.00	454.00	454.00	172.52
	CEMENT SURCHARGES						
86954	ZI FUEL SURCHG-CARS/PICKUPS<1 1/2TON Number of Units	300 1	MI	0.00	0.15	45.00	45.00
86955	ZI FUEL SURCHG-HEAVY TRKS >1 1/2 TON Number of Units	300 2	MI	0.00	0.45	270.00	270.00
372867	Cmt PSL - DOT Vehicle Charge, CMT	3	EA	0.00	241.00	723.00	723.00
7	ENVIRONMENTAL SURCHARGE,/JOB,ZI	1	JOB	0.00	134.00	134.00	134.00
8	IRON SAFETY INSPECTION SURCHARGE /JOB ZI	1	JOB	0.00	83.00	83.00	83.00
87605	ZI FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS	150 38.26	MI	0.00	0.15	860.85	860.85
432487	CMT, Bulk Cement Surcharge	820	EA	0.00	1.38	1,131.60	1,131.60
	CEMENTING MATERIALS						
13383	MUD FLUSH	1681	GAL	0.00	2.16	3,630.96	1,379.76
452992	ECONOCEM (TM) SYSTEM RS4	240	SK	0.00	0	25,209.60	9,579.65
101216940	POLY-E-FLAKE	30	LB	0.00	7.84	235.20	89.38
100064010	KWIK SEAL,FINE	60	LB	0.00	5.57	334.20	127.00
452992	ECONOCEM (TM) SYSTEM RS2	580	SK	0.00	0	31,540.40	11,985.35
100005050	HR-5	96	LB	0.00	11.07	1,062.72	403.83
76400	ZI MILEAGE,CMT MTLs DEL/RET MIN NUMBER OF TONS	150 38.26	MI	0.00	3.35	19,225.65	7,305.75
3965	HANDLE&DUMP SVC CHRg, CMT&ADDITIVES,ZI NUMBER OF EACH	1021 1	CF	0.00	5.49	5,605.29	2,130.01
	Total				USD		111,430.47
	Discount				USD		67,073.47
	Discounted Total				USD		44,357.00

HALLIBURTON

Primary Plant: Rock Springs, WY, USA
 Secondary Plant: Rock Springs, WY, USA

Price Book Ref: 01 Western US
 Price Date: 1/1/2007

<u>Mtrl Nbr</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Base Amt</u>	<u>Unit Price</u>	<u>Gross Amt</u>	<u>Net Amt</u>
7522	CMT INTERMEDIATE CASING BOM	1	JOB	0.00	0.00	0.00	0.00
	9 5/8" Float Equipment						
100004944	SHOE,FLOAT,9 5/8 8RD,4 1/4 SUPER SEAL	1	EA	0.00	1,579.00	1,579.00	600.02
100004812	CLR,FLT,9-5/8 LG 8RD 43.5-53.5PPF,4-1/4	1	EA	0.00	1,836.00	1,836.00	697.68
100004554	CTRZR ASSY,SPRL BL,LEFT HD,9 5/8 X 12	10	EA	0.00	1,035.00	10,350.00	3,933.00
100004555	CTRZR ASSY,SPRL BL,R HD,9 5/8 X 12 1/4	10	EA	0.00	1,035.00	10,350.00	3,933.00
100005045	KIT,HALL WELD-A	2	EA	0.00	74.30	148.60	56.47
	Total				USD		24,263.60
	Discount				USD		15,043.43
	Discounted Total				USD		9,220.17

Primary Plant: Rock Springs, WY, USA
 Secondary Plant: Rock Springs, WY, USA

Price Book Ref: 01 Western US
 Price Date: 1/1/2007

Job Information

7" Drilling Liner

Hogback Ridge #1	121451-1
9 5/8" Intermediate Casing	0 - 4000 ft (MD)
Outer Diameter	9.625 in
Inner Diameter	8.755 in
Linear Weight	43.50 lbm/ft
Casing Grade	L-80
8 3/4" Open Hole	4000 - 10450 ft (MD)
Inner Diameter	8.750 in
Job Excess	20 %
7" Drilling Liner	3800 - 10450 ft (MD)
Outer Diameter	7.000 in
Inner Diameter	6.276 in
Linear Weight	26 lbm/ft
Casing Grade	L-80
5" Drill Pipe	0 - 3800 ft (MD)
Outer Diameter	5.000 in
Inner Diameter	4.276 in
Linear Weight	19.50 lbm/ft
Mud Type	Water Based Mud
Mud Weight	9.10 lbm/gal

Job Recommendation

7" Drilling Liner

Fluid Instructions

Fluid 1: Water Spacer

TUNED SPACER

92 lbm/bbl Barite (Heavy Weight Additive)

Fluid Density: 10.50 lbm/gal

Fluid Volume: 40 bbl

Fluid 2:

EconoCem RS3

0.5 % HR-5 (Retarder)

Fluid Weight 14.20 lbm/gal

Slurry Yield: 1.31 ft³/sk

Total Mixing Fluid: 5.81 Gal/sk

Top of Fluid: 3400 ft

Calculated Fill: 7050 ft

Volume: 245.45 bbl

Calculated Sacks: 1050.40 sks

Proposed Sacks: 1055 sks

Fluid 3: Water Spacer

Water Displacement

Fluid Density: 8.34 lbm/gal

Fluid Volume: 318.88 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	TUNED SPACER	10.5		40 bbl
2	Cement	EconoCem RS3	14.2		1055 sks
3	Spacer	Water Displacement	8.3		318.88 bbl

HALLIBURTON

Cost Estimate

7" Drilling Liner

Mtrl Nbr	Description	Qty	U/M	Unit Price	Gross Amt	Net Amt
7524	CMT DRILLING LINER BOM	1	JOB	0.00	0.00	0.00
	CEMENTING EQUIPMENT AND SERVICES					
2	MILEAGE FOR CEMENTING CREW,ZI Number of Units	300 1	MI	5.76	1,728.00	656.64
1	ZI-MILEAGE FROM NEAREST HES BASE,/UNIT Number of Units	300 1	MI	9.79	2,937.00	1,116.06
16100	ZI CMTG LINER/SHORT CSG STRING DEPTH FEET/METERS (FT/M)	1 10450 FT	EA	17,012.00	17,012.00	6,464.56
139	ADC (AUTO DENSITY CTRL) SYS, /JOB,ZI NUMBER OF UNITS	1 1	JOB	2,275.00	2,275.00	864.50
114	R/A DENSOMETER W/CHART RECORDER,/JOB,ZI NUMBER OF UNITS	1 1	JOB	1,285.00	1,285.00	488.30
132	PORT. DAS W/CEMWIN;ACQUIRE W/HES, ZI NUMBER OF DAYS	1 1	JOB	1,649.00	1,649.00	626.62
11941	FIELD STORAGE BIN DELIVERY, ZI Number of Units	300 1	MI	9.79	2,937.00	1,116.06
16115	FIELD STORAGE BIN ON SITE >8 HRS,DAY,ZI DAYS OR PARTIAL DAY(WHOLE NO.)	1 1	EA	1,344.00	1,344.00	510.72
	CEMENT SURCHARGES					
86954	ZI FUEL SURCHG-CARS/PICKUPS<1 1/2TON Number of Units	300 1	MI	0.15	45.00	45.00
86955	ZI FUEL SURCHG-HEAVY TRKS >1 1/2 TON Number of Units	300 1	MI	0.45	135.00	135.00
372867	Cmt PSL - DOT Vehicle Charge, CMT	2	EA	241.00	482.00	482.00
7	ENVIRONMENTAL SURCHARGE,/JOB,ZI	1	JOB	134.00	134.00	134.00
8	IRON SAFETY INSPECTION SURCHARGE /JOB ZI	1	JOB	83.00	83.00	83.00
87605	ZI FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS	150 49.8	MI	0.15	1,120.50	1,120.50
432487	CMT, Bulk Cement Surcharge	1055	EA	1.38	1,455.90	1,455.90
	CEMENTING MATERIALS					
13256	TUNED SPACER	40	BBL	293.00	11,720.00	4,453.60
100003681	BARITE	37	SK	31.07	1,149.59	436.84
452992	ECONOCEM (TM) SYSTEM RS3	1055	SK	0.00	77,764.05	29,550.34
100005050	HR-5	434	LB	11.07	4,804.38	1,825.66
76400	ZI MILEAGE,CMT MTLs DEL/RET MIN NUMBER OF TONS	150 49.8	MI	3.35	25,024.50	9,509.31
3965	HANDLE&DUMP SVC CHRg, CMT&ADDITIVES,ZI NUMBER OF EACH	1254 1	CF	5.49	6,884.46	2,616.09
	Total		USD			161,969.38
	Discount		USD			98,278.68
	Discounted Total		USD			63,690.70

Primary Plant: Rock Springs, WY, USA
 Secondary Plant: Rock Springs, WY, USA

Price Book Ref: 01 Western US
 Price Date: 1/1/2007

Job Information

5" Production Liner

Hogback Ridge #1	121451-1
9 5/8" Intermediate Casing	0 - 4000 ft (MD)
Outer Diameter	9.625 in
Inner Diameter	8.755 in
Linear Weight	43.50 lbm/ft
Casing Grade	L-80
7" Drilling Liner	3800 - 10450 ft (MD)
Outer Diameter	7.000 in
Inner Diameter	6.276 in
Linear Weight	26 lbm/ft
Casing Grade	L-80
6 1/8" Production Open Hole	10450 - 12335 ft (MD)
Inner Diameter	6.125 in
Job Excess	20 %
5" Drill Pipe	0 - 10300 ft (MD)
Outer Diameter	5.000 in
Inner Diameter	4.276 in
Linear Weight	19.50 lbm/ft
5" Production Liner	10300 - 12335 ft (MD)
Outer Diameter	5.000 in
Inner Diameter	4.276 in
Linear Weight	18 lbm/ft
Casing Grade	L-80
Mud Type	Water Based Mud
Mud Weight	9.50 lbm/gal

Job Recommendation

5" Production Liner

Fluid Instructions

Fluid 1: Water Spacer

TUNED SPACER

120 lbm/bbl Barite (Heavy Weight Additive)

Fluid Density: 11 lbm/gal

Fluid Volume: 20 bbl

Fluid 2:

ExpandaCem RS1

0.5 % HR-5 (Retarder)

Fluid Weight 15.60 lbm/gal

Slurry Yield: 1.56 ft³/sk

Total Mixing Fluid: 6.46 Gal/sk

Top of Fluid: 9900 ft

Calculated Fill: 2435 ft

Volume: 46.32 bbl

Calculated Sacks: 166.40 sks

Proposed Sacks: 170 sks

Fluid 3: Water Spacer

WATER

Fluid Density: 8.34 lbm/gal

Fluid Volume: 41 bbl

Fluid 4: Mud

Displacement Fluid

Fluid Density: 9.50 lbm/gal

Fluid Volume 176.67 bbl

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	TUNED SPACER	11.0		20 bbl
2	Cement	ExpandaCem RS1	15.6		170 sks
3	Spacer	WATER	8.3		41 bbl
4	Mud	Displacement Fluid	9.5		176.67 bbl

Cost Estimate

5" Production Liner

<u>Mtrl Nbr</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Unit Price</u>	<u>Gross Amt</u>	<u>Net Amt</u>
7525	CMT PRODUCTION LINER BOM	1	JOB	0.00	0.00	0.00
	CEMENTING EQUIPMENT AND SERVICES					
2	MILEAGE FOR CEMENTING CREW,ZI Number of Units	300 1	MI	5.76	1,728.00	656.64
1	ZI-MILEAGE FROM NEAREST HES BASE,/UNIT Number of Units	300 1	MI	9.79	2,937.00	1,116.06
16100	ZI CMTG LINER/SHORT CSG STRING DEPTH FEET/METERS (FT/M)	1 12335 FT	EA	24,876.00	24,876.00	9,452.88
139	ADC (AUTO DENSITY CTRL) SYS, /JOB,ZI NUMBER OF UNITS	1 1	JOB	2,275.00	2,275.00	864.50
114	R/A DENSOMETER W/CHART RECORDER,/JOB,ZI NUMBER OF UNITS	1 1	JOB	1,285.00	1,285.00	488.30
132	PORT. DAS W/CEMWIN;ACQUIRE W/HES, ZI NUMBER OF DAYS	1 1	JOB	1,649.00	1,649.00	626.62
	CEMENT SURCHARGES					
86954	ZI FUEL SURCHG-CARS/PICKUPS<1 1/2TON Number of Units	300 1	MI	0.15	45.00	45.00
86955	ZI FUEL SURCHG-HEAVY TRKS >1 1/2 TON Number of Units	300 1	MI	0.45	135.00	135.00
372867	Cmt PSL - DOT Vehicle Charge, CMT	2	EA	241.00	482.00	482.00
7	ENVIRONMENTAL SURCHARGE,/JOB,ZI	1	JOB	134.00	134.00	134.00
8	IRON SAFETY INSPECTION SURCHARGE /JOB ZI	1	JOB	83.00	83.00	83.00
87605	ZI FUEL SURCHG-CMT & CMT ADDITIVES NUMBER OF TONS	150 12.13	MI	0.15	272.93	272.93
432487	CMT, Bulk Cement Surcharge	170	EA	1.38	234.60	234.60
	CEMENTING MATERIALS					
452979	EXPANDACEM (TM) SYSTEM RS1	170	SK	0.00	23,567.10	8,955.50
13256	TUNED SPACER	20	BBL	293.00	5,860.00	2,226.80
100003681	BARITE	24	SK	31.07	745.68	283.36
100005050	HR-5	80	LB	11.07	885.60	336.53
76400	ZI MILEAGE,CMT MTLs DEL/RET MIN NUMBER OF TONS	150 12.13	MI	3.35	6,095.33	2,316.23
3965	HANDLE&DUMP SVC CHRg, CMT&ADDITIVES,ZI NUMBER OF EACH	282 1	CF	5.49	1,548.18	588.31
	Total		USD			74,838.42
	Discount		USD			45,540.16
	Discounted Total		USD			29,298.26

Primary Plant: Rock Springs, WY, USA
Secondary Plant: Rock Springs, WY, USA

Price Book Ref: 01 Western US
Price Date: 1/1/2007

Conditions

In order to meet your needs under this Agreement (*Proposal*) with a high quality of service and responsive timing, Halliburton will be allocating limited resources and committing valuable equipment and materials to your area of operations. Accordingly, the discounts reflected in this Agreement (*Proposal*) are available only for products and services awarded on a first-call basis. As set forth below, alternate pricing will apply in the event that Halliburton is awarded work on any basis other than as a first-call provider.

The unit prices stated in the proposal are based on our current published prices. The projected equipment, personnel, and material needs are only estimates based on information about the work presently available to us. At the time the work is actually performed, conditions then existing may require an increase or decrease in the equipment, personnel, and/or material needs. Charges will be based upon unit prices in effect at the time the work is performed and the amount of equipment, personnel, and/or material actually utilized in the work. Taxes, if any, are not included. Applicable taxes, if any, will be added to the actual invoice.

It is understood and agreed between the parties that with the exception of the subject discounts, all services performed and equipment and materials sold are provided subject to Halliburton's General Terms and Conditions contained in our current price list, (which include LIMITATION OF LIABILITY and WARRANTY provisions), and pursuant to the applicable Halliburton Work Order Contract (whether or not executed by you), unless a Master Service and/or Sales Contract applicable to the services, equipment, or materials supplied exists between your company and Halliburton, in which case the negotiated Master Contract shall govern the relationship between the parties. A copy of the latest version of our General Terms and Conditions is available from your Halliburton representative or at:

http://www.halliburton.com/hes/general_terms_conditions.pdf for your convenient review, and we would appreciate receiving any questions you may have about them. Should your company be interested in negotiating a Master Contract with Halliburton, our Law Department would be pleased to work with you to finalize a mutually agreeable contract. In this connection, it is also understood and agreed that Customer will continue to execute Halliburton usual field work orders and/or tickets customarily required by Halliburton in connection with the furnishing of said services, equipment, and materials. Any terms and conditions contained in purchase orders or other documents issued by the customer shall be of no effect except to confirm the type and quantity of services, equipment, and materials to be supplied to the customer.

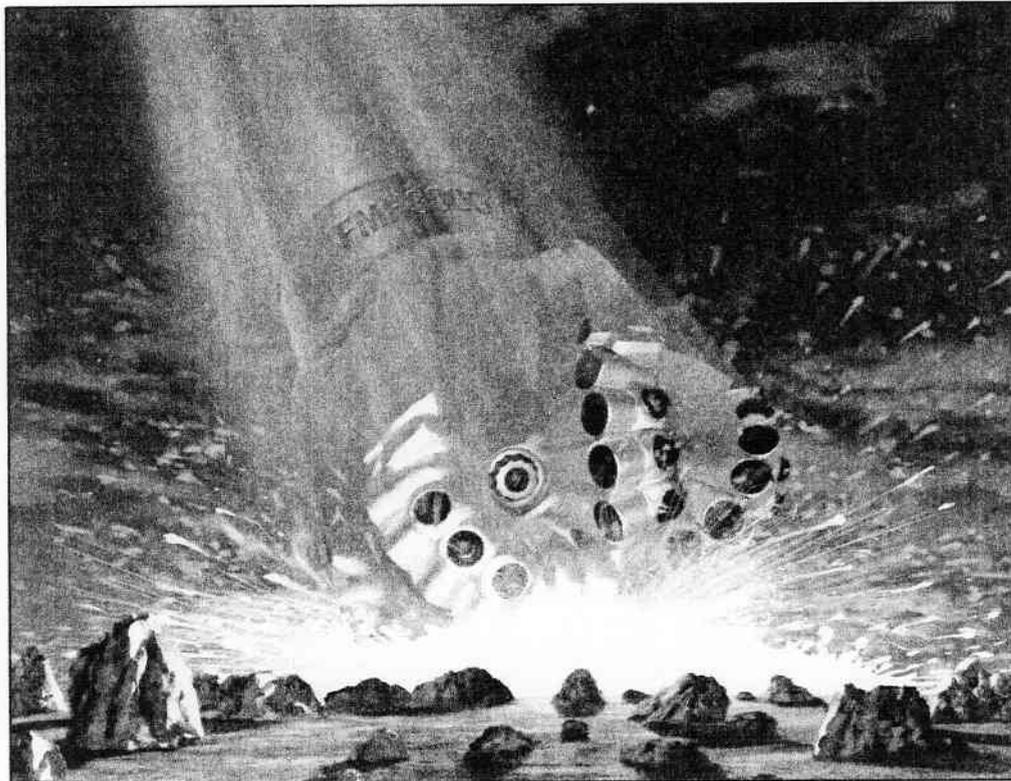
If customer does not have an approved open account with Halliburton or a mutually executed written contract with Halliburton, which dictates payment terms different than those set forth in this clause, all sums due are payable in cash at the time of performance of services or delivery of equipment, products, or materials. If customer has an approved open account, invoices are payable on the twentieth day after date of invoice.

Customer agrees to pay interest on any unpaid balance from the date payable until paid at the highest lawful contract rate applicable, but never to exceed 18% per annum. In the event Halliburton employs an attorney for collection of any account, customer agrees to pay attorney fees of 20% of the unpaid account, plus all collection and court costs.

HALLIBURTON

Security DBS Drill Bits Recommended Bit Program

Customer: **Talisman Energy Inc.**
Well name: **Hogback Ridge**
Location: **17-13N-7E**
Personally prepared for: **Rod Schnell**
Prepared by: **Dave Herman**
Date: **April 25, 2007** – *Revised May 8, 2007*



**Drilling, Evaluation
and Digital Solutions**

Security DBS Drill Bits

Drill Bit Recommendations

April 25, 2007

Rod Schnell
Talisman Energy Inc.
#3400, 888 - 3 St. SW
Calgary, Alberta
T2P 5C5

**We require 48-hour advance notification:
Alberta Operations Center**

**1-866-373-BITS (2487)
(24 hour number)**

RE: Hogback Ridge 17-13N-07E

Revised May 9, 2007

The bits recommended for your upcoming well are the **311mm FM3643Z3** to drill from surface casing to intermediate casing point. Once casing is set run in with our **222mm FMH3755ZR** drilling to the Phosphoria formation. From there to casing point utilize our **222mm XS55DSR**. To drill the production hole we recommend drilling with our **156mm FMH3843ZR**. *If any of these bits slow to an unacceptable rate they will be pulled and replaced with a sharp bit of that type until the programmed depth has been achieved. There will be a selection of Rollercones on location as back up.*

Bit	Estimated ROP (ft/hr)	Weight (dAN)	RPM	Price	Depth In	Depth Out
<u>311mm</u> FM3643Z3	20 – 30	10 – 20	Low Speed	\$12.75/ft	1500 ft	4000 ft (ICP)
<u>222mm</u> FMH3755ZR	35 – 45	10 – 20	High Torque	\$11.00/ft	4000 ft	10311ft (Phosphoria)
XS55DSR	5 – 11	18 – 22	Motor	\$21590.00 per bit	10311 ft	10450 ft (LP)
<u>156mm</u> FMH3843ZR	3 – 9	6 – 15		\$20.00/ft	10450 ft	11676 ft (Mission Canyon)
FMH3843ZR	10 – 20	6 – 15		\$20.00/ft	11676 ft	12335 ft (TD)

- *Slowing for formation tops will be required to minimize impact damage on the PDC runs.*
- *If a motor is used for the 222mm section, we recommend a Low Speed High Torque Motor with a minimum Torque output of 6000. (7000 – 8000 preferred) This is a RPM of 80 or less at 1600lpm.*

Special Conditions / Notes	Bit Information
Refer To Spec. Sheets	FM3643Z3 – 6 bladed, 13mm cutters FMH3755ZR – 7 bladed, 16mm cutters XS55SDR – 637 Insert Bit FMH3843ZR – 8 bladed, 13mm cutters

Additional Pricing Information:

Transportation	Supervision	Subsistence	Bit Repairs
\$1.20 / km	\$850.00 / day	\$95.00/ day	Bit repairs to be incurred by SDBS*

HALLIBURTON

**Drilling, Evaluation
and Digital Solutions**

Security DBS Drill Bits

Drill Bit Recommendations

The following terms and conditions would apply to this offer:

- This proposal is valid for 90 days; please contact your Security DBS Drill Bits representative if you require a revised proposal.
- Security DBS Drill Bits General Terms and Conditions will apply.
- The lost in hole price for the bits will be as per current list price.
- In the event there is non-drilling time beyond the control of Operator and Security DBS Drill Bits, the Supervisor's standby charge will be \$850.00 per day and per diem of \$95.00 per day.
- PDC bits remain property of Security DBS Drill Bits at all times.
- The use and placement of drilling jars will be the responsibility of the Operator.
- PDC depth-out will be pre-determined by Security DBS Drill Bits.
- For all self run bits that incur visual damage, please contact a Security DBS Drill Bits Representative for immediate replacement or substitute.
- Unreturned Security DBS Drill Bits bit breakers will be billed at current Security DBS Drill Bit Price List.
- Security DBS Drill Bits will provide one set of nozzles per bit; extra, lost, or unreturned nozzles will be billed at list price each.

PDC Supervisor – special terms and conditions:

Possible Repair Charges	Security DBS Drill Bits Supervision Requested	Security DBS Drill Bits Supervision NOT Requested
Bit Dropped or damaged due to abnormal conditions (i.e. surface gravel, junk in hole, poor hole conditions, float equip., reaming, excessive operating parameters etc.)	Security DBS Drill Bits will assume 100% responsibility for bit damage and repairs under normal drilling conditions.	Normal Bit Damage and repairs will be split on a minimum 50/50 basis.

Operating Parameters:

- Minimum flow Rate of 3000 lpm for 311mm
- Minimum flow Rate of 1500 lpm for 222mm
- Minimum flow Rate of 1400 lpm for 200mm
- Minimum flow Rate of 1000 lpm for 156mm

BHA Recommendations:

Vertical: PDC Bit, Near Bit Stab (under gauge 6-10mm), 1 Drill Collar, 1 String Stab (under gauge 6-10mm), 1 Shock Tool

Directional: as per Directional Drillers requirements

Should you require any further information with regards to this proposal or our product line, please feel free to call me at 260-5288. We look forward to working with you in the future.

Sincerely,

Dave Herman

Sr. Account Representative
260-5288
542-2488

HALLIBURTON

Drilling, Evaluation
and Digital Solutions



Weatherford®

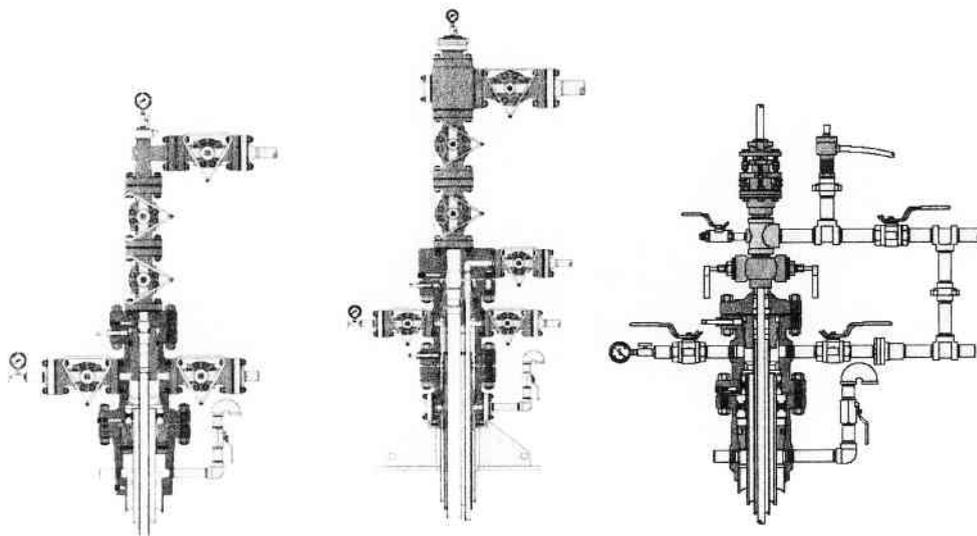
Quotation for:

Talisman Energy Inc.

Quote Number: CW-070331-CF

Submitted to: Rod Schnell

Submitted by: Craig Fisher



Weatherford would like to thank you for the opportunity to quote on this project.



Weatherford®

Wellhead Quotation

PREPARED FOR		PREPARED BY		INFORMATION		
Company	Talisman Energy Inc.	Contact	Craig Fisher	Reference	CW-070331-CF	
Attention	Rod Schnell	Division	Weatherford Wellhead Systems	Date	March 15, 2007	
Tel	(403) 237-1413	Tel	(403) 294-3509	Location	17-13N-7E	
Fax		Fax	(403) 538-0125	Well Name	Hogback Ridge	
Email		Email	Craig.Fisher@canada.weatherford.com	Rig		
DELIVERY			DESIGN SUMMARY			
4 Weeks ARO			Surface Casing	339.7 mm / 13 3/8 inch	Well Depth	-
			Intermediate Casing	244.5 mm / 9 5/8 inch	Outlets	SSO
			Production Casing	177.8 mm / 7 inch	PSL Rating	2
SHIP TO			Tubing		Material Class	DD / EE
Ex-Works Edmonton Manufacturing Facility			Polished Rods		Temperature	L + U
			Pressure Rating	34.5 MPa / 5000 PSI	Drawing No.	CQD-5007 & CCD-1109

Item	Quantity	Part No.	Description	Unit Price	Extended Price
<u>K2D DRILL THRU SYSTEM W/ RUNNING TOOLS</u>					
<u>346.1mm -34.5MPa X 346.1mm -34.5MPa</u>					
<u>SECTION A: WELLHEAD STACK EQUIPMENT</u>					
1	1	610772	Base Plate Assembly, Detachable, Weatherford, Type, 13 5/8" - 5000 PSI X 13 3/8" (346mm 34.5MPa x 339.7mm) Casing, 50" O.D.	\$3,129.00	\$3,129.00
2	1	611930	Casing Bowl Assembly, Weatherford, Type K2D, 13 5/8" - 5000 PSI (346.1mm - 34.5MPa) X 13 3/8" (339.7mm) Slip On Weld Btm Prep w/ two 2 1/16" - 5000 PSI (52.4mm - 34.5MPa) Studded Side Outlets & 1.900" (48.3 mm) VRP Threads, Detachable Landing Base Prep,	\$6,885.00	\$6,885.00
3	1	611934	Casing Spool Assembly, Weatherford, Type K2D, 13 5/8" 5000 PSI (346mm 34.5MPa) X 13 5/8" 5000 PSI (346mm 34.5MPa), W/ Two 2 1/16" 5000 PSI (52mm 34.5MPa) Studded Side Outlets, 1.900" (48.3 mm) VRP Threads, API 6A L DD PSL 2 PR2	\$12,900.00	<u>Rental</u>
4	2	479205	Ring Gasket, BX-160, Stainless Steel	\$268.00	\$536.00
5	1	610467	Stud Set, L7, 1 5/8" x 12 1/2" w/ 16 Studs / 32 2H Nuts	\$592.00	\$592.00
6	2	612471	Gate Valve Assembly, Type N, 2 1/16"- 5000 PSI (52.4mm-34.5MPa), Flanged End Connections, Hand Wheel Operated, NACE Trim, API 6A L EE PSL 2 PR2	\$2,828.00	\$5,656.00
7	2	614194	Companion Flange, 2 1/16"- 5000 PSI (52.4mm- 34.5 MPa) X 2" (50.8mm) Line Pipe, API 6A L DD PSL 2 PR2	\$139.00	\$278.00
8	2	614197	Blind Flange, 2 1/16"- 5000 PSI (52.4mm- 34.5 MPa), API 6A L DD PSL 2 PR2	\$129.00	\$258.00
9	6	399934	Ring Gasket, R-24, Stainless Steel	\$40.00	\$240.00
10	2	610401	Stud Set, L7M, 7/8" x 6" w/ 8 Studs / 16 2HM Nuts	\$48.00	\$96.00
<u>CHANGE OVER STACK EQUIPMENT</u>					
(lower gate valves moved to upper spool)					
11	1	614194	Companion Flange, 2 1/16"- 5000 PSI (52.4mm- 34.5 MPa) X 2" (50.8mm) Line Pipe, API 6A L DD PSL 2 PR2	\$139.00	\$139.00
12	4	399934	Ring Gasket, R-24, Stainless Steel	\$40.00	\$160.00
13	1	611539	Casing Vent Assembly, 2" (50.8mm) Linepipe	\$178.00	\$178.00
Total for Section 'A'					\$18,147.00

Weatherford Canada Partnership
 Completion & Production Systems
 1100, 333 - 5th Avenue S.W.
 Calgary, Alberta T2P 3B6

403/269-7788 Office
 403/266-1837 Fax

www.weatherford.com

Item	Quantity	Part No.	Description	Unit Price	Extended Price
SECTION 'B'					
<u>PRIMARY CASING MANDRELS AND MANDREL PACK-OFFS</u>					
14	1	613313	Lower Mandrel Casing Hanger, Type K2D, 13 5/8" (346.1mm), 10.5" STUB ACME-LH lift X 9 5/8" (244.5mm) 47 lb/ft (69.95 kg/m) LT&C L80 Suspension Thread Btm, API 6A L-U DD-NL PSL 2 PR2	\$4,500.00	\$4,500.00
15	1	613325	Mandrel Pack-Off Assembly, Weatherford Type K2D, Lower, 13 5/8" 5000 PSI (346mm 34.5MPa) X 9 5/8" (244.5mm) casing, API 6A L DD PSL 2 PR2	\$4,500.00	<u>Rental</u>
16	1	613317	Casing Hanger Mandrel, Type K2D, Upper, 13 5/8" (346mm), 10.5" (266.7mm) STUB ACME-LH lift X 7" (177.8mm) Long Casing 26 lb/ft suspension, API 6A L-U DD PSL 2 PR2	\$4,500.00	<u>Optional</u>
17	1	613329	Mandrel Pack-Off Assembly, Weatherford, Type K2D, Upper, 13 5/8" 5000 PSI (346mm 34.5MPa) X 7" (177.8mm) Casing, API 6A L DD PSL 2 PR2	\$4,500.00	<u>Optional</u>
18	1	613345	Primary Pack-Off Assembly, Weatherford Type K2D, Upper, 13 5/8" 5000 PSI (346mm 34.5MPa) X 7" (177.8mm) Casing, API 6A L DD PSL 2 PR2	\$2,150.00	<u>Optional</u>
Total for Section 'B'					<u>\$4,500.00</u>
SECTION 'C'					
<u>CONTINGENCY CASING SLIPS AND CASING PACK-OFFS</u>					
19	1	613332	Casing Slip Assembly, Weatherford, Type K2D, Lower, 13 5/8" 5000 PSI (346mm 34.5MPa) x 9 5/8" (244.5mm) Casing, reduced capacity, API 6A L-X EE PSL 3 PR2	\$2,850.00	\$2,850.00
20	1	613341	Casing Pack-Off Assembly, Weatherford, Type K2D, Lower, 13 5/8" 5000 PSI (346mm 34.5MPa) X 9 5/8" (244.5mm) Casing, Primary Seal API 6A L DD PSL 2 PR2	\$1,500.00	\$1,500.00
21	1	613353	Mandrel Pack-Off Assembly, Weatherford, Type K2D, Lower, 13 5/8" 5000 PSI (346mm 34.5MPa) X 9 5/8" (244.5mm) casing, contingency, API 6A L DD PSL 2 PR2	\$2,800.00	\$2,800.00
22	1	613334	Casing Slip Assembly, Weatherford, Type K2D, Upper, 13 5/8" 5000 PSI (346mm 34.5MPa) X 7" (177.8mm) Casing, API 6A L-X EE PSL 2 PR2	\$2,850.00	<u>Optional</u>
Total for Section 'C'					<u>\$7,150.00</u>
SECTION 'D'					
<u>BORE PROTECTORS</u>					
23	1	610716	Bore Protector Assembly, Weatherford, Type K2D, Long, 13 5/8" (346.1mm) x 12.312" (313mm) Bore	\$3,850.00	<u>Rental</u>
24	1	610722	Bore Protector Assembly, Weatherford, Type K2D, Short, 13 5/8" (346.1mm) x 8.74" (222mm) ID Bore	\$1,950.00	<u>Rental</u>
Total for Section 'D'					<u>Rental</u>
Weatherford Canada Partnership Completion & Production Systems 1100, 333 - 5th Avenue S.W. Calgary, Alberta T2P 3B6				403/269-7788 Office 403/266-1837 Fax www.weatherford.com	

Item	Quantity	Part No.	Description	Unit Price	Extended Price
SECTION 'E'					
WELLHEAD TOOLS					
25	1	610540	Test Plug Assembly, Weatherford, Type 3NS, 4 1/2" (114.3mm) IF Box x Pin w/ Nut and Internal Plug		<u>Rental</u>
26	1	527774-1A	Test Plug Bushing, Weatherford, Type K2D, Lower, f/ 3NS Tool		<u>Rental</u>
27	1	527774-2A	Test Plug Bushing, Weatherford, Type K2D, Upper, f/ 3NS Tool		<u>Rental</u>
28	1	610744	Casing Mandrel Running Tool Assembly, Weatherford, Type K2D, 13 5/8" (346mm), 10 1/2" (266.7mm) LH Acme x 9 5/8" (244.5mm) Casing		<u>Rental</u>
29	1	610740	Casing Mandrel Running Tool Assembly, Weatherford, Type K2D, 13 5/8" (346mm), 10 1/2" (266.7mm) LH Acme x 7" (177.8mm) Buttress		<u>Rental</u>
30	1	610756	Wash Tool Assembly, Weatherford, Type K2D, 13 5/8" x 4 1/2" (346mm x 114.3mm) IF Box		<u>Rental</u>
31	1	610695	Bore Protector and Pack-Off Run Retrieval Tool Assembly, Weatherford, Type K2D, 13 5/8" x 4 1/2" (346mm x 114.3mm) IF Box		<u>Rental</u>
32	1	610726	Pack-Off Bore Protector, Weatherford, Type K2D, Upper, 13 5/8" x 7" (346mm x 177.8mm), 29 lb/ft Casing w/ R/R Profile		<u>Rental</u>
33	1	610782	Pack-Off / Test Plug Tool Assembly, Weatherford, Type K2D, Upper, 13 5/8" x 3 1/2" (346.1mm x 88.9mm) IF Box		<u>Rental</u>
Total for Section 'D'					<u>Rental</u>
Rental Items (#3, #15 & Section D & E)					<u>\$7,500.00</u>

Note: Assembly, Test, and Paint charged at \$80.00 per hour.

Note: Reconditioned equipment will be used where available at a further 20% discount from above quoted prices

ACCEPTED

Signature: _____

Print Name: _____

Date: _____

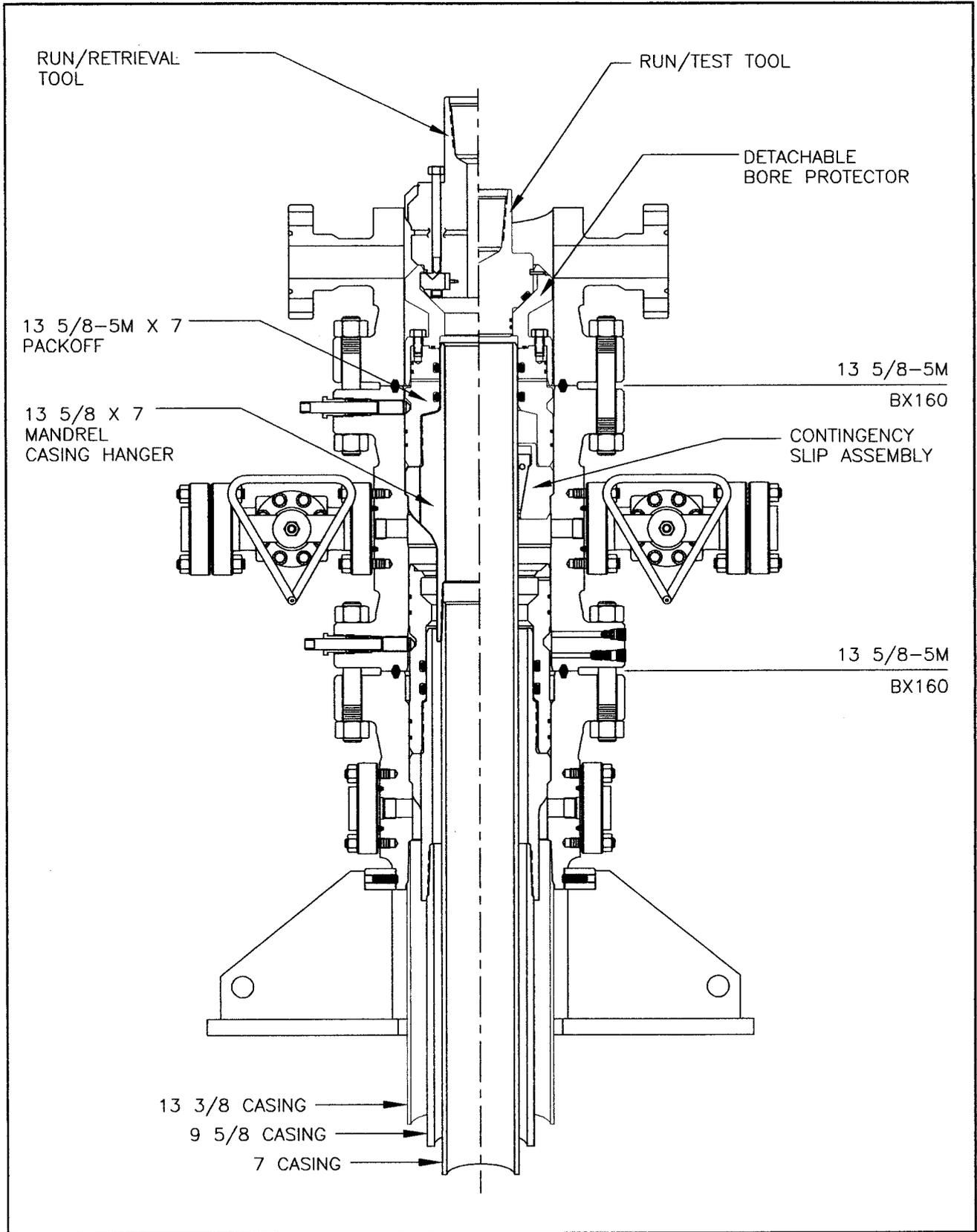
Please fax to 403.538.0125

Total for Quotation CW-061026-CF (Less Contingency - Section 'C')

Terms: Net 30 days	Prices are valid for 30 days from date of quotation. Taxes, duties, tariffs and other incidental charges are not included in pricing. Part and product numbers may change without notice. Prices are FOB Edmonton.	Total	<u>\$30,147.00</u>
---------------------------	--	--------------	---------------------------

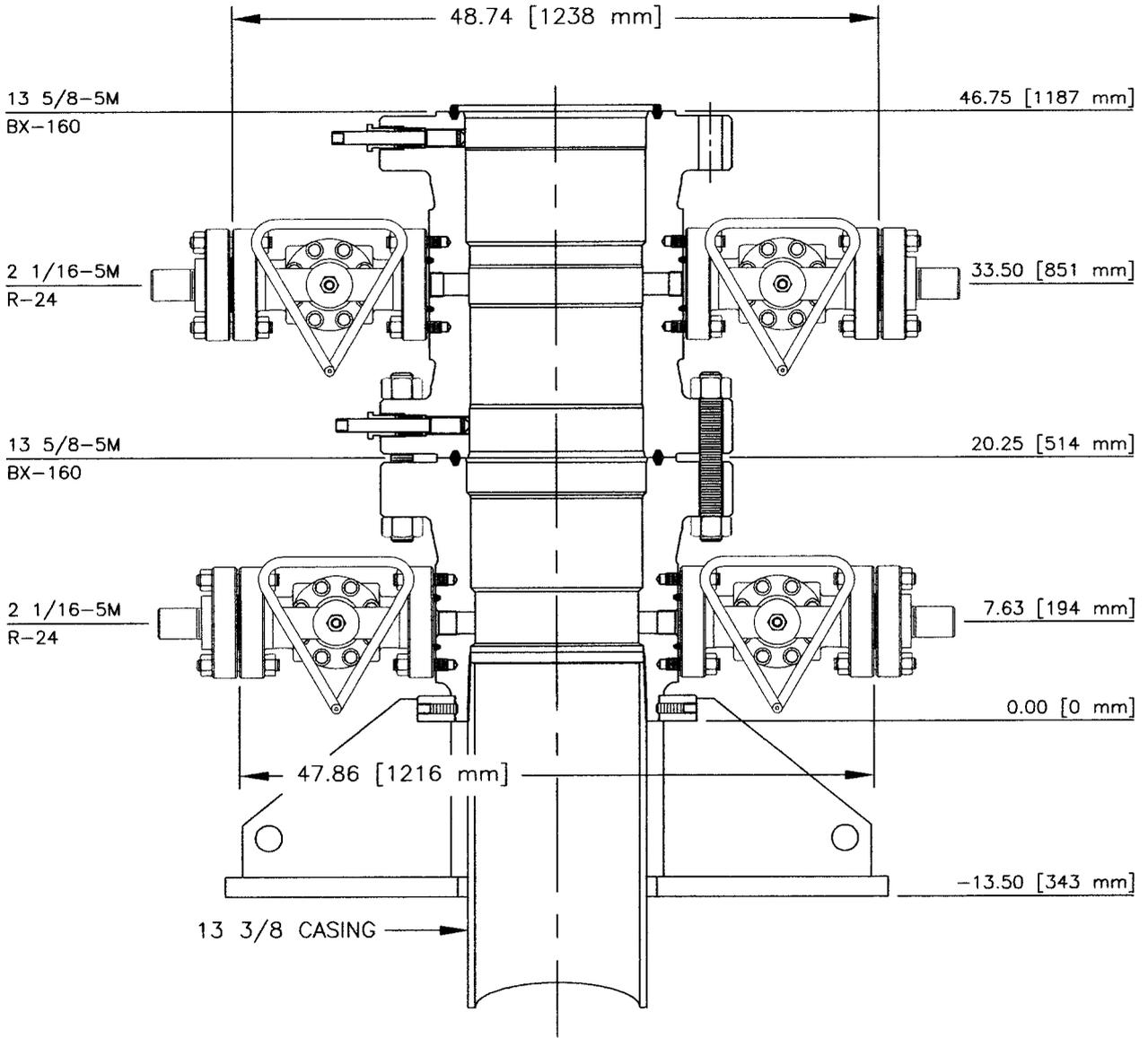
Weatherford Canada Partnership
Completion & Production Systems
1100, 333 - 5th Avenue S.W.
Calgary, Alberta T2P 3E6

403/269-7788 Office
403/266-1837 Fax
www.weatherford.com



 Weatherford Wellhead Systems Edmonton, Alberta, Canada		WELLHEAD ASSEMBLY, K2D, 13 5/8-5M SYSTEM PRIMARY X CONTINGENCY UPPER 13 3/8 X 9 5/8 X 7 CASING							
CHKD BY	<i>[Signature]</i>	DATE	15-MAY-00	DWN BY	C.W.HEBERT	DATE	15-MAY-00	SCALE	1:12
APPD BY	<i>[Signature]</i>	DATE	16-MAY-00	DWG NO	CCD-1109	REV	-	REF NO	

© WEATHERFORD INTERNATIONAL, INC. 2005 ALL RIGHTS RESERVED
 THIS DOCUMENT IS COPYRIGHTED AND WHETHER CONTAINING PATENTABLE OR NON-PATENTABLE SUBJECT
 MATTER, IS AND COMPRISES THE PROPRIETARY AND CONFIDENTIAL INFORMATION OF WEATHERFORD
 INTERNATIONAL, INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY
 MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY
 INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF WEATHERFORD
 INTERNATIONAL, INC. THIS DOCUMENT IS LOANED TO YOU IN CONFIDENCE WITH THE UNDERSTANDING THAT
 NEITHER IT NOR THE INFORMATION IN IT WILL BE REPRODUCED, USED, OR DISCLOSED, IN WHOLE OR IN
 PART FOR ANY PURPOSE EXCEPT THE LIMITED PURPOSE FOR WHICH IT IS LOANED. THIS DOCUMENT
 SHALL BE RETURNED TO WEATHERFORD INTERNATIONAL, INC., UPON DEMAND.



3. RIG:
 2. QUOTE: CW-051026-CF
 1. NARRAWAY 10-24-62-11 W6M
 NOTES:



Wellhead Systems
 Calgary, Alberta, Canada

WEATHERFORD K2D DRILLING STACK
 13 5/8-5M X 13 5/8-5M X 13 3/8 OD CASING
 W/ DETACHABLE LANDING BASE

CHKD BY	<i>Chris Elbert</i>	DATE	18-MAR-05	DWN BY	J.OGILVIE	DATE	18-MAR-05	SCALE	1:12
APPD BY	<i>Chris Elbert</i>	DATE	18-MAR-05	DWG NO	CQD-5007	REV	A	REF NO	AS LISTED ABOVE

H2S Contingency Plan

For

Fortuna Energy Inc.
Hogback Ridge 17-13N-7E
Directional Drilling Program
Section 17, T13N, R7E
Rich County, Utah
May 31, 2007

Table of Contents

Introduction and directions

1. Responsibilities and Duties

- A. All personnel
- B. Fortuna (US) LP Foreman
- C. Rig Supervisor- Toolpusher
- D. Safety Consultant
- E. Operations Center Foreman

2. Well Location Layout

- A. Location

3. Safety Procedures

- A. Training
- B. Operating Conditions
- C. Evacuation Plan
- D. Emergency Rescue Procedures

4. H2S Safety Equipment on Drilling Location

5. Well Ignition Procedures

- A. Ignition Equipment
- B. Ignition Procedures

6. Residents- Pubic in Roe

- A. Map of area around location

7. Emergency Phone Directory

- A. Fortuna (US) LP
- B. Emergency Service Phone List

8. Reference for Hydrogen Sulfide and Sulfur Dioxide

Introduction

It is the policy of Fortuna (US) LP to provide a safe and healthful work environment for all of its employees as well as contractors that may work on Fortuna (US) LP leases. Fortuna (US) LP makes a continued effort to comply with laws and regulations relative to worker safety and health, and to manage all operations in a manner to reduce risk.

The following is a H₂S contingency plan for the Fortuna (US) LP 17-13N-7E Hogback Ridge well. It is designed for personnel working on this project to follow in case of an accidental release of hydrogen sulfide during drilling and or completion operations. For the plan to be effective, all personnel must review and be familiar with onsite duties as well as the safety equipment involved.

The purpose of this plan is to act as a guideline for personnel working on the wellsite in the event of a sudden release of hydrogen sulfide **and comply with Onshore Oil and Gas Order #6, Hydrogen Sulfide Operations**. All personnel working on the wellsite as well as service personnel that may travel to location on an unscheduled basis must be familiar with this program. The cooperation and participation of all personnel involved with the drilling operation is necessary for this plan to be effective.

Directions to Location:

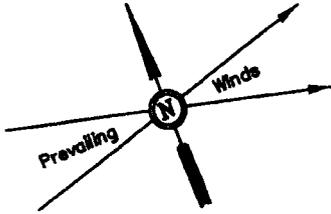
FORTUNA (US) L.P.

LOCATION LAYOUT FOR

HOGBACK RIDGE #17-13N-7E
SECTION 17, T13N, R7E, S.LB.&M.

1040' FSL 704' FEL

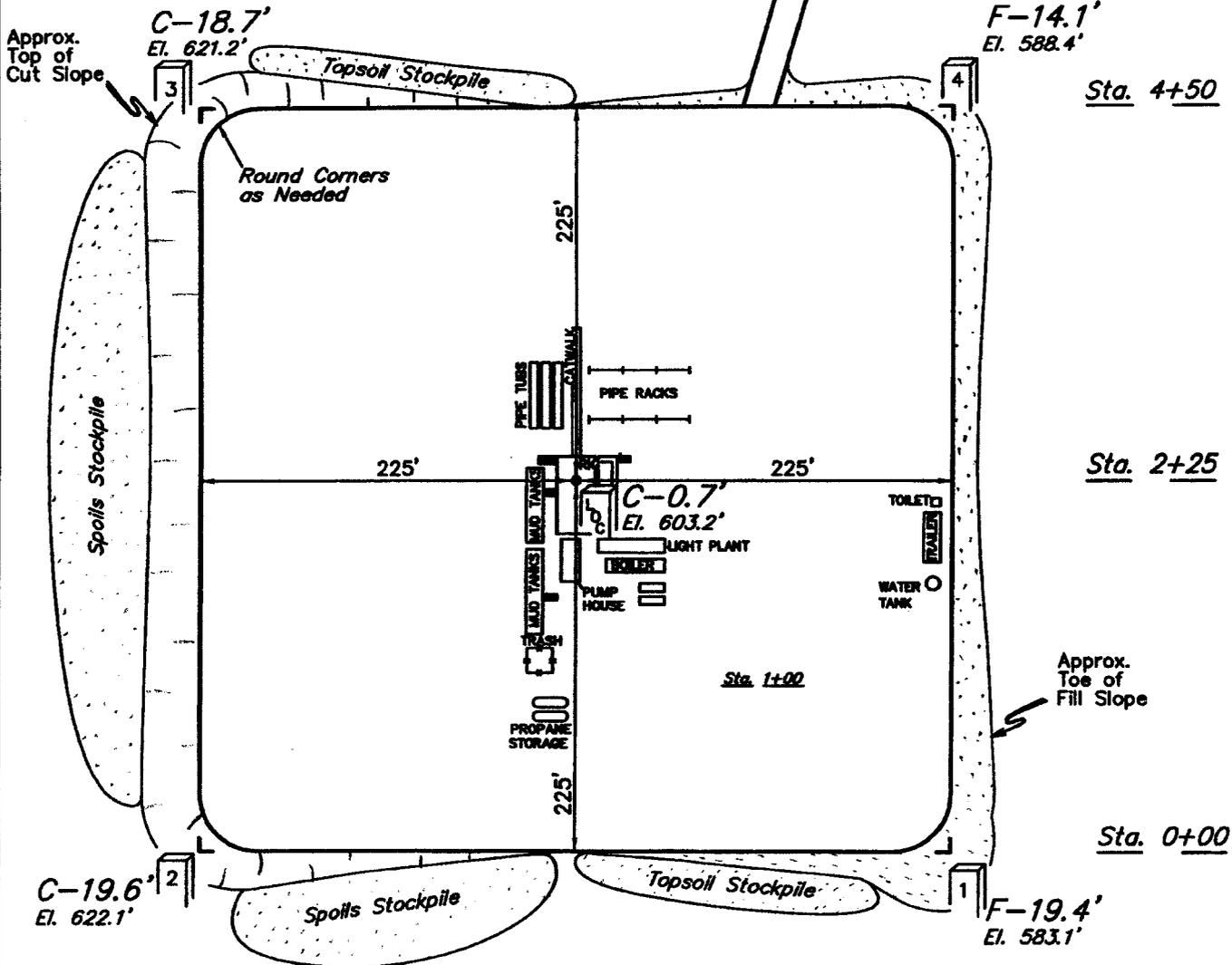
FIGURE #1



SCALE: 1" = 100'
DATE: 5-17-07
Drawn By: K.G.



Proposed Access Road



Elev. Ungraded Ground at Location Stake = 6603.2'
Elev. Graded Ground at Location Stake = 6602.5'

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East * Vernal, Utah 84078 * (435) 788-1017

FORTUNA (US) L.P.

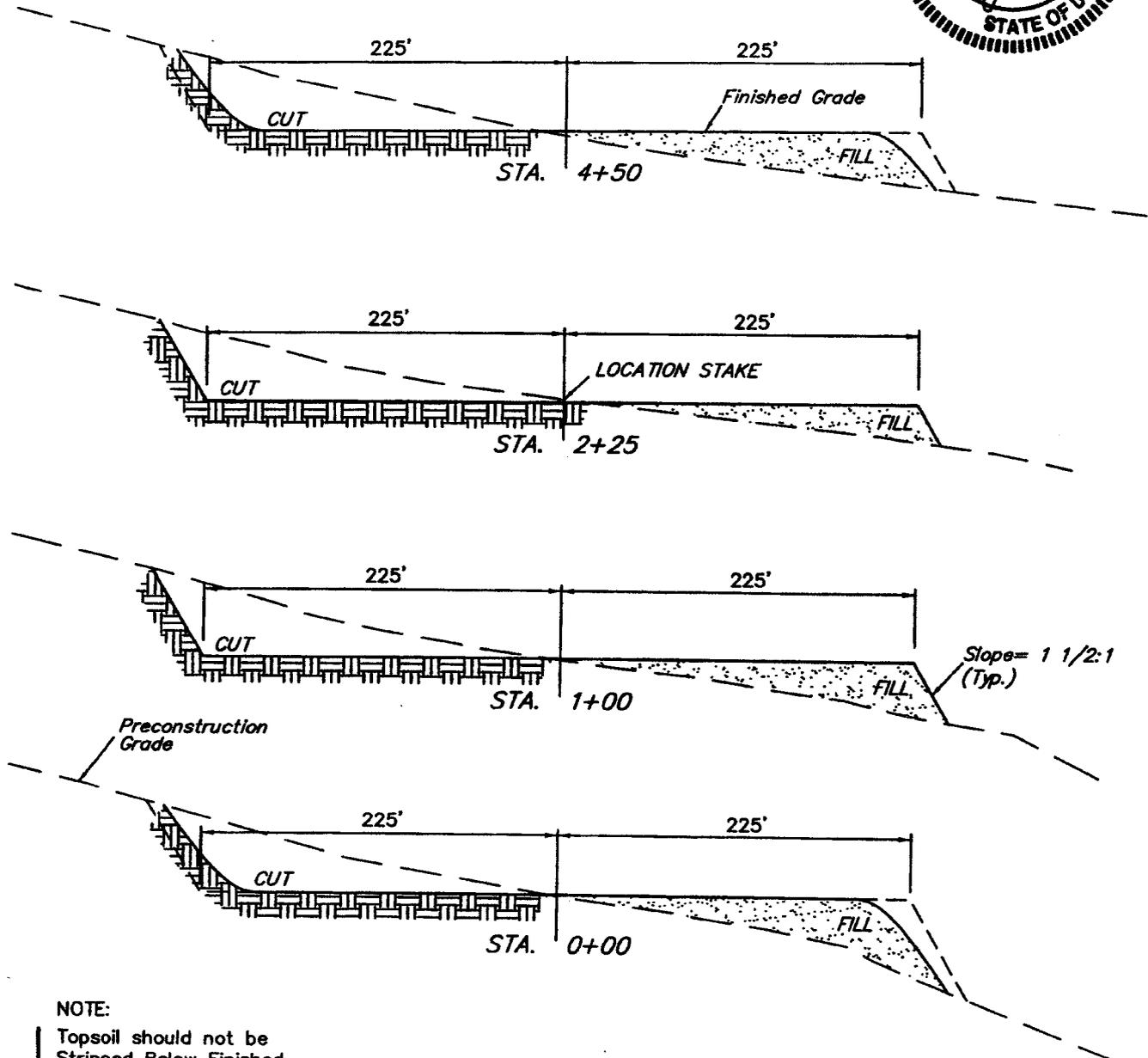
FIGURE #2

TYPICAL CROSS SECTIONS FOR

HOGBACK RIDGE #17-13N-7E
SECTION 17, T13N, R7E, S.LB.&M.
1040' FSL 704' FEL

1" = 40'
X-Section
Scale
1" = 100'

DATE: 5-17-07
Drawn By: K.G.



NOTE:

Topsoil should not be Stripped Below Finished Grade on Substructure Area.

APPROXIMATE YARDAGES

(6") Topsoil Stripping	=	4,540	Cu. Yds.
Remaining Location	=	32,180	Cu. Yds.
TOTAL CUT	=	36,720	CU.YDS.
FILL	=	29,420	CU.YDS.

* NOTE:

FILL QUANTITY INCLUDES 5% FOR COMPACTION

EXCESS MATERIAL	=	7,300	Cu. Yds.
Topsoil	=	4,540	Cu. Yds.
EXCESS UNBALANCE (After Interim Rehabilitation)	=	2,760	Cu. Yds.

UINTAH ENGINEERING & LAND SURVEYING
85 So. 200 East * Vernal, Utah 84078 * (435) 789-1017

FORTUNA (US) L.P.
ROCKBACK RIDGE #17-13N-7E
 LOCATED IN RICH COUNTY, UTAH
 SECTION 17, T13N, R7E, S.L.B.&M.



PHOTO: VIEW OF LOCATION STAKE

CAMERA ANGLE: SOUTHEASTERLY



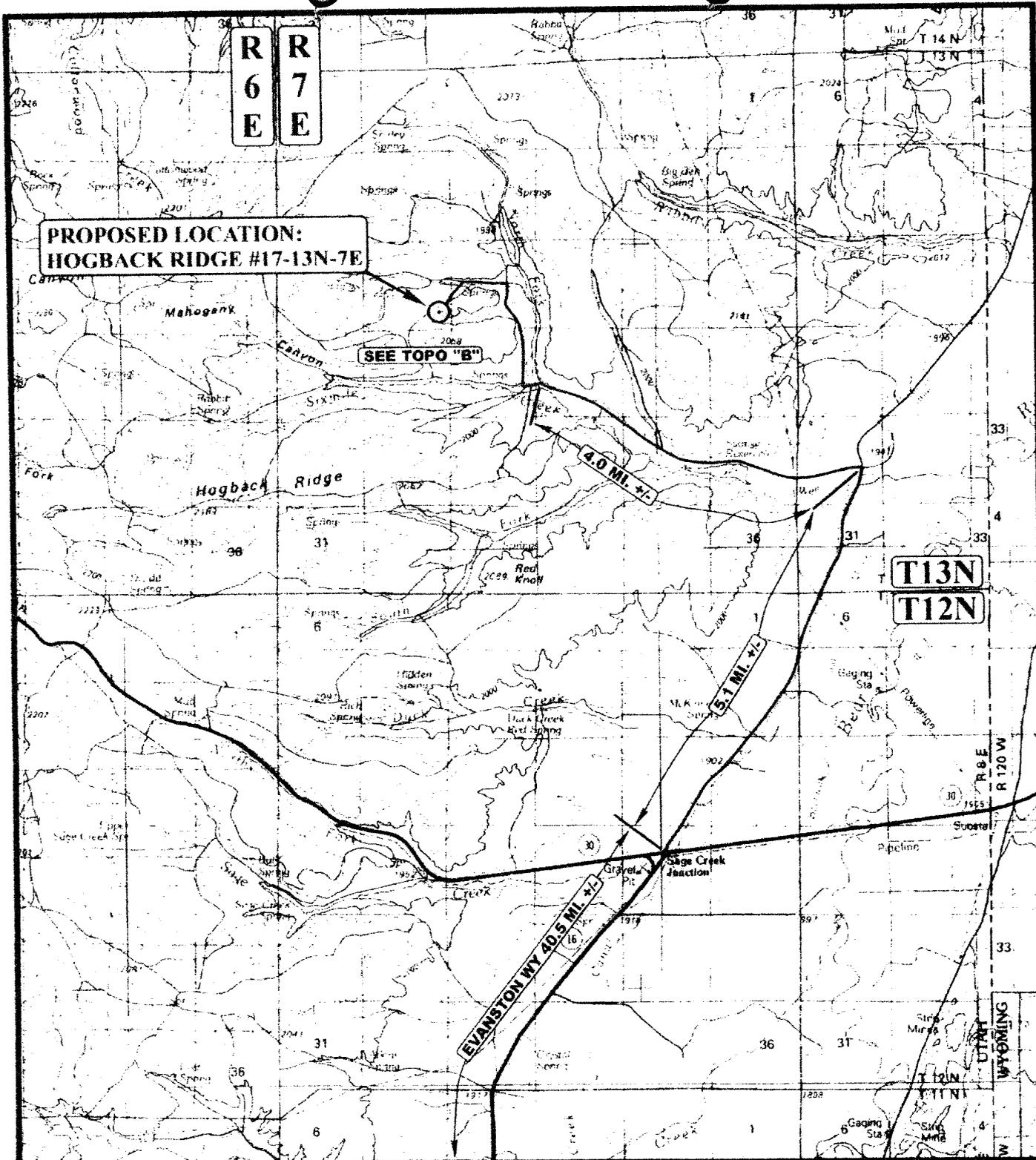
PHOTO: VIEW FROM BEGINNING OF PROPOSED ACCESS

CAMERA ANGLE: SOUTHEASTERLY



Uintah Engineering & Land Surveying
 85 South 200 East Vernal, Utah 84078
 435-789-1017 uels@uelsinc.com

DATE TAKEN (MM/DD/YY)	MONTH	DAY	YEAR	PHOTO
TAKEN BY: J.E.	DRAWN BY: B.C.		REVISED: 00-00-00	



LEGEND:

⊙ PROPOSED LOCATION

FORTUNA (US) L.P.

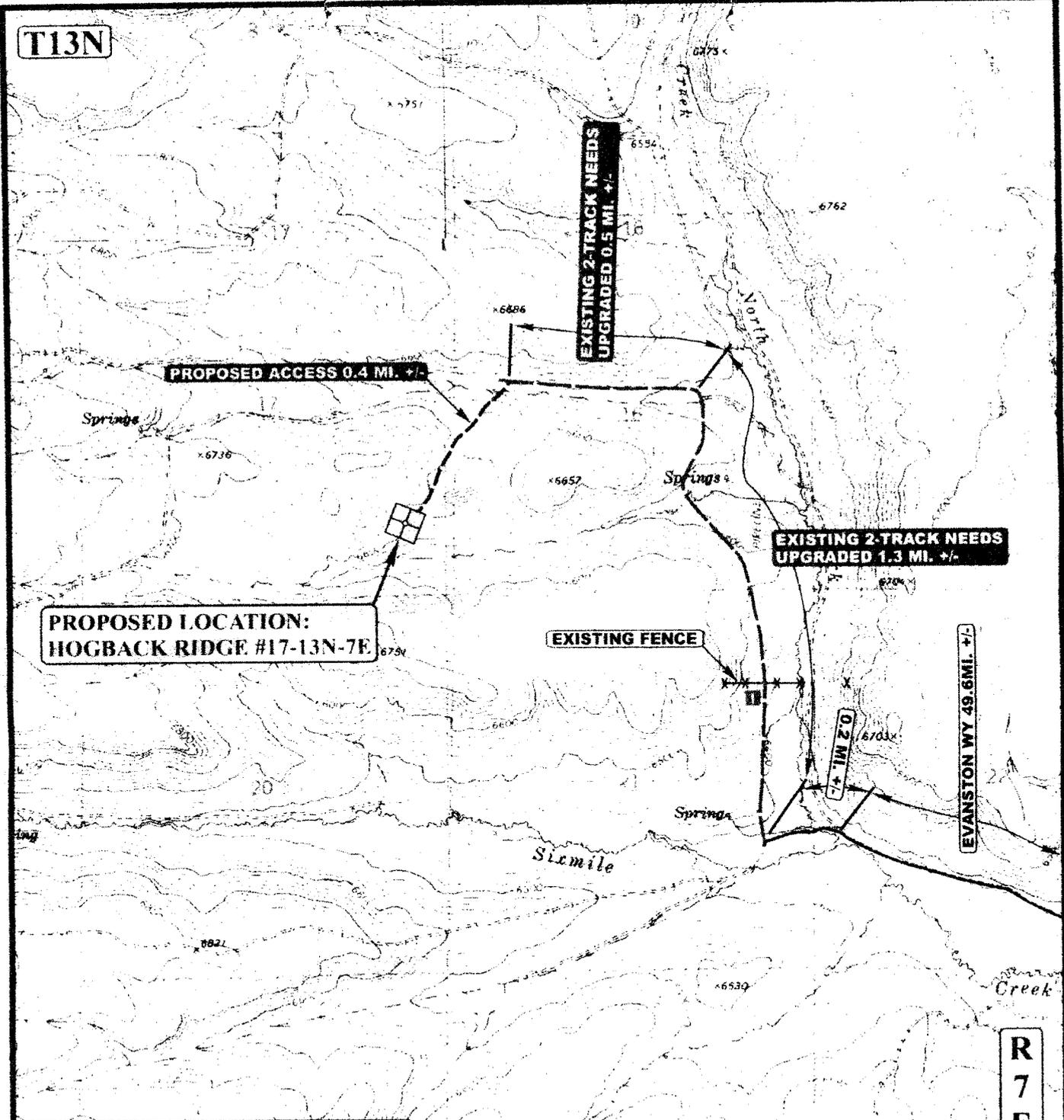
HOGBACK RIDGE #17-13N-7E
SECTION 17, T13N, R7E, S.L.B.&M.
1040' FSL 704' FEL

U&L S **Utah Engineering & Land Surveying**
 85 South 200 East Vernal, Utah 84078
 (435) 789-1017 * FAX (435) 789-1813



TOPOGRAPHIC MAP **05 18 07**
 MONTH DAY YEAR
SCALE: 1:100,000 **DRAWN BY: B.C.** **REVISED: 00-00-00** **A TOPO**

T13N



PROPOSED LOCATION:
HOGBACK RIDGE #17-13N-7E

EXISTING FENCE

EXISTING 2-TRACK NEEDS
UPGRADED 1.3 MI. +/-

EXISTING 2-TRACK NEEDS
UPGRADED 0.5 MI. +/-

PROPOSED ACCESS 0.4 MI. +/-

EVANSTON WY 49.6 MI. +/-

0.2 MI. +/-

R
7
E

LEGEND:
[Symbol] CATTLE GUARD AND STOCK GATE NEEDED

LEGEND:

- EXISTING ROAD
- - - PROPOSED ACCESS ROAD
- EXISTING 2-TRACK NEEDS UPGRADED
- * * * * * EXISTING FENCE



FORTUNA (US) L.P.
 HOGBACK RIDGE #17-13N-7E
 SECTION 17, T13N, R7E, S.L.B.&M.
 1040' FSL 704' FEL



Uintah Engineering & Land Surveying
 85 South 200 East Vernal, Utah 84078
 (435) 789-1017 * FAX (435) 789-1813

TOPOGRAPHIC MAP
 05 18 07
 MONTH DAY YEAR
 SCALE: 1" = 2000' DRAWN BY: B.C. REVISED: 00-00-00



**WORKSHEET
APPLICATION FOR PERMIT TO DRILL**

APD RECEIVED: 07/19/2007

API NO. ASSIGNED: 43-033-30059

WELL NAME: HOGBACK RIDGE 17-13N-7E
 OPERATOR: FORTUNA (US) LP (N2710)
 CONTACT: DON HAMILTON

PHONE NUMBER: 403-237-1448

PROPOSED LOCATION:

SENE

SESE : 17 130N 070E
 SURFACE: 1040 FSL 0704 FEL
 BOTTOM: 1850 FNL 0295 FEL
 COUNTY: RICH
 LATITUDE: 41.86386 LONGITUDE: -111.1691
 UTM SURF EASTINGS: 485966 NORTHINGS: 4634462
 FIELD NAME: WILDCAT (1)

INSPECT LOCATN BY: / /		
Tech Review	Initials	Date
Engineering	<i>DKD</i>	<i>11/8/07</i>
Geology		
Surface		

LEASE TYPE: *FEE*
 LEASE NUMBER: ~~UTU 078702~~ *FEE*
 SURFACE OWNER: 1 - Federal

PROPOSED FORMATION: WEBR
 COALBED METHANE WELL? NO

RECEIVED AND/OR REVIEWED:

- Plat
- Bond: Fed[1] Ind[] Sta[] Fee[]
(No. WYB 000397)
- Potash (Y/N)
- Oil Shale 190-5 (B) or 190-3 or 190-13
- Water Permit
(No. 23-3785)
- RDCC Review (Y/N)
(Date: _____)
- Fee Surf Agreement (Y/N)
- Intent to Commingle (Y/N)

LOCATION AND SITING:

- R649-2-3.
- Unit: _____
- R649-3-2. General
Siting: 460 From Qtr/Qtr & 920' Between Wells
- R649-3-3. Exception
- Drilling Unit
- Board Cause No: _____
- Eff Date: _____
- Siting: _____
- R649-3-11. Directional Drill

COMMENTS: _____

STIPULATIONS: *1-Federal Approval*

Statement of Basis

T13N R7E

CAUSE: 169-1 / 10-25-1977

HOGBACK
RIDGE 17-1

17

BHL
17-13N-7E

HOGBACK
RIDGE 17-13N-7E

OPERATOR: FORTUNA (US) LP (N2710)

SEC: 17 T.13S R. 7E

FIELD: WILDCAT (001)

COUNTY: RICH

CAUSE: 169-1 / 10-25-1977

- Field Status**
- ABANDONED
 - ACTIVE
 - COMBINED
 - INACTIVE
 - PROPOSED
 - STORAGE
 - TERMINATED

- Unit Status**
- EXPLORATORY
 - GAS STORAGE
 - NF PP OIL
 - NF SECONDARY
 - PENDING
 - PI OIL
 - PP GAS
 - PP GEOTHERML
 - PP OIL
 - SECONDARY
 - TERMINATED

- Wells Status**
- GAS INJECTION
 - GAS STORAGE
 - LOCATION ABANDONED
 - NEW LOCATION
 - PLUGGED & ABANDONED
 - PRODUCING GAS
 - PRODUCING OIL
 - SHUT-IN GAS
 - SHUT-IN OIL
 - TEMP. ABANDONED
 - TEST WELL
 - WATER INJECTION
 - WATER SUPPLY
 - WATER DISPOSAL
 - DRILLING



PREPARED BY: DIANA MASON
DATE: 23-JULY-2007

Application for Permit to Drill

Statement of Basis

12/17/2007

Utah Division of Oil, Gas and Mining

Page 1

APD No	API WellNo	Status	Well Type	Surf Ownr	CBM
620	43-033-30059-00-00		OW	F	No
Operator	FORTUNA (US) LP		Surface Owner-APD		
Well Name	HOGBACK RIDGE 17-13N-7E		Unit		
Field	WILDCAT		Type of Work		
Location	SESE 17 13N 7E S 1040 FSL 704 FEL		GPS Coord (UTM) 485966E 4634462N		

Geologic Statement of Basis

A poorly to moderately permeable soil is developed on the Tertiary (Eocene) age Wasatch Formation. Aquifers with high quality ground water are likely to be encountered in the Wasatch Formation and the subjacent Middle Jurassic age Twin Creek Limestone. The operator proposes to switch from a fresh water based mud system to drill the Surface hole (proposed seat @ 1,500') to an oil based mud system to drill the hole for the deeper portion of the well. It may be beneficial to extend the Surface casing and cement program to place the casing seat into the Gypsum Springs Member (prognosis top @ 2,350') of the Twin Creek Limestone to more adequately isolate the shallower probable fresh water bearing strata from the probable saltier strata most likely below the shales and any remnant evaporites occurring in the Gypsum Springs Member. No water rights have been filed within a mile of the location. I haven't been able to locate any Base of Moderately Saline Ground Water information in this area.

Chris Kierst
APD Evaluator

12/11/2007
Date / Time

Surface Statement of Basis

The Federal Government is the owner of the surface rights at the proposed location. The operator is responsible for acquiring all needed surface permits or rights-of-way from the BLM.

Brad Hill
Onsite Evaluator

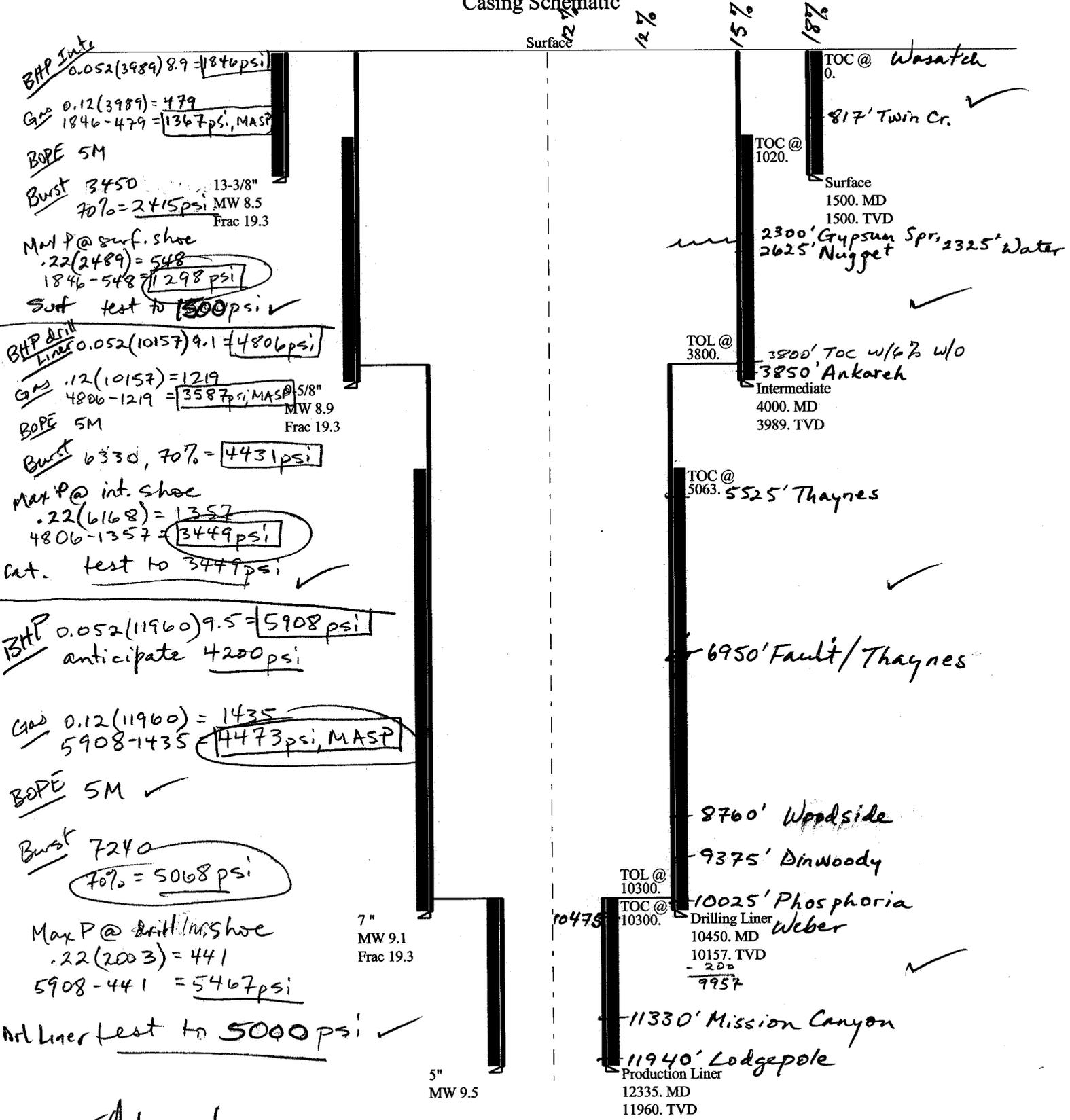
12/17/2007
Date / Time

Conditions of Approval / Application for Permit to Drill

Category	Condition
	None.

2007-08 Fortuna Hogback Ridge 17-13N-7E

Casing Schematic



BHP Int.
 $0.052(3989)8.9 = 1846 \text{ psi}$

Gas
 $0.12(3989) = 479$
 $1846 - 479 = 1367 \text{ psi, MASP}$

BOPE 5M

Burst 3450
 70% = 2415 psi
 13-3/8" MW 8.5
 Frac 19.3

Max P @ surf. shoe
 $.22(2489) = 548$
 $1846 - 548 = 1298 \text{ psi}$

Surf test to 1500 psi ✓

BHP Drill
 $0.052(10157)9.1 = 4806 \text{ psi}$

Gas
 $.12(10157) = 1219$
 $4806 - 1219 = 3587 \text{ psi, MASP}$
 5/8" MW 8.9
 Frac 19.3

BOPE 5M

Burst 6330, 70% = 4431 psi

Max P @ int. shoe
 $.22(6168) = 1357$
 $4806 - 1357 = 3449 \text{ psi}$

Int. test to 3449 psi ✓

BHP $0.052(11960)9.5 = 5908 \text{ psi}$
 anticipate 4200 psi

Gas
 $0.12(11960) = 1435$
 $5908 - 1435 = 4473 \text{ psi, MASP}$

BOPE 5M ✓

Burst 7240
 70% = 5068 psi

Max P @ drill. int. shoe
 $.22(2003) = 441$
 $5908 - 441 = 5467 \text{ psi}$

Drill Liner test to 5000 psi ✓

TOC @ Wasatch 0.

817' Twin Cr. ✓

TOC @ 1020.

Surface

1500. MD

1500. TVD

2300' Gypsum Spr, 2325' Water

2625' Nugget

TOL @ 3800.

3800' TOC w/6% w/o

3850' Ankara

Intermediate

4000. MD

3989. TVD

TOC @ 5063.

5525' Thaynes

6950' Fault/Thaynes

8760' Woodside

9375' Dinwoody

TOL @ 10300.

TOC @ 10300.

10025' Phosphoria Weber

Drilling Liner

10450. MD

10157. TVD

9957

10475

11330' Mission Canyon

11940' Lodgepole

Production Liner

12335. MD

11960. TVD

✓ Adequate DWD 8/31/07

Well name:	2007-08 Fortuna Hogback Ridge 17-13N-7E	
Operator:	Fortuna (US) LP / Talisman (Canada)	
String type:	Surface	Project ID: 43-033-30059
Location:	Rich County	

Design parameters:	Minimum design factors:	Environment:
<u>Collapse</u>	<u>Collapse:</u>	H2S considered? No
Mud weight: 8.500 ppg	Design factor 1.125	Surface temperature: 75 °F
Design is based on evacuated pipe.		Bottom hole temperature: 96 °F
		Temperature gradient: 1.40 °F/100ft
		Minimum section length: 290 ft
	<u>Burst:</u>	Cement top: Surface
	Design factor 1.00	
<u>Burst</u>		
Max anticipated surface pressure: 1,320 psi	<u>Tension:</u>	Non-directional string.
Internal gradient: 0.120 psi/ft	8 Round STC: 1.80 (J)	
Calculated BHP 1,500 psi	8 Round LTC: 1.80 (J)	
No backup mud specified.	Buttress: 1.60 (J)	
	Premium: 1.50 (J)	
	Body yield: 1.50 (B)	Re subsequent strings:
	Tension is based on buoyed weight.	Next setting depth: 3,989 ft
	Neutral point: 1,310 ft	Next mud weight: 8.900 ppg
		Next setting BHP: 1,844 psi
		Fracture mud wt: 19.250 ppg
		Fracture depth: 1,500 ft
		Injection pressure: 1,500 psi

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Internal Capacity (ft³)
1	1500	13.375	68.00	K-55	Buttress	1500	1500	12.29	1260.8

Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (Kips)	Tension Strength (Kips)	Tension Design Factor
1	662	1950	2.945	1500	3450	2.30	89	1069	12.00 B

Prepared by: Helen Sadik-Macdonald
 Div of Oil, Gas & Minerals

Phone: 801-538-5357
 FAX: 801-359-3940

Date: August 15, 2007
 Salt Lake City, Utah

Remarks:
 Collapse is based on a vertical depth of 1500 ft, a mud weight of 8.5 ppg. The casing is considered to be evacuated for collapse purposes.
 Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.

Engineering responsibility for use of this design will be that of the purchaser.

Well name:	2007-08 Fortuna Hogback Ridge 17-13N-7E	
Operator:	Fortuna (US) LP / Talisman (Canada)	Project ID:
String type:	Intermediate	43-033-30059
Location:	Rich County	

Design parameters:

Collapse

Mud weight: 8.900 ppg
 Design is based on evacuated pipe.

Minimum design factors:

Collapse:

Design factor 1.125

Burst:

Design factor 1.00

Environment:

H2S considered? No
 Surface temperature: 75 °F
 Bottom hole temperature: 131 °F
 Temperature gradient: 1.40 °F/100ft
 Minimum section length: 900 ft
 Cement top: 1,020 ft

Burst

Max anticipated surface pressure: 2,567 psi
 Internal gradient: 0.220 psi/ft
 Calculated BHP 3,444 psi

No backup mud specified.

Tension:

8 Round STC: 1.80 (J)
 8 Round LTC: 1.80 (J)
 Buttress: 1.60 (J)
 Premium: 1.50 (J)
 Body yield: 1.50 (B)

Tension is based on buoyed weight.
 Neutral point: 3,457 ft

Directional Info - Build & Hold

Kick-off point 3179 ft
 Departure at shoe: 117 ft
 Maximum dogleg: 2 °/100ft
 Inclination at shoe: 16.41 °

Re subsequent strings:

Next setting depth: 10,157 ft
 Next mud weight: 9.100 ppg
 Next setting BHP: 4,802 psi
 Fracture mud wt: 19.250 ppg
 Fracture depth: 3,989 ft
 Injection pressure: 3,989 psi

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Internal Capacity (ft³)
1	4000	9.625	43.50	L-80	LT&C	3989	4000	8.625	1672.2
Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (Kips)	Tension Strength (Kips)	Tension Design Factor
1	1844	3753	2.035	3444	6330	1.84	150	813	5.41 J

Prepared by: Helen Sadik-Macdonald
 Div of Oil, Gas & Minerals

Phone: 801-538-5357
 FAX: 801-359-3940

Date: August 15, 2007
 Salt Lake City, Utah

Remarks:

Collapse is based on a vertical depth of 3989 ft, a mud weight of 8.9 ppg. The casing is considered to be evacuated for collapse purposes. Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.

Collapse strength is (biaxially) derated for doglegs in directional wells by multiplying the tensile stress by the cross section area to calculate a

Engineering responsibility for use of this design will be that of the purchaser.

Well name:	2007-08 Fortuna Hogback Ridge 17-13N-7E	
Operator:	Fortuna (US) LP / Talisman (Canada)	
String type:	Drilling Liner	Project ID: 43-033-30059
Location:	Rich County	

Design parameters:

Collapse

Mud weight: 9.100 ppg
Design is based on evacuated pipe.

Minimum design factors:

Collapse:

Design factor 1.125

Burst:

Design factor 1.00

Environment:

H2S considered? No
Surface temperature: 75 °F
Bottom hole temperature: 217 °F
Temperature gradient: 1.40 °F/100ft
Minimum section length: 1,500 ft

Cement top: 5,063 ft

Burst

Max anticipated surface pressure: 3,271 psi
Internal gradient: 0.220 psi/ft
Calculated BHP 5,506 psi

No backup mud specified.

Tension:

8 Round STC: 1.80 (J)
8 Round LTC: 1.80 (J)
Buttress: 1.60 (J)
Premium: 1.50 (J)
Body yield: 1.50 (B)

Tension is based on buoyed weight.
Neutral point: 9,537 ft

Liner top: 3,800 ft

Directional Info - Build & Hold

Kick-off point 3179 ft
Departure at shoe: 2002 ft
Maximum dogleg: 2 °/100ft
Inclination at shoe: 17 °

Re subsequent strings:

Next setting depth: 11,960 ft
Next mud weight: 9.500 ppg
Next setting BHP: 5,902 psi
Fracture mud wt: 19.250 ppg
Fracture depth: 10,157 ft
Injection pressure: 10,157 psi

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Internal Capacity (ft³)
1	6650	7	26.00	L-80	Buttress	10157	10450	6.151	1428.6

Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (Kips)	Tension Strength (Kips)	Tension Design Factor
1	4802	5410	1.127	5506	7240	1.32	143	604	4.23 B

Prepared by: Helen Sadik-Macdonald
Div of Oil, Gas & Minerals

Phone: 801-538-5357
FAX: 801-359-3940

Date: August 15, 2007
Salt Lake City, Utah

Remarks:

For this liner string, the top is rounded to the nearest 100 ft. Collapse is based on a vertical depth of 10157 ft, a mud weight of 9.1 ppg. The Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.

Collapse strength is (biaxially) derated for doglegs in directional wells by multiplying the tensile stress by the cross section area to calculate a

Engineering responsibility for use of this design will be that of the purchaser.

Well name:	2007-08 Fortuna Hogback Ridge 17-13N-7E	
Operator:	Fortuna (US) LP / Talisman (Canada)	
String type:	Production Liner	Project ID: 43-033-30059
Location:	Rich County	

Design parameters:

Collapse
Mud weight: 9.500 ppg
Design is based on evacuated pipe.

Minimum design factors:

Collapse:
Design factor 1.125

Burst:
Design factor 1.00

Environment:

H2S considered? No
Surface temperature: 75 °F
Bottom hole temperature: 242 °F
Temperature gradient: 1.40 °F/100ft
Minimum section length: 1,500 ft

Cement top: 10,300 ft

Burst

Max anticipated surface pressure: 3,271 psi
Internal gradient: 0.220 psi/ft
Calculated BHP 5,902 psi

No backup mud specified.

Tension:
8 Round STC: 1.80 (J)
8 Round LTC: 1.80 (J)
Buttress: 1.60 (J)
Premium: 1.50 (J)
Body yield: 1.50 (B)

Tension is based on buoyed weight.
Neutral point: 12,041 ft

Liner top: 10,300 ft

Directional Info - Build & Hold

Kick-off point 3179 ft
Departure at shoe: 2554 ft
Maximum dogleg: 0 °/100ft
Inclination at shoe: 17 °

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Internal Capacity (ft³)
1	2035	5	18.00	L-80	VAM FJL	11960	12335	4.151	202.9
Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (Kips)	Tension Strength (Kips)	Tension Design Factor
1	5902	10500	1.779	5902	10140	1.72	30	304	10.15 J

Prepared by: Helen Sadik-Macdonald
Div of Oil, Gas & Minerals

Phone: 801-538-5357
FAX: 801-359-3940

Date: August 15, 2007
Salt Lake City, Utah

Remarks:
For this liner string, the top is rounded to the nearest 100 ft. Collapse is based on a vertical depth of 11960 ft, a mud weight of 9.5 ppg. The Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.
Collapse strength is (biaxially) derated for doglegs in directional wells by multiplying the tensile stress by the cross section area to calculate a

Engineering responsibility for use of this design will be that of the purchaser.



JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil Gas and Mining

JOHN R. BAZA
Division Director

November 8, 2007

Fortuna (US) LP
3400, 888 3rd Street SW
Calgary, Alberta, Canada T2P 5C5

Re: Hogback Ridge 17-13N-7E Well, Surface Location 1040' FSL, 704' FEL, SE SE,
Sec. 17, T. 13 North, R. 7 East, Bottom Location 1850' FNL, 295' FEL, SE NE,
Sec. 17, T. 13 North, R. 7 East, Rich County, Utah

Gentlemen:

Pursuant to the provisions and requirements of Utah Code Ann. § 40-6-1 *et seq.*, Utah Administrative Code R649-3-1 *et seq.*, and the attached Conditions of Approval, approval to drill the referenced well is granted.

This approval shall expire one year from the above date unless substantial and continuous operation is underway, or a request for extension is made prior to the expiration date. The API identification number assigned to this well is 43-033-30059.

Sincerely,

Gil Hunt
Associate Director

pab
Enclosures

cc: Rich County Assessor
SITLA
Bureau of Land Management, Utah State Office



Operator: Fortuna (US) LP
Well Name & Number Hogback Ridge 17-13N-7E
API Number: 43-033-30059
Lease: FEE

Location: SE SE Sec. 17 T. 13 North R. 7 East
Bottom Location: SE NE Sec. 17 T. 13 North R. 7 East

Conditions of Approval

1. General

Compliance with the requirements of Utah Admin. R. 649-1 *et seq.*, the Oil and Gas Conservation General Rules, and the applicable terms and provisions of the approved Application for permit to drill.

2. Notification Requirements

The operator is required to notify the Division of Oil, Gas and Mining of the following action during drilling of this well:

- 24 hours prior to cementing or testing casing – contact Dan Jarvis
- 24 hours prior to testing blowout prevention equipment – contact Dan Jarvis
- 24 hours prior to spudding the well – contact Carol Daniels
- Within 24 hours of any emergency changes made to the approved drilling program – contact Dustin Doucet
- Prior to commencing operations to plug and abandon the well – contact Dan Jarvis

The operator is required to get approval from the Division of Oil, Gas and Mining before performing any of the following actions during the drilling of this well:

- Plugging and abandonment or significant plug back of this well – contact Dustin Doucet
- Any changes to the approved drilling plan – contact Dustin Doucet

The following are Division of Oil, Gas and Mining contacts and their telephone numbers (please leave a voice mail message if the person is not available to take the call):

- Dan Jarvis at: (801) 538-5338 office (801) 942-0873 home
- Carol Daniels at: (801) 538-5284 office
- Dustin Doucet at: (801) 538-5281 office (801) 733-0983 home

3. Reporting Requirements:

All required reports, forms and submittals will be promptly filed with the Division, including but not limited to the Entity Action Form (Form 6), Report of Water Encountered During Drilling (Form 7), Weekly Progress Reports for drilling and completion operations, and Sundry Notices and Reports on Wells requesting approval of change of plans or other operational actions.

Page 2

43-033-30059

November 8, 2007

4. Compliance with the Conditions of Approval/Application for Permit to Drill outlined in the Statement of Basis. (Copy Attached)
5. In accordance with Utah Admin. R.649-3-11, Directional Drilling, the operator shall submit a complete angular deviation and directional survey report to the Division within 30 days following completion of the well.
6. State approval of this well does not supersede the required federal approval, which must be obtained prior to drilling.

January 18, 2008

Fluid Minerals Group
Bureau of Land Management
Salt Lake Field Office
2370 South 2300 West,
Salt Lake City, Utah 84119;

43-033-30054

RE: Update Map with Crew Camp / Staging Area—Fortuna (US) LP
Hogback Ridge 17-13N-7E
Surface Location: 1,040' FSL & 704' FEL, SE/4 SE/4,
Target Location: 1,850' FNL & 295' FEL, SE/4 NE/4,
Section 17, T13N, R7E, SLB&M, Rich County, Utah

Dear Fluid Minerals Group:

On behalf of Fortuna (US) LP (Fortuna), Buys & Associates, Inc. respectfully resubmits the enclosed revised map (Topo B) that reflects the location of the proposed Crew Camp / Staging Area on offset private surface. Private surface use and cultural clearance is presently in place for the site and access road which makes use of an existing plugged well site and its existing access road. Fortuna intends to initially utilize the Crew Camp / Staging Area for the drilling of the offset fee well Hogback Ridge 1-17-13N-7E prior to use with the referenced federal well as previously discussed.

Thank you very much for your timely consideration of this application. Please feel free to contact myself or Len Moriarity of Fortuna at 403-237-1448 if you have any questions or need additional information.

Sincerely,

Don Hamilton
Don Hamilton
Agent for Fortuna

cc: Len Moriarity, Fortuna
Diana Mason, Division of Oil, Gas and Mining
Carlos Jallo, Buys & Associates, Inc.

RECEIVED

JAN 17 2008

DIV. OF OIL, GAS & MINING

FILE COPY

T13N

**PROPOSED: CAMP SITE
(ON DRY HOLE)**

**EXISTING 2-TRACK NEEDS
UPGRADED 1.3 MI. +/-**

EXISTING POWER LINE

**PROPOSED ESCAPE
ROUTE 400' +/-**

PROPOSED ACCESS 0.6 MI. +/-

PROPOSED FOOT PATH

**EXISTING 2-TRACK NEEDS
UPGRADED 1.3 MI. +/-**

**PROPOSED LOCATION:
HOGBACK RIDGE #17-13N-7E**

EXISTING FENCE

EVANSTON WY 49.6 MI. +/-

BR-21 (SIX MILE ROAD)

LEGEND:

- 1 CATTLE GUARD AND STOCK GATE NEEDED
- 2 LOW WATER CROSSING REQUIRED
- EXISTING ROAD
- EXISTING FENCE
- EXISTING POWER LINE

RECEIVED

JAN 17 2008

DIV. OF OIL, GAS & MINING

R
7
E

LEGEND:

- PROPOSED ACCESS ROAD
- EXISTING 2-TRACK NEEDS UPGRADED
- PROPOSED ESCAPE ROUTE
- PROPOSED FOOT PATH

FORTUNA (US) L.P.

**HOGBACK RIDGE #17-13N-7E
SECTION 17, T13N, R7E, S.L.B.&M.
1040' FSL 704' FEL**



Uintah Engineering & Land Surveying
85 South 200 East Vernal, Utah 84078
(435) 789-1017 * FAX (435) 789-1813



TOPOGRAPHIC MAP 01 08 08
MONTH DAY YEAR
SCALE: 1" = 2000' DRAWN BY: Z.L. REVISED: 00-00-00



SUNDRY NOTICES AND REPORTS ON WELLS		5. LEASE DESIGNATION AND SERIAL NUMBER: UTU-078702
Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL form for such proposals.		6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A
1. TYPE OF WELL OIL WELL <input checked="" type="checkbox"/> GAS WELL <input checked="" type="checkbox"/> OTHER _____		7. UNIT or CA AGREEMENT NAME: Hogback Ridge Unit
2. NAME OF OPERATOR: Foruna (US) LP		8. WELL NAME and NUMBER: Hogback Ridge 17-13N-7E
3. ADDRESS OF OPERATOR: 3400, 888-3rd St. SW CITY: Calgary, Alberta STATE: _____ ZIP: T2P 5C5		9. API NUMBER: 4303330059
PHONE NUMBER: (403) 237-1448		10. FIELD AND POOL, OR WILDCAT: Hogback Ridge
4. LOCATION OF WELL FOOTAGES AT SURFACE: 1,040' FSL & 704' FEL, QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: SESE 17 13N 7E S		COUNTY: Rich STATE: UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA			
TYPE OF SUBMISSION	TYPE OF ACTION		
<input type="checkbox"/> NOTICE OF INTENT (Submit in Duplicate) Approximate date work will start: _____ <input checked="" type="checkbox"/> SUBSEQUENT REPORT (Submit Original Form Only) Date of work completion: _____	<input type="checkbox"/> ACIDIZE <input type="checkbox"/> ALTER CASING <input type="checkbox"/> CASING REPAIR <input type="checkbox"/> CHANGE TO PREVIOUS PLANS <input type="checkbox"/> CHANGE TUBING <input type="checkbox"/> CHANGE WELL NAME <input type="checkbox"/> CHANGE WELL STATUS <input type="checkbox"/> COMMINGLE PRODUCING FORMATIONS <input type="checkbox"/> CONVERT WELL TYPE	<input type="checkbox"/> DEEPEN <input type="checkbox"/> FRACTURE TREAT <input type="checkbox"/> NEW CONSTRUCTION <input type="checkbox"/> OPERATOR CHANGE <input type="checkbox"/> PLUG AND ABANDON <input type="checkbox"/> PLUG BACK <input type="checkbox"/> PRODUCTION (START/RESUME) <input type="checkbox"/> RECLAMATION OF WELL SITE <input type="checkbox"/> RECOMPLETE - DIFFERENT FORMATION	<input type="checkbox"/> REPERFORATE CURRENT FORMATION <input type="checkbox"/> SIDETRACK TO REPAIR WELL <input type="checkbox"/> TEMPORARILY ABANDON <input type="checkbox"/> TUBING REPAIR <input type="checkbox"/> VENT OR FLARE <input type="checkbox"/> WATER DISPOSAL <input type="checkbox"/> WATER SHUT-OFF <input checked="" type="checkbox"/> OTHER: <u>Permit Extension</u>

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

Fortuna (US) LP hereby requests a one year extension of the state permit for the referenced well
This is the first extension that has been requested.

Approved by the
Utah Division of
Oil, Gas and Mining

Date: 10/30/08
By: [Signature]

NAME (PLEASE PRINT) <u>Don Hamilton</u>	TITLE <u>Agent for Fortuna (US) LP</u>
SIGNATURE <u>Don Hamilton</u>	DATE <u>10/27/2008</u>

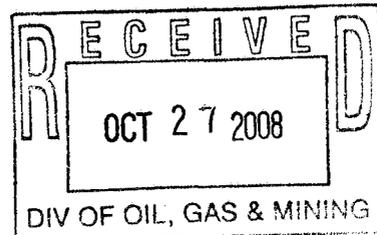
(This space for State use only)

(5/2000)

COPY SENT TO OPERATOR

Date: 10/30/2008
Initials: KS

(See Instructions on Reverse Side)



**Application for Permit to Drill
Request for Permit Extension
Validation**

(this form should accompany the Sundry Notice requesting permit extension)

API: 4303330059
Well Name: Hogback Ridge 17-13N-7E
Location: SESE, Section 17, T13N, R7E,
Company Permit Issued to: Fortuna (US) LP
Date Original Permit Issued: 11/8/2007

The undersigned as owner with legal rights to drill on the property as permitted above, hereby verifies that the information as submitted in the previously approved application to drill, remains valid and does not require revision.

Following is a checklist of some items related to the application, which should be verified.

If located on private land, has the ownership changed, if so, has the surface agreement been updated? Yes No

Have any wells been drilled in the vicinity of the proposed well which would affect the spacing or siting requirements for this location? Yes No

Has there been any unit or other agreements put in place that could affect the permitting or operation of this proposed well? Yes No

Have there been any changes to the access route including ownership, or right-of-way, which could affect the proposed location? Yes No

Has the approved source of water for drilling changed? Yes No

Have there been any physical changes to the surface location or access route which will require a change in plans from what was discussed at the onsite evaluation? Yes No

Is bonding still in place, which covers this proposed well? Yes No

Don Hamilton
Signature

10/27/2008
Date

Title: Agent

Representing: Fortuna (US) LP



GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

January 7, 2010

Fortuna (US) LP
3400, 888-3rd Street SW
Calgary, Alberta, Canada T2P5C5

Re: APD Rescinded – Hogback Ridge 17-13N-7E, Sec.17 T.13N, R.7E
Rich County, Utah API No. 43-033-30059

Ladies and Gentlemen:

The Application for Permit to Drill (APD) for the subject well was approved by the Division of Oil, Gas and Mining (Division) on November 8, 2007. On November 2, 2006, October 10, 2007 and October 30, 2008 the Division granted a one-year APD extension. No drilling activity at this location has been reported to the division. Therefore, approval to drill the well is hereby rescinded, effective January 7, 2010.

A new APD must be filed with this office for approval prior to the commencement of any future work on the subject location.

If any previously unreported operations have been performed on this well location, it is imperative that you notify the Division immediately.

Sincerely,

Diana Mason
Environmental Scientist

cc: Well File
Bureau of Land Management, Utah State Office

