



**WOLVERINE GAS AND OIL COMPANY
OF UTAH, LLC**

Energy Exploration in Partnership with the Environment

May 9, 2008

Mr. Gil Hunt
Utah Division of Oil, Gas and Mining
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Re: Application for Permit to Drill - Wolverine Gas and Oil Company of Utah, LLC
Twist Canyon Federal 21-1
NW/4 NW/4, Section 21, T21S, R1E, SLB&M
Sevier County, Utah

CONFIDENTIAL

Dear Mr. Hunt:

Wolverine Gas and Oil Company of Utah, LLC (Wolverine) hereby submits a copy of an *Application for Permit to Drill* (APD) for the referenced well. Included with this APD is the following supplemental information:

- R649-3-2 Exception Plat showing proposed BHL;
- R649-3-11 Directional Drilling Application Plat showing proposed BHL;
- BLM Surface Use Plan of Operations;
- Survey Plat;
- Drilling Plan, BOPE Diagram, and Directional Plan;
- H2S Drilling Operations Plan;
- Road Design, Location Layout, and Pad Cross-Section Drawings;
- Vicinity Map

RECEIVED

MAY 16 2008

DIV. OF OIL, GAS & MINING

The City of Salina (Water System 21014) will be the source for water during drilling and completion operations on this proposed well. The surface at the planned drill site is administered by the Bureau of Land Management.

Please note that this proposed well is named similar to but different than a well named the Wolverine Federal Twist Canyon 21-1 (API 43-041-30042) for which a State permit was

granted during 2005. The previously permitted well was never drilled and the APD has expired. This proposed well is to be named the Twist Canyon Federal 21-1.

The proposed location is within 460' of a drilling unit boundary, so a request for exception to spacing (R649-3-2) is hereby requested for the well based on restrictive topography relative and the need to drill at an optimum structural location. Wolverine is the only owner and operator within 460' of the proposed well location.

This letter and the accompanying plats are also intended to serve as an application for directionally drilling the well per R649-3-11. Wolverine is the owner of all oil and gas within 460 feet from all points along the intended wellbore for the well. Information relating to R649-3-11 is as follows:

Operator: Wolverine Gas and Oil Company of Utah, LLC

Address: One Riverfront Plaza
55 Campau, N.W.
Grand Rapids, MI 49503-2616

Well: Twist Canyon Federal 21-1

Field: NA (Wildcat)

Reservoir: NA (Wildcat)

County: Sevier

Reason: Restrictive topography and to minimize surface impact

CONFIDENTIAL

Please accept this letter as Wolverine's written request for confidential treatment of all information contained in and relating to this application and proposed well.

Thank you for consideration of this application. Please feel free to contact myself or Ed Higuera of this office if you have any questions or need additional information.

Sincerely,



Ellis M. Peterson
Senior Production Engineer
Wolverine Gas and Oil

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

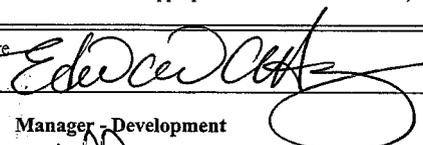
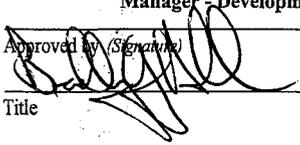
FORM APPROVED
OMB No. 1004-0137
Expires March 31, 2007

5. Lease Serial No. UTU-80587	
6. If Indian, Allottee or Tribe Name N/A	
7. If Unit or CA Agreement, Name and No. Wolverine Federal Unit	
8. Lease Name and Well No. Twist Canyon Federal 21-1	
9. API Well No. 43-041-30 058	
1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER	10. Field and Pool, or Exploratory Exploratory
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 type="checkbox"/> Multiple Zone	11. Sec., T. R. M. or Blk. and Survey or Area Section 21, T21S, R1E, SLB&M
2. Name of Operator Wolverine Gas & Oil Company of Utah, LLC	12. County or Parish Sevier
3a. Address 55 Campau NW Grand Rapids, MI 49503-2616	13. State UT
3b. Phone No. (include area code) 616-458-1150	14. Distance in miles and direction from nearest town or post office* 2.2 miles east-northeast of Salina, Utah
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface 1007' FNL 1173' FWL, NW/4 NW/4 At proposed prod. zone 2500' FSL, 1500' FWL, NE/4 SW/4	15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 1500
16. No. of acres in lease 640	17. Spacing Unit dedicated to this well 40 acres
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. None	20. BLM/BIA Bond No. on file BLM WY3329
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 5947' GR	22. Approximate date work will start* 07/01/2008
23. Estimated duration 120 days	

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 	Name (Printed/Typed) Edward A. Higuera	Date 05/06/2008
Title Manager - Development		
Approved by 	Name (Printed/Typed) BRADLEY G. HILL	Date 06-24-08
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)

Sur f

429999 X
43137634
38.971915
-111.808058

Federal Approval of this
Action is Necessary

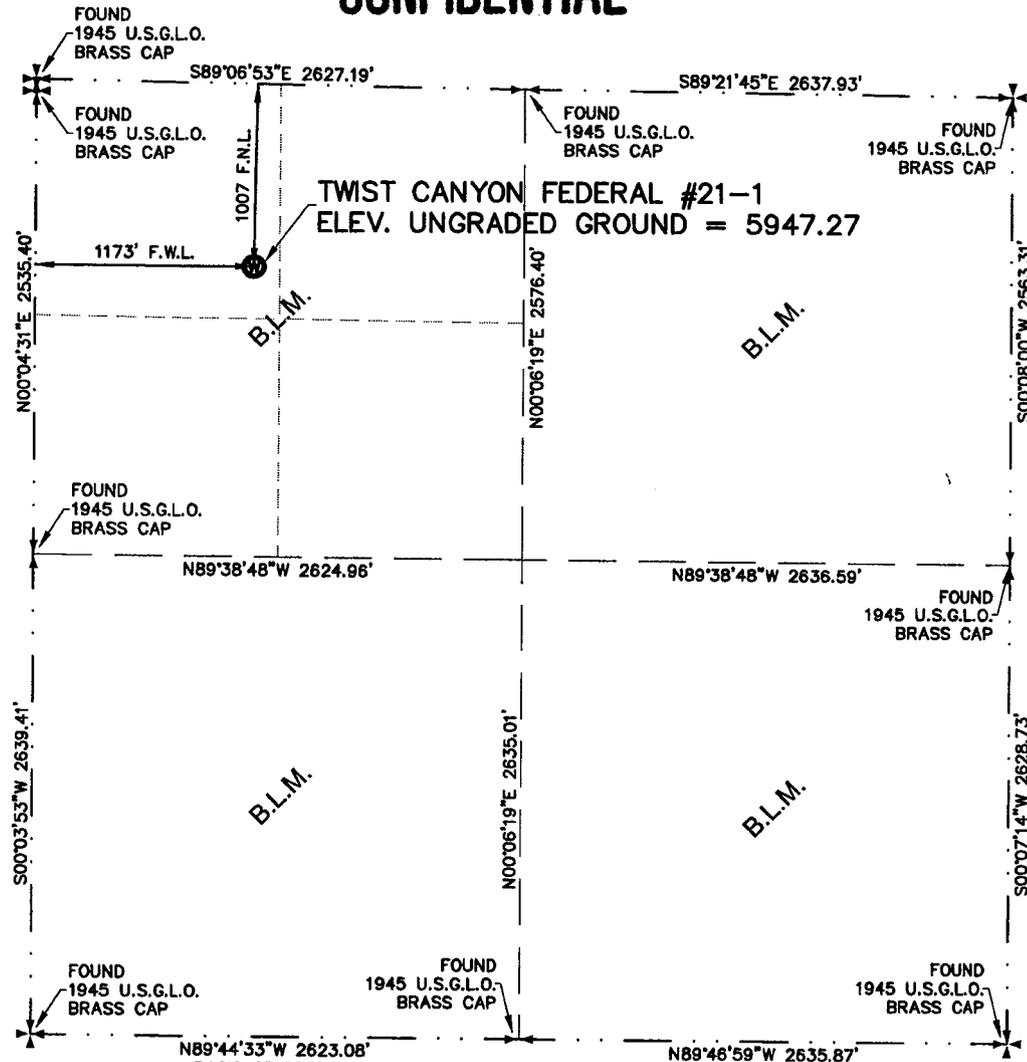
BHL

430104 X
43132534
38.947331
-111.806789

RECEIVED
MAY 16 2008
DIV. OF OIL, GAS & MINING

Section 21, T.21 S., R.1 E., S.L.B. & M.

CONFIDENTIAL



TWIST CANYON FEDERAL #21-1
ELEV. UNGRADED GROUND = 5947.27

BASIS OF BEARINGS
BASIS OF BEARING USED WAS N89°44'33"W BETWEEN THE SOUTHWEST CORNER AND THE SOUTH QUARTER CORNER OF SECTION 21, T.21 S., R.1 E., S.L.B. & M.
LATITUDE = 38°58'19.5467" (38.97209631)
LONGITUDE = -111°48'30.4914" (-111.80846983)

PROJECT Wolverine Gas & Oil Company of Utah, L.L.C.

WELL LOCATION, LOCATED AS SHOWN IN THE N.W. 1/4 OF THE N.W. 1/4 OF SECTION 21, T.21 S., R.1 E., S.L.B. & M. SEVIER COUNTY, UTAH

LEGEND

- = SECTION CORNERS LOCATED
- = QUARTER SECTION CORNERS LOCATED
- = PROPOSED WELL HEAD

NOTE: THE PURPOSE OF THIS SURVEY WAS TO PLAT THE TWIST CANYON FEDERAL #21-1 LOCATION. LOCATED IN THE N.W. 1/4 OF THE N.W. 1/4 OF SECTION 21, T.21 S., R.1 E., S.L.B. & M., SEVIER COUNTY.

BASIS OF ELEVATION

ELEVATION BASED ON SALINA H.A.R.N. STATION LOCATED IN THE NW 1/4 OF SECTION 19, T.21 S., R.1 E., S.L.B. & M.



CERTIFICATE

THIS IS TO CERTIFY THAT THIS 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.

TREVOR R. GADD, L.S. #343639
DATE 04/25/08



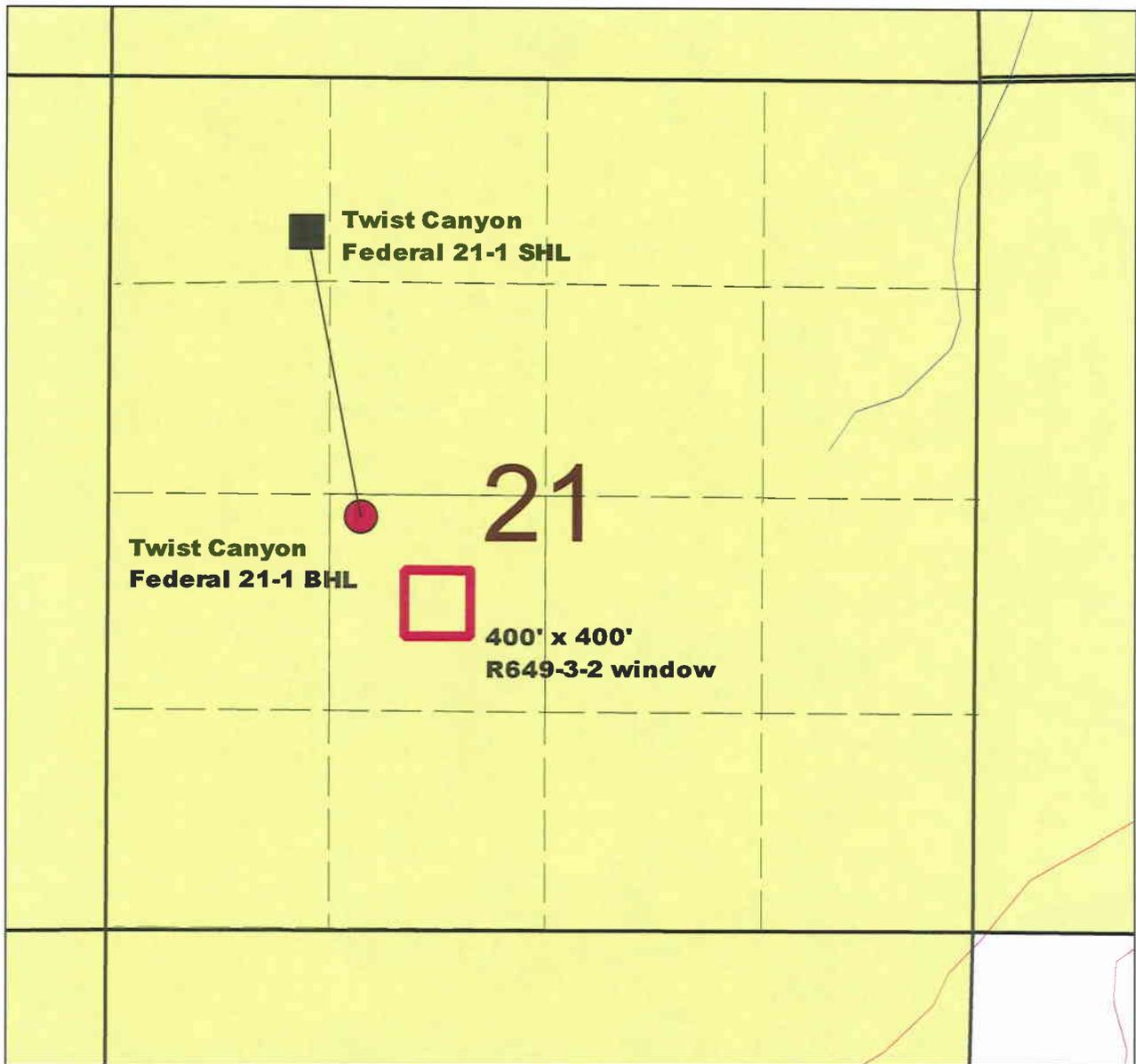
Jones & DeMille Engineering

1535 South 100 West - Richfield, Utah 84701
Phone (435) 896-8266
Fax (435) 896-8268
www.jonesanddemille.com

Well Location Plat for

Wolverine Gas & Oil Company of Utah, L.L.C.

DESIGNED	SURVEYED	CHECKED	DRAWN	PROJECT NO.	SHEET NO.
-	T.W.G.	T.R.G.	T.R.G.	0802-098	1
DATE 4/25/2008		DWG NAME well location	SCALE 1"=1000'		



Twist Canyon Federal 21-1 Well Location

SHL: 1173' FWL, 1007 FNL, NW/4 NW/4, Sec. 21, T21S, R1E, Sevier Co., UT

BHL: 1500' FWL, 2500' FSL, NE/4 SW/4, Sec. 21, T21S, R1E, Sevier Co., UT



Wolverine Lease



Proposed SHL



Proposed BHL

CONFIDENTIAL

0.1000 0 0.1000 0.2000 0.3000 0.4000 mi

1 inch = 1000 feet



WOLVERINE GAS & OIL Company of Utah, LLC
(Operator)

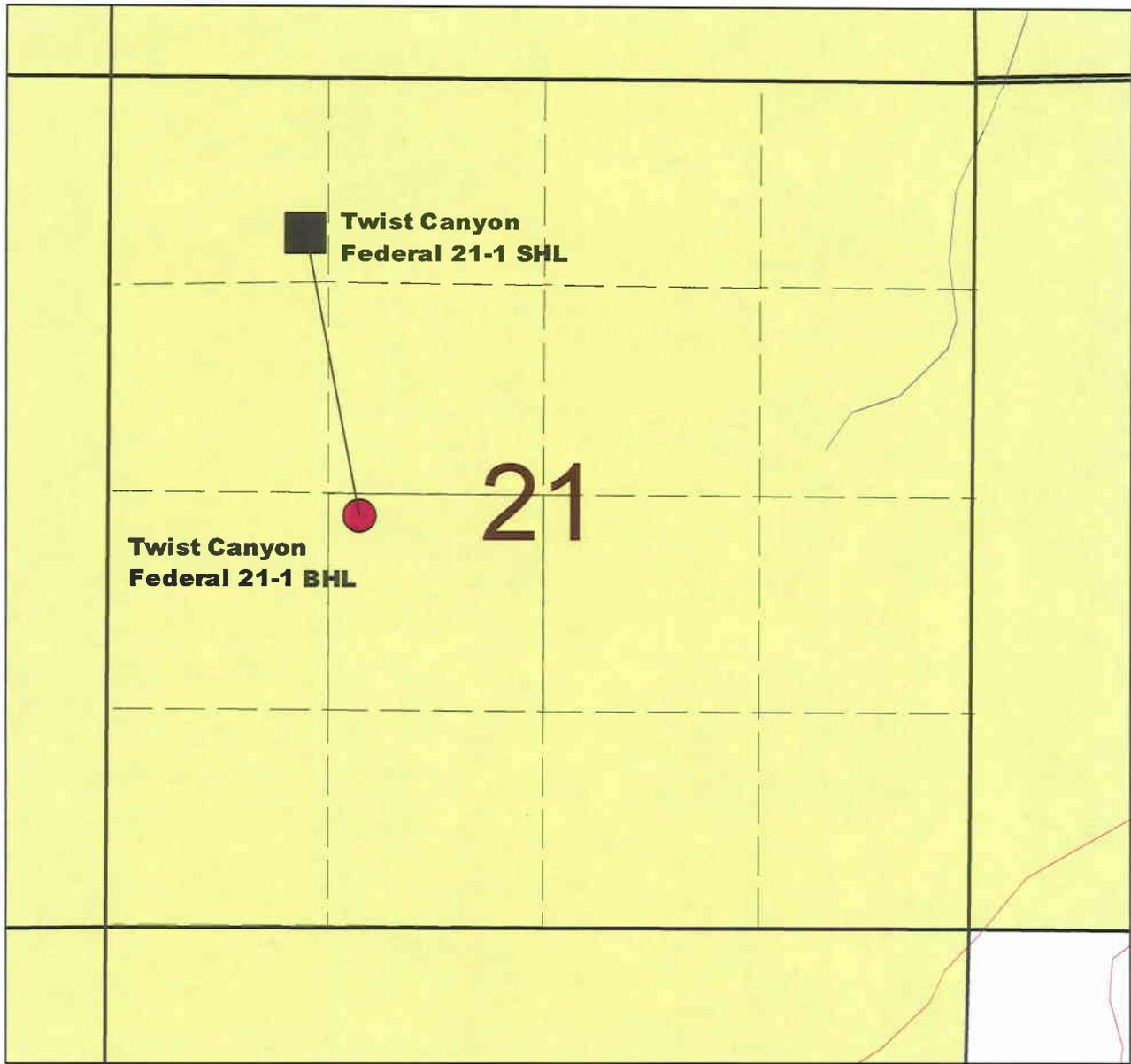
Energy Exploration in Partnership with the Environment

ONE RIVERFRONT PLAZA
55 CAMPALU, N.W.
GRAND RAPIDS, MI 49503-2616
(616) 458-1150

Exception Location and Ownership Plat
(R649-3-2)

Date: 5/6/2008

Author



Twist Canyon Federal 21-1 Well Location

SHL: 1173' FWL, 1007 FNL, NW/4 NW/4, Sec. 21, T21S, R1E, Sevier Co., UT

BHL: 1500' FWL, 2500' FSL, NE/4 SW/4, Sec. 21, T21S, R1E, Sevier Co., UT



Wolverine Lease



Proposed SHL



Proposed BHL

CONFIDENTIAL



1 inch = 1000 feet



WOLVERINE GAS & OIL Company of Utah, LLC
(Operator)

Energy Exploration in Partnership with the Environment

ONE RIVERFRONT PLAZA
55 CAMPAU, N.W.
GRAND RAPIDS, MI 49503-2816
(616) 458-1150

Directional Drilling Application Plat (R649-3-11)

Date: 5/6/2008

Author

SURFACE USE PLAN OF OPERATIONS

For inclusion with Application for Permit to Drill

Name of Operator: Wolverine Gas and Oil Company of Utah, LLC
Address: One Riverfront Plaza, 55 Campau NW
Grand Rapids, Michigan, 49503-2616

Well Location: **Twist Canyon Federal 21-1**
1007' FNL & 1173' FWL, (being in NW/4 NW/4)
Section 21, T21S, R1E, SLB&M
Sevier County, Utah

Access Road Location: Existing lease road to previously drilled Wolverine State Twist Canyon 16-1 crosses BLM land in Sections 4 and 9, and crosses State land in Section 16. Access road to be constructed crosses State land in Section 16 and BLM land in Section 21.

Fee surface use is not required for construction and drilling of the referenced well and access road. State surface use is required for that portion of the access road that crosses Section 16-T21S-R1E. Federal surface use is being requested with the associated Application for Permit to Drill (APD) through the BLM – Richfield Field Office.

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

A Federal onsite inspection was conducted on Tuesday, May 1st, 2007 with the following individuals present:

Charlie Irons - Wolverine Gas and Oil Company of Utah, LLC
Paul Spiering - Wolverine Gas and Oil Company of Utah, LLC.
Darin Robinson – Jones & DeMille Engineering
Glen Nebeker - Western Land Services – NEPA Specialist
Stan Andersen - BLM Supervisory Natural Resource Specialist
Chris Horting-Jones - BLM Archaeologist
Rod Lee - BLM Environmental Coordinator
Brant Hallows - BLM Range Management Specialist
Pam Hart – BLM Legal Instruments Examiner
Burke Williams – BLM Range Conservationist
Bert Hart - BLM Team Leader

CONFIDENTIAL

Existing Roads:

The vicinity map in the APD packet shows the proposed well location and its proximity to the town of Salina, Utah (being 3 miles northeast of Salina).

Driving directions: From Salina, Utah, travel north on US 89, under Utah Department of Transportation (UDOT) maintenance approximately 4 miles to Willow Creek Road (a gravel county road), follow easterly about 1.8 miles then turn south onto the lease road (on BLM land) for the previously-drilled Wolverine State Twist Canyon 16-1 well. Follow lease road approximately 1.68 miles to south line of BLM land and onto State land. Continue approximately 0.45 miles to existing well pad for Wolverine State Twist Canyon 16-1 well. The surface conditions of Willow Creek road and the existing lease road are considered adequate to bear rig-related traffic without improvement.

Access Roads to be Constructed and Reconstructed:

Proposed access will require the construction of a new road from the existing 16-1 well pad southerly to the proposed 21-1 well location. An existing ATV trail/road connects the two locations but due to rough terrain,

portions of the present road route from the 16-1 well pad across State land to the BLM lease boundary cannot be used. A switchback road will need to be constructed off the 16-1 well pad to accommodate rig traffic. See road design drawings in APD packet. From the BLM lease boundary (north line of Sec 21-21S-1E) and southerly to the 21-1 well site, the access road will be constructed generally following the existing trail/road. The new constructed road across BLM land will include one vehicle turnout, as shown on the drawings, to allow traffic to pass.

Total length of new constructed access road is 4,522 feet, or 0.86 mile. BLM on-lease road length is about 820 feet, or 0.15 mile. An application for right-of-way is being submitted to the School and Institutional Trust Lands Administration (SITLA) for the state-owned portion of the proposed access road.

Road construction, operation and maintenance will be in compliance with the terms and conditions of the Conditions of Approval, the American Association of State Highway and Transportation (AASHTO) safety standards, and will meet criteria for the Manual of Uniform Traffic Control Devices (MUTCD) manual for signs.

Energy dissipating structures and silt fences will be utilized to minimize erosion that may result from the road construction.

The Operator intends to install a gate across the lease road at the point where construction begins (near the edge of the 16-1 well pad) to restrict traffic to the proposed well. An ATV guard would be installed adjacent to the gate so that ATV traffic will have continued access by use of the lease road. These installations would be subject to SITLA approval. An area around one side of the 21-1 well pad would be left passable by ATV traffic so that public land in Section 21 will remain accessible by this route.

All existing county roads, realigned roads and the new lease road will be maintained and kept in good repair during all phases of operation. Vehicle operators will obey posted speed restrictions and observe safe speeds commensurate with road and weather conditions.

Location of Existing Wells within a one-mile radius:

Well	Type/status	Surface Location	Bottom Hole Location
Wolverine State Twist Canyon 16-1	Dry/ Suspended	SW4NW4 Section 16	SW4SE4 Section 16

Location of Existing and/or Proposed Facilities if Well is Productive:

(a) *On well pad* –A temporary testing facility may be constructed on this location in the event drilling is successful, consisting of treater/separator, tanks and related components. The facility would be surrounded by a dike of sufficient capacity to contain the storage capacity of the largest tank. All loading lines and valves would be located inside the berm surrounding the tank battery.

(b) *Off well pad* – It is not possible to know whether an off-well pad production facility would be necessary in the event of a discovery. In the event such a facility is needed, the existing well pad for the 16-1 well would potentially be used for collection, treating and load-out. The Operator will submit this information for approval at such time as production requirements are known.

Location and Type of Water Supply (Rivers, Creeks, Lakes, Ponds and Wells):

The Operator intends to purchase water for drilling purposes from the City of Salina, under contract for sale dated 9/27/2007. Water will be loaded from a hydrant north of Pioneer Cemetery on Slaughterhouse Road in the SE4NW4 Section 19-T21S-R1E, and transported by tankers to the location, using county roads and the approved lease roads. Should additional water sources be pursued they will be properly permitted through the State of Utah – Division of Water Rights. The BLM will be notified of any changes in water supply.

Construction Materials:

Natural earth materials used for fill on the well pad will be taken from cuts made in construction of the pad. Imported granular borrow from an approved source will be applied to the surface of the well pad and access road where deemed necessary. No construction materials will be removed from federal lands.

Methods for Handling Waste Disposal:

The reserve pit will be used for the disposal of waste mud and drill cuttings. All borehole fluids and salts will be contained in the reserve pit. It will be located in cut material and will be lined with 12 mil minimum thickness plastic nylon reinforced liner material. The liner will overlay a felt liner pad only if sharp rock edges result from excavation. The pit liner will overlap the top of the pit walls and be covered with dirt and/or rocks to hold it in place. No trash, scrap pipe, etc. that could puncture the liner will be disposed of in the pit. Pit walls will be sloped no greater than 2:1. A minimum 2-foot freeboard will be maintained in the pit at all times during the drilling and completion operations. After evaporation of fluids, back-fill of sub-soil and compaction to prevent settling will

occur within 90 days of cessation of pit use. If necessary, any remaining fluids will be pumped out of the pit and transported off site.

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 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.

Wastewater will not be discharged on the surface at this site and the drilling of the well will not require a wastewater management plan.

All rubbish and debris will be kept in containers on the well site, and will be hauled to an approved disposal site upon completion of drilling operations and as needed during such operations. There will be no chemical disposal of any type.

Self-contained, portable toilets will be used for human waste, and the waste will be disposed at an approved human waste disposal facility. Sanitation will comply with local and state regulations.

Ancillary Facilities:

No ancillary facilities are anticipated at this time.

Well Site Layout:

Pad Location and Layout Drawings in the APD packet show the proposed well site layout including location of the reserve pit and access road onto the pad, turnaround areas, parking areas, living facilities, soil material stockpiles, and the orientation of the rig with respect to the pad and other facilities. Cross section sheets said packet show cuts and fills required for construction, and their relationship to topography. As detailed above under Methods for Handling Waste Disposal, the reserve pit will be lined and appropriate measures as described above will be taken to prevent leakage. The pit will be fenced on three sides during drilling operations and then the fourth side will be immediately fenced when the rig is moved off location.

The pad and road designs would be consistent with BLM specifications.

A pre-construction meeting with responsible company representative and contractors will be conducted at the project site prior to commencement of surface-disturbing activities. The pad and road will be construction-staked (centerline and exterior boundaries) prior to this meeting.

All surface disturbing activities will be supervised by a qualified, responsible company representative who is aware of the terms and conditions of approval from the BLM under the APD, and terms and conditions of approval from SITLA under the right-of-way grant for the portion of the access road across State land.

All cut and fill slopes will be such that stability can be maintained for the life of the activity.

The stockpiled topsoil (first 6 inches or maximum available) will be isolated in a berm by the well pad. Topsoil will be stockpiled for reclamation in such a way as to prevent soil loss and contamination.

Water spraying may be implemented if necessary to minimize dust.

Plans for Reclamation of the Surface:

Interim Reclamation: In the event production is achieved the Operator will perform interim reclamation of the site. Interim reclamation will consist of reclamation of the reserve pit and reclamation of that portion of the well pad not needed for ongoing operations. After evaporation of fluids, the pit will be back-filled with sub-soil and/or rock and compacted to prevent settling. The pit area will be surfaced with granular borrow to render it a usable part of the well pad. All portions of the pad no longer necessary for well workover, testing or treating will be contoured to match the surrounding terrain to the best extent practicable. Stockpiled topsoil will be evenly distributed thereon, scarified and seeded as per BLM conditions of approval.

Final Reclamation: In the event the well is a dry hole, or at such time that all production ceases and the well has been plugged and abandoned, the Operator will perform final reclamation of the site. Final reclamation will consist of reclamation of the reserve pit, the well pad and the access road as it crosses BLM land.

Any accumulation of hydrocarbons in the reserve pit will be removed and recovered for sale unless it is determined by the authorized officer to be waste oil. All waste oil will be disposed of properly at approved facilities. The portion of the reserve pit liner which is exposed above the cuttings will be cut and removed from the site and

disposed in an authorized landfill. After evaporation of fluids, the pit will be back-filled with subsoil and/or rock from the reserve pit stockpile and compacted to prevent settling.

Road base material used in the construction of the access road and pad will be removed from the site and disposed in a proper manner. If the reserve pit has adequate capacity, then some or all of the road base material may be buried in the reserve pit, provided that the granular is not contaminated by oil or other waste materials. The access road will be contoured using an excavator or similar equipment, rather than simply ripping the surface. The path of the ATV trail that existed prior to new-road construction will be left in a condition passable to ATV traffic.

Subsoil from the portions of the well pad that are fill will be pulled up onto the pad in order to reestablish the original slope to the best extent possible. The portions that are cut will be filled to match the original slope of the land to the best extent possible. Topsoil from the stockpile will then be evenly distributed over the entire impacted area, including the new-construction portion of the access road. The entire impacted area will be scarified and seeded in late fall, using the seed mix and methods described in BLM conditions of approval. Final reclamation will take place within 180 days after plugging date of the last well on site, depending on weather, season and other extenuating circumstances.

During the life of the project and until the site is released from liability for reclamation, the project will be inspected at least annually for noxious weeds. If invasive noxious weeds are found, the weeds will be treated to eliminate further reproduction, and treatment shall continue until the weeds have been eradicated. If noxious weeds are found, the BLM will be notified of their occurrence.

Surface Ownership:

The surface of the proposed well site and the southerly 820+/- of the access road is federally owned and is administered by the Bureau of Land Management, United States Department of Interior. The access road across Section 16-T21S-R1E is owned by the State of Utah and is administered by the School and Institutional Trust Lands Administration (SITLA). The previously built portion of the access road in Sections 4 and 9 is federally owned and is administered by the Bureau of Land Management, United States Department of Interior.

Other Information:

The top 6 inches of soil material will be stripped and removed from the new-construction portion of the access road and well pad and stockpiled for future reclamation of the site. This topsoil shall be stockpiled separately from any other excavated materials. It will be reserved for reclamation and not utilized for any other purpose. If it is stockpiled for more than one year it will be seeded with a seed mix approved by the authorized officer.

Heavy equipment used to construct and rehabilitate the well pad and access road will be cleaned and/or sprayed to remove any noxious or invasive weeds and seeds, prior to entering to the project site. Any other equipment and vehicles that have been used in other locations where noxious weeds or seeds could have attached to the equipment will also be sprayed and/or cleaned.

All equipment and vehicles will be confined to the access road and well pad.

Western Land Services will conduct a Class III archeological survey and will submit same under separate cover to the appropriate agencies.

Western Land Services will conduct a T&E survey and prepare an EA for the proposed well site. The T&E report and EA will be submitted under separate cover to the appropriate agencies.

No stream alteration or drainage crossings are involved that require additional State or Federal approval.

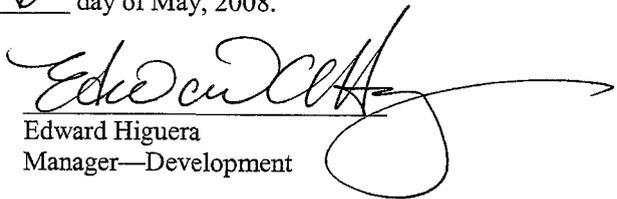
All permanent structures, including pumping units, constructed or installed will be painted a flat, non-reflective color as described on page 40 of the Gold Book (Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, 4th Edition 2006). Permanent structures are defined as being on location for six months or longer. Facilities that are required to comply with Occupational Safety and Health Act (OSHA) shall be excluded.

Fire suppression equipment will be available to suppress any wildfires caused by construction or related activities. In the event of a wildfire the Sevier County Fire Warden will be notified.

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I, or someone under my direct supervision, have full knowledge of state and Federal laws applicable to this operation; 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 in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

Executed this 6 day of May, 2008.

Signature: 
Edward Higuera
Position Title: Manager—Development

Address: Wolverine Gas and Oil Company of Utah, LLC
One Riverfront Plaza, 55 Campau NW
Grand Rapids, Michigan, 49503-2616

Telephone: 616-458-1150

Field representative (if not above signatory)

Address: Paul Spiering
1140 N Centennial Park Drive
Richfield, Utah 84701

Telephone: 435-896-1943

Agents not directly employed by the operator must submit a letter from the operator authorizing that agent to act or file this application on their behalf.

CONFIDENTIAL

WOLVERINE GAS AND OIL COMPANY OF UTAH, LLC

DRILLING PLAN

Twist Canyon Federal 21-1
NW/4 NW/4 Section 21, Township 21 South, Range 1 East, S.L.B.&M.
Sevier County, Utah

CONFIDENTIAL

Plan Summary:

It is planned to drill this confidential exploratory well as a directional bore hole due to surface topography constraints and in accordance with the enclosed directional drilling plan. The well will be drilled to a depth of 12,900' to test the Twin Creek, Navajo, Sinbad and Kaibab formations. Well path deviation caused by subsurface geologic irregularities is expected to be the primary drilling concern in this area. No abnormal pressure is anticipated. The presence of Hydrogen Sulfide gas is anticipated in the Kaibab Formation and deeper, and an H2S contingency plan to be in effect before drilling below the Shnabkaib at +/-10,700' compliments this drilling plan.

The planned location is as follows:

Surface Hole Location: 1007' FNL, 1173' FWL, Section 21, T21S, R1E, S.L.B. & M.

Bottom Hole Location: 2500' FSL, 1500' FWL, Section 21, T21S, R1E, S.L.B. & M.

Conductor casing will be set at approximately 120 feet and cemented to surface. A 17-1/2" hole will be drilled to 2000' where 13-3/8" surface casing will be set and cemented to surface. A 12-1/4" hole will be drilled through the Twin Creek and Navajo formations to approximately 10,400' where the well will be logged and 9-5/8" casing will be set and cemented. Then, an 8-1/2" hole will be drilled to 12,900'. The well will be logged and if significant porosity and hydrocarbon shows are encountered in the Sinbad, Kaibab or other formations, then 5-1/2" production casing will be set and cemented at TD.

Drilling activities at this well are expected to commence as early as July 1, 2008 if regulatory approvals are attained.

Well Name: Twist Canyon Federal 21-1
Surface Location: 1007' FNL, 1173' FWL NW/4 NW/4 Section 21, T21S, R01E, S.L.B. & M. Sevier County, Utah
TD Bottom-Hole Location: 2500' FSL, 1500' FWL NE/4 SW/4 Section 21, T21S, R01E, S.L.B. & M. Sevier County, Utah
Elevations: 5952' (Est. graded ground) 5978' (Est. KB)

I. Geology:

Tops of important geologic markers and anticipated water, oil, gas, and mineral content are as follows:

Formation	TVD Interval (KB)	MD Interval (KB)	Contents	Pressure Gradient
Volcanics	26' - 876'	26' - 876'		
Arapien	876' - 7574'	876' - 7908'		
Twin Creek	7574' - 7878'	7908' - 8212'	O/G/W	0.44 psi/ft
Navajo	7878' - 7917'	8212' - 8251'	O/G/W	0.44 psi/ft
T HGRZ	7917' - 7960'	8251' - 8294'		
B HGRZ	7960' - 8895'	8294' - 9229'		
Kayenta	8895' - 9031'	9229' - 9365'		
Wingate	9031' - 9389'	9365' - 9723'		
Chinle	9389' - 9849'	9723' - 10183'		
Shinarump	9849' - 9936'	10183' - 10270'		
Moenkopi	9936' - 10633'	10270' - 10967'		
Shnabkaib	10633' - 10702'	10967' - 11036'		
M Moenkopi	10702' - 10997'	11036' - 11331'		
Sinbad	10997' - 11051'	11331' - 11385'	O/G/W	0.44 psi/ft
L Moenkopi	11051' - 11301'	11385' - 11635'		
Black Dragon	11301' - 11483'	11635' - 11817'		
Kaibab	11483' - 11567'	11817' - 11901'	O/G/W	0.44 psi/ft
Toroweap	11567' - 12550'	11901' - 12884'		
Total Depth	12550'	12900'		

CONFIDENTIAL

II. Well Control:

The contracted drilling rig has a 10M BOP system but conditions only require a 5M BOP system. BOPE will be in place and tested as a 5M system prior to drilling out the surface casing shoe. See attached schematic of BOPE.

A. The BOPE will as a minimum include the following:

Wellhead Equipment (5M Min.):

BOPE Item	Flange Size and Rating
Annular Preventer	13-5/8" 5M
Double Rams (5" Pipe - top, Blind - bottom)	13-5/8" 10M
Drilling Spool w/ 2 side outlets (4" Choke Line, 4" Kill Line)	13-5/8" 10M x 13-5/8" 10M
Single Ram (Pipe)	13-5/8" 10M
Spacer Spool	13-5/8" 10M x 13-5/8" 10M
Casing Spool (Multi-Bowl)	13-5/8" 10M x 13-5/8" 5M
Casing Head (13-5/8" SOW, w/ two 2-1/16" SSO's)	13-5/8" 5M

Auxiliary Equipment (5M minimum):

BOPE Item
Choke Line with 2 valves (3" minimum)
Kill Line with 2 valves and one check valve (2" minimum)
2 Chokes with one remotely controlled at a location readily accessible to the driller
Upper and lower kelly cock valves with handles

Safety Valves to fit all drill string connections in use
Inside BOP or float sub
Pressure gauge on choke manifold
Fill-up line above the uppermost preventer
Wear bushing in casing head

- A. **Choke manifold** will be functionally equipped and sized at a minimum as shown on the attached diagram. All chokes will be straight lines, or use tee blocks or be targeted with running tees if there are turns, and all choke lines will be anchored. All valves (except chokes) in the kill line choke manifold and choke line will be full opening and allow straight through flow.
- B. **System accumulator** will have sufficient capacity to open the hydraulically-controlled gate valve and close all rams plus the annular preventer (3 ram system will have added 50 percent safety factor to compensate for any fluid loss in the control system or preventers) and retain a minimum pressure of 200 psi above pre-charge on the closing manifold without use of the closing unit pumps. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir shall be maintained at the manufacturer's recommendations. The accumulator will have two (2) independent power sources available to close the preventers. Nitrogen bottles may be one of those sources, and if so, will have charge maintained per manufacturer's specifications.
- C. **Accumulator pre-charge pressure test** will be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure will be corrected if the measured precharge pressure is found to be above or below the maximum or minimum specified limits. Only nitrogen gas will be used to precharge.
- D. **Power for the closing unit pumps** will be available to the unit at all times so that the pumps will automatically start when the closing valve manifold pressure has decreased to the pre-set level.
- E. **Accumulator pump capacity** will be such that, with the accumulator system isolated from service, the pumps will be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and retaining a minimum of 200 psi above the specified accumulator pre-charge pressure.
- F. **Locking devices**, either manual (i.e., hand wheels) or automatic, will be installed on the ram type preventers. A valve will be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.
- G. **Remote controls** will be readily accessible to the driller and will be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve.
- H. **Well control equipment testing** will be performed using clear water when the equipment is initially installed, whenever any seal subject to test pressure is broken, following related repairs, and as a minimum, every 30-day interval. The tests will apply to all related well control equipment.

Ram type preventers and associated equipment will be isolated and tested to 5000 psi. The annular preventer will be tested to 2500 psi. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer, for all tests. A casing head valve will be open below the test plug during testing of the BOP stack. Valves will be tested from the working pressure side with all down-stream valves open. Kill line valves will be tested with the check valve held open or the ball removed.

Pipe and blind rams will be activated each trip, but not more than once a day. The annular preventers will be functionally operated at least weekly. A pit level drill will be conducted weekly for each crew. All BOPE drills and tests will be recorded in the IADC driller's log.

CONFIDENTIAL

III. Casing and Cementing:

A. Casing Program (all new casing):

Hole Size	Casing Size	Weight	Grade	Connection	Coupling Diameter	Setting Depth
30"	24"		Conductor			0' - 120' GL
17.50"	13.375"	68.0	J-55	BTC	14.375"	0' - 2000' KB
12.25"	9.625"	47.0	L-80	BTC	10.625"	0' - 4000' KB
12.25"	9.625"	53.5	HCP-110	LTC	10.625"	4000' - 10400' KB
8.5"	5.500"	20.0	L-80	LTC & BTC	6.050"	0' - 12,900' KB

	Surface	Intermediate	Production
Casing O. D. (in)	13.375	9.625	5.500
Casing Grade	J-55	HCP-110 & L-80	L-80
Weight of Pipe (lbs/ft)	68.0	47.0 & 53.5	20.0
Connection	BTC	BTC & LTC	LTC & BTC
Top Setting Depth - MD (ft)	0	0	0
Top Setting Depth - TVD (ft)	0	0	0
Bottom Setting Depth - MD (ft)	2000	10400	12900
Bottom Setting Depth - TVD (ft)	2000	10100	12550
Maximum Mud Weight - Inside (ppg)	9.0	10.6	9.0
Maximum Mud Weight - Outside (ppg)	9.0	10.6	9.0
Design Cement Top - TVD (ft)	0	1500	9500
Design Cement Top - MD (ft)	0	1500	9800
Max. Hydrostatic Inside w/ Dry Outside (psi)	936	5567	5873
Casing Burst Rating (psi)	3450	6870	9190
Burst Safety Factor (1.10 Minimum)	3.69	1.23	1.56
Max. Hydrostatic Outside w/ Dry Inside (psi)	936	5567	5873
Collapse Rating	1950	8850	8830
Collapse Safety Factor (1.125 Minimum)	2.08	1.59	1.50
Casing Weight in Air 1000 lbs	136	530.4	258
Body Yield 1000 lbs	1069	1086	466
Joint Strength 1000 lbs	1140	1122	503
Tension Safety Factor (1.70 Minimum)	7.86	2.05	1.81

CONFIDENTIAL

Casing with same or greater burst, collapse, and tension rating may be substituted for any of the planned casing sizes depending on availability and actual conditions.

B. Cementing Program

<u>Casing Size</u>	<u>Cement Slurry</u>	<u>Quantity (sks)</u>	<u>Density (ppg)</u>	<u>Yield (ft³/sk)</u>
13.375"	Lead: CBM Lite	375	10.5	4.12
	Tail: Premium Plus	450	15.6	1.19
9.625"	Lead: Elastiseal foamed	1100	10.5ppge	1.47 (unfoamed)
	Tail: Premium AG	900	14.4	1.47
5.500"	50:50 POZ Premium AG w/20% silica, retarder	900	14.4	1.21

Surface: 13-3/8" surface casing will be cemented from setting depth (2000') to surface and topped out with premium cement if necessary. Hardware will include a guide shoe, float collar, top plug, and a minimum of one centralizer per joint on the bottom three (3) casing joints. Water or other preflush fluid pumped ahead of the slurry will separate cement from the drilling fluids.

Intermediate: 9-5/8" intermediate casing will be cemented from setting depth (10,400') to 1500' (into the 13-3/8" casing shoe at 2000'). Slurry volume will be based on calipered hole size plus a minimum of 25% excess. Hardware will include a guide shoe, float collar, top plug, and centralizers on bottom and as needed across any pay zones. The cement will be foamed due to the required cement column to raise cement to 1500'. Water and preflush fluid pumped ahead of the slurry will separate cement from the drilling fluids.

Drilling liner: none planned

Production: 5-1/2" production casing may then be run and cemented in one stage from setting depth of 12,900' to 9800' (into the 9-5/8" casing shoe at 10,400'). A minimum of 20 percent silica will be added to the cement slurry if bottom-hole temperature exceeds 230 °F. Slurry volume will be based on calipered hole size plus 20% excess. Hardware will include a guide shoe, float collar, top plug, and centralizers as needed across any pay zones. Water and preflush fluid pumped ahead of the slurry will separate cement from the drilling fluids.

Other: - The BLM will be notified at least twenty-four hours prior to running and cementing the surface and production casing strings.

Actual cement slurries for all casing will be based on final service company recommendations.

The size, weight, grade, type of thread, number of joints, and footage of all casing run will be recorded in the driller's log. The amount and type of all cement pumped will be recorded in the driller's log.

Adequate time will be allowed before drilling out for the cement at the casing shoe to achieve a minimum 500-psi compressive strength.

All casing strings will be tested to 1500 psi before drilling out and if pressure declines by more than 10 percent in 30 minutes, corrective action will be taken.

Before drilling more than 20 feet of new hole below each casing string, a pressure integrity test of the casing shoe will be performed to a minimum of the mud weight equivalent anticipated to control the pore pressure to the next casing depth or at total depth of the well.

CONFIDENTIAL

IV. Mud Program:

<u>Depth</u>	<u>Mud Weight (ppg)</u>	<u>Mud Type</u>	<u>Viscosity</u>	<u>Fluid Loss</u>
0 – 2000'	8.4 – 9.4	Fresh Water	26 - 40	N/C to 20 cc
2000' – 10400'	10.0 - 10.5	Salt Mud	32 - 50	N/C to 10 cc
10400' – 12900'	8.6 – 9.1	LSND Polymer	35 - 45	8 – 10 cc

- A. After mudding up, slow pump rates will be taken daily and recorded in the driller's log.
- B. Visual mud monitoring equipment will be in place to detect volume changes indicating loss or gain of circulating fluid volume.
- C. Abnormal pressures are not anticipated. In the event such pressures are to be anticipated, electronic/mechanical mud monitoring equipment will be in place and include as a minimum; pit volume totalizer (PVT); stroke counter; and flow sensor.
- D. A mud test will be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtrate, and pH.
- E. The 10M BOPE system is not required for conditions on this well and use of the trip tank is not anticipated.
- F. Gas detecting equipment will be installed in the mud return system, and hydrocarbon gas shall be monitored for pore pressure changes. The presence of Hydrogen Sulfide gas may be encountered and an H2S contingency plan is included here.
- G. The need to vent combustible or noncombustible gas is not expected. If needed, a flare system designed to gather and burn all gas will be available. The flare line discharge will be located more than 100 feet from the well head and it will be positioned downwind of the prevailing wind direction. The flare line will have straight lines unless turns are targeted with running tees and it will be anchored. The flare system will have an effective method for ignition.
- H. Abnormal pressure is not expected. If abnormal pressure is to be anticipated, a mud-gas separator (gas buster) will be installed and operable beginning at a point at least 500 feet above any anticipated hydrocarbon zone of interest.

V. Evaluation:

- A. Mud Log: A mud logging unit will be in operation from spud to TD. Samples will be caught, cleaned, bagged, and marked as required.
- B. Drill Stem Tests: No DST's are expected.
- C. Coring: No whole coring is planned. Rotary side-wall cores may be taken at select intervals in conjunction with open-hole logging operations.
- D. Wireline Logs: Wireline logs will be run as hole conditions allow from total depth to surface casing to assist in determining lithology and potential for hydrocarbon recovery. The logging tools will at a minimum survey resistivity, gamma radiation, and sonic velocity.

VI. Expected Bottom-Hole Pressure and Abnormal Conditions:

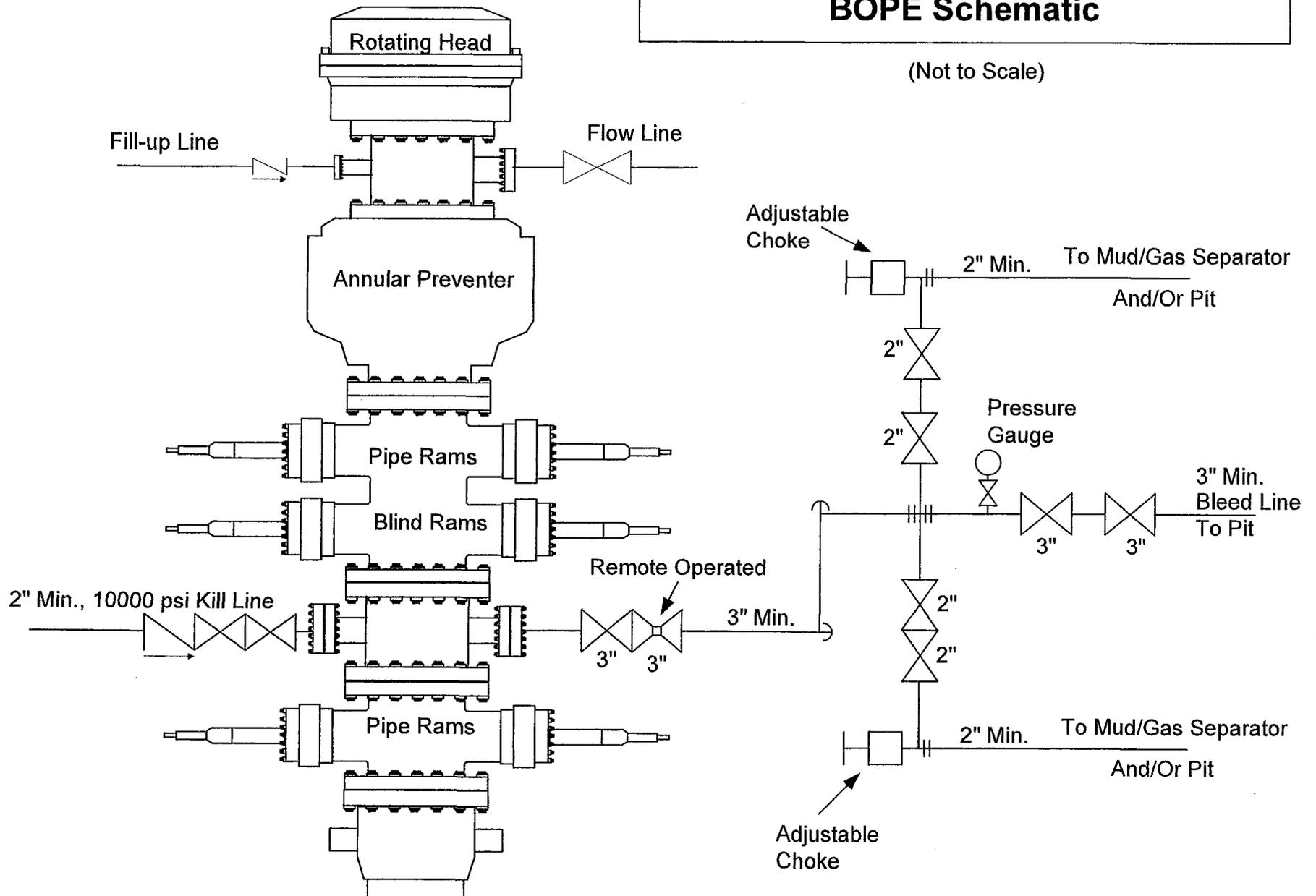
- A. Hydrogen Sulfide: Hydrogen Sulfide (H₂S) gas may exist in the geologic formations to be penetrated by this well, and the H2S contingency plan will be in effect below 10,700'.
- B. Pressure: No abnormally pressured zones are expected in this well. The pressure gradient for all potentially productive formations is expected to be approximately 0.44 psi/ft.
- C. Temperature: No abnormally high temperatures are expected. Bottom-hole temperature is expected to be approximately 270 °F.

end

CONFIDENTIAL

Twist Canyon Federal 21-1 BOPE Schematic

(Not to Scale)



CONFIDENTIAL

WOLVERINE GAS & OIL COMPANY

Location: UTAH Slot: Twist Canyon Federal 21-1 (1007FNL & 1173FWL)
 Field: SEVIER COUNTY Well: Twist Canyon Federal 21-1
 Facility: SEC.21-T21S-R1E Wellbore: Twist Canyon Federal 21-1 PWB



INTEQ

Well Profile Data

Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	26.00	0.000	169.300	26.00	0.00	0.00	0.00	0.00
End of Tangent	2100.00	0.000	169.300	2100.00	0.00	0.00	0.00	0.00
End of Build (S)	3766.67	25.000	169.300	3714.28	-351.66	66.45	1.50	357.88
End of Tangent (S)	6219.06	25.000	169.300	5936.90	-1370.06	258.88	0.00	1394.30
End of Drop (S)	7885.72	0.000	169.300	7551.18	-1721.71	325.32	1.50	1752.18
End of Tangent	12884.54	0.000	169.300	12550.00	-1721.71	325.32	0.00	1752.18

Location Information

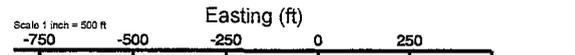
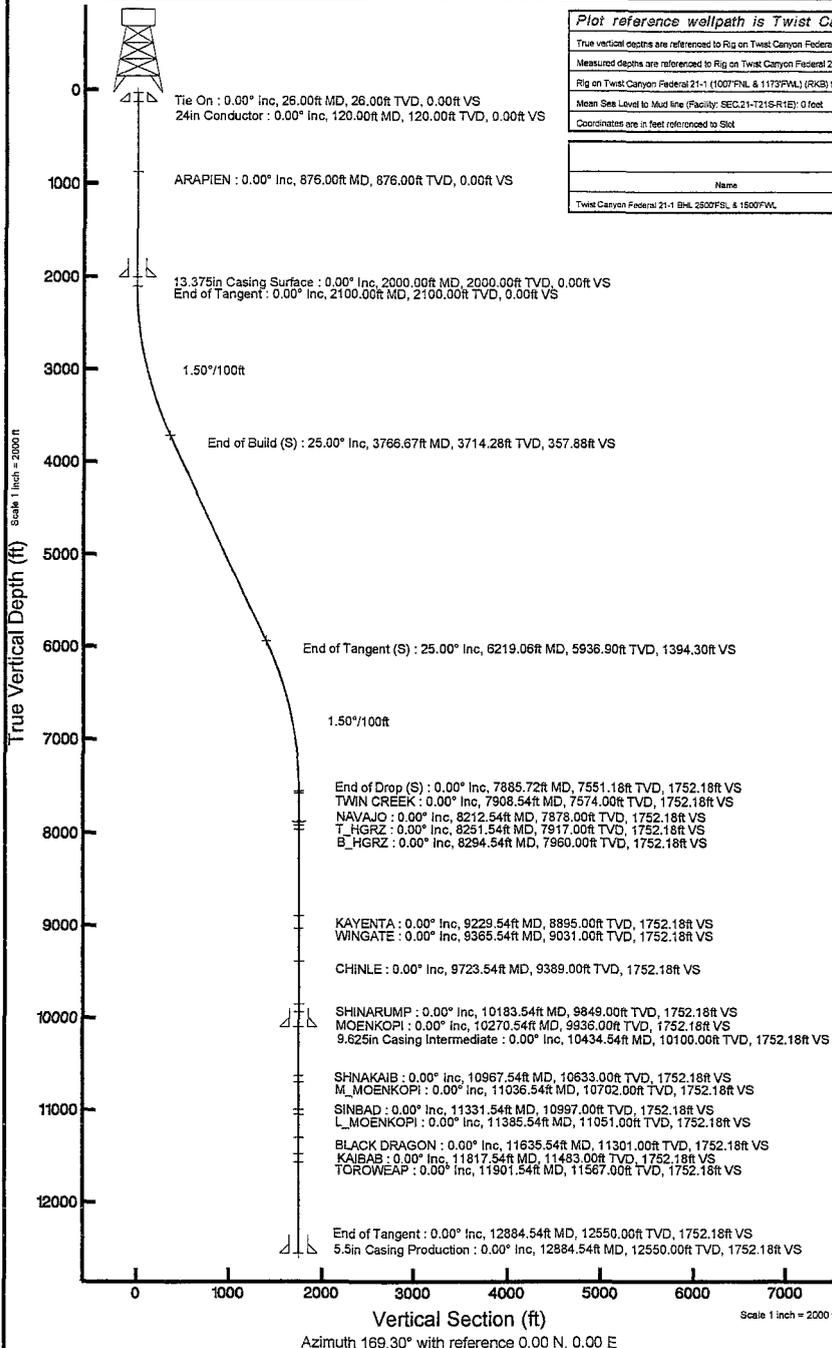
Facility Name	Grid East (USft)	Grid North (USft)	Latitude	Longitude
SEC.21-T21S-R1E	1552712.204	6794483.085	38°58'19.547"N	111°48'30.491"W
Slot	Local N (ft)	Local E (ft)	Grid East (USft)	Grid North (USft)
Twist Canyon Federal 21-1 (1007FNL & 1173FWL)	0.00	0.00	1552712.204	6794483.085
Rig on Twist Canyon Federal 21-1 (1007FNL & 1173FWL) (RKB) to Mud line (Facility: SEC.21-T21S-R1E)			5973ft	
Mean Sea Level to Mud line (Facility: SEC.21-T21S-R1E)			0ft	
Rig on Twist Canyon Federal 21-1 (1007FNL & 1173FWL) (RKB) to Mean Sea Level			5973ft	

Plot reference wellpath is Twist Canyon Federal 21-1_pwp (REV A-0)

True vertical depths are referenced to Rig on Twist Canyon Federal 21-1 (1007FNL & 1173FWL) (RKB)	Grid System: NAD83 / Lambert Utah State Planes, Central Zone (4302), US feet
Measured depths are referenced to Rig on Twist Canyon Federal 21-1 (1007FNL & 1173FWL) (RKB)	North Reference: True north
Rig on Twist Canyon Federal 21-1 (1007FNL & 1173FWL) (RKB) to Mean Sea Level: 5973 feet	Scale: True distance
Mean Sea Level to Mud line (Facility: SEC.21-T21S-R1E): 0 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: douglin on 5/17/2008

Targets

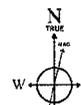
Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (USft)	Grid North (USft)	Latitude	Longitude
Twist Canyon Federal 21-1 BHL 2500FSL & 1500FVL	7876.00	-1721.71	325.32	1552021.59	6792780.24	38°58'02.929"N	111°46'26.573"W	



Twist Canyon Federal 21-1
(1007FNL & 1173FWL)

CONFIDENTIAL

Twist Canyon Federal 21-1 BHL
2500FSL & 1500FVL



805M (1046.0 to 2008.0) Dip: 64.67° Field: 51749.6 ft
 Magnetic North is 12.20 degrees East of True North (at 5/12/2008)
 To correct azimuth from Magnetic to True add 12.20 degrees
 For example: if the Magnetic North Azimuth = 60 degs, then the Grid North Azimuth = 90 + 12.20 = 102.20

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 1 of 7



REFERENCE WELLPATH IDENTIFICATION			
Operator	WOLVERINE GAS & OIL COMPANY	Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH	Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY	Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-R1E		

REPORT SETUP INFORMATION			
Projection System	NAD83 / Lambert Utah State Planes, Central Zone (4302), US feet	Software System	WellArchitect® 2.0
North Reference	True	User	Doublina
Scale	1.00001	Report Generated	5/1/2008 at 11:09:24 AM
Convergence at slot	0.20° West	Database/Source file	Denver/Twist_Canyon_Federal_21-1_PWB.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[USft]	Northing[USft]	Latitude	Longitude
Slot Location	0.00	0.00	1552712.20	6794483.09	38°58'19.547"N	111°48'30.491"W
Facility Reference Pt			1552712.20	6794483.09	38°58'19.547"N	111°48'30.491"W
Field Reference Pt			1516134.37	6732217.32	38°48'02.619"N	111°56'09.781"W

WELLPATH DATUM		
Calculation method	Minimum curvature	Rig on Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL) (RKB) to Facility Vertical Datum
Horizontal Reference Pt	Slot	Rig on Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL) (RKB) to Mean Sea Level
Vertical Reference Pt	Rig on Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL) (RKB)	Facility Vertical Datum to Mud Line (Facility)
MD Reference Pt	Rig on Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL) (RKB)	Section Origin
Field Vertical Reference	Mean Sea Level	Section Azimuth

CONFIDENTIAL

CONFIDENTIAL

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 2 of 7



REFERENCE WELLPATH IDENTIFICATION			
Operator	WOLVERINE GAS & OIL COMPANY	Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH	Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY	Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-R1E		

WELLPATH DATA (152 stations) † = interpolated/extrapolated station										
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Latitude	Longitude	DLS [°/100ft]	Comments
0.00†	0.000	169.300	0.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
26.00	0.000	169.300	26.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	Tie On
126.00†	0.000	169.300	126.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
226.00†	0.000	169.300	226.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
326.00†	0.000	169.300	326.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
426.00†	0.000	169.300	426.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
526.00†	0.000	169.300	526.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
626.00†	0.000	169.300	626.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
726.00†	0.000	169.300	726.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
826.00†	0.000	169.300	826.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
876.00†	0.000	169.300	876.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	ARAPIEN
926.00†	0.000	169.300	926.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1026.00†	0.000	169.300	1026.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1126.00†	0.000	169.300	1126.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1226.00†	0.000	169.300	1226.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1326.00†	0.000	169.300	1326.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1426.00†	0.000	169.300	1426.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1526.00†	0.000	169.300	1526.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1626.00†	0.000	169.300	1626.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1726.00†	0.000	169.300	1726.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1826.00†	0.000	169.300	1826.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
1926.00†	0.000	169.300	1926.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
2026.00†	0.000	169.300	2026.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	
2100.00	0.000	169.300	2100.00	0.00	0.00	0.00	38°58'19.547"N	111°48'30.491"W	0.00	End of Tangent
2126.00†	0.390	169.300	2126.00	0.09	-0.09	0.02	38°58'19.546"N	111°48'30.491"W	1.50	
2226.00†	1.890	169.300	2225.98	2.08	-2.04	0.39	38°58'19.527"N	111°48'30.487"W	1.50	
2326.00†	3.390	169.300	2325.87	6.68	-6.57	1.24	38°58'19.482"N	111°48'30.476"W	1.50	
2426.00†	4.890	169.300	2425.60	13.90	-13.66	2.58	38°58'19.412"N	111°48'30.459"W	1.50	
2526.00†	6.390	169.300	2525.12	23.73	-23.32	4.41	38°58'19.316"N	111°48'30.436"W	1.50	
2626.00†	7.890	169.300	2624.34	36.16	-35.53	6.71	38°58'19.196"N	111°48'30.406"W	1.50	

CONFIDENTIAL

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 3 of 7



REFERENCE WELLPATH IDENTIFICATION			
Operator	WOLVERINE GAS & OIL COMPANY	Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH	Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY	Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-R1E		

WELLPATH DATA (152 stations) † = interpolated/extrapolated station										
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Latitude	Longitude	DLS [°/100ft]	Comments
2726.00†	9.390	169.300	2723.20	51.18	-50.29	9.50	38°58'19.050"N	111°48'30.371"W	1.50	
2826.00†	10.890	169.300	2821.64	68.79	-67.59	12.77	38°58'18.879"N	111°48'30.330"W	1.50	
2926.00†	12.390	169.300	2919.58	88.96	-87.42	16.52	38°58'18.683"N	111°48'30.282"W	1.50	
3026.00†	13.890	169.300	3016.96	111.69	-109.75	20.74	38°58'18.462"N	111°48'30.229"W	1.50	
3126.00†	15.390	169.300	3113.71	136.97	-134.59	25.43	38°58'18.216"N	111°48'30.169"W	1.50	
3226.00†	16.890	169.300	3209.76	164.77	-161.90	30.59	38°58'17.946"N	111°48'30.104"W	1.50	
3326.00†	18.390	169.300	3305.06	195.07	-191.68	36.22	38°58'17.652"N	111°48'30.033"W	1.50	
3426.00†	19.890	169.300	3399.53	227.86	-223.89	42.31	38°58'17.334"N	111°48'29.956"W	1.50	
3526.00†	21.390	169.300	3493.11	263.10	-258.53	48.85	38°58'16.991"N	111°48'29.873"W	1.50	
3626.00†	22.890	169.300	3585.73	300.79	-295.56	55.85	38°58'16.625"N	111°48'29.784"W	1.50	
3726.00†	24.390	169.300	3677.34	340.89	-334.96	63.29	38°58'16.236"N	111°48'29.690"W	1.50	
3766.67	25.000	169.300	3714.28	357.88	-351.66	66.45	38°58'16.071"N	111°48'29.650"W	1.50	End of Build (S)
3826.00†	25.000	169.300	3768.06	382.95	-376.29	71.10	38°58'15.827"N	111°48'29.591"W	0.00	
3926.00†	25.000	169.300	3858.69	425.22	-417.82	78.95	38°58'15.417"N	111°48'29.492"W	0.00	
4026.00†	25.000	169.300	3949.32	467.48	-459.35	86.79	38°58'15.006"N	111°48'29.392"W	0.00	
4126.00†	25.000	169.300	4039.95	509.74	-500.88	94.64	38°58'14.596"N	111°48'29.293"W	0.00	
4226.00†	25.000	169.300	4130.58	552.00	-542.40	102.49	38°58'14.186"N	111°48'29.194"W	0.00	
4326.00†	25.000	169.300	4221.21	594.26	-583.93	110.33	38°58'13.775"N	111°48'29.094"W	0.00	
4426.00†	25.000	169.300	4311.84	636.52	-625.46	118.18	38°58'13.365"N	111°48'28.995"W	0.00	
4526.00†	25.000	169.300	4402.47	678.79	-666.98	126.03	38°58'12.954"N	111°48'28.896"W	0.00	
4626.00†	25.000	169.300	4493.10	721.05	-708.51	133.87	38°58'12.544"N	111°48'28.796"W	0.00	
4726.00†	25.000	169.300	4583.73	763.31	-750.04	141.72	38°58'12.133"N	111°48'28.697"W	0.00	
4826.00†	25.000	169.300	4674.36	805.57	-791.56	149.57	38°58'11.723"N	111°48'28.598"W	0.00	
4926.00†	25.000	169.300	4765.00	847.83	-833.09	157.41	38°58'11.312"N	111°48'28.498"W	0.00	
5026.00†	25.000	169.300	4855.63	890.10	-874.62	165.26	38°58'10.902"N	111°48'28.399"W	0.00	
5126.00†	25.000	169.300	4946.26	932.36	-916.15	173.11	38°58'10.491"N	111°48'28.300"W	0.00	
5226.00†	25.000	169.300	5036.89	974.62	-957.67	180.95	38°58'10.081"N	111°48'28.200"W	0.00	
5326.00†	25.000	169.300	5127.52	1016.88	-999.20	188.80	38°58'09.671"N	111°48'28.101"W	0.00	
5426.00†	25.000	169.300	5218.15	1059.14	-1040.73	196.65	38°58'09.260"N	111°48'28.002"W	0.00	
5526.00†	25.000	169.300	5308.78	1101.40	-1082.25	204.49	38°58'08.850"N	111°48'27.902"W	0.00	

CONFIDENTIAL

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 4 of 7



REFERENCE WELLPATH IDENTIFICATION				
Operator	WOLVERINE GAS & OIL COMPANY		Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH		Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY		Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-R1E			

WELLPATH DATA (152 stations) † = interpolated/extrapolated station										
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Latitude	Longitude	DLS [°/100ft]	Comments
5626.00†	25.000	169.300	5399.41	1143.67	-1123.78	212.34	38°58'08.439"N	111°48'27.803"W	0.00	
5726.00†	25.000	169.300	5490.04	1185.93	-1165.31	220.19	38°58'08.029"N	111°48'27.704"W	0.00	
5826.00†	25.000	169.300	5580.67	1228.19	-1206.83	228.03	38°58'07.618"N	111°48'27.604"W	0.00	
5926.00†	25.000	169.300	5671.30	1270.45	-1248.36	235.88	38°58'07.208"N	111°48'27.505"W	0.00	
6026.00†	25.000	169.300	5761.93	1312.71	-1289.89	243.73	38°58'06.797"N	111°48'27.406"W	0.00	
6126.00†	25.000	169.300	5852.57	1354.98	-1331.42	251.57	38°58'06.387"N	111°48'27.306"W	0.00	
6219.06	25.000	169.300	5936.90	1394.30	-1370.06	258.88	38°58'06.005"N	111°48'27.214"W	0.00	End of Tangent (S)
6226.00†	24.896	169.300	5943.20	1397.23	-1372.94	259.42	38°58'05.976"N	111°48'27.207"W	1.50	
6326.00†	23.396	169.300	6034.45	1438.14	-1413.13	267.01	38°58'05.579"N	111°48'27.111"W	1.50	
6426.00†	21.896	169.300	6126.73	1476.64	-1450.96	274.16	38°58'05.205"N	111°48'27.020"W	1.50	
6526.00†	20.396	169.300	6220.00	1512.71	-1486.41	280.86	38°58'04.855"N	111°48'26.935"W	1.50	
6626.00†	18.896	169.300	6314.17	1546.33	-1519.44	287.10	38°58'04.528"N	111°48'26.856"W	1.50	
6726.00†	17.396	169.300	6409.20	1577.47	-1550.05	292.88	38°58'04.226"N	111°48'26.783"W	1.50	
6826.00†	15.896	169.300	6505.00	1606.12	-1578.19	298.20	38°58'03.948"N	111°48'26.716"W	1.50	
6926.00†	14.396	169.300	6601.53	1632.25	-1603.87	303.05	38°58'03.694"N	111°48'26.654"W	1.50	
7026.00†	12.896	169.300	6698.70	1655.84	-1627.05	307.43	38°58'03.465"N	111°48'26.599"W	1.50	
7126.00†	11.396	169.300	6796.46	1676.88	-1647.72	311.34	38°58'03.261"N	111°48'26.550"W	1.50	
7226.00†	9.896	169.300	6894.74	1695.35	-1665.87	314.77	38°58'03.081"N	111°48'26.506"W	1.50	
7326.00†	8.396	169.300	6993.46	1711.24	-1681.49	317.72	38°58'02.927"N	111°48'26.469"W	1.50	
7426.00†	6.896	169.300	7092.57	1724.55	-1694.56	320.19	38°58'02.798"N	111°48'26.437"W	1.50	
7526.00†	5.396	169.300	7191.99	1735.25	-1705.08	322.18	38°58'02.694"N	111°48'26.412"W	1.50	
7626.00†	3.896	169.300	7291.66	1743.35	-1713.04	323.68	38°58'02.615"N	111°48'26.393"W	1.50	
7726.00†	2.396	169.300	7391.51	1748.84	-1718.43	324.70	38°58'02.562"N	111°48'26.380"W	1.50	
7826.00†	0.896	169.300	7491.47	1751.71	-1721.26	325.23	38°58'02.534"N	111°48'26.374"W	1.50	
7885.72	0.000	169.300	7551.18 ¹	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	1.50	Drop (S)
7908.54†	0.000	169.300	7574.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	TWIN CREEK
7926.00†	0.000	169.300	7591.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8026.00†	0.000	169.300	7691.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8126.00†	0.000	169.300	7791.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8212.54†	0.000	169.300	7878.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	NAVAJO

CONFIDENTIAL

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 5 of 7



INTEQ

REFERENCE WELLPATH IDENTIFICATION				
Operator	WOLVERINE GAS & OIL COMPANY		Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH		Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY		Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-R1E			

WELLPATH DATA (152 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Latitude	Longitude	DLS [°/100ft]	Comments
8226.00†	0.000	169.300	7891.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8251.54†	0.000	169.300	7917.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	T_HGRZ
8294.54†	0.000	169.300	7960.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	B_HGRZ
8326.00†	0.000	169.300	7991.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8426.00†	0.000	169.300	8091.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8526.00†	0.000	169.300	8191.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8626.00†	0.000	169.300	8291.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8726.00†	0.000	169.300	8391.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8826.00†	0.000	169.300	8491.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
8926.00†	0.000	169.300	8591.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9026.00†	0.000	169.300	8691.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9126.00†	0.000	169.300	8791.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9226.00†	0.000	169.300	8891.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9229.54†	0.000	169.300	8895.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	KAYENTA
9326.00†	0.000	169.300	8991.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9365.54†	0.000	169.300	9031.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	WINGATE
9426.00†	0.000	169.300	9091.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9526.00†	0.000	169.300	9191.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9626.00†	0.000	169.300	9291.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9723.54†	0.000	169.300	9389.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	CHINLE
9726.00†	0.000	169.300	9391.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9826.00†	0.000	169.300	9491.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
9926.00†	0.000	169.300	9591.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10026.00†	0.000	169.300	9691.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10126.00†	0.000	169.300	9791.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10183.54†	0.000	169.300	9849.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	SHINARUMP
10226.00†	0.000	169.300	9891.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10270.54†	0.000	169.300	9936.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	MOENKOPI
10326.00†	0.000	169.300	9991.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10426.00†	0.000	169.300	10091.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	

CONFIDENTIAL

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 6 of 7



INTEQ

REFERENCE WELLPATH IDENTIFICATION				
Operator	WOLVERINE GAS & OIL COMPANY		Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH		Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY		Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-RIE			

WELLPATH DATA (152 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Latitude	Longitude	DLS [°/100ft]	Comments
10526.00†	0.000	169.300	10191.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10626.00†	0.000	169.300	10291.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10726.00†	0.000	169.300	10391.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10826.00†	0.000	169.300	10491.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10926.00†	0.000	169.300	10591.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
10967.54†	0.000	169.300	10633.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	SHNAKAIB
11026.00†	0.000	169.300	10691.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11036.54†	0.000	169.300	10702.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	M_MOENKOPI
11126.00†	0.000	169.300	10791.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11226.00†	0.000	169.300	10891.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11326.00†	0.000	169.300	10991.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11331.54†	0.000	169.300	10997.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	SINBAD
11385.54†	0.000	169.300	11051.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	L_MOENKOPI
11426.00†	0.000	169.300	11091.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11526.00†	0.000	169.300	11191.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11626.00†	0.000	169.300	11291.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11635.54†	0.000	169.300	11301.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	BLACK DRAGON
11726.00†	0.000	169.300	11391.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11817.54†	0.000	169.300	11483.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	KAIBAB
11826.00†	0.000	169.300	11491.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
11901.54†	0.000	169.300	11567.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	TOROWEAP
11926.00†	0.000	169.300	11591.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12026.00†	0.000	169.300	11691.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12126.00†	0.000	169.300	11791.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12226.00†	0.000	169.300	11891.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12326.00†	0.000	169.300	11991.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12426.00†	0.000	169.300	12091.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12526.00†	0.000	169.300	12191.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12626.00†	0.000	169.300	12291.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12726.00†	0.000	169.300	12391.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	

CONFIDENTIAL

Planned Wellpath Report

Twist Canyon Federal 21-1_pwp (REV.A-0)

Page 7 of 7



REFERENCE WELLPATH IDENTIFICATION			
Operator	WOLVERINE GAS & OIL COMPANY	Slot	Twist Canyon Federal 21-1 (1007'FNL & 1173'FWL)
Area	UTAH	Well	Twist Canyon Federal 21-1
Field	SEVIER COUNTY	Wellbore	Twist Canyon Federal 21-1 PWB
Facility	SEC.21-T21S-R1E		

WELLPATH DATA (152 stations) † = interpolated/extrapolated station										
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Latitude	Longitude	DLS [°/100ft]	Comments
12826.00†	0.000	169.300	12491.46	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	
12884.54	0.000	169.300	12550.00	1752.18	-1721.71	325.32	38°58'02.529"N	111°48'26.373"W	0.00	End of Tangent

HOLE & CASING SECTIONS									
Ref Wellbore: Twist Canyon Federal 21-1 PWB					Ref Wellpath: Twist Canyon Federal 21-1_pwp (REV.A-0)				
String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
24in Conductor	26.00	120.00	94.00	26.00	120.00	0.00	0.00	0.00	0.00
17.5in Open Hole	26.00	2000.00	1974.00	26.00	2000.00	0.00	0.00	0.00	0.00
13.375in Casing Surface	26.00	2000.00	1974.00	26.00	2000.00	0.00	0.00	0.00	0.00
12.25in Open Hole	26.00	10434.54	10408.54	26.00	10100.00	0.00	0.00	-1721.71	325.32
9.625in Casing Intermediate	26.00	10434.54	10408.54	26.00	10100.00	0.00	0.00	-1721.71	325.32
8.5in Open Hole	26.00	12884.54	12858.54	26.00	12550.00	0.00	0.00	-1721.71	325.32
5.5in Casing Production	26.00	12884.54	12858.54	26.00	12550.00	0.00	0.00	-1721.71	325.32

TARGETS									
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	Shape
1) Twist Canyon Federal 21-1 BHL 2500'FSL & 1500'FWL		7878.00	-1721.71	325.32	1553031.59	6792760.24	38°58'02.529"N	111°48'26.373"W	point

SURVEY PROGRAM						
Start MD [ft]		End MD [ft]		Positional Uncertainty Model	Log Name/Comment	Wellbore
5973.00		12884.54		MTC (Collar, post-2000) (Standard)		Twist Canyon Federal 21-1 PWB

CONFIDENTIAL

H2S Drilling Operations Plan

Wolverine Gas and Oil Company of Utah, LLC

Twist Canyon Federal 21-1

Section 21
Township 21S - Range 01E
Sevier Co, Utah

Elevation 5947 ft

CONFIDENTIAL

Wolverine Gas and Oil Company of Utah, LLC
One Riverfront Plaza
55 Campau, NW
Grand Rapids, Michigan 49503-2616

Table of Contents

Introduction, directions, and general

I. Responsibilities and Duties

- A. All personnel
- B. Wolverine Drilling Foreman
- C. Rig Supervisor- Toolpusher
- D. Safety Consultant
- E. Drilling Manager

II. Well Location Layout

- A. Location

III. Safety Procedures

- A. Training
- B. Operating Conditions
- C. Warning System Response and Evacuation Plan
- D. Emergency Rescue Procedures

IV. H2S Safety Equipment

V. Operating Procedures and Equipment

VI. Well Ignition Procedures

- A. Ignition Equipment
- B. Ignition Procedures

VII. Residents- Public in Radius of Exposure

- A. Map of area around location

VIII. Emergency Phone Directory

- A. Wolverine Gas and Oil Company of Utah, LLC
- B. Emergency Services Phone List

IX. Reference for Hydrogen Sulfide and Sulfur Dioxide

CONFIDENTIAL

Introduction

The following H2S Drilling Operations Plan (DOP) is to be used as a contingency plan during the drilling and completion of the Twist Canyon Federal 21-1 well. It is intended to follow and meet the requirements of the Bureau of Land Management (BLM) Onshore Oil and Gas Order 6 (Order 6). An H2S Public Protection Plan (PPP) does not accompany this DOP because the Twist Canyon Federal 21-1 is located such that exposure risk to the public is minimal and the wellsite does not meet the criteria requiring a PPP as specified in Order 6.

The purpose of this plan is to act as a guideline for personnel working at the wellsite in the event of hydrogen sulfide release during drilling or completion operations. All personnel working at the wellsite as well as service personnel that may travel to location on an unscheduled basis must be familiar with this program and are expected to follow procedures in this plan if Hydrogen Sulfide (H2S) is detected. The cooperation and participation of all personnel involved with the drilling or completion operation is necessary for this plan to be effective.

Directions to location:

From Salina, from 4-way stop in center of Salina, go 3.7 mi north on Hgwy 89, then 1.7 mi east on Willow Creek Rd, then 3 mi south on lease road to location.

General

A copy of this H2S DOP is to be available at the wellsite beginning when operations become subject to the terms of Order 6. The operations on any BLM authorized well are subject to Order 6 when drilling reaches a depth of 500 feet above or 3 days prior to penetrating the first zone that is reasonably expected to contain in excess of 100 ppm H2S or when H2S that was not anticipated is encountered in excess of 100 ppm in the gas stream. When the H2S DOP becomes effective, initial training of personnel is to have been completed and all H2S related safety equipment is to be installed, tested and operational. On the Twist Canyon Federal 21-1, the first formation with potential to contain H2S is the Kaibab.

I. Duties & Responsibilities

In order to assure proper execution of the contingency plan, it is essential that one person be responsible for and in charge of implementing the procedures outlined in this plan. The order of responsibility will be as follows:

1. Wolverine representative on location - if unable to perform his/ her duties.
2. Alternate Wolverine representative - if unable to perform his/ her duties.
3. Rig Toolpusher/ Supervisor - if unable to perform his/ her duties.
4. Safety consultant representative - if available.

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 "wind awareness". 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.
6. If the H2S alarms sound (indicating H2S concentration greater than 10 ppm):
 - a. Essential personnel shall don the appropriate respiratory protective equipment and follow safety procedures. Essential personnel will continue to wear respiratory protective equipment until the area is declared safe (H2S<10 ppm) by the person in charge.
 - b. Non-essential personnel shall evacuate to the appropriate safe briefing area using escape-breathing systems and then wait there for further instructions from the authorized Wolverine drilling representative.
 - c. Initiate rescue protocol if necessary - following training procedures.

CONFIDENTIAL

B. Wolverine - Foreman

1. The Wolverine foreman will confirm that all personnel on location at any time are trained in H₂S safety and aware of above list of duties.
2. The Wolverine foreman will ensure that all personnel follow all safety and emergency procedures.
3. The Wolverine foreman will endeavor to keep the number of personnel on location to a minimum and to ensure that only essential personnel are on location during critical operations.
4. Should any extreme danger condition exist (H₂S>10 ppm), the Wolverine foreman will:
 - a. Assess the situation and inform all personnel by an appropriate means of communication.
 - b. Be responsible for having an evaluation of the condition conducted and if warranted, have the red flags and warning signs posted at location entrances.
 - 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 as outlined in this plan and company protocol. Follow appropriate emergency procedures for emergency services notification.
 - e. Proceed to rig floor with personal protection equipment and supervise operations with rig supervisor. Take action to control and reduce the H₂S hazard.
 - f. Verify that essential personnel are properly protected with supplied air breathing equipment and that non-essential personnel are in a safe breathing area.
 - g. Be responsible for contacting local emergency personnel to authorize and conduct an evacuation of persons/residents in area surrounding the drilling location.
 - h. Commence ignition procedures if the ignition criteria as outlined in Section IV of this plan are met.

10. Operational danger or caution sign(s) will be displayed along all controlled accesses to the site. The sign(s) will legible and large enough to be read by all persons entering the wellsite and be placed a minimum of 200 feet but not more than 500 feet from the wellsite and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.
11. Protective safety equipment will be available for all essential personnel. There will be five 30-minute SCBA and five air line breathing units with emergency escape cylinders located at the drilling floor or dog house, one SCBA and air line unit will be located in the derrick (for derrick man), one 30-minute SCBA per person will be located by the quarters of all personnel on location, and 30-minute SCBA and escape units will be distributed as needed near the shaker, mud tanks, and any other area where escape from an H₂S contaminated area could be difficult. A safety trailer containing the compressed breathing air will be located near the well site and air lines will be run from the safety trailer to where the air line breathing units are located.

III. Safety Procedures

A. Training

When this plan is in effect, everyone on the drilling location must be properly trained in hydrogen sulfide safety and carry documentation indicating that the training has occurred within the previous 12 months. There will be a training session that reviews this site specific H₂S plan and the H₂S PPP (if applicable) for all personnel in each work crew on location. Training will also include weekly H₂S and well control drills. All training sessions and drills are to be recorded in the driller's log, as well as in the safety trailer logbook.

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. Confined space procedures and work practices to reduce possibility of toxic gas exposure.
5. First aid for toxic gas exposure and resuscitation equipment.
6. The buddy system.
7. Emergency evacuation procedures.
8. A review of the contingency plan for this well.

B. Operating Conditions

A three-color flag warning system will be used to notify personnel approaching the drill site as to operating conditions on the wellsite. The flags represent the following:

Green Flag - Potential Danger

Yellow Flag - Moderate Danger

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

A red warning flag will be displayed when H₂S is detected in excess of 10 ppm at any detection point.

The operational danger or caution signs located at the entrance to the location will be painted a high visibility red, black and white, or yellow with black lettering. They will be legible and large enough to be read by all persons entering the wellsite and will read "DANGER – POISON GAS – HYDROGEN SULFIDE" and in small lettering "Do not approach if Red Flag is Flying".

All sign(s) and, when appropriate, flag(s) will be visible to all personnel approaching the location under normal lighting and weather conditions.

Location access will be monitored and controlled during "non-routine" operations such as perforating, pressurized pumping, and well testing of potential H₂S bearing formations. The number of personnel on location will be restricted to "essential" personnel only.

C. Warning System Response and Evacuation Plan

When H₂S is detected in excess of 10 ppm at any detection point indicating that an extreme danger condition exists, all non-essential personnel will be moved to a safe area and essential personnel (i.e., those necessary to maintain control of the well) shall wear pressure-demand type protective breathing apparatus. Once accomplished, operations may proceed.

There are no permanent residents or areas frequented by the public within a 1-mile radius of the drill site. The prevailing wind is from the southwest. The Wolverine foreman will contact local authorities to authorize and work in coordination with them to evacuate and restrict non-essential personnel from areas near the wellsite where H₂S concentration levels could potentially exceed 10 ppm. All regulatory agencies will be notified as soon as possible.

D. Emergency Rescue Procedures

Well site personnel should not attempt emergency rescues unless they have been properly trained. A trained person who discovers another person overcome by hydrogen sulfide **should not attempt to rescue without first donning the proper breathing equipment**. When making an emergency rescue always use the following procedures:

1. Don rescue breathing equipment before attempting to rescue someone.
2. Remove the victim from the contaminated area to an area free of toxic gas by traveling upwind or cross wind. Be certain that you are in a safe area before removing your breathing equipment.
3. If the victim is not breathing, initiate mouth-to-mouth resuscitation immediately. Follow CPR guidelines and replace mouth to mouth with a bag mask resuscitator if available.
4. Treat the victim for shock, keeping the victim warm and calm. Never leave the victim alone.
5. Any personnel who experience hydrogen sulfide exposure must be taken to a hospital for examination and their supervisor must be notified of the incident.
6. Their supervisor shall follow the company Emergency Preparedness plan.

IV. H2S Safety Equipment on Drilling Location

<u>Item</u>	<u>Amount</u>	<u>Description</u>
1.	1	Safety trailer with a cascade system of 10-300 cu. ft bottles of compressed breathing air complete with high-pressure regulators.
2.	At least 1000 ft.	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 for cylinder refill.
3.	Twelve (12)	Scott 30-minute self-contained breathing apparatuses (SCBA).
4.	Twelve (12)	Scott airline units with emergency escape cylinders.
5.	One (1)	4-channel continuous electronic H2S monitors with audible and visual alarms. The set points for these alarms are 10 ppm for the low alarm and 15 ppm for the high alarm.
6.	Two (2)	Sensidyne portable hand operated pump type detection units with tubes for hydrogen sulfide and sulfur dioxide.
7.	One (1)	Oxygen resuscitator with spare oxygen cylinder.
8.	One (1)	Trauma first aid kit.
9.	One (1)	Stokes stretcher and one (1) KED.
10.	Four	Windsocks.
11.	At least one (1)	Well condition sign with 3 flag system.
12.	Two (2)	Safe Briefing Area (SBA) signs.
13.	One (1)	Fire blanket.
14.	One (1)	Set air splints.
15.	Two (2)	Electric explosion proof fans.
16.	One (1)	Bullhorn and chalk board.
17.	Three (3)	300 cu. ft. air bottles for the safe briefing area.
18.	Two (2)	30# fire extinguishers.
19.	Six (6)	Battery powered voice microphones for communication when wearing air masks.
20.	One (1)	Battery powered combustible gas meter.

V. Operating Procedures and Equipment

1. If zones containing in excess of 100 ppm of H₂S gas are encountered while drilling with air, gas, mist, other non-mud circulating mediums for aerated mud, the well will be killed with a water-based mud and mud will be used thereafter as the circulating medium for continued drilling.
2. A flare system will be designed and installed to safely gather and burn H₂S-bearing gas and it will be equipped with a suitable and safe means of ignition. If noncombustible gas is to be flared, the system will have a supplemental fuel to maintain ignition.
3. Flare lines will be located as far from the operating site as feasible and in a manner to compensate for wind changes. The flare line(s) mouth(s) will be located not less than 150 feet from the wellbore. Flare lines will be straight unless targeted with running tees.
4. If SO₂ is to be released as a result of flaring of H₂S, portable SO₂ detection equipment will be available for checking the SO₂ level in the flare impact area. If the flare impact area reaches a sustained ambient threshold level of 2 ppm or greater of SO₂ in air and includes any occupied residence, school, church, park, or place of business, or other area where the public could reasonably be expected to frequent, the PPP will be implemented.
5. The choke manifold included as a component of the well control system will have at least one remote controlled choke with controls readily accessible to the drilling or other authorized personnel.
6. A rotating head will be installed and operable.
7. A mud-gas separator will be rigged up and manifolded to the choke and flare system.
8. The drilling mud will be a water-based system maintained with a pH of 10 or greater. Corrosion inhibitor additives will be in the mud. Sufficient scavenger chemicals will be available on location and will be used to scavenge or neutralize any H₂S in the drilling fluid. Mud weight will be maintained as needed to control pressure in any formations encountered.
9. All equipment that has potential for exposure to H₂S will be suitable for H₂S service. The casing head and spools, blowout preventer assembly, rotating head, kill lines, choke, choke manifold and lines, valves, mud-gas separator and other related equipment will have metallurgical standards conforming to NACE MR0175/ISO 15156. Elastomers, packing, and similar inner parts exposed to H₂S will be resistant at the maximum anticipated temperature of exposure. Drill strings, surface casing, intermediate casing, and BOP shear rams are exempt from these requirements.

10. All respiratory protective, H₂S detection, and other needed safety equipment will be in place and ready for use, and all rig crews and other service personnel will be trained in its use when this plan is effective.
11. There will be a continuous electronic H₂S detection system that will automatically 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 four H₂S sensors in place on the drilling rig. 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. All H₂S detection equipment will be calibrated as recommended by the manufacturer and calibration records will be maintained on location.
12. 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 personnel on location have 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.
13. Electronic voice-microphones will be available for essential personnel to use when working under mask to facilitate communication.
14. Additional breathing equipment will be provided 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.
15. Electric explosion-proof ventilating fans (bug blowers) will be available to provide air movement in enclosed areas where gas might accumulate.
16. Any drill stem test performed on any formation potentially containing H₂S will be done with a minimal number of personnel at the drilling site as necessary to safely operate the test equipment. Any such drill-stem test will be conducted only during daylight hours and will be a closed chamber test with no fluids allowed to flow from surface.
17. Any production testing of an H₂S bearing formation will be done with proper wellhead and other equipment in place to allow a controlled test through separation equipment and flare as needed. Any such test would be conducted with monitoring and warning devices in place and proper safety equipment available.

VI. Well Ignition Procedures

If it should become apparent that an uncontrolled release of hydrogen sulfide to the atmosphere might endanger the health and safety of the public or well site personnel, the Wolverine drilling foreman will make a decision to ignite the well. In the absence of mitigating circumstances, this should be when the discharge of H₂S is not controllable and continued discharge could expose the public to an H₂S concentration exceeding 10 ppm or well site personnel to an H₂S concentration exceeding 50 ppm. The following procedure should be followed before attempting to ignite the well.

A. Ignition Equipment - The following equipment will be available for on-site for use by the ignition team.

1. Two 12-gauge flare guns with flare shells.
2. Two 500-foot fire-resistant retrieval ropes.
3. One portable combustible gas meter.
4. Self contained breathing apparatus (SCBA) for each member of the ignition team.
5. One backup vehicle with communication equipment.

B. Ignition Procedures:

1. The Wolverine drilling foreman will ensure that well site personnel are evacuated to a safe area upwind of the well bore prior to any ignition action.
2. The Wolverine foreman and a designated partner "buddy" backed up by well site safety personnel will comprise the ignition team. All team members will be wearing 30-minute SCBA's.
3. The backup crew will be positioned near a radio-equipped vehicle at a safe distance from the sour gas release. They will stand by to rescue the actual team igniting the well.
4. The partner of the ignition team will carry a combustible gas/Hydrogen Sulfide meter to continuously monitor the area in which they are working and define the perimeter of the gas cloud.
5. The Wolverine foreman will carry the flare gun and shells.
6. The ignition team will determine the hazardous area and establish safe working perimeters. Once this is identified the team will proceed upwind of the release and fire a flare into the area. If trouble is encountered in trying to light the leak, reattempt to ignite by firing the flare shells at 45° and 90° angles to the gas source, but DO NOT approach closer to the leak.

7. After ignition, monitor for sulfur dioxide and work with the support group to restrict access to the contaminated area.

VII. Residents - Public in Radius of Exposure

There are no permanent residents or paved roads within a 1-mile radius of the well site. Wolverine may have personnel working in the area and their contact numbers will be included. The surrounding area is federally and privately owned and maintained. This land may be used for recreational purposes including hunting and recreational vehicles any time during the drilling or completion of this well.

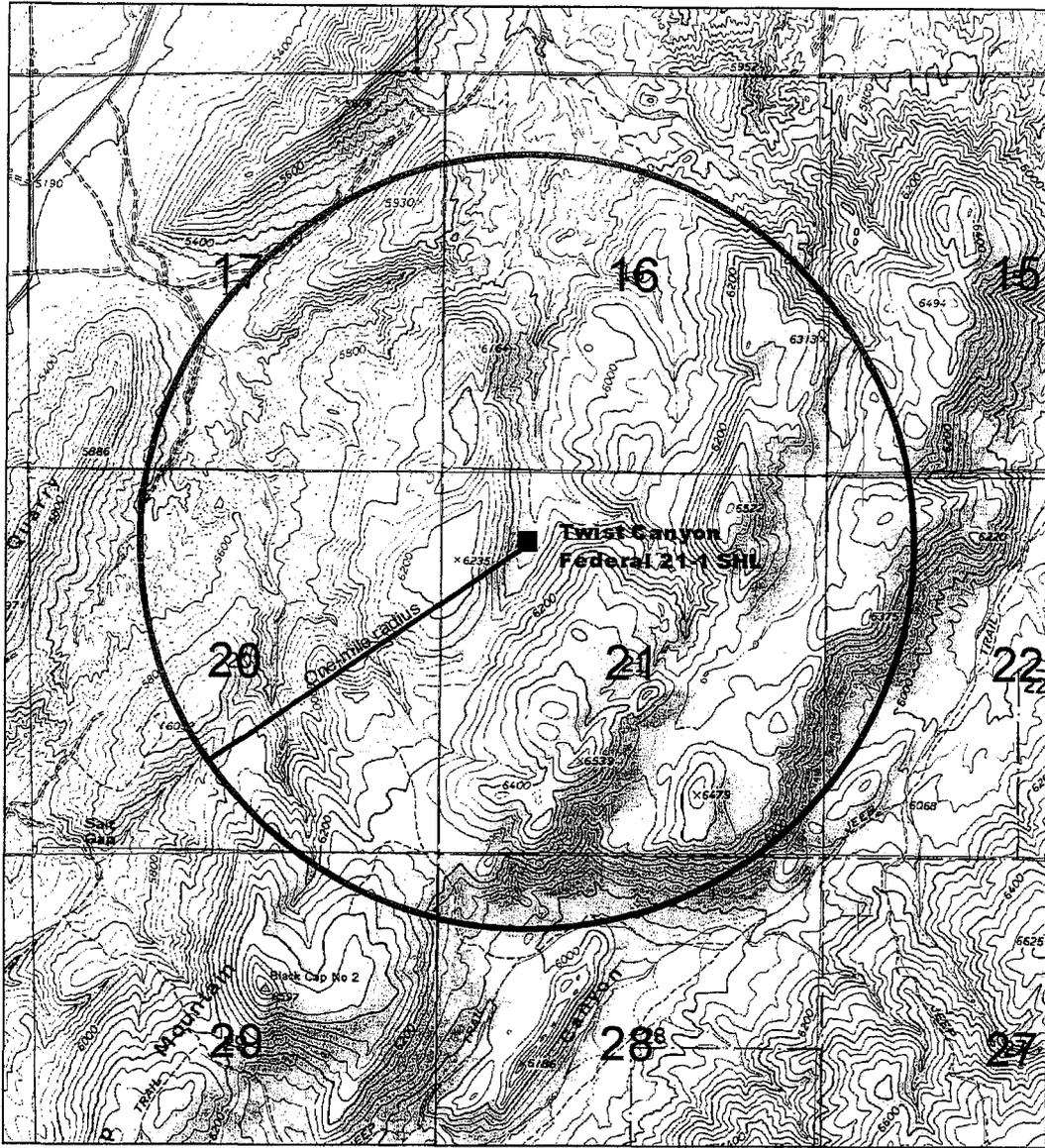
VIII. Emergency Phone Directory

A. Wolverine Gas and Oil Company of Utah, LLC

Steve Hash (Drilling Mgr – EXACT Engineering, Inc)	office 918-599-9400 cell 918-629-9801
Pete Toups (Operations Manager – SST Drilling)	office 307-235-3529 cell 307-262-4465
Darren Naylor (Foreman, On Site Rep – Wolverine)	rig cell 435-979-2202
Ed Higuera (Operations Manager – Wolverine)	office 616-458-1150

B. Emergency Services Phone List

1. Sevier Valley Medical Center - Richfield, UT 435 - 896-8271
2. Gunnison Valley Hospital, Sanpete County 435 - 528-7246
3. Ambulance Services – Sevier County, UT 911 or 435-896-6471
4. Ambulance Services – Sanpete County, UT 911 or 435-835-2191
5. Sheriff Department - Sevier County, UT..... 911 or 435-896-6471
6. Sheriff Department – Sanpete County, UT 911 or 435-835-2191
7. Highway Patrol - Utah 800 - 222-0038
8. Fire Department - Sevier County..... 911 or 435-896-6471
9. Al McKee, BLM – Salt Lake City, UT (cell phone) 801- 828-7498
10. Utah Division Oil, Gas & Mining - Salt Lake City, UT..... 801- 538-5277
11. Medical Helicopter - Air Med- Salt Lake City, UT..... 800 - 453-0120
12. Utah OSHA (Mark LeBlanc) 801- 530-6862
13. Sevier Valley Medical Center - Richfield, UT 435-896-8271



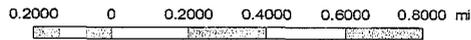
CONFIDENTIAL

ONE-MILE RADIUS PLAT H₂S Drilling Operations Plan

Proposed Twist Canyon Federal 21-1
 Sec. 21, T21S, R1E
 Sevier County, UT
 05/05/2008



Wolverine Gas and Oil Company of Utah, LLC
 One Riverfront Plaza, 55 Campus NW
 Grand Rapids, Michigan 49503
 (616)-458-1150



IX. Reference for Hydrogen Sulfide (H2S) and Sulfur Dioxide (SO2)

PROPERTY OF GAS

If gas should be produced, it could be a mixture of Carbon Dioxide, Hydrogen Sulfide, and Methane.

TOXICITY OF VARIOUS GASES

<u>Common Name</u>	<u>Chemical Formula</u>	<u>Specific Gravity of Air=1</u>	<u>1 Threshold Limit</u>	<u>2 Hazardous Limit</u>	<u>3 Lethal Concern</u>
Hydrogen Cyanide	HCN	0.94	10 ppm	150 ppm/hr	300 ppm
Hydrogen Sulfide	H ₂ S	1.18	10 ppm	250 ppm/hr	600 ppm
Sulfur Dioxide	SO ₂	2.21	2 ppm	-----	1,000 ppm
Chloride	CL ₁	2.45	1 ppm	4 ppm/hr	1,000 ppm
Carbon Monoxide	CO	0.97	50 ppm	400 ppm/hr	1,000 ppm
Carbon Dioxide	CO ₂	1.52	5,000 ppm	5%	10%
Methane	CH ₄	0.55	90,000 ppm	Combustible Above 5% in Air	-----

1 **Threshold**=Concentration at which it is believed that all workers may repeatedly be exposed, day after day, without adverse side effects.

2 **Hazardous**=Concentration that may cause death.

3 **Lethal**=Concentration that will cause death with short-term exposure.

HYDROGEN SULFIDE

GENERAL PROPERTIES

Hydrogen Sulfide itself is a colorless and transparent gas and is flammable. It is heavier than air and, hence, may accumulate in low places.

Although the slightest presence of H₂S in the air is normally detectable by its characteristic "Rotten Egg" odor, it is dangerous to rely on the odor as a means of detecting excessive concentrations because the sense of smell is rapidly lost allowing lethal concentrations to be accumulated without warning. The following table indicates the poisonous nature of Hydrogen Sulfide, which is more toxic than Carbon Monoxide.

COMMON NAMES: Sour Gas, Rotten Egg Gas, Sulphurated Hydrogen, Hydrogen sulfide, Stink Damp, H₂S, Acid Gas, Sweet Gas*

PHYSICAL-CHEMICAL PROPERTIES

- Chemical Formula..... H₂S
1. Specific Gravity (Air = 1.000)..... 1.193 (@ 77°F)
 2. Color None
 3. Odor..... Compared to Rotten Eggs
 4. Odor Threshold 0.13 part of 1 ppm
 5. Corrosivity Reacts with metals, plastics, tissues and nerves.
 6. Solubility in Water 4.0 to 1 in H₂O @ 32°F
2.6 to 1 in H₂O @ 68°F
 7. Effects on Humans Olfactory nerves, respiratory nerves, irritates sensitive membranes in eyes, nose, and throat.
 8. Vapor Pressure 19.6 atmospheres at 25°C
 9. Explosive Limits 4.3% to 46% by volume in air.

* H₂S is a sweet tasting Gas, but often the word "tasting" is left out.

10. Ignition Temperature.....	18°F (Burns with a pale blue flame)
11. Molecular Weight.....	34.08
12. Conversion Factors.....	1 mg/1 of air = 717 ppm (at 25°C and 760 mm HG). 1 ppm = 0.00139 mg/1 of air.
13. pH.....	3 in water

INDUSTRIAL OCCURRENCES

Hydrogen Sulfide exposures occur in certain processes in the petroleum industry, chemical plants, chemical laboratories, sulfur and gypsum mines, viscose rayon and rubber industries, tanneries, and in the manufacture of some chemicals, dyes, and pigments. It may be encountered in excavations in the swampy or filled ground. It is produced when sulfur-containing organic matter decomposes, and it can therefore be found in sewage or organic-waste treatment plants. A common sewer gas, it may find its way into utility manhole, particularly dangerous when encountered in tanks, vessels, and other enclosed spaces.

TOXIC PROPERTIES

Hydrogen Sulfide is an extremely toxic and irritating gas. Free Hydrogen Sulfide in the blood reduces its oxygen carrying capacity, thereby depressing the nervous system. Sufficiently high concentrations can cause blockage of the phrenic nerve, resulting in immediate collapse and death due to respiratory failure and asphyxiation.

Because Hydrogen Sulfide is oxidized quite rapidly to sulfates in the body, no permanent after effects occur in cases of recovery from acute exposures unless oxygen deprivation of the nervous system is prolonged. However, in cases of acute exposures, there is always the possibility that pulmonary edema may develop. It is also reported that symptoms such as nervousness, dry nonproductive coughing, nausea, headache, and insomnia, lasting up to about 3 days have occurred after acute exposures to Hydrogen Sulfide.

At low concentrations the predominant effect of Hydrogen Sulfide is on the eyes and respiratory tract. Eye irritation, conjunctivitis, pain, lacrimation, keratitis, and photophobia may persist for several days. Respiratory tract symptoms include coughing, painful breathing, and pain in the nose and throat.

There is no evidence that repeated exposures to Hydrogen Sulfide results in accumulative or systemic poisoning. Effects such as eye irritation, respiratory tract irritation, slow pulse rate, lassitude, digestive disturbances, and cold sweats may occur, but these symptoms disappear in a relatively short time after removal from the exposure. Repeated exposures to Hydrogen Sulfide do not appear to cause any increase or decrease in susceptibility to this gas.

The paralytic effect of Hydrogen Sulfide on the olfactory nerve is probably the most significant property of the gas. This paralysis may create a false sense of security. A worker can be

overcome after the typical rotten-egg odor has disappeared. Rather than the characteristic Hydrogen Sulfide odor, some victims of sudden acute overexposure have reported a brief sickeningly sweet odor just prior to unconsciousness.

Subjective olfactory responses to various concentrations of Hydrogen Sulfide have been summarized as follows:

0.02 ppm	No odor
0.13 ppm	Minimal perceptible odor
0.77 ppm	Faint, but readily perceptible odor
4.60 ppm	Easily detectable, moderate odor
27.0 ppm	Strong, unpleasant odor, but not intolerable

Physiological responses to various concentrations of Hydrogen Sulfide have been reported as follows:

10 ppm	Beginning eye irritation
50-100 ppm	Slight conjunctivitis and respiratory tract irritation after 1 hour exposure
100 ppm	Coughing, eye irritation, loss of sense of smell after 2-15 minutes. Altered respiration, pain in the eyes, and drowsiness after 15-30 minutes, followed by throat irritation after 1 hour. Several hours ¹ exposure results in gradual increase in severity of these symptoms and death may occur within the next 48 hours.
200-300 ppm	Marked conjunctivitis and respiratory tract irritation after 1 hour exposure
500-700 ppm	Loss of consciousness and possibly death in 30 minutes.
700 ppm	Rapid unconsciousness, cessation of respiration, and death.
1000-2000 ppm	Unconsciousness at once, with early cessation of respiration and death in a few minutes. Death may occur even if individual is removed to fresh air at once.

ACCEPTABLE CONCENTRATIONS

ACCEPTABLE EIGHT-HOUR TIME-WEIGHTED AVERAGE

To avoid discomfort, the Time-Weighted average concentration of Hydrogen Sulfide shall not exceed 10 ppm.

ACCEPTABLE CEILING CONCENTRATION

The acceptable concentration for protection of health for an eight-hour, five-day week shall be 20 ppm, Fluctuations are to occur below this concentration.

ACCEPTABLE MAXIMUM FOR PEAKS ABOVE ACCEPTABLE BASE LINE FOR CONTINUOUS EXPOSURE

A single-peak concentration not exceeding 50 ppm for a maximum of 10 minutes is allowable provided that the daily time-weighted average is not exceeded.

H₂S EQUIVALENTS

<u>Parts Per Million</u>	<u>Percents</u>	<u>Grains per 100 cu. Ft.</u>
1	0.0001	0.055
10	0.001	0.55
18	0.0018	1.0
100	0.01	5.5
1000	0.1	55.5
10000	1.0	555.5

Grains per 100 cu. Ft. = % by volume Mole 636.4
1% by volume = 10,000 ppm

SULFUR DIOXIDE

Sulfur Dioxide (SO₂) is a colorless, transparent gas and is non-flammable.

Sulfur Dioxide is produced during the burning of H₂S. Although SO₂ is heavier than air, it will be picked up by a breeze and carried downwind at elevated temperatures, while Sulfur Dioxide is extremely irritating to the eyes and mucous membranes of the upper respiratory tract, it has exceptionally good warning powers in this respect.

CONCENTRATIONS

EFFECTS

<u>%SO₂</u>	<u>ppm</u>	
.0002	2	Safe for eight (8) hour exposure
.0005	5	Pungent odor-normally a person can detect SO ₂ in this range.
.0012	12	Throat irritation, coughing, constriction of the chest, tearing and smarting of the eyes.
.015	150	So irritating that it can only be endured for a few minutes.
.05	500	Causes a sense of suffocation, even with the first breath.

PHYSICAL PROPERTIES AND CHARACTERISTICS

Chemical Formula.....	SO ₂
1. Specific Gravity	2.212
2. Color	None
3. Flammable.....	No
4. Odor.....	Characteristic, pungent, gives ample warning of its presence.
5. Corrosivity	Dry---not corrosive to ordinary metals. Wet---corrosive to most common metals.

6. Allowable Concentrations.....2 ppm (ACGIH)
2 ppm (OSHA)
7. Effects on HumansIrritates eyes, throat and upper
Respiratory system.

TOXIC PROPERTIES

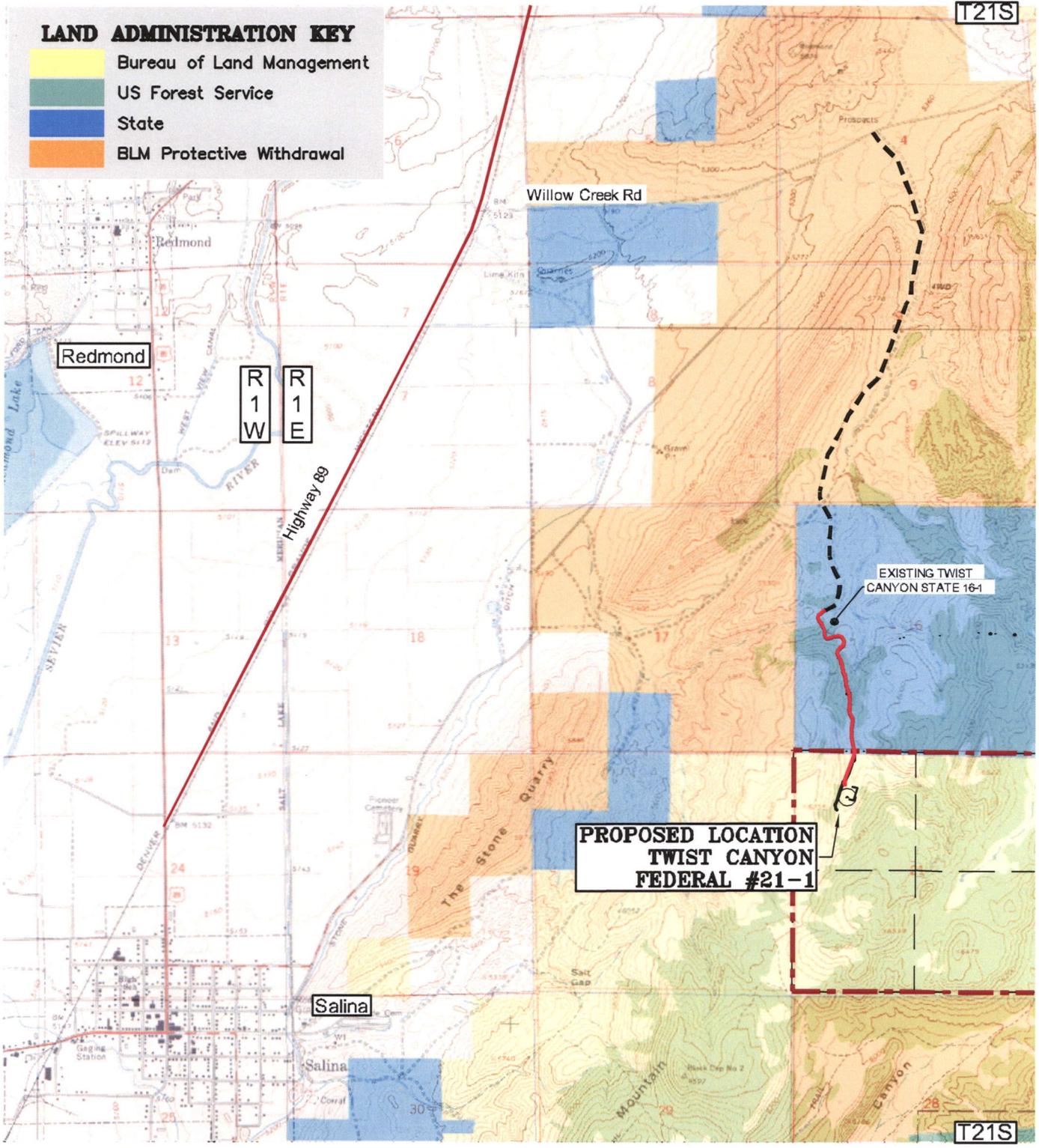
Sulfur Dioxide is an irritating gas in its vapor form and the odor is so intensely irritating that concentrations of 3 to 5 parts per million in the air are readily detectable by the normal person. In higher concentrations, the severely irritating effect of the gas makes it unlikely that any person would be able to remain in a Sulfur Dioxide contaminated atmosphere unless they were unconscious or trapped.

Sulfur Dioxide gas is intensely irritating to the eyes, throat, and upper respiratory system. Inhalation of this gas in concentrations of 8 to 12 parts per million in air causes throat irritation, coughing, constriction of the chest, tearing and smarting of the eyes. 150 parts per million is so extremely irritating that it can be endured only for a few minutes. 500 parts per million is so acutely irritating to the upper respiratory tract that it causes a sense of suffocation, even with the first breath.

Out of numerous reported exposures to Sulfur Dioxide, there are few references that would indicate pneumonia as an after effect.

LAND ADMINISTRATION KEY

- Bureau of Land Management
- US Forest Service
- State
- BLM Protective Withdrawal



**PROPOSED LOCATION
TWIST CANYON
FEDERAL #21-1**

EXISTING TWIST
CANYON STATE 16-1

LEGEND

- PROPOSED LOCATION
- EXISTING ROADWAY
- NEW ROADWAY
- LEASE BOUNDARY

**Wolverine Twist Canyon Federal #21-1
Section 21, T21 S., R1 E., S.L.B. & M.
1007' FNL 1173' FWL**

Wolverine Gas & Oil Co of Utah, LLC

Twist Canyon Federal #21-1

Vicinity Map



Jones & DeMille Engineering
1535 South 100 West - Richfield, Utah 84701
Phone (435) 896-8266 Fax (435) 896-8268
www.jonesanddemille.com

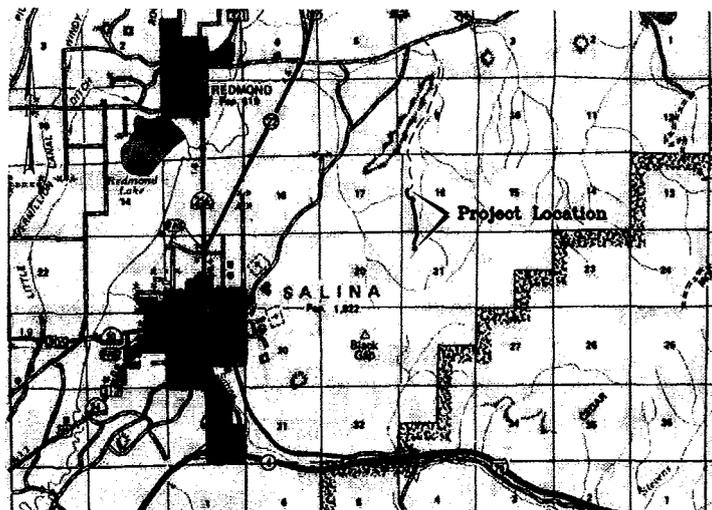
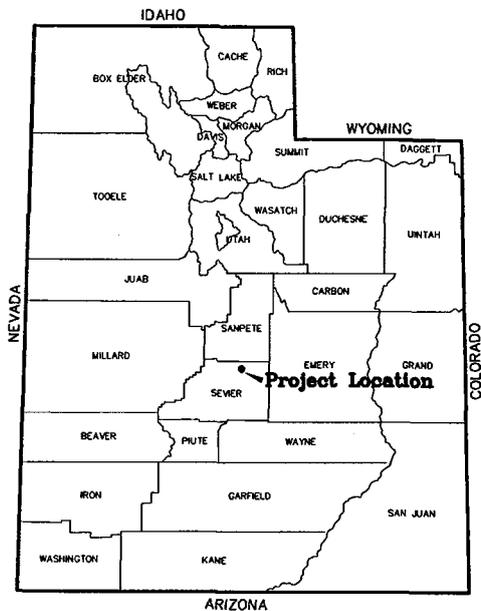


SCALE: 1" = 3000'

DRAWN: L.G. 04-08	PEN TBL: _1sIndrd-hp2800.csb	PROJECT: 0802-098	SHEET: 1
CHECK: D.R. 04-08	FILE: VICMAP21-1	LAST UPDATE: 5/2/2008	

**Wolverine Gas & Oil Co. of Utah, L.L.C.
Twist Canyon Federal #21-1
2008**

PROJECT NO.	SHEET NO.
0802-098	1



APPROVAL

RECOMMENDED FOR APPROVAL:	
<i>Darin A. R. [Signature]</i>	5-6-08
ENGINEER	DATE
APPROVED:	
_____	DATE

VICINITY MAP



Jones & DeMille Engineering
1535 South 100 West - Richfield, Utah 84701
Phone (435) 896-8266
Fax (435) 896-8268
www.jonesanddemille.com

NOTES & SPECIFICATIONS

1.6 ACCEPTANCE TESTING

- A. Engineer will perform density tests in accordance with ASTM D2922. Maximum laboratory density will be determined in accordance with AASHTO T180, Method D for A-1 soils and AASHTO T99, Method D for other soils.
1. Frequency of Tests: Minimum of 1 random density test for each sublot of 1,500 square yards.
 2. Acceptance: Average density is 95 percent or greater for each lot. Reject sublot tests less than 92 percent.
 3. If tests indicate Work is not acceptable, re-compact and retest.

1.7 PROTECTION

- A. Protect adjacent public and private land. Do not work or travel outside staked construction daylight lines as indicated on Drawings.
- B. Protect features remaining.
- C. Protect bench marks, survey control points, existing features and fences from displacement and damage.

PART III STORM DRAINAGE

1.1 MATERIALS

- A. Corrugated Steel Pipe and Fittings:
1. Meet requirements of AASHTO M36, minimum 16 gage.
 2. Coupling Bands: Galvanized steel bands and bolts.
 3. Fittings: Same material as pipe, molded or formed to suit pipe size.
- B. Bedding: Use excavated or imported material with 1.5 inch maximum size free of rubbish, debris, organic and frozen materials.

1.2 INSTALLATION - PIPE

- A. Verify location and elevation of culverts.
- B. Install pipe and fittings in accordance with manufacturer's instructions. Install pipe starting at downstream end. Secure pipe culvert joints watertight.
- C. Place and compact bedding around pipe culverts to 96% maximum laboratory density.
- D. Backfill and compact remainder of trench with 6-inch minus material. Compact to 96% maximum laboratory density.

1.3 PROTECTION

- A. Protect pipe from damage or displacement.

PART IV GRANULAR BORROW

1.1 MATERIALS

- A. Granular Borrow:
1. Classification: AASHTO M145, A-1-a through A-1-b.
 2. Gradation: 3 inches maximum for road and pad surface, 10 inches maximum for rig foundation.
 3. Fines (Percent Passing No. 200 Sieve): Less than 15.
 4. Liquid Limit: Less than 35.
 5. Plasticity Index: Less than 15.

1.2 PREPARATION

- A. Correct irregularities in subgrade gradient and elevation by scarifying, reshaping, and re-compacting.

- B. Do not place granular borrow and select granular backfill on soft, muddy, or frozen surfaces.
- C. Do not place granular borrow and select granular backfill until subgrade is accepted by Engineer.

1.3 PLACEMENT

- A. Place granular borrow and select granular backfill in layers not exceeding 9 inches. Reduce layer thickness if necessary to obtain required compaction.
- B. Place to thickness, elevation, and grades indicated on Drawings.
- C. Compact to 96 percent of maximum laboratory density.
- D. Maintain optimum moisture content. If excess water is apparent, aerate to reduce moisture content. If too dry, add water and mix uniformly.
- E. Grade finish surface to reasonably smooth and uniform surface.

1.4 TOLERANCES

- A. Moisture Content: Plus or minus 2 percent of optimum.
- B. Compacted Thickness: Plus or minus ½ inch. If thickness exceeds tolerance, remove excess material and re-compact. If thickness is less than tolerance, scarify, add material, and re-compact.

 Jones & DeWille Engineering 1525 South 900 West - Provo, Utah 84601 Phone: 801-733-1000 www.jonesanddewille.com		REVISIONS NO. DATE DESCRIPTION 1 08/02/08 ORIGINAL SUBMISSION FOR AUTHORIZATION 2 08/02/08 REVISED TO REFLECT CHANGES TO THE PROJECT	DRAWING NO. 0802-038 SHEET NO. 1C DATE 08/02/08 PROJECT GENERAL NUMBER 0802-038	DIVISION 5000 DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DRAWN BY: JLD CHECKED BY: JLD DATE: 08/02/08 QUANTITY:	APPROVAL PROJECT GENERAL NUMBER 0802-038 APPROVED BY: JLD DATE: 08/02/08	PROJECT GENERAL NUMBER 0802-038 APPROVED BY: JLD DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02/08	DIVISION NAME: EROSION CONTROL DIVISION CODE: 5000 DIVISION TITLE: TWIST CANYON DIVISION NUMBER: 0802-038 DIVISION DATE: 08/02
---	--	---	--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

NOTES & SPECIFICATIONS

1.5 ACCEPTANCE TESTING

- A. Engineer will perform density testing in accordance with ASTM D2922. Maximum laboratory density will be determined according to AASHTO T180, Method D.
1. Frequency of Tests: Minimum of 1 random density test for each subplot of 1,500 square yards for each layer placed.
 2. Acceptance: Average density is 96 percent or greater for each lot. Reject subplot tests less than 92 percent.
 3. If tests indicate Work is not acceptable, re-compact, and retest. If necessary, remove and replace Work.

1.6 PROTECTION

- A. Maintain adequate drainage.
- B. Maintain granular borrow and select granular backfill until next layer is placed or until final acceptance of project.

PART V UNTREATED BASE COURSE

1.1 MATERIALS

- A. Untreated Base Course: Natural gravel, crushed rock, crushed slag, or existing subbase meeting following requirements:
1. Aggregate Passing No. 40 Sieve: AASHTO T90, non-plastic.
 2. Wear: AASHTO T96, not exceed 50 percent.
 3. Dry-Rodded Unit Weight: AASHTO T19, not less than 75 pounds per cubic foot.
 4. Gradation: AASHTO T27 & T11, 3/4 or 1 inch maximum per Table 02722-3.

Table 02722-3 Gradation Limits		
Sieve Size	Percent Passing of Total Aggregate (Dry Weight)	
	3/4 inch	1 inch
1 inch	—	100
3/4 inch	100	—
1/2 inch	—	79-91
3/8 inch	78-92	—
No. 4	56-67	49-61
No. 16	28-38	27-35
No. 200	7-11	7-11

1.2 PREPARATION

- A. Correct irregularities in subgrade gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place untreated base course on soft, muddy, or frozen surfaces.
- C. Do not place untreated base course until granular borrow is accepted.

1.3 AGGREGATE PLACEMENT

- A. Spread untreated base course over prepared surface.
- B. Maintain optimum moisture content of untreated base course. If excess water is apparent, aerate to reduce moisture content. If too dry, add water and mix uniformly.
- C. Place aggregate in maximum 6 inch compacted layers. If untreated base course is placed in successive layers, do not place next layer until previous layer has been tested and accepted.

- D. Level and contour surfaces to elevations and gradients as indicated.
- E. Compact with self-propelled compaction equipment. Use hand-operated compaction equipment in areas inaccessible to self-propelled compaction equipment.

1.4 TOLERANCES

- A. Moisture Content: Plus or minus 2 percent of optimum.
- B. Compacted Thickness: Plus or minus 2 inch. If thickness exceeds tolerance, remove excess material and re-compact. If thickness is less than tolerance, scarify, add material, and re-compact.
- C. Surface Smoothness: Plus or minus 3/4 inch measured with 10 foot straight edge.

1.5 ACCEPTANCE TESTING

- A. Engineer will perform density testing in accordance with ASTM D2922. Maximum laboratory density will be determined in accordance with AASHTO T180, Method D.
1. Frequency: Minimum of 1 random density test for each subplot of 1,500 square yards.
 2. Acceptance: Average density is 96 percent or greater for each lot. Reject subplot tests less than 92 percent.
 3. If tests indicate Work is not acceptable, recompact, and retest. If necessary, remove and replace work.
- B. Pay Factor for Density: Engineer will determine for each lot using Table 02722-1.

 Jones & Deville Engineering <small>1500 Main Street, P.O. Box 1000 Pritchett, Missouri 64650 Phone: 660.325.2222</small>	APPROVAL FEDERAL PROJECT GENERAL SUPERVISOR DATE APPROVED	CHECKED B.L. DATE CHECKED	CHECKED D.F. DATE CHECKED	CHECKED DATE CHECKED	REVIEW DATE BY	ORIGINAL SUBMISSION FOR AUTHORIZATION NO. DATE REVISIONS NO. DATE REVISIONS	DRAWN DATE BY NONE
PROJECT NUMBER 0802-098	PROJECT NAME NOTES & SPECIFICATIONS	COUNTY Sevier	DIVISION 0802-098	DIVISION NAME 0802-098	DIVISION NUMBER 0802-098	DIVISION DATE 02/20/2008	DIVISION BY 5/7/2008
SHEET NO. 1D							

NOTES & SPECIFICATIONS

Percent of Max. Laboratory Density	Pay Factor
96 or greater	1.00
92 to 95	0.90

- C. Engineer will perform gradation tests in accordance with AASHTO T27 and T11.
1. Random samples will be taken as needed from windrow or on grade prior to compaction.
 2. If tests indicate materials are not acceptable, make adjustments in production. If necessary, remove and replace work.

Lot (Tons)	Minimum No. of Samples
Greater than 2,500	4
1,500 to 2,500	3
Less than 1,500	2

1.6 PROTECTION

- A. Maintain untreated base course until final acceptance of project.

PART VI SEEDING AND ROAD OBLITERATION

1.1 MATERIALS

- A. Seed Mixture:

SPECIES	Pounds of Pure Live Seed/Acre
Forage Kochio	1.0
Yellow Sweet Clover	1.0
Common Sunflower	2.0
Appar Lewis Flax	2.0
Eski Sainfoin	1.0
Lodok Alfalfa	1.0
Delor Small Burnet	2.0
Covar Sheep Fescue	1.0
Bozoisky Russian Wildrye	1.0
Sandburg Bluegrass	1.0
Luna Pubescent Wheatgrass	1.0
Hycrest Crested Wheatgrass	1.0
TOTAL	15.0

- B. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of seeds.

1.2 PREPARATION

- A. Grade disturbed areas to blend with existing contours.
- B. Obliterate road by scarifying, moon scaping or other approved method.
- C. Scarify all compacted surfaces.
- D. Loosen top surface soil 1/4 inch minimum depth.

1.3 APPLICATION

- A. After completing earth disturbing activities, apply seed mixture in disturbed areas and stockpile area. Apply seed in late fall (October/November). Do not seed areas finished with granular borrow and untreated base course.
- B. Apply seed mixture using one of following methods:
 1. Drill Method: Apply seed mixture by seed drilling equipment to 2 inch depth.
 2. Broadcast Method: Rate (lbs/acre) must be doubled if broadcast method is chosen. Mix all seed together, except for the Forage kochia. Broadcast using a four-wheeler equipped with a seeder. After broadcast seeding the main mix, drag the area with a small harrow (used with four wheeler), to cover seed. After the main seeding process is completed, broadcast forage kochia on top of the disturbed soil. Do not harrow or otherwise disturb soil/seed.
- C. Do not apply seed mixture during windy periods, during excessively dry periods, or when ground is excessively wet or frozen.

1.4 PROTECTION

- A. Protect seeded areas until final acceptance of Work.
- B. Repair any damage to seeded areas caused by construction operations.

Wolverine Gas & Oil Co of Utah LLC
 TWIST CANYON FEDERAL #21-1
 NOTES & SPECIFICATIONS
 PROJECT NUMBER: 0802-098

Sevier
 COUNTY

SHEET NO. 1E

APPROVAL
 REGIONAL
 DATE

PROJECT REGIONAL NUMBER

DATE

NOTES & SPECIFICATIONS

PART VII STOCK TIGHT FENCE

1.1 MATERIALS

- A. Posts: ASTM A702 painted metal or ASTM A123 galvanized metal with minimum 15 square inch anchor plate securely attached. If post is set in concrete footing minimum of 4 inches wide and depth equal to post depth plus 3 inches, anchor plate may be omitted. Use tubular, channel, Tee, U, Y, or other approved shape..
- B. Barbed Wire: ASTM A121, Class 1 coating, 2 strands 12.5 gage wire twisted, 4 point barbs at maximum of 5 inches on center.
- C. Wire Mesh (field fence): ASWTM A116, Class 1 zinc coating 6-inch vertical wire spacing minimum.
- D. Tie Wire: Aluminum alloy steel wire.

1.2 PREPARATION

- A. Verify location of fence.

1.3 INSTALLATION

- A. Install fence in straight lines as indicated on Drawings.
- B. Excavate post holes to depth and diameter indicated on Drawings. If Driving does not damage line posts, line posts may be driven in place.
- C. Install brace posts and brace panels at each gate, corner, end and at intervals not exceeding 500 linear feet. Brace corner posts in 2 directions w/brace panels. Install corner posts at changes in line or grade where angle of deflection is 30 degrees or more.
- D. Place barbed wire on outside of posts. Install stays at equal spacing between posts.
- E. Remove sags from barbed wire.

PART VIII RESERVE PIT LINER

1.1 MATERIALS

- A. Pit Liner: 12 mil minimum thickness, scrim reinforced HDPE liner
 - 1. Minimum Grab warp tensile strength: 210 lb
 - 2. Minimum Puncture resistance: 104 lb
 - 3. Manufactured by Dane Chemco, Or-equal.
 - 4. Seams: Factory or supplier glued watertight joints required.
- B. Pit Liner protective liner: HDPE heat-fused joint 40 mil minimum thickness.

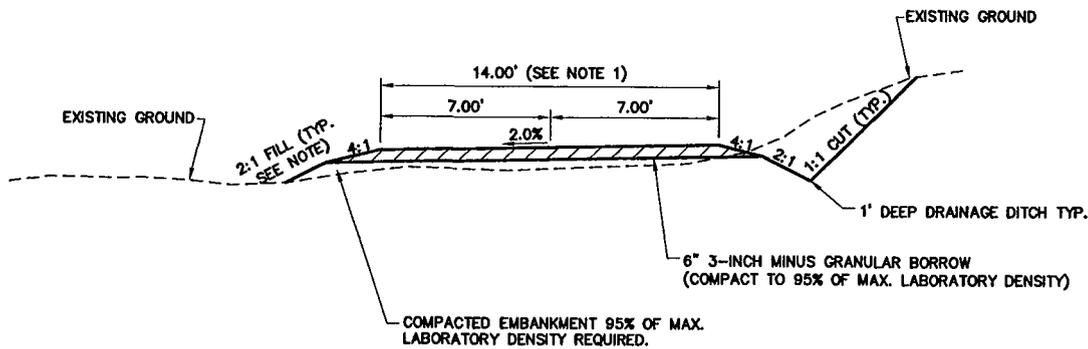
1.2 PREPARATION

- A. Verify pit dimensions, and liner quantity.
- B. Smooth pit bottom and walls and remove rocks and other debris.

1.3 INSTALLATION

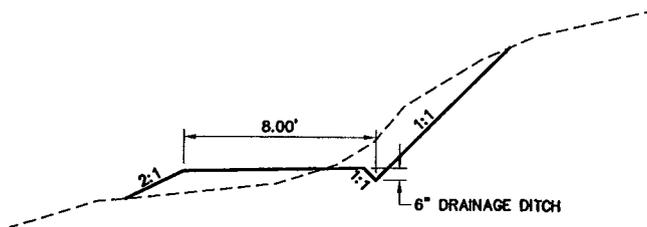
- A. Install liner as shown on drawing details.
- B. Fill lined pit to 1/10th capacity with water to secure and pull liner into place.
- C. Anchor liner edges with granular borrow as shown on drawing details.
- D. Protect liner from damage and displacement.

 Jones & DeVillie Engineering 1888 S. 1000 West - P.O. Box 1000 Panguitch, Utah 84650 Phone: (435) 625-1000 Fax: (435) 625-1001 www.jonesanddevillie.com		NO. DATE 1 02-06 2 02-06 3 02-06 4 02-06 5 02-06 6 02-06 7 02-06 8 02-06 9 02-06 10 02-06 11 02-06 12 02-06	REVISIONS 1 02-06 2 02-06 3 02-06 4 02-06 5 02-06 6 02-06 7 02-06 8 02-06 9 02-06 10 02-06 11 02-06 12 02-06	REVIEW DATE BY 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06	CHECKS D. R. 02-06 B. L. 02-06 D. R. 02-06 B. L. 02-06	QUANT. 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06 02-06	ROLE NONE NONE NONE NONE NONE NONE NONE NONE NONE NONE	DWG. NAME: 8P04 SHW. SET: TWIST CANYON DATE CREATED: 02/02/06 PEN. TEL.: 435-625-1000 FAX: 435-625-1001 E-MAIL: jandevillie@jonesanddevillie.com
Wolverine Gas & Oil Co of Utah LLC TWIST CANYON FEDERAL #21-1 NOTES & SPECIFICATIONS PROJECT NUMBER: 0802-098								
Sevier COUNTY								
SHEET NO. 1F								



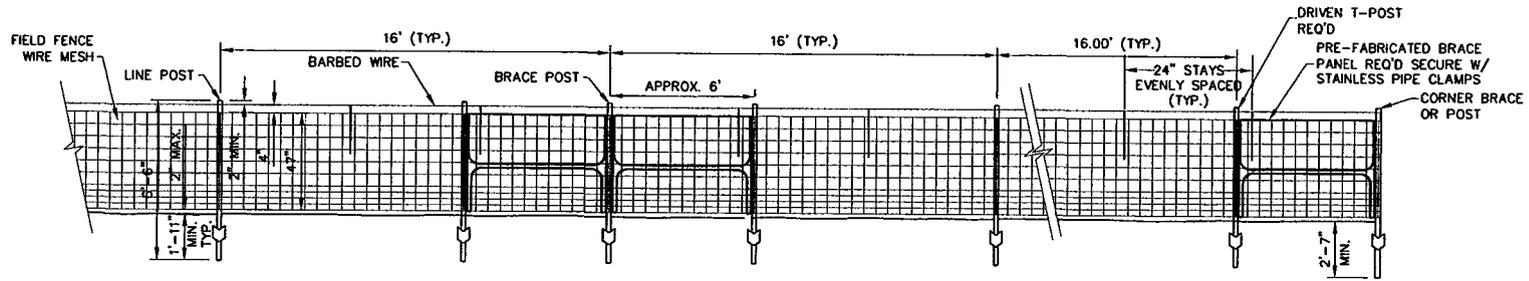
TYPICAL #1

- NOTES:
- 20-FOOT WIDTH AT TURN-OUTS
 - 1.5:1 FILL SLOPES ARE REQUIRED IN ISOLATED STEED AREAS TO CATCH EXISTING GROUND.

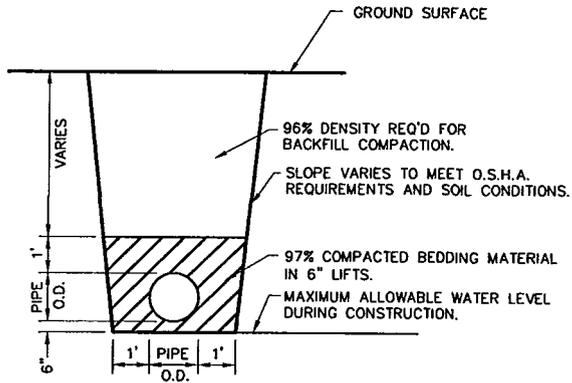


OHV BYPASS TRAIL TYPICAL SECTION

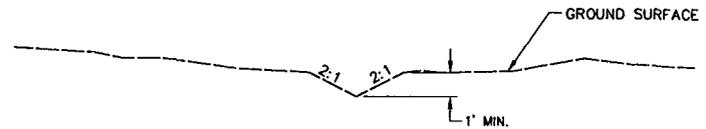
Jones & DeWitt Engineering 1525 South 100 West - P.O. Box 1000, Salt Lake City, UT 84143 Phone (801) 466-6666 Fax (801) 466-6666 www.jonesanddewitt.com		APPROVAL DATE REVIEW DATE	CHECKS LG OACB CHECKS DATE	REVISIONS NO. DATE BY ORIGINAL SUBMISSION FOR AUTORIZATION DATE BY REVISIONS DATE BY	DRAWN NAME: TYP SHEET NO.: TS-01 SHEET TOTAL: 08/02/08 07/0008 LAST UPDATE
Wolverine Gas & Oil Co. of Utah, LLC TWIST CANYON FEDERAL #21-1 TYPICAL SECTION PROJECT NUMBER: 0802-098		APPROVAL DATE REVIEW DATE		CHECKS LG OACB CHECKS DATE	
SEVIER COUNTY		SHEET NO. TS-01			



TEMPORARY STOCK TIGHT FENCE DETAIL

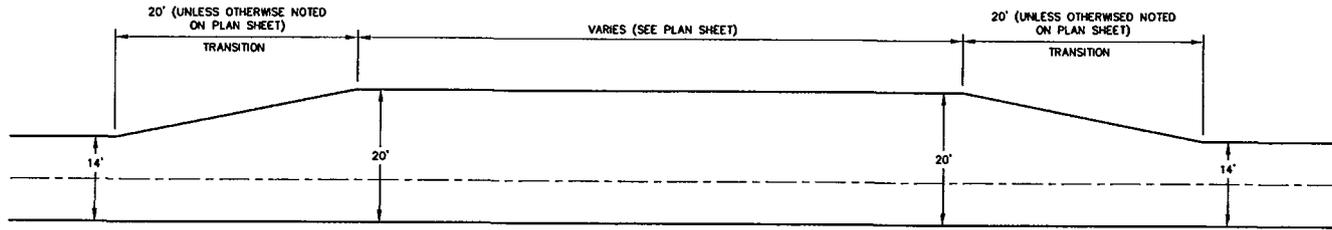


CULVERT TRENCH DETAIL

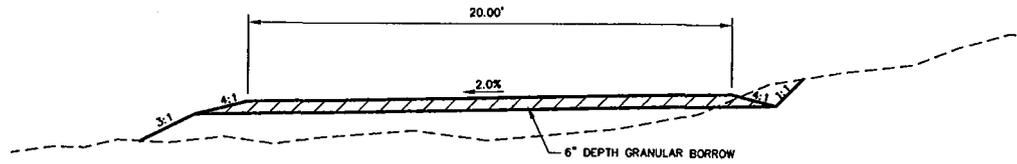


DRAINAGE BYPASS DITCH DETAIL

Jones & DeKilke Engineering 1234 Main St. • P.O. Box 1234 • Salt Lake City, UT 84101 Phone (801) 555-1234 • Fax (801) 555-5678		REVISIONS NO. DATE BY DESCRIPTION	REMARKS ORIGINAL SUBMISSION FOR AUTHORIZATION
DESIGNER: [Blank] DRAWN: B.L. 10-07 CHECKED: [Blank]	D.R.: 10-07 DATE: [Blank]	SCALE: NONE	DWG. NAME: SEVIER DWG. NO.: 0802-098 DWG. DATE: 5/17/08
PROJECT NUMBER: 0802-098	SHEET: 0802-098	COUNTY: SEVIER	LAST UPDATE: [Blank]
Wolverine Gas & Oil Co. of Utah LLC TWIST CANYON FEDERAL #2-1-1 DETAIL SHEET		SHEET NO. DT-01	PROJECT NUMBER: 0802-098



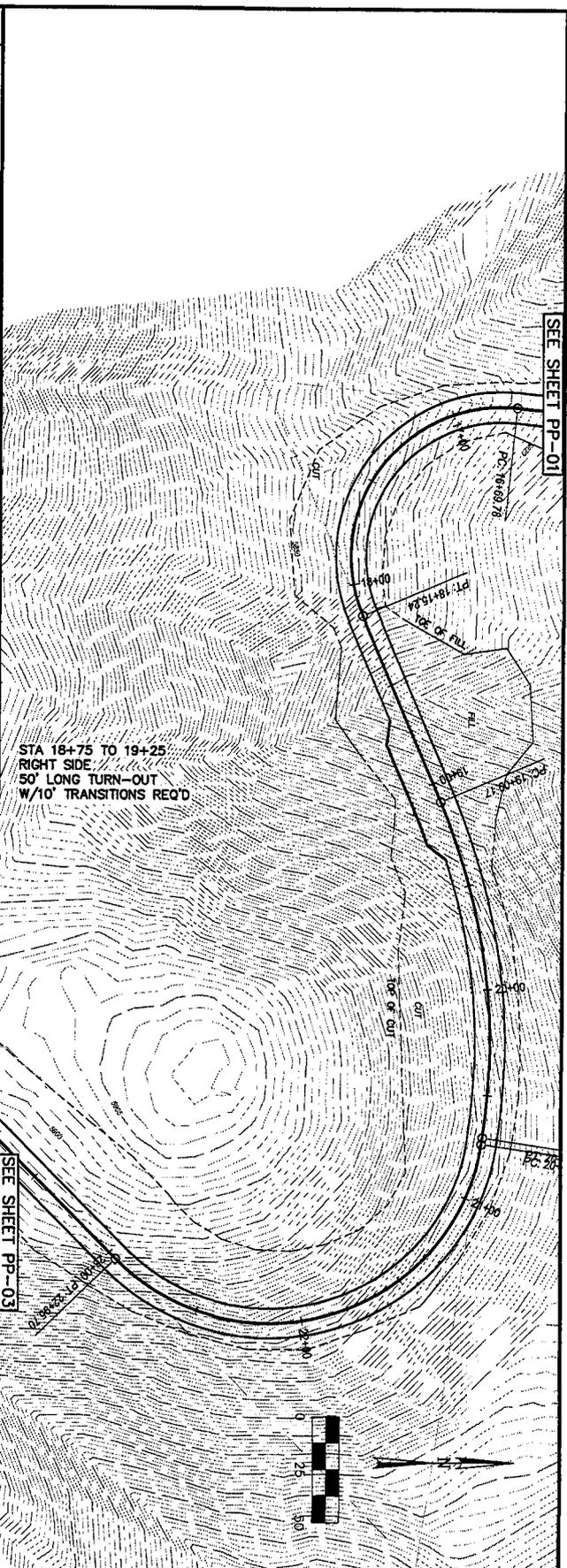
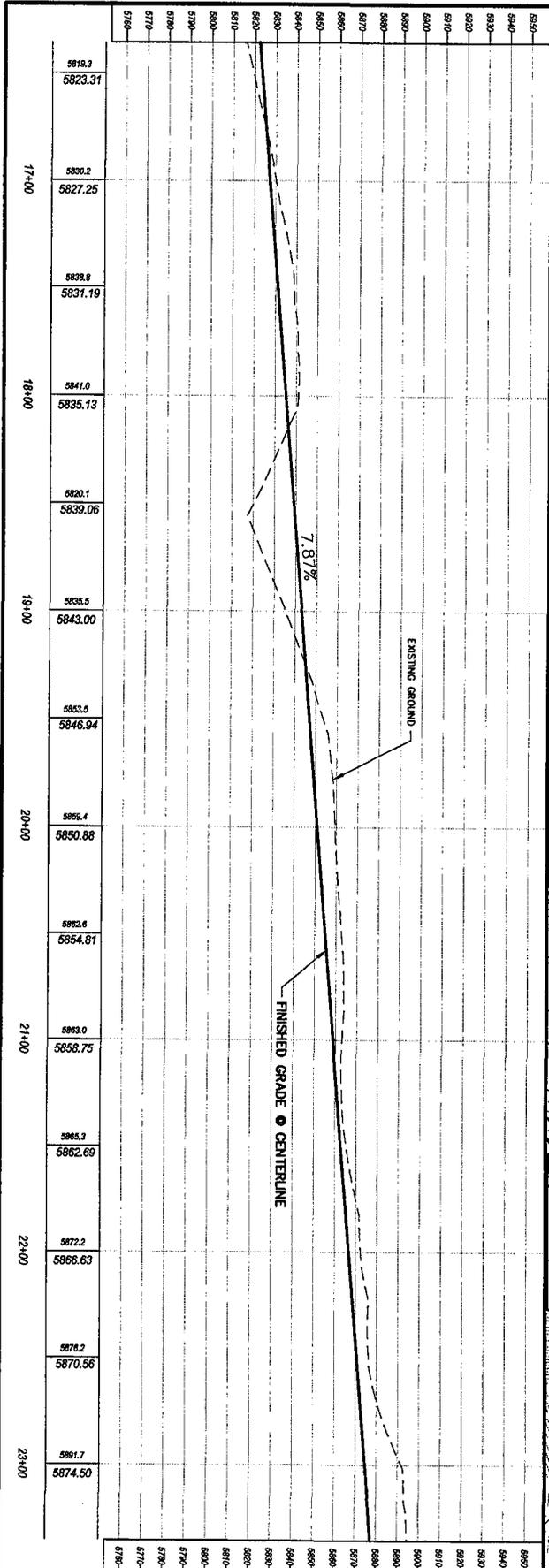
PLAN VIEW



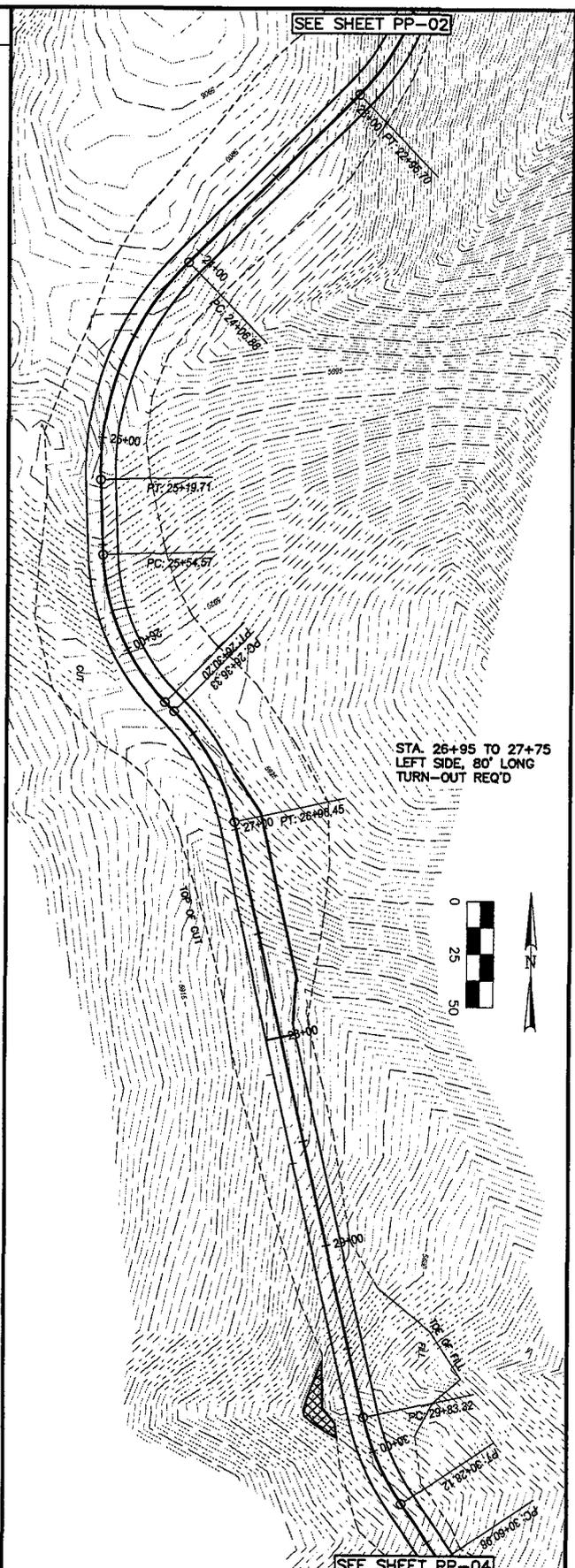
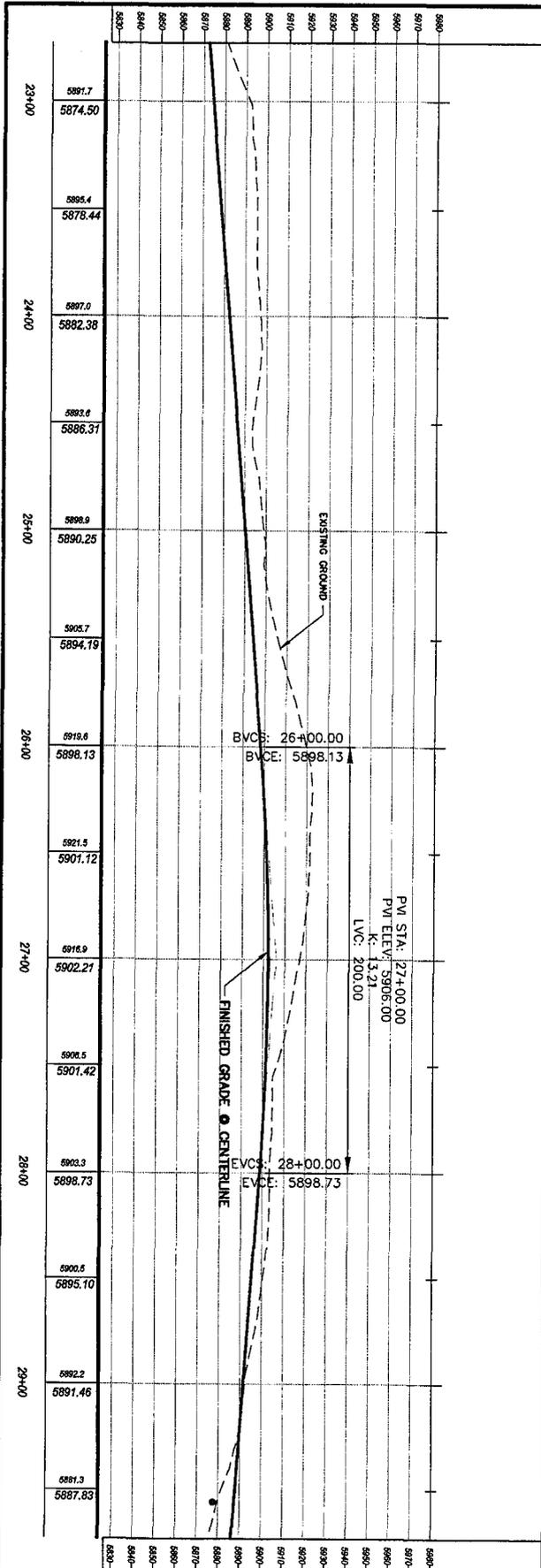
SECTION VIEW

TURN-OUT TYPICAL

Wolverine Gas & Oil Co. of Utah LLC TWIST CANYON FEDERAL #21-1 DETAIL SHEET PROJECT NUMBER: 0802-098		Jones & DeVillie Engineering <small>1000 South 100 West - P.O. Box 100 - ACTY Provo, Utah 84601-1000 Phone: (435) 799-0000 Fax: (435) 799-0001</small>		APPROVAL RECORD: DATE: _____ BY: _____ DATE: _____ BY: _____ DATE: _____ BY: _____		REVIEW: DATE: _____ BY: _____		SCALE: NONE SHIT SET: TWIST CANYON DWG. NAME: 0802-098 DWG. CREATED: 10/23/07 DWG. PLOT: 10/23/07 DWG. PLOT DATE: 10/23/07 DWG. PLOT BY: _____ DWG. PLOT DATE: _____ DWG. PLOT BY: _____		SHEET NO. DT-02 COUNTY: SEVIER SHEET NO. 0802-098	
--	--	---	--	--	--	-------------------------------------	--	--	--	---	--



SHEET NO. PP-02	SEWER CONCRETE	Wolverine Gas & Oil Co. of Utah, LLC		Jones & DeMille Engineering 1505 South 100 West - Provo, UT 84601 Phone (435) 888-4288 Fax (435) 888-8286 www.jonesanddemille.com		NO. DATE REVISION BY		REMARKS	
		TWIST CANYON FEDERAL #21-1		DESIGN: JS/LG 03/08	CHECK: DATE: ST: DATE: ST:	ORIGINAL SUBMISSION FOR AUTHORIZATION		REVISIONS	
PROJECT NUMBER: 0802-098		APPROVED: DATE: BY:	APPROVED: DATE: BY:	SCALE: 1:50H&V	DWG NAME: PP-02	DWG CREATED: 03/21/08	LAST UPDATE: 5/7/2008	PEN TEL: 1-800-850-0808	

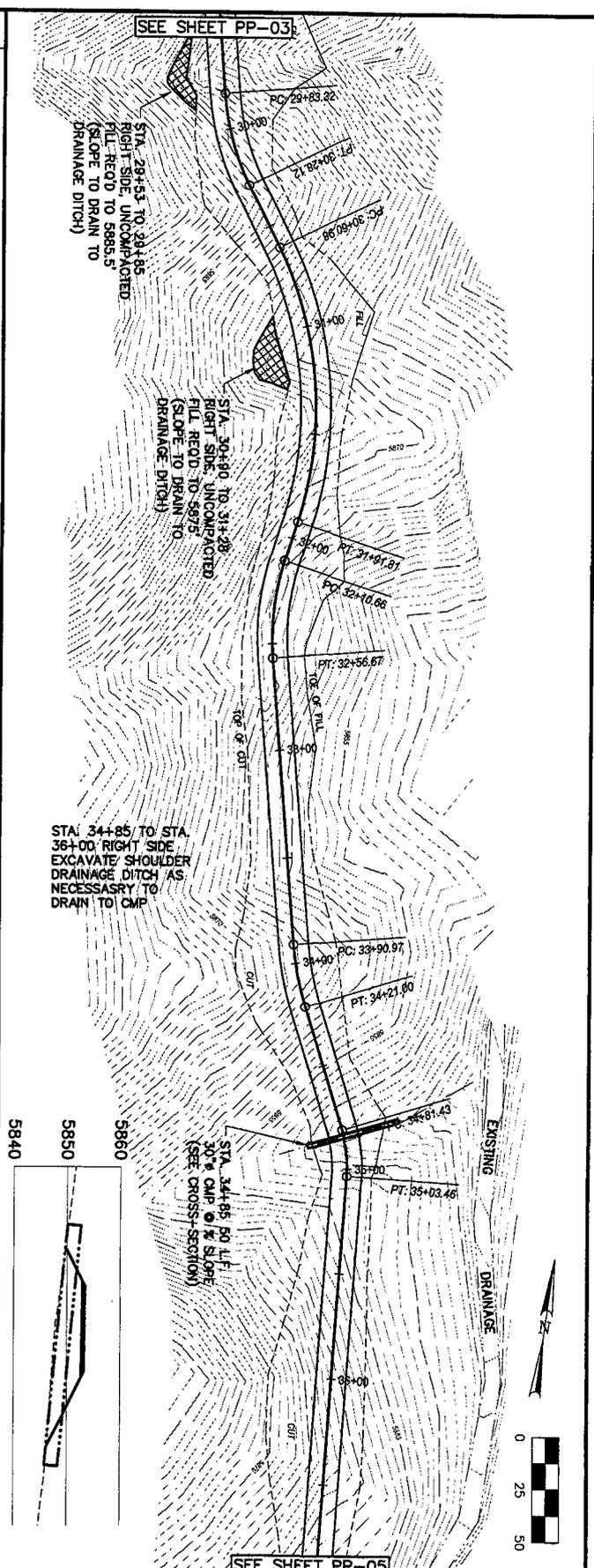
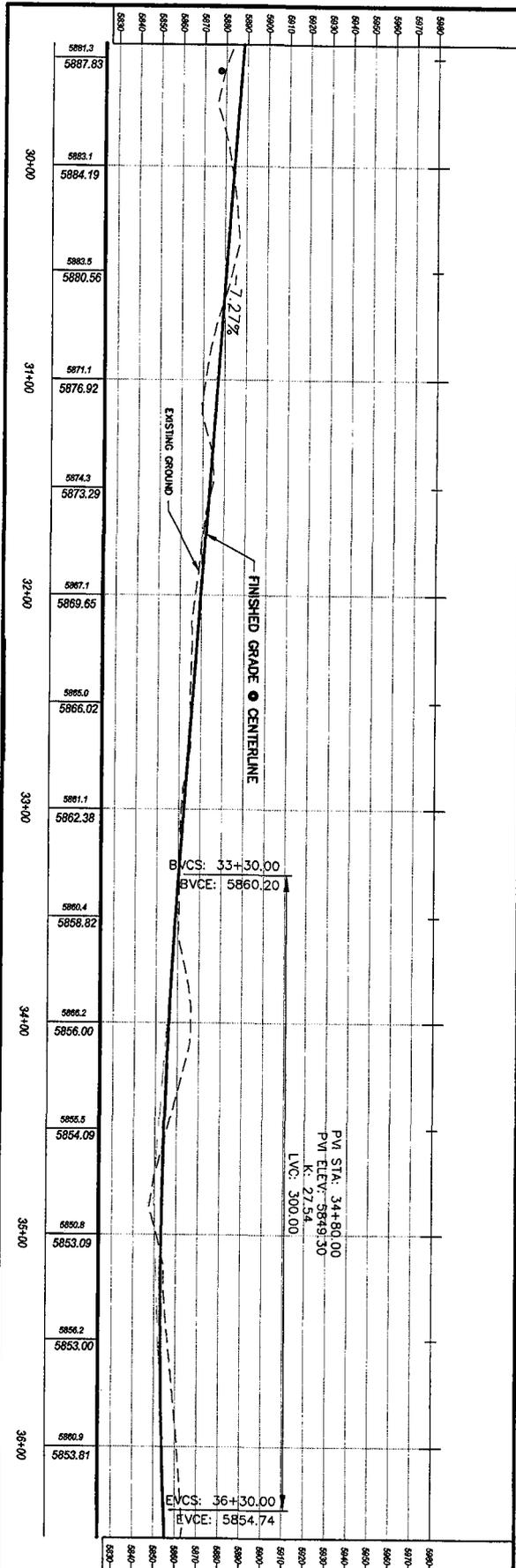


Wolverine Gas & Oil Co. of Utah, LLC
 TWIST CANYON FEDERAL #21-1
 PLAN & PROFILE SHEET
 PROJECT NUMBER: 0802-098

Jones & DeMille Engineering
 1608 South 100 West - Provo, UT 84601
 Phone (435) 896-8200 Fax (435) 896-8205
 www.jonesanddemille.com

DESIGN	CHECK	REVIEW
DRAWN: JS/LG 03/08	CHECK	DATE:
DATE:	CHECK	BY:

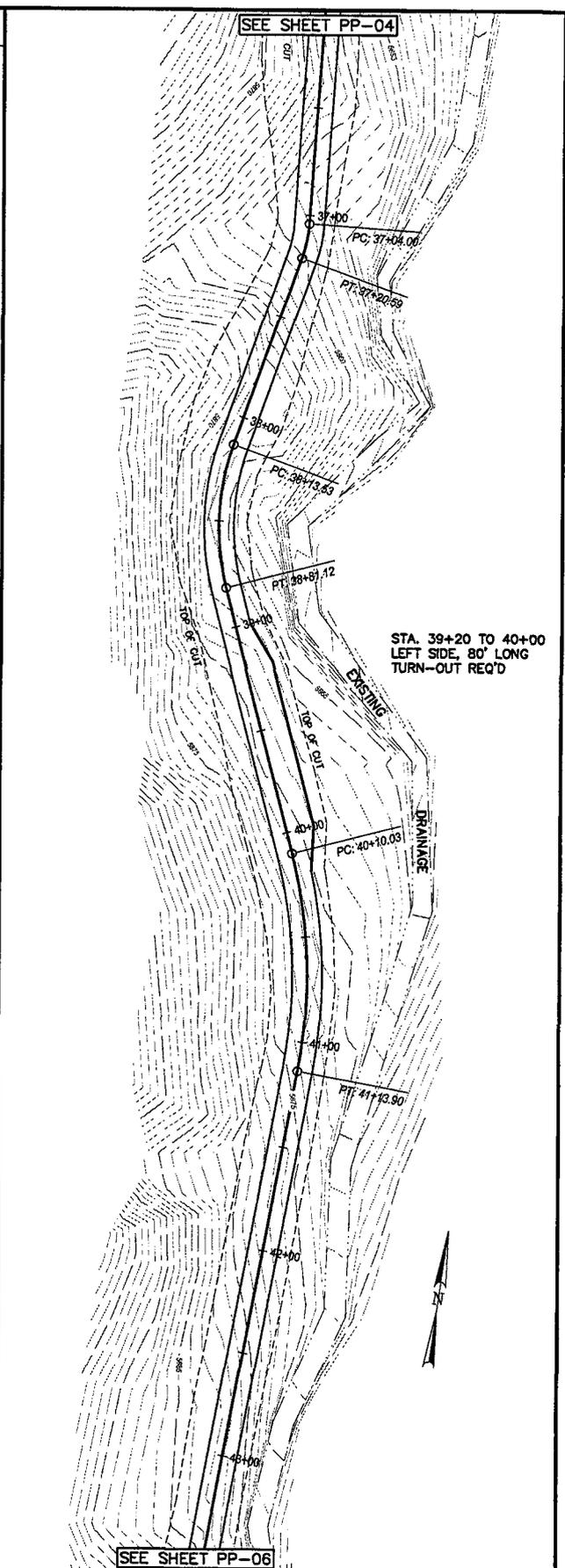
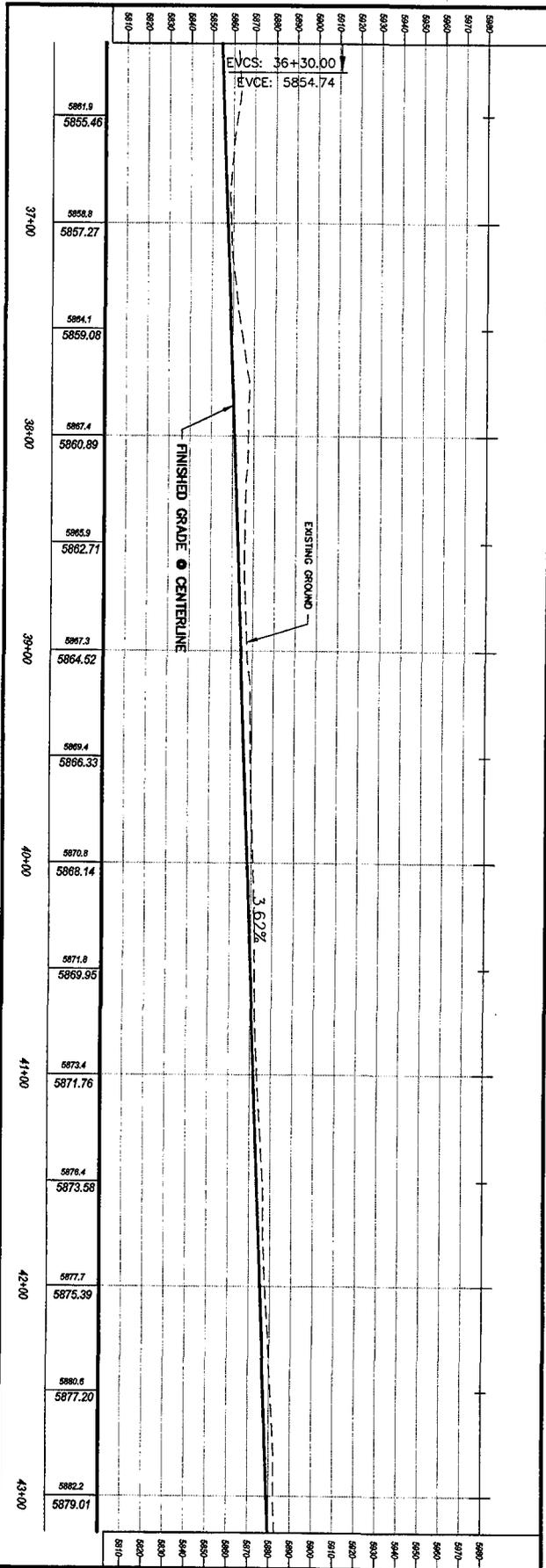
NO.	DATE	REVISION	REMARKS
ORIGINAL SUBMISSION FOR AUTHORIZATION			
REVISIONS			
SCALE: 1:50H&V	DWG NAME: PP-03	DWG CREATED: 03/21/08	LAST UPDATE: 5/7/2008
SHT SET: TWIST CANYON		PEN TEL: 435-896-8205	



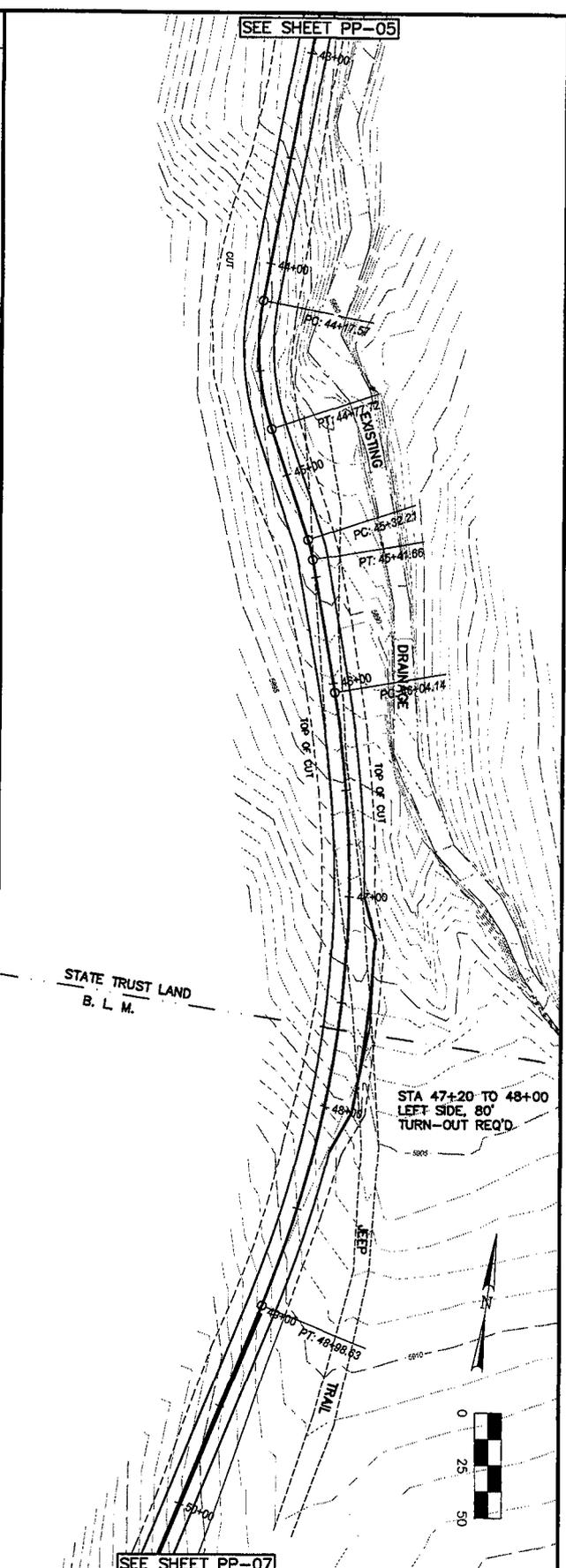
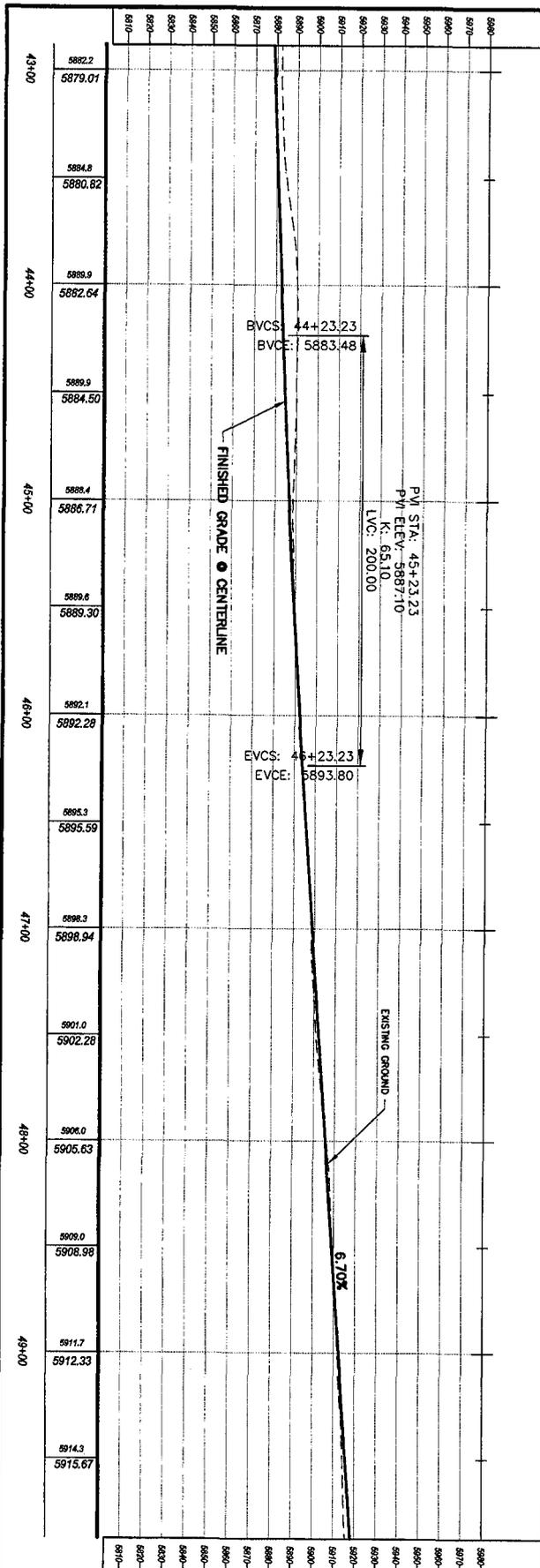
Wolverine Gas & Oil Co. of Utah, LLC
 TWIST CANYON FEDERAL #21-1
 PLAN & PROFILE SHEET
 PROJECT NUMBER: 0802-098

DESIGN	CHECK	REVIEW
DRAWN: JBL/G 03/08	CHECK	DATE:
DATE:	PROJECT ENGINEER:	DATE:
DATE:	DATE:	DATE:

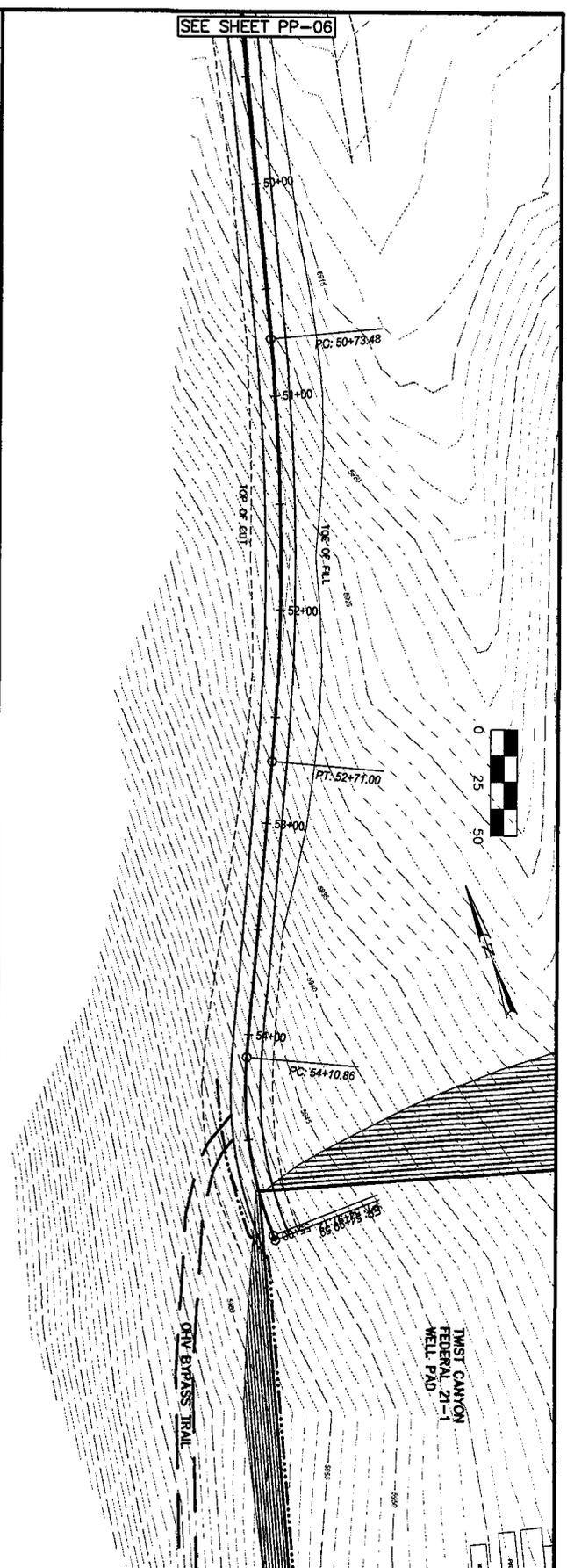
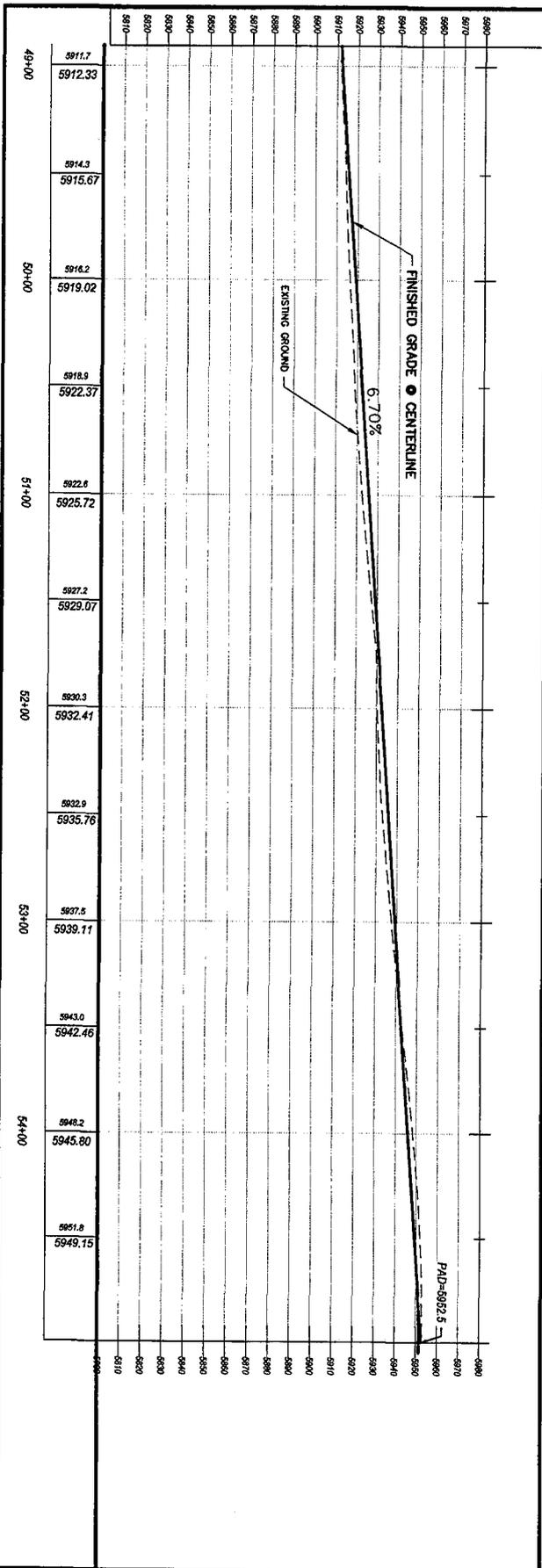
NO.	DATE	ISSUED FOR	BY	REVISIONS	REMARKS
ORIGINAL SUBMISSION FOR AUTHORIZATION					
REVISIONS					
SCALE: 1:50H&V	DWG NAME: PP-4	DWG CREATED: 03/21/08	LAST UPDATE: 5/7/2008		
SHT SET: TWIST CANYON		PEN TEL: 801-220-0808			



SHEET NO. PP-05	Wolverine Gas & Oil Co. of Utah, LLC		Jones & DeMille Engineering 1838 South 400 West, - Provo, Utah 84701 Phone (435) 866-8200 Fax (435) 866-8206 www.jonesanddemille.com		NO. DATE		REVISIONS		REMARKS	
	TWIST CANYON FEDERAL #21-1				DESIGNER: JSL/G 03/08		CHECKER: DATE:		REVIEWER: DATE:	
	PLAN & PROFILE SHEET		APPROVAL RECORD:		APPROVED: DATE:		PROJECT DESIGN ENGINEER: DATE:		SCALE: 1:50H&V	
	PROJECT NUMBER: 0802-098		APPROVED: DATE:		PROJECT DESIGN ENGINEER: DATE:		DWG NAME: PP-05		DWG CREATED: 03/21/08	
						SHT SET: TWIST CANYON		DWG UPDATED: 5/7/2008		
								PEN TR: 1000000000		
								LAST UPDATE:		



SHEET NO. PP-06	SEWER	Wolverine Gas & Oil Co. of Utah, LLC		Jones & DeMille Engineering		NO. DATE		DESIGN		CHECK		REVIEW		REMARKS	
		TWIST CANYON FEDERAL #21-1		1920 South 100 West - P.O. Box 100, UO 84701 Phone (435) 968-2299 Fax (435) 968-2298 www.jonesanddemille.com		DESIGN		CHECK		REVIEW		REMARKS		REVISIONS	
PROJECT NUMBER: 0802-098		APPROVED: _____ DATE _____ PROJECT DESIGN ENGINEER		DRAWN: JS/LG 03/08		CHECK: _____ DATE _____		SCALE: 1:50H&V		DWG NAME: PP-06		DWG CREATED: 03/21/08		LAST UPDATE: 5/7/2008	
		APPROVED: _____ DATE _____		QUANT: _____ CHECK: _____ BY: _____		SHT SET: TWIST CANYON		PEN TEL: (435) 968-2298							



SEE SHEET PP-06

Wolverine Gas & Oil Co. of Utah, LLC
 COUNTY: SEVIER
 SHEET NO.: PP-07
 PROJECT NUMBER: 0802-098
 PLAN & PROFILE SHEET



APPROVAL	DESIGN	CHECK	REVIEW
RECORD: _____	DATE: _____	PROJECT DESIGN ENGINEER: _____	DATE: _____
APPROVED: _____	DATE: _____	DRAWN: JS/LG 03/08	CHECK: _____
DATE: _____	DATE: _____	QUANT: _____	CHECK: _____

NO.	DATE	REVISION	BY	REMARKS

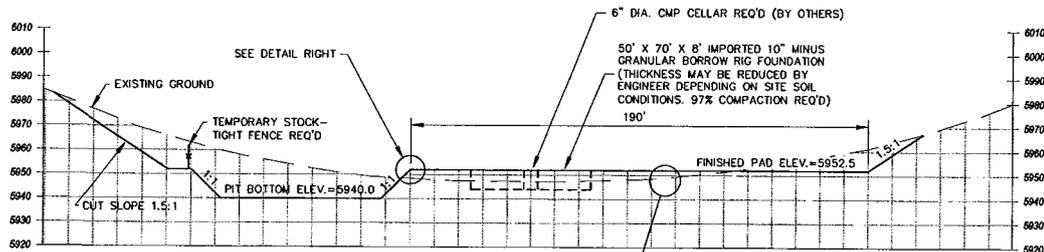
ORIGINAL SUBMISSION FOR AUTHORIZATION

REVISIONS

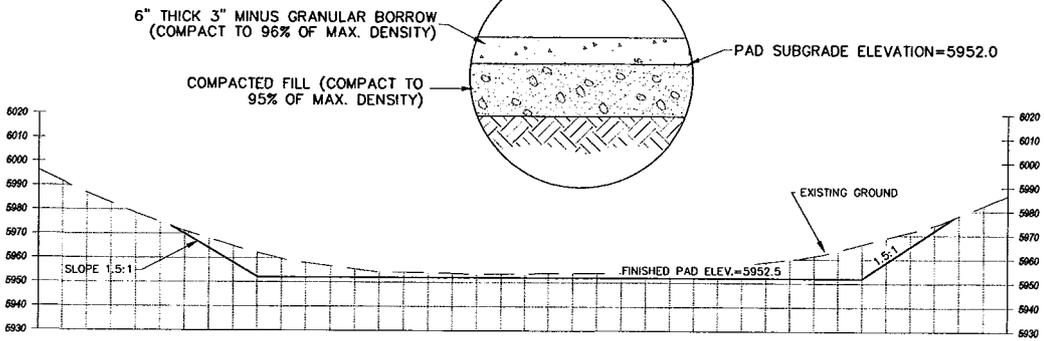
SCALE: 1:50H&V
 DWG NAME: PP-07
 SHEET SET: TWIST CANYON
 DWG CREATED: 03/21/08
 PEN TEL: (435) 886-4386
 LAST UPDATE: 5/7/2008

CONFIDENTIAL

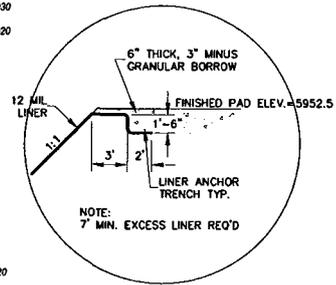
WOLVERINE GAS AND OIL COMPANY OF UTAH, LLC.
CROSS SECTIONS FOR
TWIST CANYON FEDERAL #21-1
SECTION 21, T.21 S., R.1 E., S.L.B. & M.



SECTION 12+99.77



SECTION 14+00



NOTE:
7' MIN. EXCESS LINER REQ'D

APPROVAL		DATE	REVISIONS	REMARKS
APPROVED	DATE	BY	NO.	DESCRIPTION
DESIGNED	DATE	BY	NO.	DESCRIPTION
CHECKED	DATE	BY	NO.	DESCRIPTION
DRAWN	DATE	BY	NO.	DESCRIPTION
PROJECT ENGINEER	DATE	BY	NO.	DESCRIPTION
PROJECT MANAGER	DATE	BY	NO.	DESCRIPTION
CLIENT	DATE	BY	NO.	DESCRIPTION
CREATED: 04/16/2008	LAST UPDATE: 07/20/09			
<p>Wolverine Gas & Oil Co of Utah, LLC TWIST CANYON FEDERAL #21-1 WELL PAD CROSS-SECTIONS PROJECT NUMBER: 0802-098</p>				
<p>SEVIER COUNTY SHEET NO. CS-01</p>				

**WORKSHEET
APPLICATION FOR PERMIT TO DRILL**

APD RECEIVED: 05/16/2008

API NO. ASSIGNED: 43-041-30058

WELL NAME: TWIST CYN FED 21-1
 OPERATOR: WOLVERINE GAS & OIL CO (N1655)
 CONTACT: ED HIGUERA

PHONE NUMBER: 616-458-1150

PROPOSED LOCATION:

NWNW 21 210S 010E
 SURFACE: 1007 FNL 1173 FWL
 BOTTOM: 2500 FSL 1500 FWL
 COUNTY: SEVIER
 LATITUDE: 38.97192 LONGITUDE: -111.8081
 UTM SURF EASTINGS: 429999 NORTHINGS: 4313763
 FIELD NAME: WILDCAT (1)

INSPECT LOCATN BY: / /		
Tech Review	Initials	Date
Engineering		
Geology		
Surface		

LEASE TYPE: 1 - Federal
 LEASE NUMBER: UTU-80587
 SURFACE OWNER: 1 - Federal

PROPOSED FORMATION: TORWP
 COALBED METHANE WELL? NO

RECEIVED AND/OR REVIEWED:

- Plat
- Bond: Fed[1] Ind[] Sta[] Fee[]
(No. WY3329)
- Potash (Y/N)
- Oil Shale 190-5 (B) or 190-3 or 190-13
- Water Permit
(No. 21014)
- RDCC Review (Y/N)
(Date:)
- Fee Surf Agreement (Y/N)
- Intent to Commingle (Y/N)

LOCATION AND SITING:

- R649-2-3.
- Unit: WOLVERINE *orc*
- 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- Security Deposit
2- Spacing Strip

API Number: 4304130058

Well Name: TWIST CYN FED 21-1

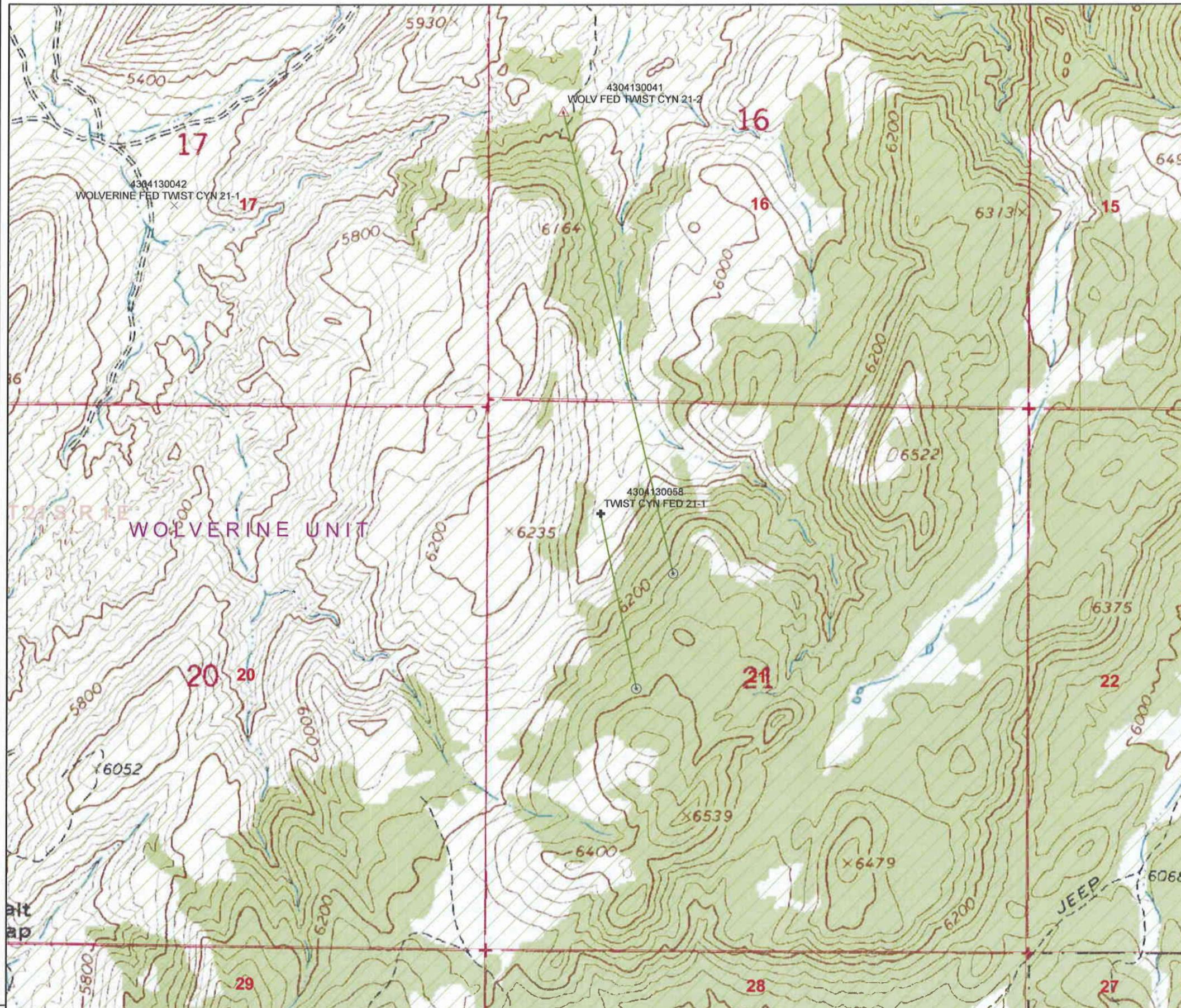
Township 21.0 S Range 01.0 E Section 21

Meridian: SLBM

Operator: WOLVERINE GAS & OIL CO UT

Map Prepared: 5/23/2008
Map Produced by Diana Mason

- | | |
|---------------|------------------------|
| Units | Wells Query |
| STATUS | ✕ <all other values> |
| ACTIVE | GIS_STAT_TYPE |
| EXPLORATORY | <Null> |
| GAS STORAGE | ◆ APD |
| NF PP OIL | ○ DRL |
| NF SECONDARY | ⊕ GI |
| PI OIL | ⊗ GS |
| PP GAS | ✕ LA |
| PP GEOTHERML | ⊕ NEW |
| PP OIL | ⊕ OPS |
| SECONDARY | ○ PA |
| TERMINATED | ⊕ PGW |
| Fields | ● POW |
| STATUS | ⊕ RET |
| Unknown | ⊕ SGW |
| ABANDONED | ● SOW |
| ACTIVE | ○ TA |
| COMBINED | ○ TW |
| INACTIVE | ⊕ WD |
| STORAGE | ⊕ WI |
| TERMINATED | ● WS |
| Sections | ○ Bottom Hole Location |
| Township | |





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

June 24, 2008

Wolverine Gas & Oil Company of Utah, LLC
55 Campau NW
Grand Rapids, MI 49503-2616

Re: Twist Canyon Federal 21-1 Well, Surface Location 1007' FNL, 1173' FWL, NW NW, Sec. 21, T. 21 South, R. 1 East, Bottom Location 2500' FSL, 1500' FWL, NE SW, Sec. 21, T. 21 South, R. 1 East, Sevier 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.

Appropriate information has been submitted to DOGM and administrative approval of the requested exception location is hereby 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 43-041-30058.

Sincerely,

Gil Hunt
Associate Director

pab
Enclosures

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



Operator: Wolverine Gas & Oil Company of Utah, LLC
Well Name & Number Twist Canyon Federal 21-1
API Number: 43-041-30058
Lease: UTU-80587

Surface Location: NW NW **Sec.** 21 **T.** 21 South **R.** 1 East
Bottom Location: NE SW **Sec.** 21 **T.** 21 South **R.** 1 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

Notify the Division within 24 hours of spudding the well.

- Contact Carol Daniels at (801) 538-5284

Notify the Division prior to commencing operations to plug and abandon the well.

- Contact Dustin Doucet at (801) 538-5281 (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.

4. State approval of this well does not supersede the required federal approval, which must be obtained prior to drilling.
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. This proposed well is located in an area for which drilling units (well spacing patterns) have not been established through an order of the Board of Oil, Gas and Mining (the "Board"). In order to avoid the possibility of waste or injury to correlative rights, the operator is requested, once the well has been drilled, completed, and has produced, to analyze geological and engineering data generated therefrom, as well as any similar data from surrounding areas if available. As soon as is practicable after completion of its analysis, and if the analysis suggests an area larger than the quarter-quarter section upon which the well is located is being drained, the operator is requested to seek an appropriate order from the Board establishing drilling and spacing units in conformance with such analysis by filing a Request for Agency Action with the Board.

DIVISION OF OIL, GAS AND MINING

SPUDDING INFORMATION

Name of Company: WOLVERINE GAS & OIL COMPANY UT

Well Name: TWIST CYN FED 21-1

Api No: 43-041-30058 Lease Type: FEDERAL

Section 21 Township 21S Range 01E County SEVIER

Drilling Contractor SST RIG # 68

SPUDDED:

Date 08/10/08

Time _____

How DRY

Drilling will Commence: _____

Reported by MURRAY BROOKS

Telephone # (435) 979-2202

Date 08/11/08 Signed CHD

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

FORM 6

ENTITY ACTION FORM

Operator: Wolverine Gas and Oil Company of Utah, LLC Operator Account Number: N 1655
Address: 55 Campau NW, One Riverfront Plaza
city Grand Rapids
state MI zip 49503-2616 Phone Number: (616) 458-1150

Well 1

API Number	Well Name		QQ	Sec	Twp	Rng	County
4304130058	Twist Canyon Federal 21-1		NWNW	21	21S	1E	Sevier
Action Code	Current Entity Number	New Entity Number	Spud Date			Entity Assignment Effective Date	
A	99999	17042	8/11/2008			8/25/08	
Comments: <u>TORWP BHL = NESW</u>							CONFIDENTIAL

Well 2

API Number	Well Name		QQ	Sec	Twp	Rng	County
Action Code	Current Entity Number	New Entity Number	Spud Date			Entity Assignment Effective Date	
Comments:							

Well 3

API Number	Well Name		QQ	Sec	Twp	Rng	County
Action Code	Current Entity Number	New Entity Number	Spud Date			Entity Assignment Effective Date	
Comments:							

ACTION CODES:

- A - Establish new entity for new well (single well only)
- B - Add new well to existing entity (group or unit well)
- C - Re-assign well from one existing entity to another existing entity
- D - Re-assign well from one existing entity to a new entity
- E - Other (Explain in 'comments' section)

Helene Bardolph - Wolverine Gas & Oil Corp.

Name (Please Print)

Signature

Engineering Administration

8/21/2008

Title

Date

RECEIVED

AUG 21 2008

(5/2000)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5. Lease Serial No. **UTU-80587**

6. If Indian, Allottee or Tribe Name

7. Unit or CA Agreement Name and No. **Wolverine Federal Unit**

8. Lease Name and Well No. **Twist Canyon Federal 21-1**

9. AFI Well No. **4304130058**

10. Field and Pool, or Exploratory **Exploratory**

11. Sec., T., R., M., on Block and Survey or Area **21, T21S, R1E SLB&M**

12. County or Parish **Sevier** 13. State **UT**

14. Date Spudded **08/10/2008** 15. Date T.D. Reached **08/22/2008** 16. Date Completed **9-2-08**
 D & A Ready to Prod.

17. Elevations (DF, RKB, RT, GL)* **5952 KB**

18. Total Depth: MD **807'** TVD **807'** 19. Plug Back T.D.: MD **0 (Surface)** TVD **0** 20. Depth Bridge Plug Set: MD TVD

21. Type Electric & Other Mechanical Logs Run (Submit copy of each) **None (mud)**

22. Was well cored? No Yes (Submit analysis)
Was DST run? No Yes (Submit report)
Directional Survey? No Yes (Submit copy)

23. Casing and Liner Record (Report all strings set in well)

Hole Size	Size/Grade	Wt. (#/ft.)	Top (MD)	Bottom (MD)	Stage Cementer Depth	No. of Sk. & Type of Cement	Slurry Vol. (BBL)	Cement Top*	Amount Pulled
40"	36" cond.		Surface	55 GL					
26"	18 5/8" J	68.0	0	504	N/A	465 Prem. 1350 Neat	97 (top job)	250 0	0 0

24. Tubing Record

Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)
N/A								

25. Producing Intervals

Formation	Top	Bottom	Perforated Interval	Size	No. Holes	Perf. Status
A) N/A						
B)						
C)						
D)						

26. Perforation Record

27. Acid, Fracture, Treatment, Cement Squeeze, etc.

Depth Interval	Amount and Type of Material
N/A	

28. Production - Interval A

Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	
			→						P & A

28a. Production - Interval B

Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	
			→						

RECEIVED
OCT 15 2008

DIV. OF OIL, GAS & MINING

*(See instructions and spaces for additional data on page 2)

COPY CONFIDENTIAL

28b. Production - Interval C

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

28c. Production - Interval D

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

29. Disposition of Gas (Sold, used for fuel, vented, etc.)

30. Summary of Porous Zones (Include Aquifers):

Show all important zones of porosity and contents thereof: Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries.

31. Formation (Log) Markers

Formation	Top	Bottom	Descriptions, Contents, etc.	Name	Top
					Meas. Depth
Quaternary	0	807 (TD)	Tuff, Volcaniclastic Sandstone	Tertiary Volcanics	0

32. Additional remarks (include plugging procedure):

This well was plugged and abandoned in the surface hole section because of well bore stability problems. Replacement well will be drilled on same pad. No logs were run on this surface hole.

33. Indicate which items have been attached by placing a check in the appropriate boxes:

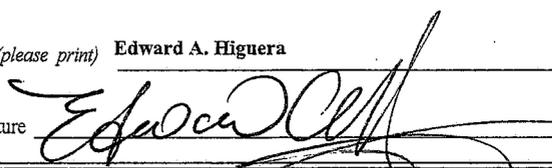
- Electrical/Mechanical Logs (1 full set req'd.)
 Geologic Report
 DST Report
 Directional Survey
 Sundry Notice for plugging and cement verification
 Core Analysis
 Other:

34. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions)*

Name (please print) Edward A. Higuera

Title Manager - Development

Signature



Date 10/10/2008

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.

(Form 3160-4, page 2)
CONFIDENTIAL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

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

SUBMIT IN TRIPLICATE- Other instructions on reverse side.

1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		5. Lease Serial No. UTU-80587
2. Name of Operator Wolverine Gas and Oil Company of Utah, LLC		6. If Indian, Allottee or Tribe Name
3a. Address 55 Campau NW, Grand Rapids, MI 49503	3b. Phone No. (include area code) 616-458-1150	7. If Unit or CA/Agreement, Name and/or No. Wolverine Federal Unit
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Surface: 1007' FNL, 1173' FWL, Sec 21, T21S, R1E BHL: 2500' FSL, 1500' FNL, Sec 21, T21S, R1E		8. Well Name and No. Twist Canyon Federal 21-1
		9. API Well No. 43-041-30058
		10. Field and Pool, or Exploratory Area Exploratory
		11. County or Parish, State Sevier

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

TYPE OF SUBMISSION	TYPE OF ACTION			
<input type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input checked="" type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other _____
	<input type="checkbox"/> Change Plans	<input checked="" type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

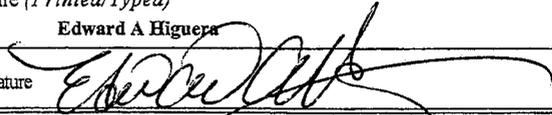
13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplate horizontally, give subsurface locations and measured and true vertical depths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

The purpose of this sundry is to submit documentation of the abandonment of Twist Canyon Federal 21-1, which had to be abandoned prematurely after drilling to 807' and encountering severe wellbore stability issues in the Black Cap Mountain Formation, a highly unconsolidated volcanoclastic sandstone. After attempting corrective measures, the well was plugged and abandoned, as outlined in the attached narrative.

The rig will be skidded approximately 100' north and a new wellbore drilled under the name Twist Canyon Federal 21-1A. Verbal approval has been granted for this well and a separate sundry will be submitted for this new well.

RECEIVED
OCT 15 2008
DIV. OF OIL, GAS & MINING

14. I hereby certify that the foregoing is true and correct

Name (Printed/Typed) Edward A Higuera	Title Manager - Development
Signature 	Date 09/19/2008

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by _____	Title _____	Date _____
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.		
Office _____		

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)

CONFIDENTIAL

To: BLM and UDOGM

From: Wolverine Gas and Oil Company of Utah, LLC

Re: Twist Canyon Federal 21-1 (original wellbore)
API No. 43-041-30058
Sundry Notice Narrative

The purpose of this Sundry is to document the activity at the above-referenced well and to document final abandonment of the well bore. During the drilling of this wellbore, changes had to be made to the original conductor and surface casing program. These changes were communicated previously with Al McKee, BLM and implemented based on his verbal approval. This document also records the actual lengths and dimensions of casing installed in this wellbore.

1. Conductor: Thirty six (36) inch conductor was set at 55' GL after encountering unstable hole at approximately 70. Originally, we had planned to set 24" conductor to 120'. At 70 feet, the rathole drilling could not advance, and after the formation dulled the carbide teeth on the 26-in bucket rig twice, drilling was terminated.
2. 18-5/8 Contingency Casing: Using a 26" hammer bit and drilling with air, we drilled hard, fractured tuff to approximately 439' and then encountered a formation change and drilled loose grains of volcanoclastic sandstone. At approximately 535', hole conditions became unstable and we decided to set 18-5/8, 68 ppf, J-55 BTC contingency string. We ran the 18-5/8 casing to 467' and tagged fill (68' of fill) and washed down to 509 feet with water, but could not get returns. Casing acted like it was rotating on a boulder and we lost four feet, so the decision was made to cement the casing. Cemented bottom casing with 97bbls of 15.8 lb.gal cement. We ran 2-3/8" tubing in the casing annulus and cemented, in four separate attempts, the annulus with 283 barrels (In the annulus between the 26-inch hole and 18-5/8" casing, 283 barrels would fill 880 ft.). The 18-5/8" casing was not part of the originally approved APD.
3. Drilling Surface Hole: Drilled out of 18-5/8 casing with 17-1/2 hammer bit and drilled with air to 807'. The volcanoclastic sand drilled easily, although we experienced partial to no returns at the blooie line. We drilled to 807' and had alternating periods of no circulation and periods of unloading large volumes of sand and baseball sized rocks. We attempted to clean the hole for 10 hours, pumping sweeps and working pipe. On the following bit trip, we encountered sudden drag, but we were able to work through it. Inside the 18-5/8 casing, though, we encountered a tight spot, and it took considerable effort to work the bit through, but we eventually made it to surface.

COPY
CONFIDENTIAL

At this point, we conducted an evaluation our hole conditions by running an Expro TC camera into the hole to 496'. The TV pictures indicated an obstruction below the casing as well as some casing damage. We were able to run an 8-3/4" bit and no obstruction was found and continued to run the bit to 561 where some obstruction was found (likely sand fill from cave ins). Corrective measures were evaluated and attempted, but abandonment of this wellbore and skidding the rig and re-drilling the well was determined to be necessary.

4. Well Abandonment: On September 2, the well was plugged by pumping 200 bbls down the 18-5/8" casing followed by 143 cubic yards of ready-mix concrete, which filled the casing to surface (volume of casing is approximately 30 cubic yards). Drilled cement in casing from 41' to 62' with 17-1/2" bit. Layed down bit and BHA and notified BLM of abandonment and preparations were made to skid rig. Final abandonment occurred with by cutting 18-5/8 conductor 3 ft below ground level and filing the 18-5/8" from the existing top of cement to surface with 3.8 cubic yards of concrete. A 0.25" thick steel plate was welded to top of the cut-off 18-5/8" conductor . A weep hole was placed in this plate. Well identification and location data was placed on this plate with a welder. A length of 4" steel pipe was welded on top of the cap. This pipe extends about six inches above ground level at this time (so it won't interfere with drilling operations of the replacement well). After operations are completed on the Twist Canyon 21-1A (replacement well), an additional six feet of 4" steel pipe will be welded to this short length. The well location and identification will be permanently welded on the pipe, as per Onshore Order No. 2. The cellar was filled with native soil.

CONFIDENTIAL

43-641-30058



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Utah State Office

P.O. Box 45155

Salt Lake City, UT 84145-0155

<http://www.blm.gov/ut/st/en.html>



IN REPLY REFER TO:

3160

UTU80800X

(UT922100)

JUN 26 2012

*Twist Cyn Fed 21-1
21S 1E 21*

RECEIVED

JUN 28 2012

DIV. OF OIL, GAS & MINING

Mr. Richard Moritz
One Riverfront Plaza
55 Campau, N.W.
Grand Rapids, MI 49503-2616

Re: Automatic Contraction
Wolverine Unit
Sanpete & Sevier Counties, Utah

Dear Mr. Moritz:

Your letter of June 20, 2012, describes the lands automatically eliminated effective March 16, 2012, from the Wolverine Unit Area, Sanpete & Sevier Counties, Utah, pursuant to Section 2(e) of the unit agreement and requests our concurrence. The lands you have described contain 68,062.645 acres, more or less, and contain all legal subdivisions, no parts of which are in the 7th Revision of the Navajo Participating Area "A" and the Initial Navajo 1 Formation - Carbon Sequestration a/k/a Providence Participating Area. As a result of the automatic elimination, the unit is reduced to 2,080.92 acres.

The following Federal Leases are entirely eliminated from the unit area.

UTU 73155	UTU 74851	UTU 78183	UTU 82687
UTU 73157	UTU 74852	UTU 80587	UTU 82690
UTU 73158	UTU 74853	UTU 80906	UTU 80951
UTU 73160	UTU 74854	UTU 80908	
UTU 73529	UTU 76453	UTU 80909	
UTU 73530	UTU 76454	UTU 80910	
UTU 74370	UTU 76455	UTU 80911	
UTU 74850	UTU 76456	UTU 80955	

The following Federal Leases are partially eliminated from the unit area.

UTU 73156	UTU 73528	UTU 80907
-----------	-----------	-----------