

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
811 S. First St., Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

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

Form C-141  
Revised August 24, 2018  
Submit to appropriate OCD District office

Incident ID	NRM2018233009
District RP	
Facility ID	
Application ID	

## Release Notification

### Responsible Party

Responsible Party: BP America Production Co	OGRID: 778	<b>INITIAL &amp; REMEDIATION PLAN</b>
Contact Name: Steve Moskal	Contact Telephone: (505) 330-9179	
Contact email: steven.moskal@bpx.com	Incident # (assigned by OCD)	
Contact mailing address: 1199 Main St., Suite 101, Durango CO, 81301		

### Location of Release Source

Latitude: 36.721295° Longitude: -107.669461°  
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: Roelofs B 003	Site Type: Natural Gas Production Well Pad
Date Release Discovered: June 17, 2020	API#: 30-045-08208

Unit Letter	Section	Township	Range	County
M	15	T29N	R08W	San Juan

Surface Owner:  State  Federal  Tribal  Private (Name: \_\_\_\_\_)

### Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input checked="" type="checkbox"/> Produced Water	Volume Released (bbls): <b>6.7</b>	Volume Recovered (bbls): <b>0</b>
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Condensate	Volume Released (bbls): <b>135</b>	Volume Recovered (bbls): <b>0</b>
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release:  
Release of condensate and produced water caused from a storage tank integrity failure.

**BP discovered a leaking condensate tank on 6/17/2020. Leak was contained to berm, tank was emptied and shut in. At this time, the impacts appear to be confined to the tank footprint and will be further delineated via hollow stem auger currently being scheduled.**

**BP will elect to install a soil vapor extraction system.**

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Was this a major release as defined by 19.15.29.7(A) NMAC?  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? Steve Moskal to Cory Smith (cell phone – Voicemail) on October 14, 2019 at 2:00 PM	

### Initial Response

*The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury*

<input checked="" type="checkbox"/> The source of the release has been stopped. <input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input checked="" type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.
If all the actions described above have <u>not</u> been undertaken, explain why:
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.
Printed Name: <u>Steve Moskal</u> Title: <u>Environmental Coordinator</u>
Signature:  Date: <u>6/29/2020</u>
email: <u>steven.moskal@bpx.com</u> Telephone: <u>(505) 330-9179</u>
<b><u>OCD Only</u></b> Received by: <u>Ramona Marcus</u> Date: <u>6/30/2020</u>

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## Site Assessment/Characterization

*This information must be provided to the appropriate district office no later than 90 days after the release discovery date.*

What is the shallowest depth to groundwater beneath the area affected by the release?	>100 (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas <b>not</b> on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

<b>Characterization Report Checklist:</b> <i>Each of the following items must be included in the report.</i>
<input checked="" type="checkbox"/> Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
<input checked="" type="checkbox"/> Field data
<input checked="" type="checkbox"/> Data table of soil contaminant concentration data
<input checked="" type="checkbox"/> Depth to water determination
<input checked="" type="checkbox"/> Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
<input checked="" type="checkbox"/> Boring or excavation logs
<input checked="" type="checkbox"/> Photographs including date and GIS information
<input checked="" type="checkbox"/> Topographic/Aerial maps
<input checked="" type="checkbox"/> Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico  
Oil Conservation Division

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Printed Name: Steve Moskal Title: Environmental Coordinator

Signature:  Date: 6/29/2020

email: steven.moskal@bpx.com Telephone: (505) 330-9179

**OCD Only**

Received by: Ramona Marcus Date: 6/30/2020

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## Remediation Plan

**Remediation Plan Checklist:** Each of the following items must be included in the plan.

- Detailed description of proposed remediation technique
- Scaled sitemap with GPS coordinates showing delineation points
- Estimated volume of material to be remediated
- Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

**Deferral Requests Only:** Each of the following items must be confirmed as part of any request for deferral of remediation.

- Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- Extents of contamination must be fully delineated.
- Contamination does not cause an imminent risk to human health, the environment, or groundwater.

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Printed Name: Steve Moskal Title: Environmental Coordinator

Signature: 

Date: 6/29/2020

email: steven.moskal@bpx.com

Telephone: (505) 330-9179

**OCD Only**

Received by: Ramona Marcus Date: 6/30/2020

- Approved       Approved with Attached Conditions of Approval       Denied       Deferral Approved

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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## Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

**Closure Report Attachment Checklist:** *Each of the following items must be included in the closure report.*

- A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

email: \_\_\_\_\_ Telephone: \_\_\_\_\_

**OCD Only**

Received by: \_\_\_\_\_ Date: \_\_\_\_\_

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Title: \_\_\_\_\_

NRM2018233009

<b>BP Remediation Plan Roelofs B 003</b>	
To:	Cory Smith (NMOCD) Emmanuel Adeloye (BLM)
From:	Steven Moskal (BP)
CC:	Jeff Blagg (Blagg Engineering)
Date:	6/29/2020
Re:	Roelofs B 003 – Soil vapor extraction remedial plan. API #30-045-08208, (M), S-15, T29N, R08W



The Roelofs B 003 site is an active natural gas production pad within the San Juan Basin Gas Field in San Juan County, New Mexico. The site is located on land managed by the Bureau of Land Management.

On June 17, 2020, evidence of a production tank leaking was observed by oil staining on the tank and evidence along the tank grade ring. Tank gauging data indicated that approximately 135 bbls of condensate and 6.7 bbls of produced water were lost. The tank had previously been gauged in May with no issues. BP plans to delineate the site with a hollow stem auger that is currently being scheduled. The boring activity will be directly beneath the removed leaking tank and in the immediate area, approximately 12' and 25' out in the four cardinal directions. The borings are planned to be constructed as soil vapor extraction (SVE) points. Electricity is on site.

At this time, the contamination appears to be confined to the immediate area below the tank. At the surface, the site soils consist of loose sand, silty sands with clay lenses.

## **REMEDIATION PLAN**

### **Drilling & Delineation**

BP proposes to advance up to 8 soil boring to determine the vertical and lateral extents of the remaining contamination. Total depth is not known at this time but is expected to be approximately 25' below ground surface. If vertical extent of the contamination is identified, a single boring will be advanced ten feet beyond the lower reaches of the identified impacts.

The borings will be advanced using a minimum 4" (ID) hollow stem auger or comparable tooling. In each boring, 2-inch PVC well screen will be placed in the lower portion of each soil boring, approximately 15 feet long, with an attached riser to just above the surface. The subsurface elevation of the 15' screened interval will be varied between each boring to target differing strata during SVE operations. Sand pack will be added to the boring annulus to 1' above the screened interval. Hydrated bentonite will be placed in the remainder of the boring to 1' bgs where cement will be used to seal the surface completion and install a well protector. The well protectors will be lockable.

During advancement of the well borings, soil samples will be collected for confirmation. A soil samples will be collected every 5' or more frequent if possible. The soil samples will be field screened using a calibrated photoionization detector via an approved field headspace method. A minimum of two soil samples will be submitted for laboratory analysis, following handling and chain of custody protocols, for analysis of EPA Methods 8015 TPH (GRO, DRO and MRO), 8021 BTEX and 6010 chlorides. The soil samples with the highest PID from each boring along with the soil sample base of the boring or at the groundwater interface will be submitted for analysis. The contaminated soil will be collected and containerized for offsite disposal.

## **SVE Installation and Operation**

BP proposes to employ soil vapor extraction (SVE) technology to the determined SVE points or monitoring wells described above. The system will incorporate the following:

- 1) An explosion proof, (Class 1, Div. 1) electrically driven skid mounted SVE pump will be installed on site:
  - a. Rotron EN505 (2.0 HP, single phase, 230 volt, 12 amp continuous, 56 amp inrush).

The SVE package will be fitted with a water/product knockout drum, high water level shutoff, two vacuum gauges, one flow rate gauge and explosion proof starter switch.

- 2) The air extraction points will be fitted with 2-inch quick-connect fittings.
- 3) A 2-inch diameter PVC pipe and/or flexible hose with quick connect fittings will be connected from the SVE blower to one SVE well at a time. The hose will be long enough to reach any of the SVE manifold or any single SVE point.
- 4) During operation, the flexible air hose will be moved to other points as deemed necessary by site monitoring:
  - A) Exhaust vapors from the SVE pump will be measured with an organic vapor meter (OVM) on a daily basis for the first 5 days operation, weekly for the first month of operation, and then monthly thereafter or adjusted as needed based on system performance.
  - B) Upon start up, a gas sample will be collected from the vacuum stream; thereafter, an annual sample will be collected from the vacuum stream and will be laboratory analyzed for total petroleum hydrocarbons (TPH) by U.S. EPA Method 8015B and volatile hydrocarbons (BTEX) by U.S. EPA Method 8021. The location of the collection point will be determined based on the SVE system setup, but will preferably be upstream of the blower to reduce impacts of heat and turbulence to the air stream.
  - C) When exhaust vapors appear to reach an asymptotic limit, the air injection hose will be moved to various other injection points and exhaust vapors from other unused observation points will be measured with an organic vapor meter (OVM) on a monthly basis.
- 5) When site remediation appears to be complete based on monitoring results from the active remediation system, test borings will be advanced to a depth of approximately 50-60 feet at locations about 5 feet from the remediation point. Soil samples will be collected at various depths of known contamination intervals for laboratory determination of residual hydrocarbons. This testing will include total petroleum hydrocarbons (TPH) by U.S. EPA Method 8015B and volatile hydrocarbons (BTEX) by U.S. EPA Method 8021. Note that the New Mexico Oil Conservation Division (NMOCD), Aztec District Office, will be notified prior to this drilling and sampling so that personnel may be available for witnessing.

NMOCD will be provided with laboratory test results. Following review of the remediation system monitoring and laboratory test results, either site closure, continued system operation or modifications to the remediation plan will be requested.

During operation, BP will strive to operate the system continuously, with hopes of achieving 90% or greater run time.

**REPORTING**

Reporting, including soil boring logs, laboratory data and field reports, of the delineation activity will be provided to the NMOCD within 60 days of the final lab report receipt.

The performance of the SVE system and remediation will be reported annually with field OVM data, estimated run times, system performance, mass removal and product recovery and maintenance or changes in the system configuration will be included. The sampling of the vacuum stream will be reported in an annual report.

A final report will be provided within 60 days of the final closure sampling event.

Regards,



Steve Moskal  
BP America Production Co.

# Roelofs B 003

API #30-045-08208

GPS of BH-1: 36.721295°, -107.669461°

## Legend

-  Boring Location
-  Roelofs B 003 Wellhead



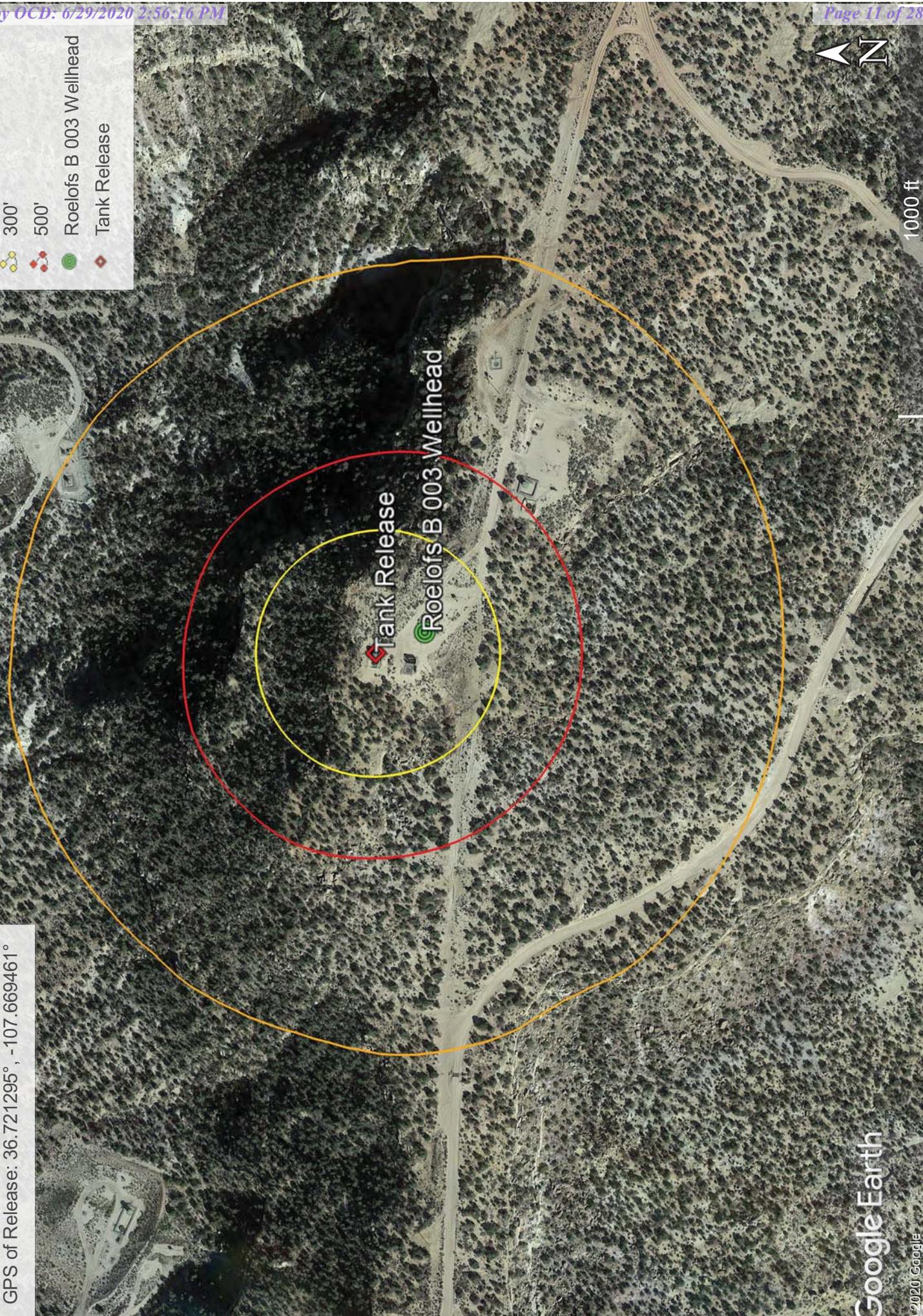
# Roelofs B 003

API #30-045-08208

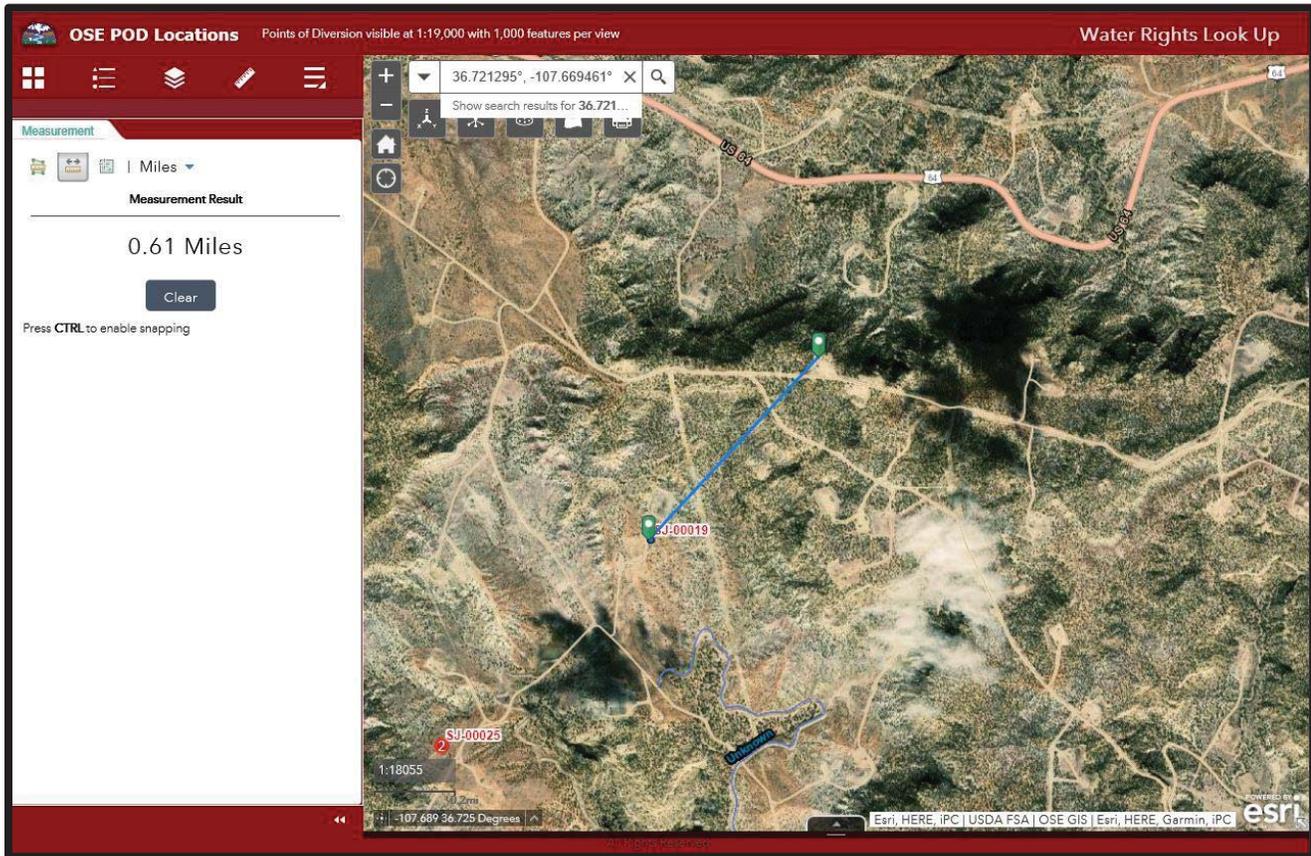
GPS of Release: 36.721295°, -107.669461°

## Legend

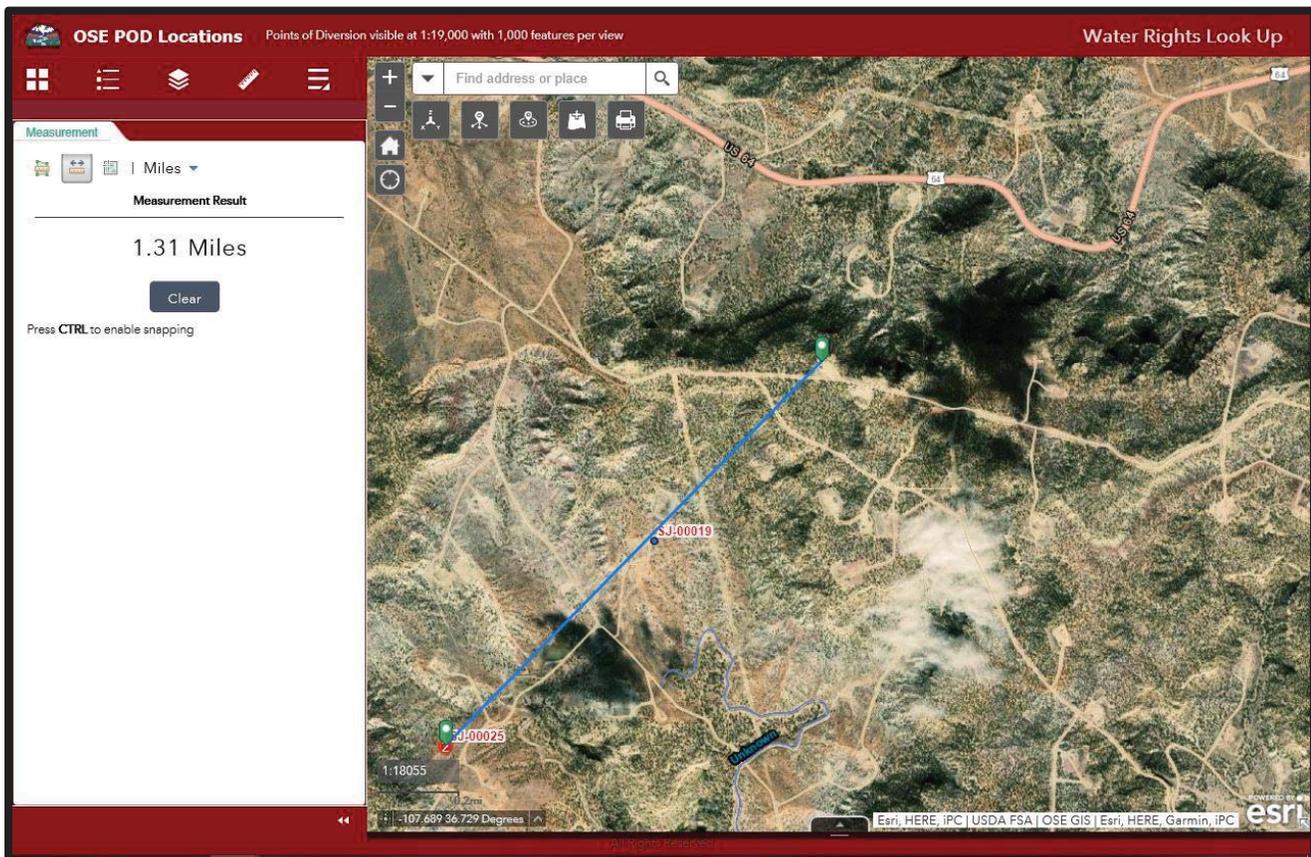
-  1000'
-  300'
-  500'
-  Roelofs B 003 Wellhead
-  Tank Release



1000 ft



Above: Distance to nearest water well



Above: Distance to SJ-00025 with depth of water at 402 below ground surface.



## **SITING AND HYDRO-GEOLOGICAL REPORT FOR ROELOFS B 003**

### **Siting Criteria 19.15.17.10 NMAC**

Depth to groundwater at the site is estimated to be greater than 100 feet. This estimation is based on data from Stone and others (1983), and depth to groundwater data obtained from water wells permitted by the New Mexico State Engineer's Office (OSE, Figure 1). Local topography and proximity to adjacent water features are also considered. A topographic map of the site is provided as Figure 2 and demonstrates that the below grade tank (BGT) is not within 300 feet of any continuously flowing watercourse or within 200 feet of any other significant watercourse, lakebed, sinkhole or playa lake as measured from the ordinary high water mark. Figure 3 demonstrates that the BGT is not within 300 feet of a permanent residence, school, hospital, institution or church. Figure 4 demonstrates, based on a search of the OSE database and USGS topographic maps, that there are no freshwater wells or springs within 1000 feet of the BGT. Figure 5 demonstrates that the BGT is not within a municipal boundary or a defined municipal freshwater well field. Figure 6 demonstrates that the BGT is not within 500 feet of a wetland. Figure 7 demonstrates that the BGT is not in an area overlying a subsurface mine. The BGT is not located in an unstable area. Figure 8 demonstrates that the BGT is not within the mapped FEMA 100-year floodplain.

### **Local Geology and Hydrology**

This particular site is located on the top of the Manzanares Mesa within Manzanares Canyon but south of Escarbada Canyon and County Road 4800. Manzanares canyon joins the Largo Canyon wash to the south west. Regional topography of Largo Canyon is composed of mesas dissected by deep, narrow canyons and arroyos. The more resistant cliff-forming sandstones of the San Jose Formation cap the interbedded siltstones, shales and sandstones of the Nacimiento Formation. Accumulations of talus and eroded sands at the base of canyon walls form steep to gentle slopes that transition into flat-bottomed arroyos within the canyons. Deposits of Quaternary alluvial and eolian sands occur prominently near the surface of Largo Canyon, especially near streams and washes.

### **Regional Geology and Hydrology**

The San Juan Basin is situated in the Navajo section of the Colorado Plateau and is characterized by broad open valleys, mesas, buttes and hogbacks. Away from major valleys and canyons topographic relief is generally low. Native vegetation is sparse and shrubby. Drainage is mainly by the San Juan River, the only permanent stream in the Navajo Section of the Colorado Plateau. The San Juan River is a tributary of the Colorado River. Major tributaries include the Animas, Chaco and La Plata Rivers. Flow of the San Juan River across the basin is regulated by the Navajo Dam, located about 30 miles northeast of Farmington, New Mexico. The climate is arid to semiarid with an average annual precipitation of 8 to 10 inches. Soils within the basin consist of weathered parent rock derived from predominantly physical means mostly from eolian depositional system with fluvial having a lesser impact.

Cretaceous and Tertiary sandstones, as well as Quaternary Alluvial deposits, serve as the primary aquifers in the San Juan Basin (Stone et al., 1983). The San Jose Formation of Eocene age occurs in both New Mexico and Colorado, and its outcrop forms the land surface over much of the eastern half of the central basin. It overlies the Nacimiento Formation in the area generally south of the Colorado-New Mexico border and overlies the Animas Formation in the general area north of the State Line. The San Jose Formation was deposited in various fluvial-type environments. In general, the unit consists of an interbedded sequence of sandstone, siltstone, and shale. Thickness of the San Jose Formation increases from west to east. Groundwater is associated with alluvial and fluvial sandstone aquifers. The occurrence of groundwater is mainly controlled by distribution of sandstone in the formation. The reported or measured discharge from numerous water wells completed in the formation range from 0.15 to 61 gallons per minute (gpm) and with a median of 5 gpm. Most of the wells provide water for livestock and domestic purposes. The formation is suitable for recharge from precipitation due to overlying soils being sandy, highly permeable and absorbent. Low annual precipitation, relatively high transpiration and evaporation rates and deep dissection of the formation by the San Juan River and its main tributaries all tend to reduce the effective recharge to the formation. Aquifers within the coarser and continuous sandstone bodies of the Nacimiento Formation of Paleocene age are between 0 and 1000 feet deep in the majority of the basin as well (Stone et al., 1983).

### **References**

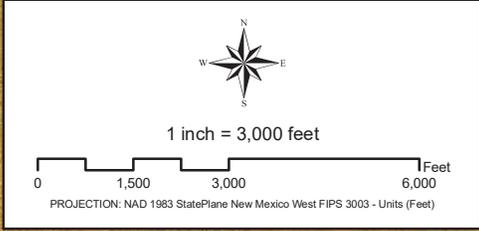
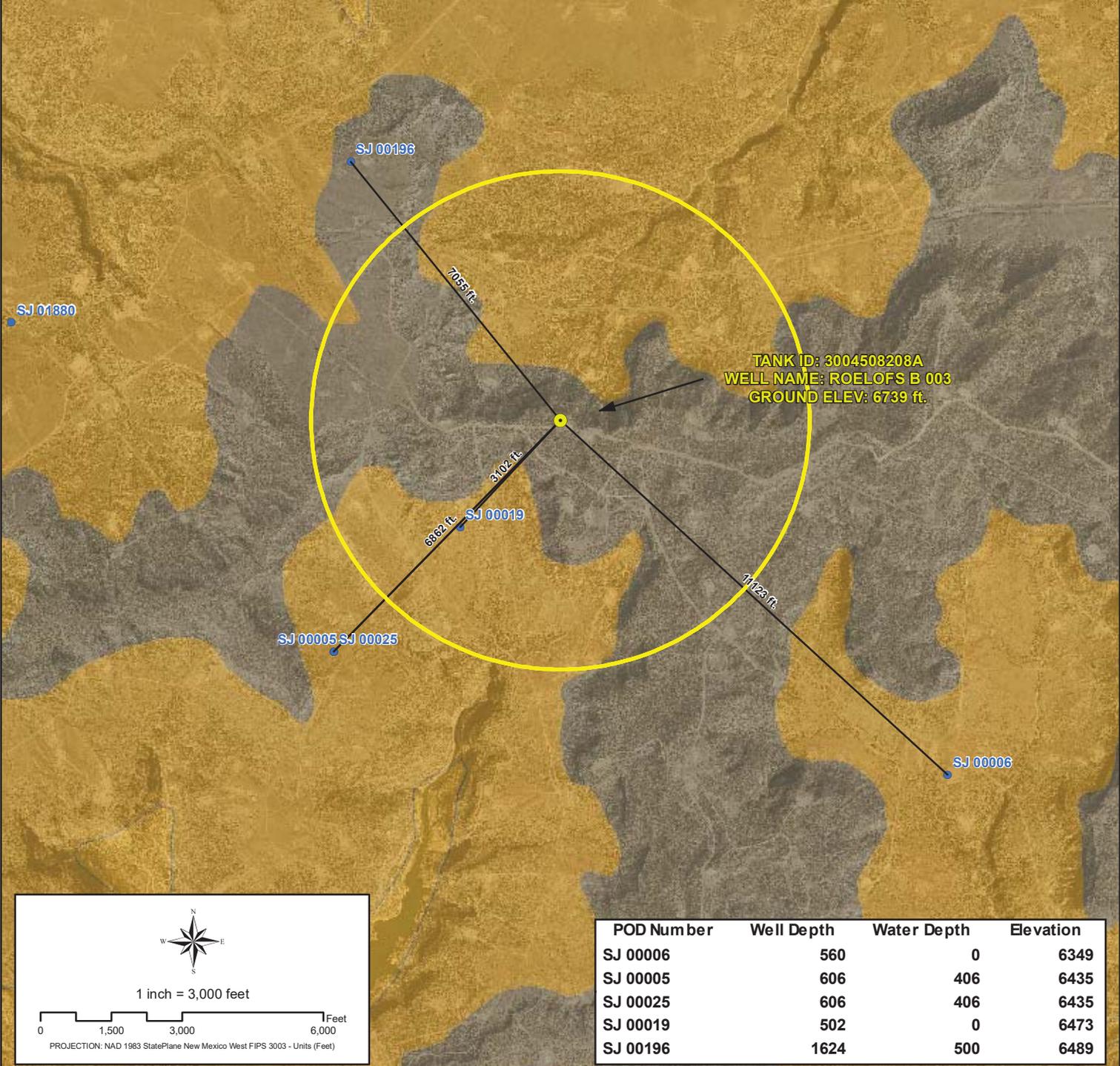
Circular 154—Guidebook to coal geology of northwest New Mexico By E. C. Beaumont, J. W. Shomaker, W. J. Stone, and others, 1976

Stone, et al., 1983, Hydrogeology and Water Resources of the San Juan Basin, New Mexico, Socorro, New Mexico Bureau of Mines and Mineral Resources Hydrologic Report 6, 70 p

**LEGEND**

- BGT Location
- Water Well Location
- Distance to BGT (Line of Sight)
- 1 Mile Buffer
- Groundwater Evaluation (Alluvial Geology)**
- Groundwater Likely Less Than 50 Feet BGS
- Groundwater Suspected to be Less Than 50 Feet BGS

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Ka - Animas formation</li> <li><span style="background-color: #c4e1a1; width: 20px; height: 10px; display: inline-block;"></span> Kch - Cliff House sandstone</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Kf - Fruitland formation</li> <li><span style="background-color: #c4e1a1; width: 20px; height: 10px; display: inline-block;"></span> Kkl - Kirtland shale, lower shale member</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Kkm - Kirtland shale, Farmington sandstone member</li> <li><span style="background-color: #c4e1a1; width: 20px; height: 10px; display: inline-block;"></span> Kku - Kirtland shale, upper shale member</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Kl - Lewis shale</li> <li><span style="background-color: #c4e1a1; width: 20px; height: 10px; display: inline-block;"></span> Kmf - Menefee formation</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Koa - Ojo Alamo sandstone</li> </ul> | <p><b>Surficial Geology Units</b></p> <ul style="list-style-type: none"> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Kpc - Pictured Cliffs sandstone</li> <li><span style="background-color: #c4e1a1; width: 20px; height: 10px; display: inline-block;"></span> Kpl - Point Lookout sandstone</li> <li><span style="background-color: #4f81bd; width: 20px; height: 10px; display: inline-block;"></span> Lake</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qa - Alluvium</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qal - Alluvium</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qap - Pediment gravel</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qat - Terrace gravel</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qes - Eolian sand</li> </ul> | <ul style="list-style-type: none"> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qg - Terrace gravel</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qgs - Gravelly sand</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Qsw - Sheetwash alluvium</li> <li><span style="background-color: #fff2cc; width: 20px; height: 10px; display: inline-block;"></span> Tbg - Bridgetimber Gravel</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Ti - Intrusive rocks</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Tn - Nacimiento formation</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Tsc - Cuba Mesa Member</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Tsj - San Jose Formation</li> <li><span style="background-color: #d9ead3; width: 20px; height: 10px; display: inline-block;"></span> Tsr - Regina Member</li> </ul> |
|--|---|--|



**GROUNDWATER LESS THAN 50 FT.**

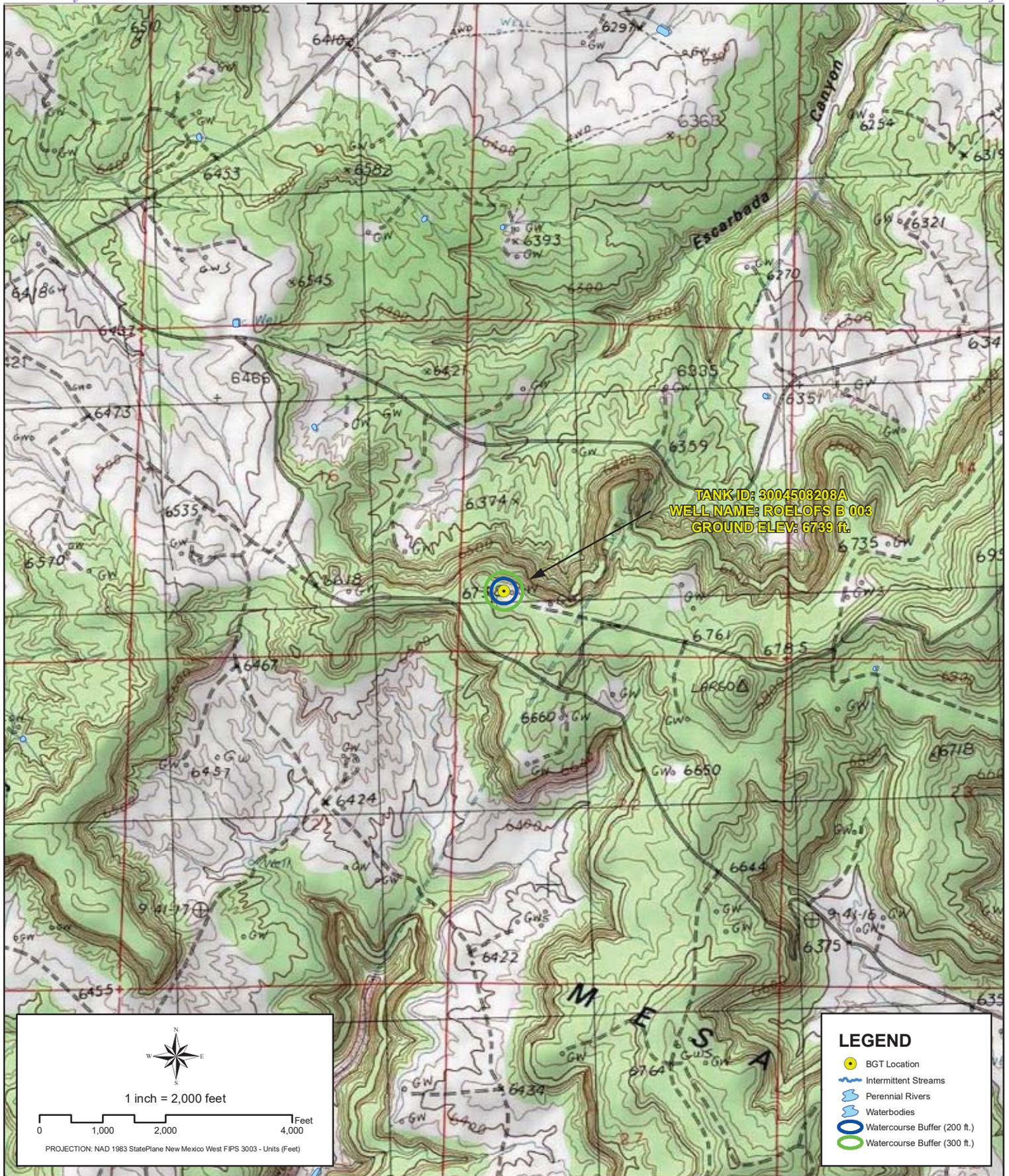
**WELL NAME: ROELOFS B 003**

API NUMBER: 3004508208 TANK ID: 3004508208A

SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23

FIGURE

1



Creation Date: 5/3/2010

Created by: EBB

File Path: X:\BP\PASS\Sector\_7\Sector\_7\AIMXD\3004508208A.mxd

Reviewed by: AGH



# PROXIMITY TO WATERCOURSES

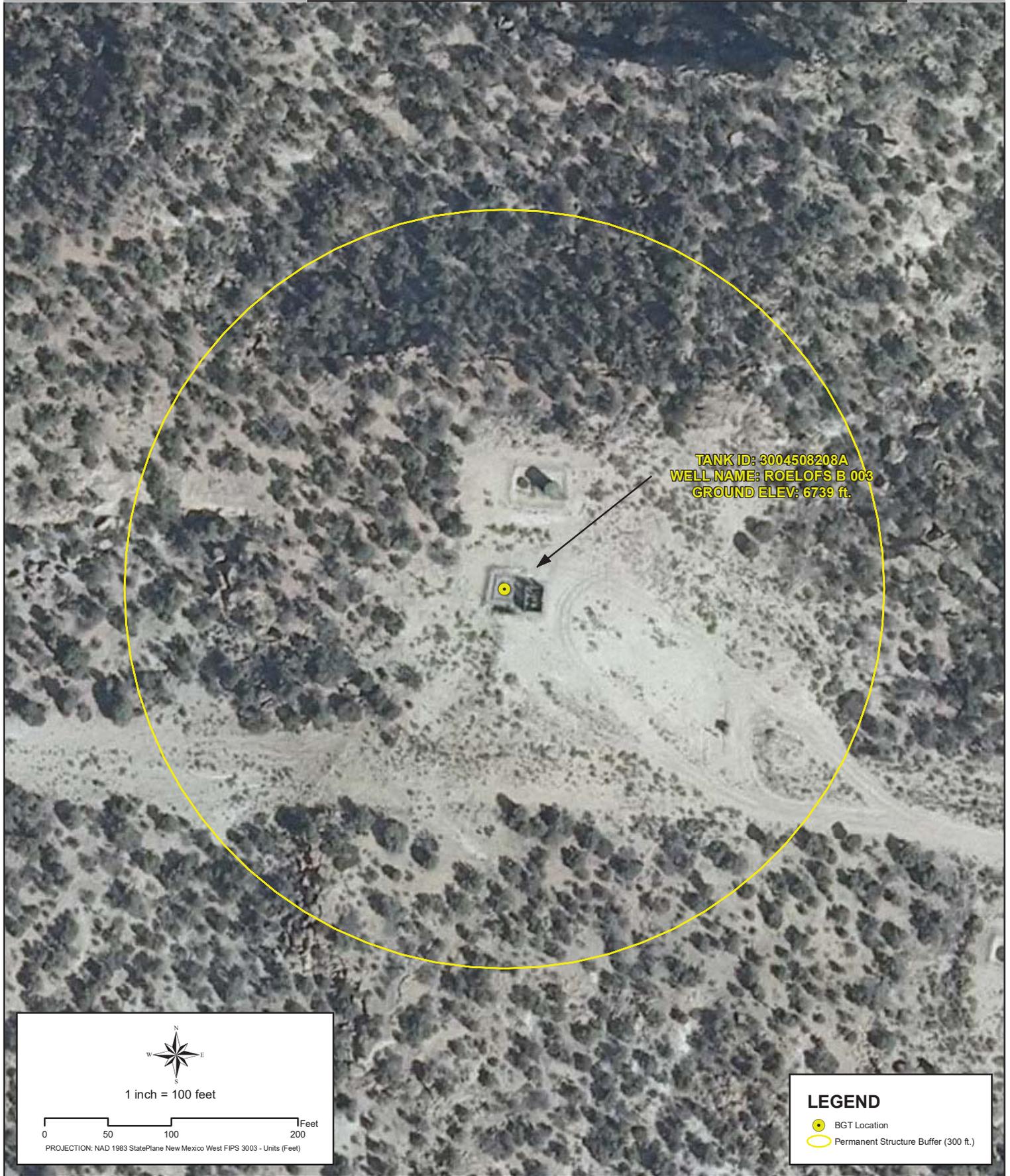
WELL NAME: ROELOFS B 003

API NUMBER: 3004508208 TANK ID: 3004508208A

SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23

## FIGURE

# 2



Creation Date: 5/3/2010

Created by: EBB

File Path: X:\BP\PASS\Sector\_7\Sector\_7\AIMXD\3004508208A.mxd

Reviewed by: AGH



# PROXIMITY TO PERMANENT STRUCTURE

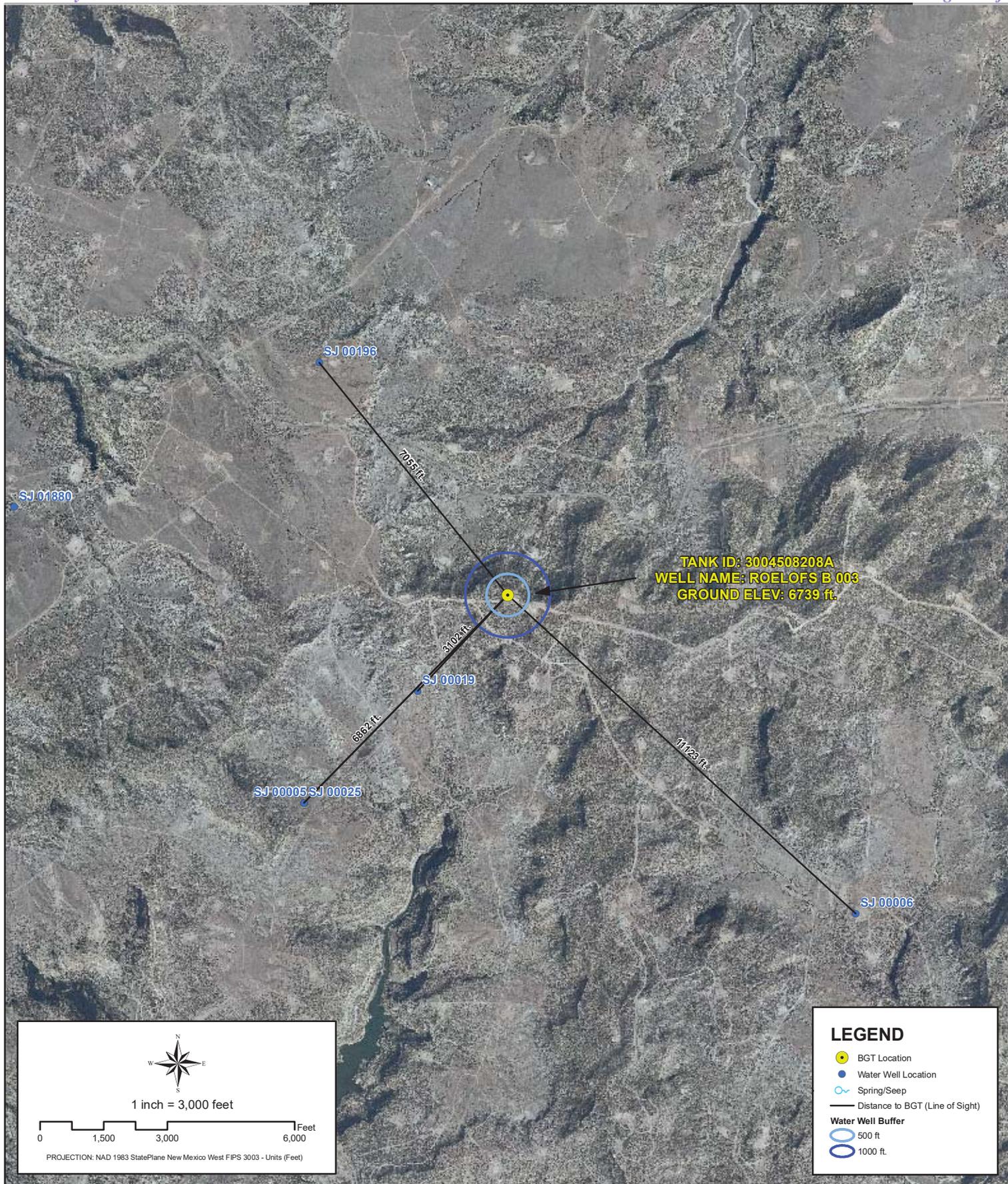
**WELL NAME: ROELOFS B 003**

API NUMBER: 3004508208 TANK ID: 3004508208A

SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23

## FIGURE

# 3



# PROXIMITY TO WATER WELLS

**WELL NAME: ROELOFS B 003**

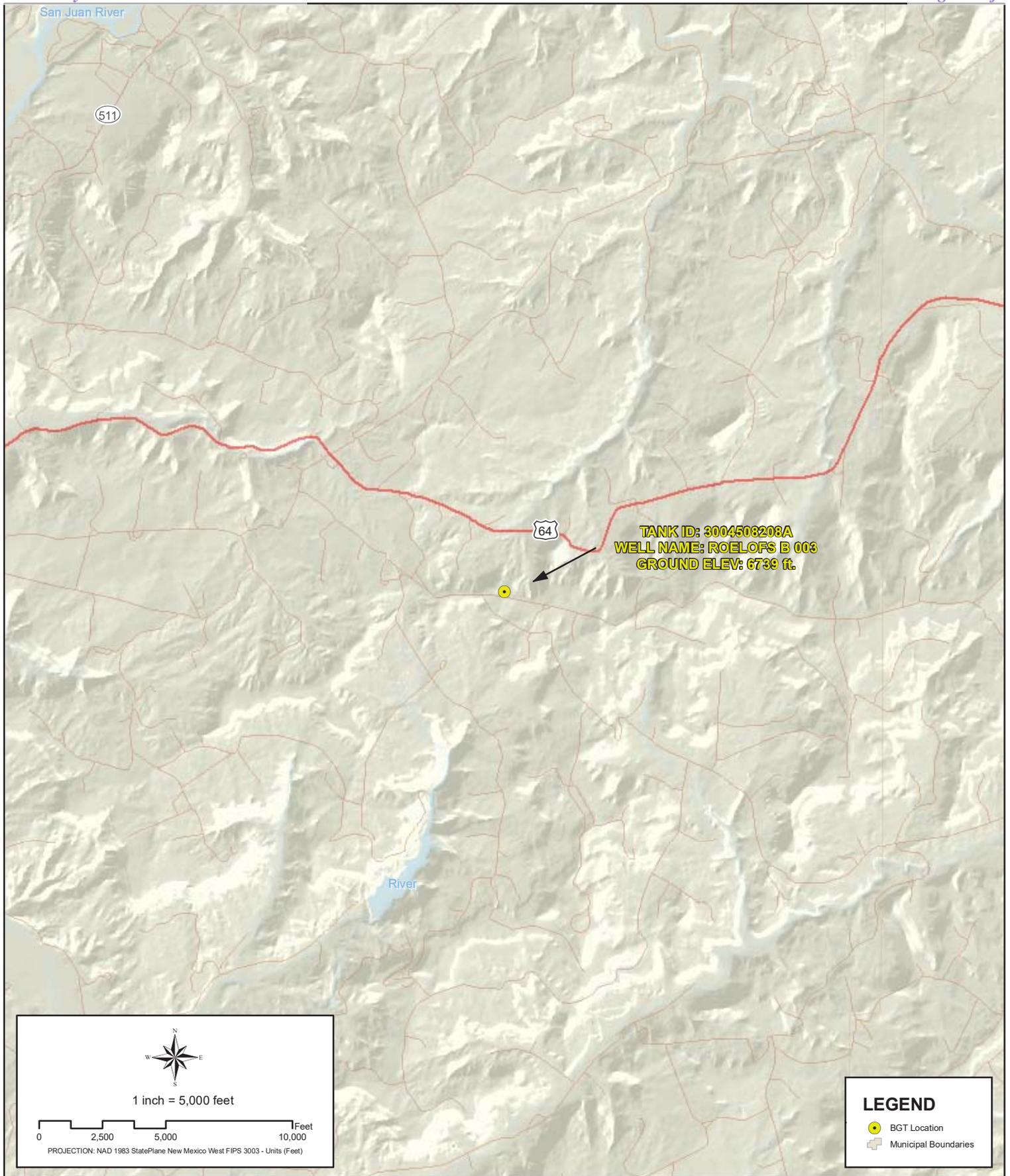
API NUMBER: 3004508208 TANK ID: 3004508208A

SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23

## FIGURE

# 4





Creation Date: 5/3/2010

Created by: EBB

File Path: X:\BP\PASS\Sector 7\Sector 7A\MXDs\3004508208A.mxd

Reviewed by: AGH



# PROXIMITY TO MUNICIPAL BOUNDARY

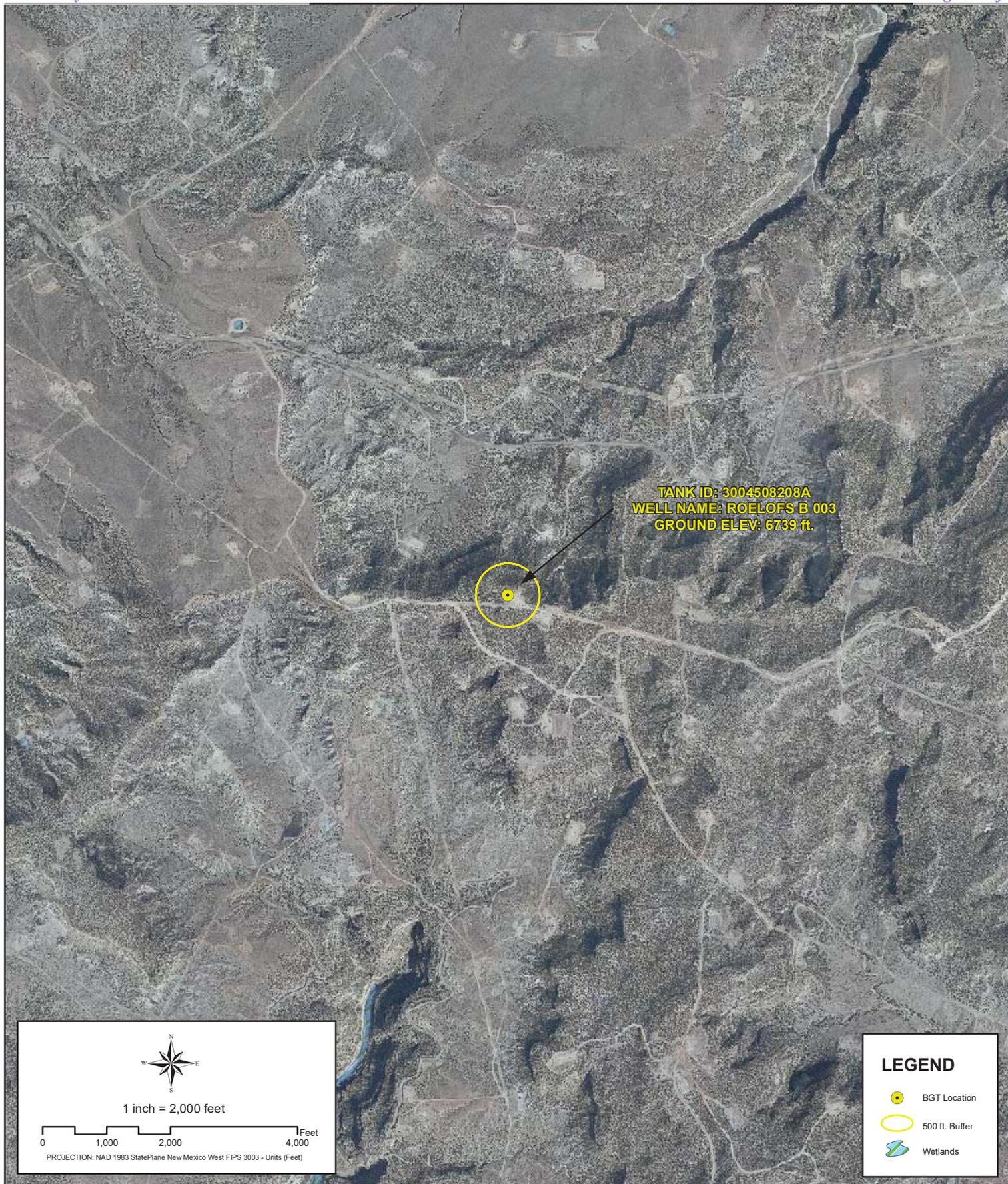
**WELL NAME: ROELOFS B 003**

API NUMBER: 3004508208 TANK ID: 3004508208A

SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23

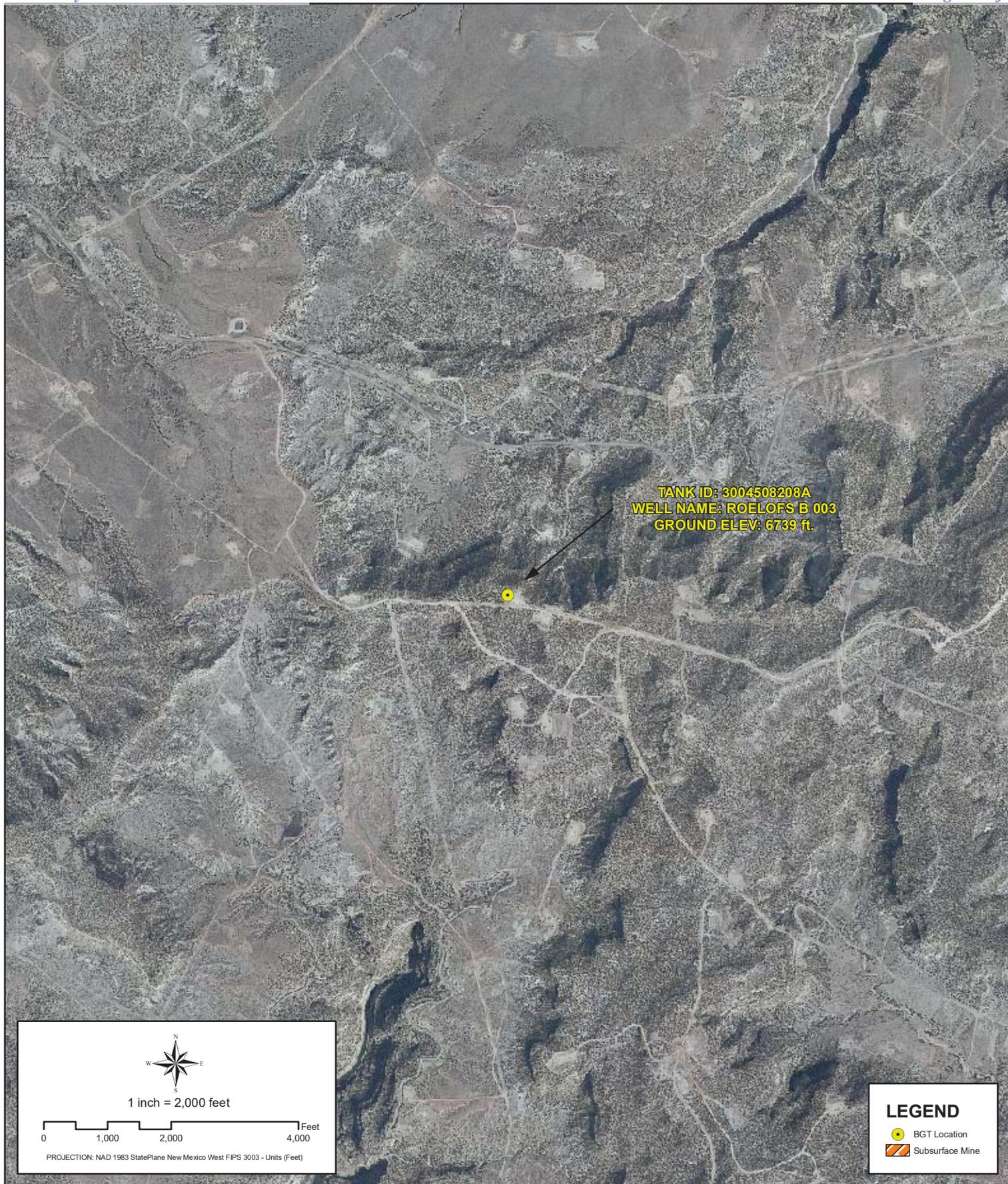
FIGURE

5



**PROXIMITY TO WETLANDS**  
**WELL NAME: ROELOFS B 003**  
 API NUMBER: 3004508208 TANK ID: 3004508208A  
 SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23

**FIGURE**  
**6**



TANK ID: 3004508208A  
 WELL NAME: ROELOFS B 003  
 GROUND ELEV: 6739 ft.

1 inch = 2,000 feet

PROJECTION: NAD 1983 StatePlane New Mexico West FIPS 3003 - Units (Feet)

**LEGEND**

- BGT Location
- Subsurface Mine

Creation Date: 5/3/2010 Created by: EBB  
 File Path: X:\BP\PASS\Sector\_7\Sector\_7\AMXD\3004508208A.mxd Reviewed by: AGH

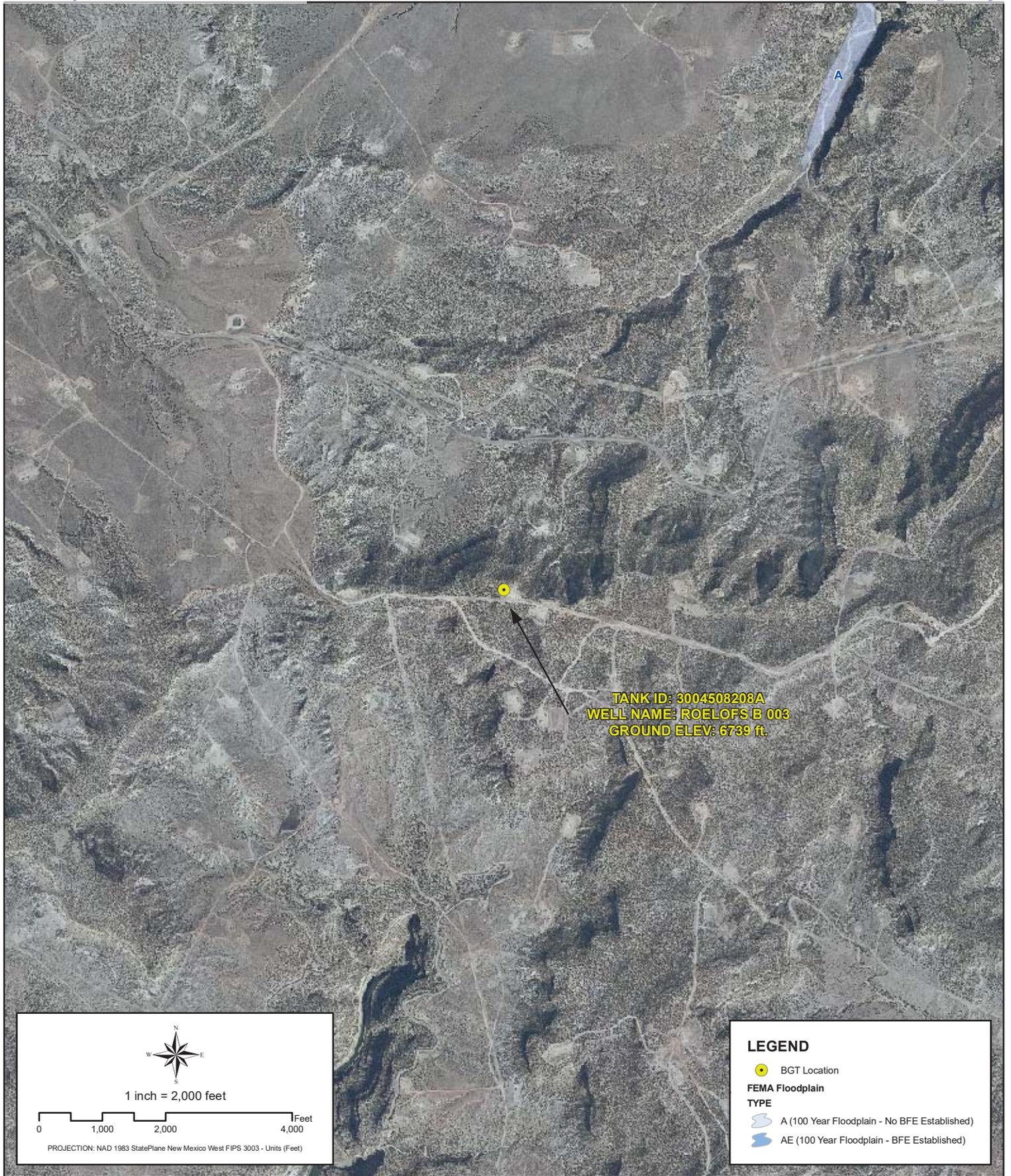


# PROXIMITY TO SUBSURFACE MINES

**WELL NAME: ROELOFS B 003**

API NUMBER: 3004508208 TANK ID: 3004508208A  
 SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M.NM23

FIGURE  
**7**



File Path: X:\BP\PASS\Sector\_7\Sector\_7\AIMXD\3004508208A.mxd



# PROXIMITY TO FLOODPLAIN

**WELL NAME: ROELOFS B 003**

API NUMBER: 3004508208 TANK ID: 3004508208A

**SECTION 15, TOWNSHIP 29.0N, RANGE 08W, P.M. NM23**

## FIGURE

# 8

## SOUTHERN SAN JUAN BASIN (SSJB)

### Figure Citation List

March 2010

#### **Figure 1: Groundwater Less Than 50 ft.**

##### **Layers:**

**Water Wells:** **iWaters Database: NMOSE/ISC (Dec. 2009)**

New Mexico Office of the State Engineer (OSE) /ISC iWaters database. (Data updated: 12/2009. Data received: 03/09/2010). Data available from:  
[http://www.ose.state.nm.us/waters\\_db\\_index.html](http://www.ose.state.nm.us/waters_db_index.html).

**Cathodic Wells:** **Tierra Corrosion Control, Inc. (Aug. 2008)**

Tierra Corrosion Control, Inc. 1700 Schofield Ln. Farmington, NM 87401. Driller's Data Log. (Data collected: All data are associated with cathodic protection wells installed at BP facilities between 2008-2009. Data received: 05/06/2010).

**Hydrogeological Evaluation:** **Wright Water Engineers, Inc. (2008)**

Evaluation completed by Wright Water Engineers, Inc. Durango Office. Data created using digital statewide geology at 1:500,000 from USGS in combination with 10m Digital Elevation Model (DEM) from NRCS. (Data compiled: 2008.)

Results: Spatial Polygons representing "Groundwater likely to be less than 50 ft." and "Groundwater suspected to be less than 50 ft."

**Surficial Geology:** **USGS (1963/1987)**

Data digitized and rectified by Geospatial Consultants. (Data digitized: 03/23/2010). Original hard copy maps sourced from United States Geological Survey (USGS). Data available from:  
<http://pubs.er.usgs.gov/>.

*Geology, Structure and Uranium Deposits of the Shiprock Quadrangle, New Mexico and Arizona.* 1:250,000. I - 345. Compiled by Robert B. O'Sullivan and Helen M. Beikman. 1963.

*Geologic Map of the Aztec 1 x 2 Quadrangle, Northwestern New Mexico and Southern Colorado.* 1:250,000. I - 1730. Compiled by Kim Manley, Glenn R. Scott, and Reinhard A. Wobus. 1987.

**Aerial Imagery:** **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:  
 NAD\_1983\_StatePlane\_New\_Mexico\_West\_FIPS\_3003\_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

**Figure 2: Proximity to Watercourses****Layers:****Perennial Streams:****NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital Representation of USGS 24k Topographic map series with field updates as required. Data available from: <http://nhd.usgs.gov/>.

**Intermittent Streams:****NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital Representation of USGS 24k Topographic map series with field updates as required. Data available from: <http://nhd.usgs.gov/>.

**Water Bodies:****NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital representation of USGS 24k Topographic map series with field updates as required. Data available from: <http://nhd.usgs.gov/>.

**USGS Topographic Maps:****USGS (2007)**

USGS 24k Topographic map series. 1:24000. Maps are seamless, scanned images of USGS paper topographic maps. Data available from: <http://store.usgs.gov>.

**Figure 3: Proximity to Permanent Structure****Layers:****Aerial Imagery:****Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:  
NAD\_1983\_StatePlane\_New\_Mexico\_West\_FIPS\_3003\_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

**Figure 4: Proximity to Water Wells****Layers:**

**Water Wells:** **iWaters Database: NMOSE/ISC (Dec. 2009)**

New Mexico Office of the State Engineer (OSE) /ISC iWaters database. (Data updated: 12/2009. Data received: 03/09/2010). Data available from: [http://www.ose.state.nm.us/waters\\_db\\_index.html](http://www.ose.state.nm.us/waters_db_index.html).

**Springs/Seeps:** **NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital representation of USGS 24k Topographic map series with field updates as required. Data available from: <http://nhd.usgs.gov/>.

**Aerial Imagery:** **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name: NAD\_1983\_StatePlane\_New\_Mexico\_West\_FIPS\_3003\_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

**Figure 5: Proximity to Municipal Boundary****Layers:**

**Municipal Boundary:** **San Juan County, New Mexico (2010)**

Data provided by San Juan County GIS Division. (Data received: 03/25/2010).

**Shaded Relief:** **NED, USGS (1999)**

National Elevation Dataset (NED). U.S. Geological Survey, EROS Data Center. (Data created: 1999. Data downloaded: April, 2010). Resolution: 10 meter (1/3 arc-second). Data available from: <http://ned.usgs.gov/>.

**StreetMap North America:** **Tele Atlas North America, Inc., ESRI (2008)**

Data derived from Tele Atlas Dynamap/Transportation North America, version 5.2. (Data updated: annually. Data series issue: 2008).

**Figure 6: Proximity to Wetlands****Layers:****Wetlands:****NWI (2010)**

National Wetlands Inventory (NWI). U.S Fish and Wildlife Service. (Data last updated: 09/25/2009. Data received: 03/21/2010). Data available from: <http://www.fws.gov/wetlands/>.

**Aerial Imagery:****Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:  
NAD\_1983\_StatePlane\_New\_Mexico\_West\_FIPS\_3003\_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

**Figure 7: Proximity to Subsurface Mine****Layers:****Subsurface Mine:****NM Mining and Minerals Division ( 2010)**

New Mexico Mining and Minerals Division. (Data received: 03/12/2010). Contact: Susan Lucas Kamat, Geologist. Provided PLSS NM locations (Sections) for the two subsurface mines located in San Juan and Rio Arriba counties.

**Aerial Imagery:****Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:  
NAD\_1983\_StatePlane\_New\_Mexico\_West\_FIPS\_3003\_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

**Figure 8: Proximity to FEMA Floodplain**

**Layers:**

**FEMA Floodplain:**

**FEMA (varying years)**

Data digitized and rectified by Wright Water Engineers, Inc. (Data digitized: August 2008).

Digitized from hard copy Flood Insurance Rate Maps (FIRMs) (varying years) of San Juan County.

**Aerial Imagery:**

**Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery.

Projected coordinate system name:

NAD\_1983\_StatePlane\_New\_Mexico\_West\_FIPS\_3003\_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.