

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

Form C-141  
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

**Release Notification and Corrective Action**

**OPERATOR**

Initial Report  Final Report

Name of Company: BP	Contact: Steve Moskal
Address: 200 Energy Court, Farmington, NM 87401	Telephone No.: 505-326-9497
Facility Name: Gallegos Canyon Unit 199E	Facility Type: Natural gas well
Surface Owner: Private	Mineral Owner: Federal
API No. 3004524174	

**LOCATION OF RELEASE**

Unit Letter K	Section 34	Township 29N	Range 12W	Feet from the 1,560	North/South Line South	Feet from the 1,520	East/West Line West	County: San Juan <b>OIL CONS. DIV DIST. 3</b>
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Latitude 36.67990° Longitude -108.09035°

MAR 02 2017

**NATURE OF RELEASE**

Type of Release: Produced water, oil and condensate	Volume of Release: unknown	Volume Recovered: none
Source of Release: Former earthen pit and separator dump line	Date and Hour of Occurrence: unknown	Date and Hour of Discovery: February 24, 2016
Was Immediate Notice Given? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required	If YES, To Whom?	
By Whom? Steve Moskal	Date and Hour:	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.\*

Describe Cause of Problem and Remedial Action Taken.\* The site had a suspected leak associated with the dump line of the separator. During an investigation, partial delineation of contaminants determined that the release had contacted a historical impact, likely associated with an earthen pit.

Describe Area Affected and Cleanup Action Taken.\* BP proposes to employ soil shredding to remediate hydrocarbon impacted soils at the location. The areas of concern will be excavated, treated and backfilled according to the attaché remediation plan, pending approval.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD 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 NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD 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.

Signature: 	<u>OIL CONSERVATION DIVISION</u>	
Printed Name: Steve Moskal	Approved by Environmental Specialist 	
Title: Field Environmental Coordinator	Approval Date: <u>3/2/2017</u>	Expiration Date:
E-mail Address: steven.moskal@bp.com	Conditions of Approval:	Attached <input checked="" type="checkbox"/>
Date: February 28, 2017 Phone: 505-326-9497	<u>NUE 1706152357</u>	

\* Attach Additional Sheets If Necessary

Operator/Responsible Party,

The OCD has received the form C-141 you provided on 3/2/2017 regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number NF170652357 has been assigned. Please refer to this case number in all future correspondence.

It is the Division's obligation under both the Oil & Gas Act and Water Quality Act to provide for the protection of public health and the environment. Our regulations (19.15.29.11 NMAC) state the following,

*The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC. [emphasis added]*

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District III office in 30 on or before 4/2/2017. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

The goals of a characterization effort are: 1) determination of the lateral and vertical extents along with the magnitude of soil contamination. 2) determine if groundwater or surface waters have been impacted. 3) If groundwater or surface waters have been impacted, what are the extents and magnitude of that impact. 4) The characterization of any other adverse impacts that may have occurred (examples: impacts on vegetation, impacts on wildlife, air quality, loss of use of property, etc.). To meet these goals as quickly as possible, the following items must, at a minimum, be addressed in the release characterization workplan and subsequent reporting:

- Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C<sub>6</sub> thru C<sub>36</sub>), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.
- Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C<sub>6</sub> thru C<sub>36</sub>), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.
- Nominal detection limits for field and laboratory analyses must be provided.
- Composite sampling is not generally allowed.
- Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

for laboratory analysis from each borehole or test pit (highest observed contamination and deepest depth investigated). Copies of the actual laboratory results must be provided including chain of custody documentation.

- Probable depth to shallowest protectable groundwater and lateral distance to nearest surface water. If there is an estimate of groundwater depth, the information used to arrive at that estimate must be provided. If there is a reasonable assumption that the depth to protectable water is 50 feet or less, the responsible party should anticipate the need for at least one groundwater monitoring well to be installed in the area of likely maximum contamination.

- If groundwater contamination is encountered, an additional investigation workplan may be required to determine the extents of that contamination. Groundwater and/or surface water samples, if any, must be analyzed by a competent laboratory for volatile organic hydrocarbons (typically Method 8260 full list), total dissolved solids, pH, major anions and cations including chloride and sulfate, dissolved iron, and dissolved manganese. The investigation workplan must provide the groundwater sampling method(s) and sample handling protocols. To the fullest extent possible, aqueous analyses must be undertaken using nominal method detection limits. As with the soil analyses, copies of the actual laboratory results must be provided including chain of custody documentation.

- Accurately scaled and well-drafted site maps must be provided providing the location of borings, test pits, monitoring wells, potentially impacted areas, and significant surface features including roads and site infrastructure that might limit either the release characterization or remedial efforts. Field sketches may be included in subsequent reporting, but should not be considered stand-alone documentation of the site's layout. Digital photographic documentation of the location and fieldwork is recommended, especially if unusual circumstances are encountered.

**Nothing herein should be interpreted to preclude emergency response actions or to imply immediate remediation by removal cannot proceed as warranted. Nonetheless, characterization of impacts and confirmation of the effectiveness of remedial efforts must still be provided to the OCD before any release incident will be closed.**

**Jim Griswold**  
OCD Environmental Bureau Chief  
1220 South St. Francis Drive  
Santa Fe, New Mexico 87505  
505-476-3465  
jim.griswold@state.nm.us

## **BP Remediation Plan**

To: Cory Smith, Vanessa Fields (NMOCD)  
From: Steve Moskal (BP)  
CC: Jeff Blagg (Blagg Engineering)  
Date: 2/28/2017  
Re: Gallegos Canyon Unit 199# - Ex-situ Soil Remediation – Soil Shredding  
(N) S34, T29N, R12W; API #30-045-24714

Dear Mr. Smith and Ms. Fields,

The Gallegos Canyon Unit (GCU) 199E site is an active natural gas production well location within the San Juan Basin Gas Field in San Juan County, New Mexico. The site is located on private land.

### **Background**

Initial site investigation performed on February 24, 2017, determined by delineation determined a separator dump line to the below grade tank had an integrity failure. During further delineation of the impacts, BP discovered impacts likely associated with a historical earthen pit.

### **Proposed Remediation – Soil Shredding**

Based on recent success of soil shredding technologies performed on BP remediation sites, BP proposes to use this technology at the subject site. To date, BP has successfully contracted soil shredding of nearly 70,000 cubic yards of soil to meet site closure standards.

Soil shredding involves the excavation of the impacted soil which is then placed in processing equipment, such as a hammer mill or pug mill, to mechanically process and break-up the soil. The soil becomes more uniform and is aerated during the mechanical processing. The soil is then ejected from the processing equipment and a chemical oxidizer is applied, in this case, a 35% solution of hydrogen peroxide and water. The applied concentration of hydrogen peroxide typically ranges from 3-8%. The hydrogen peroxide quickly oxidizes the hydrocarbon impacts (reagents), resulting in soil, water and carbon dioxide (products). Once the soil is processed, it is stockpiled and allowed to sit for approximately 2-5 days of residence time. A composite soil sample is collected from each segregated stockpile and submitted for laboratory analysis to determine the effectiveness of the ex-situ remediation process. If the laboratory results are of acceptable levels, the soil will be used as backfill to the excavation; if results are unsatisfactory, the soil is passed through the process once more and a subsequent laboratory sample will be collected for laboratory confirmation as described before. Typically, 24-48 hours of notice is provided to the regulatory agencies for the opportunity to observe and witness the stockpile sampling.

BP proposes to perform the remediation of hydrocarbon impacts by the means of soil shredding. A conservative estimate of approximately 500 cubic yards of soil will be treated through the soil shredding process. BP proposes to treat the impacted soil and segregate windrow stockpiles broken into 100 cubic yard increments. A single, five point composite, soil sample will be collected to represent each 100 cubic yard stockpile. Once a baseline of approximately 1,000 cubic yards of soil is consistently and successfully treated, BP will propose to decrease the sampling frequency to 500 cubic yard stockpile segments. The 500 cubic yard sampling modification will be discussed with the NMOCD and BLM for approval and input prior to implementation. BP would expect to have a sampling modification approval from the agencies within 48 working hours from the time of request.

The remediation will then continue until complete and sampling will be based on the regulatory agencies approved sampling plan.

Excavation sampling will be in accordance with a typical dig and haul. The sidewalls and base of the excavation will be sampled in a frequency based on the size and progress of the excavation. Agency notification of excavation sampling will also be issued in advanced, 48 hours if possible.

BP is anticipates implementing remediation at the site beginning March 6, 2017. BP plans to shut the well in and remove necessary surface equipment.

It is understood, that if soil remediation is not successful via the soil shredding, an alternative method such as a dig and haul or soil vapor extraction will be necessary. BP will be in close communications with the agencies in the event an alternative remediation method is required.

### **Site Closure and Reporting**

The site ranking, performed by BP, anticipates a TPH closure standard of 1,000 ppm based on the following criteria; documentation is attached:

Depth to groundwater - >100' – 0 Points

Distance to watercourse - >200', <1,000' – 10 Points (Hammond Ditch)

Distance to water well or water source - >1,000' – 0 Points

Total site Ranking – 10 Points = 1,000 ppm TPH, 10 ppm benzene and 50 ppm BTEX.

Once the soil shredding process is complete, the excavated area will be fully backfilled and compacted, and surface equipment will be re-set. Final reclamation of the well pad will occur at a later date, once the natural gas production well is plugged and abandoned.

A final remediation report will be delivered to NMOCD and BLM for approval of final site closure regarding the excavation and soil shredding activities within 60 days of the end of remediation.

## **SITING AND HYDRO-GEOLOGICAL REPORT FOR GALLEGOS CANYON UNIT 199E**

### **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 an alluvial terrace south of the San Juan River and above the Hammond Main Canal and Road 5500. Topography is dominated by the main channel of the river, its floodplain and terrace deposits. Moving out from the San Juan River, eroded surfaces of the Nacimiento Formation form slopes that are capped by the resistant sandstones of the San Jose Formation.

### **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 predominant geologic formation this close to the San Juan River is Quaternary alluvium. Alluvial valley fill consists of gravel, sand, silt and clay (Stone et al., 1983). In the valleys of the San Juan River and its tributaries, the

alluvium does not exceed 100 feet in thickness. Terrace deposits consist of boulder gravel resting on benches cut into the Tertiary bedrock of the area. Numerous shallow wells produce water from valley fill for stock and domestic uses along the river and transmissivities are generally high. Much of the water in the valley fill of the San Juan River comes from drainage of irrigated lands, as well as from underlying and adjacent bedrock units.

### **References**

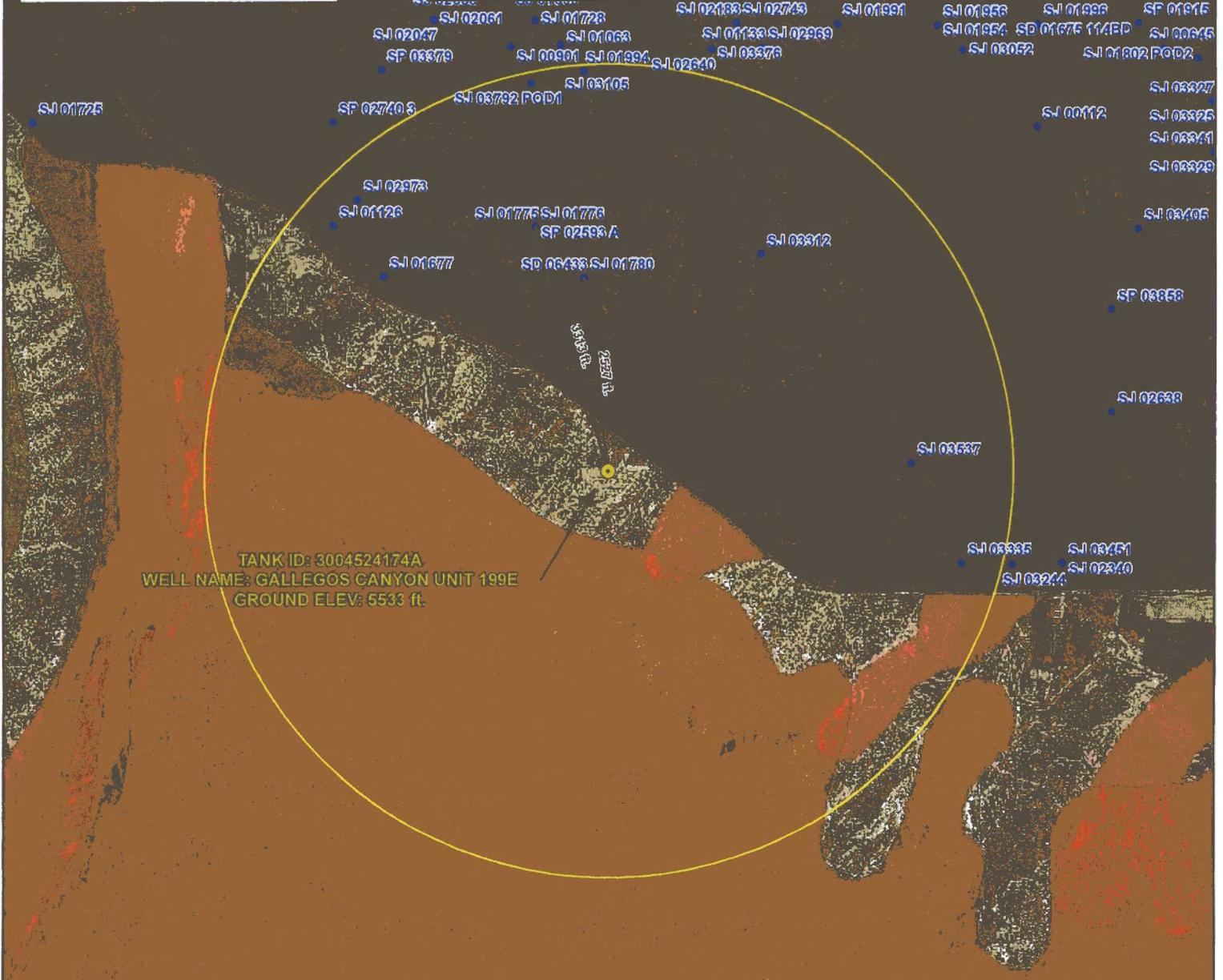
Circular 154—Guidebook to coal geology of northwest New Mexico By E. C. Beaumont, J. W. Shomaker, W. J. Stone, and others, 1976

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**

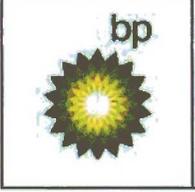
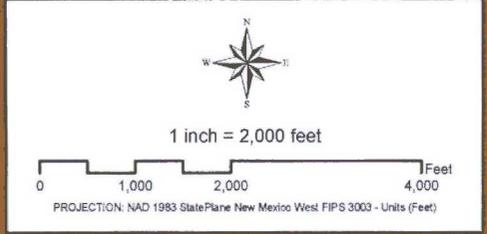
- BGT Location
- Water Well Location
- Distance to BGT (Line of Sight)
- 1 Mile Buffer
- Groundwater Evaluation (Alluvial Geology)**
- Groundwater Likely Less Than 50 Feet BGS
- Groundwater Suspected to be Less Than 50 Feet BGS

- Surficial Geology Units**
- Ka - Animas formation
  - Kch - Cliff House sandstone
  - Kf - Fruitland formation
  - Kkl - Kirtland shale, lower shale member
  - Kkm - Kirtland shale, Farmington sandstone member
  - Kku - Kirtland shale, upper shale member
  - Kl - Lewis shale
  - Kmf - Menefee formation
  - Koa - Ojo Alamo sandstone
  - Kpc - Pictured Cliffs sandstone
  - Kpl - Point Lookout sandstone
  - Lake
  - Qa - Alluvium
  - Qal - Alluvium
  - Qap - Pediment gravel
  - Qat - Terrace gravel
  - Qes - Eolian sand
  - Qg - Terrace gravel
  - Qgs - Gravelly sand
  - Qsw - Sheetwash alluvium
  - Tbg - Bridgetimber Gravel
  - Ti - Intrusive rocks
  - Tn - Nacimiento formation
  - Tsc - Cuba Mesa Member
  - Tsj - San Jose Formation
  - Tsr - Regina Member



TANK ID: 3004524174A  
 WELL NAME: GALLEGOS CANYON UNIT 199E  
 GROUND ELEV: 5533 ft.

POD Number	Well Depth	Water Depth	Elevation
SD 06433	0	0	5345
SJ 01780	0	0	5345
SJ 01775	15	0	5339
SJ 01776	0	0	5339
SP 02593 A	0	0	5339

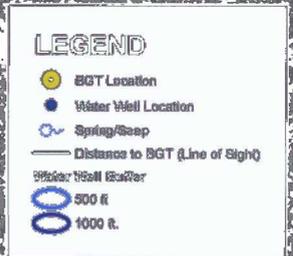
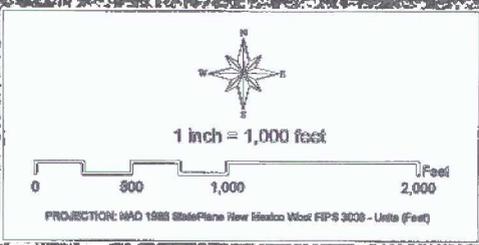
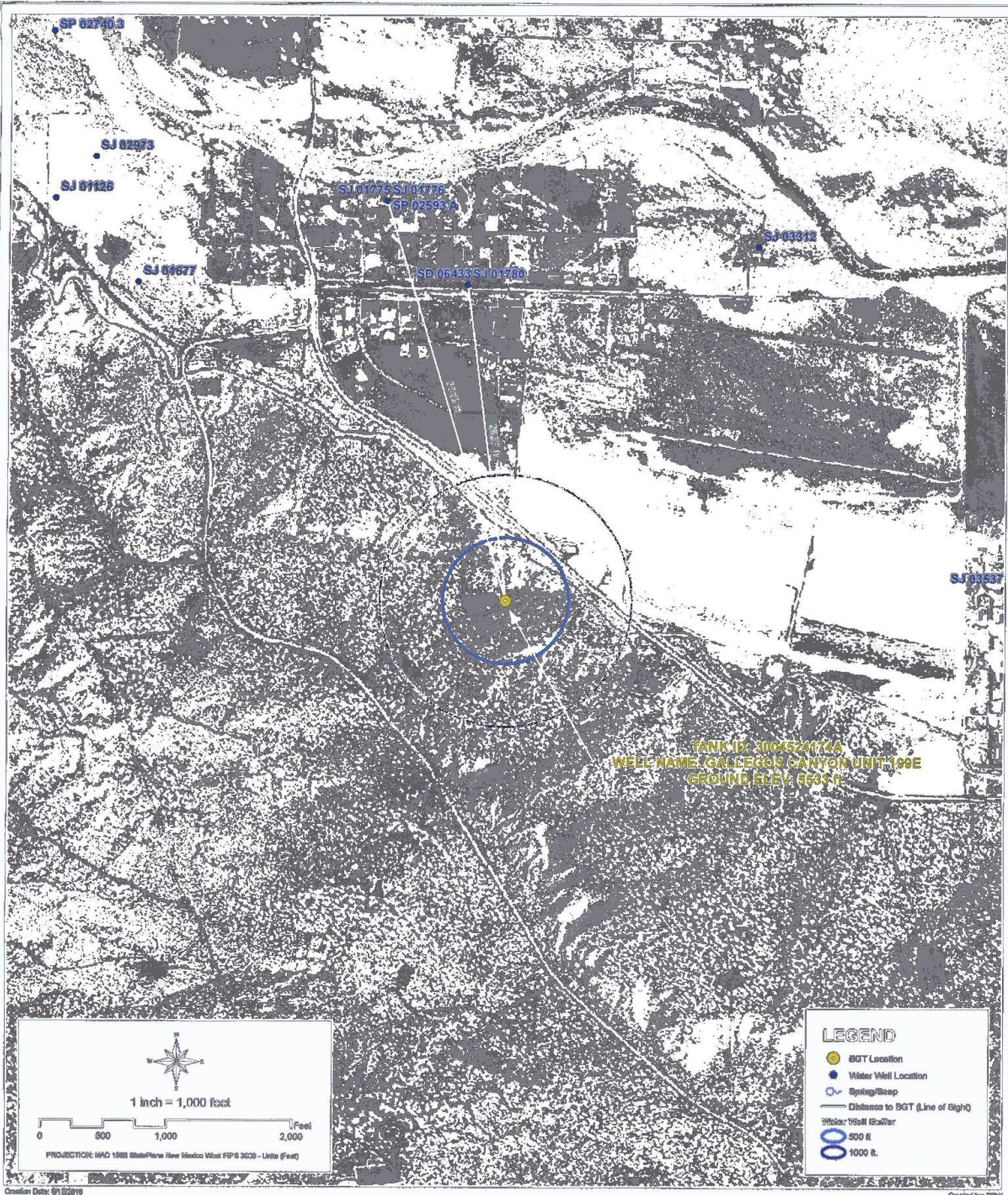


**GROUNDWATER LESS THAN 50 FT.**  
**WELL NAME: GALLEGOS CANYON UNIT 199E**  
 API NUMBER: 3004524174 TANK ID: 3004524174A  
 SECTION 34, TOWNSHIP 29.0N, RANGE 12W, P.M. NM23

**FIGURE**  
**1**







Creation Date: 9/18/2016  
File Path: J:\BPLTE\_Inspection\WAG\Basin\_3004524174A\3004524174A.mxd

Created by: PFW  
Reviewed by: AGH



**PROXIMITY TO WATER WELLS**  
**WELL NAME: GALLEGOS CANYON UNIT 199E**  
**API NUMBER: 3004524174 TANK ID: 3004524174A**  
**SECTION 34, TOWNSHIP 29.0N, RANGE 12W, P.M. NM23**

**FIGURE**  
**4**