AP - 113

STAGE 1 & 2 WORKPLANS

11/05/2012

STAGE 2 ABATEMENT PLAN

HOLLY ENERGY PARTNERS
HOBBS SOUTH GSA
SE1/4 of the SW1/4 of SECTION 15, T19S; R38E
LEA COUNTY, NEW MEXICO

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TABLE OF CONTENTS

LIST OF FIGURES
(Following Text)

LIST OF TABLES
(Following Text)

LIST OF APPENDICES

1.0 INTRODUCTION

This Stage 2 Abatement Plan is submitted on behalf of Holly Energy Partners (HEP) for the Hobbs South GSA pipeline leak (Site) located in Lea County, New Mexico (Figure 1). On March 27, 2002 a leak was reported by Plains personnel from the 8-inch pipeline owned by Navajo Refining Company. There is no record of the leak being reported to New Mexico Oil Conservation Division (NMOCD), but it is believed that Plains provided the notification as the discoverer and property owner. An interim C-141 form was completed by HEP for this report and is included in Appendix A.

This Stage 2 Abatement Plan proposes to remove the crude oil from groundwater and to assess recovery methods and recharge of the crude for use in evaluating site conditions. In addition, groundwater monitoring will be conducted using existing monitoring wells.

This plan is being required pursuant to NMOCD Rule 19.E.1 and NMOCD Rule 19.E.3. The Stage 2 Abatement Plan presented herein complies with the requirements of these rules and incorporates work previously performed at the Site since detection of the crude oil release described below.

1.1 DESCRIPTION OF THE SITE

The Site is located approximately 3 miles south of Hobbs, NM in an area where several crude oil storage facilities are clustered. The Site is located in the SE ¼ of the SW ¼ of Section 15, Township 19 South, Range 38 East in Lea County, New Mexico (32.654949°North, 103.137432° West). The topography at the Site is relatively flat and the average elevation is approximately 3,598 feet-mean sea level (Figure 2). The Site is located on Plains Pipeline property at 214 County Road 61, Hobbs, NM. The surrounding land contains crude oil storage tanks, rural residences and open range land (Figure 1).

1.2 SITE HISTORY AND NATURE OF THE RELEASE

On March 27, 2002 a leak was discovered in an 8-inch pipeline operated by Navajo Refining Company. An unknown volume of crude oil was released to subsurface soils. The leak was discovered when the pipeline was exposed for trenching for an electrical line. The soil in the excavation trench was saturated with crude oil. The pipeline was shut down and a 150 foot section of the pipeline was replaced in the area. This pipeline has remained inactive since this leak was discovered in 2002.

In 2002, the impacted soil was removed from an area encompassing 112 feet by 5 feet by 3 feet; soils which overlay the area of the pipeline repair. The excavation was

expanded in this area and additional petroleum stained soil was removed from an area encompassing approximately 25 feet by 14 feet by 14 feet deep.

In January 2003, an additional excavation to remove impacted soil was completed in the area east of the pipeline. Soil could not be removed to the west due the presence of a Plains pipeline and pipeline valves and manifolds. Approximately 4,033 cubic yards were removed at the Site and stockpiled on site or used as road base. The results of the soil analyses of the removed soil indicated that no BTEX or GRO concentrations were detected, but DRO was detected in the range from 133 to 594 mg/Kg (Appendix B-1).

1.3 SUMMARY OF PREVIOUS INVESTIGATIONS

All of the available data collected prior to 2012 is contained in Appendix B. Four groundwater monitoring wells (MW-1, MW-2, MW-3 and MW-4) and 13 boreholes (BH-1 to BH-13) were used to characterize the Site in late 2002 and early 2003 (Figure 3). The closest monitoring well to the leak area (MW-4) is approximately200 feet to the west and down-gradient of the historical leak. The remaining two down-gradient wells are greater than 200 feet east of the historical leak. The initial boreholes were located in the area of the leak and approximately 150 feet east of the leak.

There is no documentation available as to when approximately 50 additional boreholes, which were converted to temporary fluid measurement 2-inch wells, were installed at the Site (Figure 3). In addition, there is no documentation available when the 15 4-inch wells were installed at the Site and there is no available information pertaining to the construction of any of these wells. Total fluid pumps were used in the boreholes and as of May 2008, approximately 879 barrels (bbls) of crude oil had been recovered at the Site. Crude oil recovery efforts continued at the Site until 2012 with the amount recovered reported as 1,061.4 bbls.

The analytical results of soil obtained from the excavations and soil borings indicated that the soil was impacted in the area of the leak to the depth of groundwater, and approximately 150 feet east of the excavation area (Appendix B-1). The impacts above the state standards were detected to 50 ft-bgs, the depth of groundwater (Appendix B-1).

The maximum thickness of the oil accumulation on top of groundwater was measured at 6 feet. The dissolved phase hydrocarbon concentrations in down-gradient groundwater monitor wells have been below the New Mexico Water Quality Control Commission (NMWQCC)standards for benzene, toluene, ethylbenzene and total xylenes (BTEX)since 2002 (Appendix B-2).

2.0 GEOLOGY AND HYDROGEOLOGY

The Geologic Map of New Mexico (2003) prepared by the New Mexico Bureau of Geology and Mineral Resources and Geology and Ground-Water Conditions in Southern Lea County, New Mexico (Ground-Water Report 6) on behalf of the USGS was reviewed in association with the evaluation of regional geology and hydrogeology for the Site.

The surficial geologic unit (Qep) mapped for the location is described as Quaternary aged "Eolian and piedmont deposits (Holocene to middle Pleistocene) – Interlayered eolian sands and piedmont slope deposits along the eastern flank of the Pecos River Valley, primarily between Carlsbad and Roswell. Typically capped by thin eolian deposits, this sediment ranges from zero to 20-feet in thickness in this portion of Lea County. The Quaternary sediment unconformably overlies the Tertiary age Ogallala Formation. The Ogallala Formation is comprised of sands, silts, indurated calcium carbonate, gravel, and some clay. Groundwater in this area is primarily produced from the Ogallala aquifer. The Ogallala Formation unconformably overlies the Triassic age Dockum group. The Dockum group consists of red shale and sandstone and is commonly referred to as "red beds". The red beds can exceed 1,000 feet in thickness in this region and may produce small amounts of water at the bottom of the formation.

The regional groundwater flow direction in the Ogallala is toward the east and south and follows the Triassic subcrop surface. Groundwater quality is very good with total dissolved solids (TDS) concentrations typically below 1,000 mg/L. Recharge primarily occurs via infiltration from precipitation events.

2.1 SITE GEOLOGY AND HYDROGEOLOGY

The surface soils encountered at the Site include fill, and a mix of caliche, silt, and fine sand to approximately 17 ft-bgs. This surface soil is consistent with the surface soil description (Quaternary sediment) for this physiographic province. The soil types encountered below the surface layer at the Site include indurated (hardened) calcium carbonate intervals of variable thickness locally referred to as "caliche", fine-grained sand, silt, sandstone with caliche and the saturated zone consisting of fine sandstone (Appendix B-3).

Groundwater is found at the Site in fine sandstone consistent with the Ogallala aquifer. The depth to groundwater at the Site is approximately 55 ft-bgs (Appendix B-5). The groundwater flow is towards the east-southeast, and the groundwater gradient is very flat with a gradient of approximately 0.0004 feet/foot (Appendix B-4).

An evaluation of water well information obtained from the New Mexico Office of the State Engineer indicated that there are three domestic, agricultural or public water supply wells within a 1,000 foot radius of the Site and an additional 13 water wells are located within a one mile radius of the Site (Figure 5, Table 1). One well is located approximately 2800 feet down gradient from the Site; the remaining wells are located up-gradient of the Site (Figure 5).No water wells in close proximity to the Site are known to have been impacted by the leak. These wells were sampled in December 2002 (Appendix B-2).

2.2 CURRENT SITE CONDITIONS

Petroleum-stained soil in an area of approximately 112 feet by 5 feet by 3 feet and 25 feet by 14 feet by 14 feet was excavated in the area of the pipeline leak in 2002. An additional excavation in January 2003 measured approximately 11 ft. deep, 10 to 12 ft. wide at the bottom, and 220 ft. long (including ramps) and removed approximately 2,040 cubic yards. The pipeline is currently not in use. Based on the available data additional impacts may remain in the vadose zone soil below 17 ft-bgs to the top of groundwater in the area near the leak.

Presently, there are four groundwater monitoring wells, 54 2-inch fluid measuring wells, and 15 fluid recovery 4-inch wells remaining at the Site. The recovery of the crude oil on groundwater was initiated in 2003 and continued to 2012. As of December 2011, approximately 1,061.4 bbls of crude oil have been recovered at the Site. As measured in August 2012, the maximum crude oil thickness is approximately 6 feet in the area near the leak (Figure 3).

Crude oil has not been measured in any of the peripheral monitoring wells (Appendix B-5), nor have BTEX constituents above NMWQCC standards been detected in any of the Site monitoring wells since 2002. Current site conditions are shown in photographs contained in Appendix C.

2.3 WELL EVALUATIONS

All temporary and monitoring wells were evaluated in August 2012. An evaluation of all of the monitoring and borehole wells located at the Site included validation of all well locations, measurement of the fluid levels and the total well depths. This evaluation is included in Appendix D.

Fluid levels were measured in 69 temporary, monitoring and recovery wells and four monitoring wells. Crude oil was measured in 32 of the temporary and recovery wells (Figure 3). None of the four groundwater monitoring wells have either free-phase or dissolved hydrocarbon contamination (Appendix D).

The evaluation of the existing borehole wells indicated that many of the wells were outside of the impacted area, or were dry and would not be useful for the Stage 2 abatement activities. Approximately 35 of the existing wells are proposed to be abandoned, primarily due to the minimal groundwater saturation in these wells or they are unnecessary to monitor the Site.

Well abandonment will be completed per State guidelines (NMAC19.27.4.30). To plug a well, the entire well will be filled from the bottom upwards to land surface using a tremie pipe. The well will be plugged with neat cement slurry, a bentonite based plugging material, or other sealing material approved by the state engineer for use in the plugging of non-artesian wells.

2.4 SITE CONCEPTUAL MODEL

The Site was impacted by a leak in a pipeline by crude oil. The crude oil on groundwater has remained in the same location since 2002 and currently has a maximum thickness of 6 feet. The crude oil is predominantly found in the area of the leak (Figure 3). The primary chemicals of concern are hydrocarbon constituents that originated from the crude oil.

Hydrocarbon impacts at the Site appear to be limited to soil and groundwater within 150 feet of the location of the leak. Petroleum impacted soil remains in this area below 17 ft-bgs to the top of groundwater at approximately 55 ft-bgs. The impacts to groundwater appear to be limited to this area with the crude remaining on groundwater (Figure 3). Dissolved phase hydrocarbons have not impacted the groundwater monitoring wells or drinking water wells located in the area down-gradient from the release or near the residences located in this area.

The Site is located in area of multiple crude oil storage tanks and is about 3 miles south of Hobbs, NM. The closest residences are located approximately 625 feet from the area and the closet drinking water well is located within 1,000 feet of the leak (Figure 5). The well is used for drinking water supply for the nearby residences and has not been impacted by the leak, as determined by analytical testing of these wells and the groundwater monitoring wells which are situated as sentinels for these supply wells.

There appears to be no immediate threat to the environment or to drinking water wells located in the area caused by the release and any remaining impacts. The crude oil and associated impacts have remained in the area of the leak since 2002. This type of crude oil has a very low mobility and does not readily desorb nor dissolve and therefore, any remaining impacts are only in the immediate area of the release.

The low mobility rate may be attributed to the high percentage of paraffin in the crude oil which is characteristic of this type of crude oil found in the eastern New Mexico

Permian Basin area. The crude oil thickness has been measured at the Site since 2002 and has not migrated from the area, suggesting that most of the soil impacts have been generally mitigated and the released crude oil has a low mobility rate and is not readily dissolved in groundwater.

The removal of the crude oil by the current method, which is a manually-operated total fluid pumping method that recovers minimal amounts of product and predominantly water, is not effective because the groundwater table is not being depressed in the area so that that the crude oil can be removed more effectively from groundwater.

The lowering of groundwater table in the area of the crude oil would allow for more of the crude oil to be removed efficiently under a depressed water table, however, the current groundwater regulations for Lea County, New Mexico do not allow for the removal of any groundwater if the TDS in groundwater is less than 10,000 mg/L. The TDS at his site is less than 2,000 mg/L.

The remedial strategy for site closure is based on the current NMOCD requirements. To close the Site with no further action, the crude oil would have to be removed separately from groundwater (19.15.17.13 NMAC). Once the phase-separated hydrocarbons (crude oil) have been removed to a *de minimis* thickness, remedial actions would then focus on the low-level dissolved phase concentrations. Based on existing conditions, it is likely that monitoring of the dissolved phase hydrocarbons and natural attenuation parameters, the state standards could be met as a site closure strategy.

The proposed remedial technology for the Site uses a crude oil only skimming system that does not depress the groundwater table to remove the crude oil. This system is designed to shut down automatically when water is encountered in the pump and can be restarted remotely without visiting the Site.

3.0 CHARACTERIZATION, MONITORING AND PRODUCT RECOVERY PLAN

3.1 DOCUMENTATION

All information collected will be documented in such a manner that it can be easily transferred and interpreted by those not familiar with the field activities being conducted for the investigation. In accordance with this goal, bound field logbooks will be maintained throughout the project. Each page will be legible when copied and written using an indelible-ink pen for all records. The pages in the logbook will be dated, numbered and initialed by the recorder. All field data such as monitoring well number, depth to water and product, total well depth, and any other qualitative observations will be documented in the field log book. In addition to the field data, general information will also be recorded, such as equipment used, daily weather conditions, personnel onsite, site safety and any anomalies that may have occurred during field activities.

3.2 SUBSURFACE SOIL SAMPLING

The extent of the impacts has not been adequately documented to assess the extent of vadose soil impacts. In the area of the leak, eight soil borings will be advanced to confirm the extent of the subsurface soil impacts in the leak area using an air rotary drill rig. The soil borings will used to define the horizontal and vertical extent of impacts to the top of groundwater or to approximately 55 ft-bgs. Figure 4 shows the expected locations of the soil borings.

Soil cuttings will be observed and collected continuously. A soil sample will be selected by the Site geologist and analyzed for BTEX compounds, TPH-GRO and TPH-DRO, if head space analysis, visual staining and volatile odors are observed in the cuttings. A photo-ionization detector (PID) will be used to monitor the cuttings and head space analysis. At a minimum, the soil sample with either the highest head space concentration per boring and at the total depth of the boring will be submitted for laboratory analysis for a total of two samples per boring.

For head space analysis, a portion of the soil sample interval will be placed into a clean Ziploc bag, allowed to warm for 30 minutes and then screened using the PID. The cuttings will be collected and temporarily stockpiled on plastic. The cuttings may be separated on-site into impacted and non-impacted soil, based on visual observation and head space analysis for waste management. The impacted cuttings will be sampled for BTEX, total petroleum hydrocarbons (TPH) and RCRA metals analyses at the conclusion of drilling activities. If the results indicate the waste is above state standards, the waste will be handled and disposed of properly at an offsite disposal facility.

3.3 GROUNDWATER CHARATERIZATION

Two wells will be installed to remove the crude oil impacts from the area of the leak (Figure 4). The wells will be constructed using 4-inch PVC and installed with 15 feet of 20-slot (0.020 inches) screen so that 5 feet of the screen is above the static fluid level and 10 feet is below the static fluid level (Figure 7).

The wells will be installed according to New Mexico Office of the State Engineer rules (19.27.4 NMAC) using an air rotary drill rig. The boring diameter is expected to be 8¼ inches and the total depth of the well will be approximately 10 feet below the top of the fluid, approximately 50 to 60 ft-bgs. Total depths of the wells may vary based on observations of subsurface conditions and the fluid level of the product, as determined by the on-site geologist. The well borings will be logged by the on-site geologist based on the cuttings.

Figure 7 depicts a typical well construction that will be used for the Site wells. The wells will be constructed with 4-inch diameter schedule 40 PVC casing and screen, consisting of 15 feet of 20-slot (0.020 inch) screen. In addition, a 1-inch piezometer will be installed alongside the 4-inch well and constructed the same as the 4-inch well (Figure 7). This piezometer will be used to measure fluid levels so that the pumps will not have to be removed for fluid level measurement. A 10/20 sand filter pack will be placed in the boring from the bottom of the well boring to approximately 2 feet above the well screens. A bentonite seal will be placed from the top of the sand pack to approximately 5 feet above the sand pack. The bentonite will be hydrated with potable water to create a seal. A grout seal will be placed from the top of the bentonite seal to 3 ft-bgs. A 3-foot manhole cover will be placed on each well and cemented in place.

If soil staining is observed or if volatiles are detected with the photo-ionization detector (PID) in the cuttings, a sample will be collected and analyzed for BTEX compounds. The cuttings will be collected and temporarily stockpiled on plastic. The cuttings may be separated on-site into impacted and non-impacted soil, based on visual observation and head space analysis for waste management. The impacted cuttings will be sampled for BTEX, total petroleum hydrocarbons (TPH) and RCRA metals analyses at the conclusion of drilling activities. If the results indicate the waste is above state standards, the waste will be handled and disposed of properly at an offsite disposal facility.

The final well locations are based on historical crude oil thickness data, utility clearances and will be determined by the Site geologist. Prior to drilling, private and public utilities will be cleared and additionally, each well location will be cleared to 5 ft-bgs using a Hydrovac, if necessary. The NMOCD will be notified approximately one week prior to drilling activities, as required by 19.15.30.14.B NMAC.

If product is not measured, each well will be surged with a surge block assembly 24-hours after the bentonite seal is placed, and developed further with a bailer or pump to remove any sediment. All development water will be placed in totes and disposed of properly.

All drilling and well development equipment will be cleaned prior to initiation of drilling activities and in between all borings using a high pressure washer.

The locations of the wells and the relative elevation of the top of the PVC casing of each well will be surveyed by a licensed surveyor to an accuracy of +/- 0.01 ft. The ground surface in the area of the well will also be surveyed to +/- 0.1 ft. The wells will be plugged and abandoned according to state regulations upon completion of all groundwater monitoring activities. Total depths of the wells may vary based on observations of subsurface conditions and the fluid level of the product, as determined by the on-site geologist.

3.4 PRODUCT RECOVERY

A Small Diameter Filter Scavenger™ (SDFS) product recovery system will be installed in each of the new 4-inch recovery wells. This system will separate product from water within the recovery wells, eliminating the need for an above ground separation system. The Filter Scavenger pumps will pump the recovered product into a collection tank for recycling.

This pump is designed to remove product only off the top of groundwater. The pump utilizes a floating intake cartridge to recover hydrocarbons and will turn on and off in response to signals sent to the control module by a conductivity/density (reservoir) probe, the tank full probe, on-site control panel and remote telemetry system. A portion of the conductivity probe is located inside the pump's product reservoir to turn the pump off when water is encountered during pumping. The reservoir probe consists of a HI and LO float actuated sensors. When the reservoir fills with product and water is encountered, the float rises, trips the HI sensor and turns on the product pump. When the product level falls, the float trips the LO sensor and shuts off the pump. A water override conductivity sensor is located inside the product reservoir. Once the pump canister is filled via gravity, the magnetically coupled gear pump pressurizes the system and pumps the recovered fluid to the surface and into the tank. The floating cartridge follows the water table and consists of a float with a treated oleophilic/hydrophobic screen. The oleophilic/hydrophobic screen allows hydrocarbons to enter the pump cartridge while repelling water.

The system will be monitored on a monthly basis in the field to assess the amount of recovered crude oil, the effectiveness of the pump and equipment maintenance. Fluid levels will be measured in the newly installed wells and all other wells that contain

crude oil using an oil/water interface probe. Additionally, the fluid level will be measured in the recovery tank. The recovered crude oil will be scheduled for recycling when the tank is at 80 percent of capacity.

3.5 GROUNDWATER MONITORING

Groundwater monitoring will be conducted at the Site in June and December. Prior to groundwater sampling, fluid levels will be measured in all wells using a water level indicator or an oil/water interface probe. If crude oil is not observed in the monitoring well, dissolved oxygen will be measured using a down hole probe. Groundwater samples will only be collected from the monitoring wells that do not contain crude oil.

The wells will be purged and groundwater samples will be collected using the low flow purging technique and monitored during purging of each well for chemical stability. All purged water will be managed in accordance to state and federal requirements and temporarily placed in a plastic tote. The samples sent to the laboratory for analysis will be given the well name, date and time of the sample collection, requested analyses and the initials of the sampler. Field parameters obtained during purging will include temperature, specific conductance, pH, and oxidation reduction potential (ORP). The meter used for the field parameters will be calibrated daily when in use and the calibration will be recorded in the logbook. Groundwater samples will be placed into the appropriate laboratory provided containers following field parameter measurements. The samples will be placed in an ice-chilled cooler for transport to the laboratory under chain-of-custody procedures.

The fluid levels will be used for analysis of the product recovery system. The groundwater sampling will be used to characterize the extent of dissolved-phase hydrocarbon distribution. An annual report containing the results of the product recovery, groundwater monitoring, and any recommendations for the monitoring and recovery network will be submitted at the end of each calendar year.

3.6 ANALYTICAL PROGRAM

All groundwater and quality assurance and quality control (QA/QC) samples will be analyzed for BTEX by Method 8120B or 8260B. Soil samples will be analyzed for BTEX by Method 8120B or 8260B and TPH by Method 8015M, and if needed, for RCRA metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver) by Method 6010/6020. The laboratory reporting limits will meet state cleanup levels.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

With the report of results, evidence will be presented that the sampling and analysis is consistent with the techniques listed in Subsection B of the 20.6.3107 NMAC and with 20.6.4.13 NMAC of the NMWQCC standards. Each groundwater sampling event will include one duplicate sample, which will be analyzed for BTEX. A trip blank will be included in each cooler shipped to the laboratory and analyzed for BTEX. A temperature blank will be included with each submitted cooler and used to determine temperature at the time of submission to the laboratory. One equipment blank (pump) will be submitted for each sampling event and analyzed for BTEX.

5.0 POST CLOSURE PLAN

HEP will petition for closure of the Abatement Plan, when eight consecutive sampling events or evidence demonstrates to the satisfaction of the NMOCD that the NMWQCC standards of 20.6.4 NMAC are met. HEP will plug and abandon all wells according to the New Mexico Office of the State Engineer Rules and restore the Site.

6.0 SCHEDULE

The schedule anticipated at this time for abatement plan is as follows:

- Well installations – 30 days after Abatement Plan approval
- Completion of the pump system – 60 days after approval of Abatement Plan
- Installation of conveyance piping – 60 days after approval of Abatement Plan
- Groundwater Monitoring – June and December
- Annual Report – 30 days following the receipt of the December laboratory analytical report.

FIGURES

LAT/LONG: 32.6549° NORTH, 103.1382° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO EAST

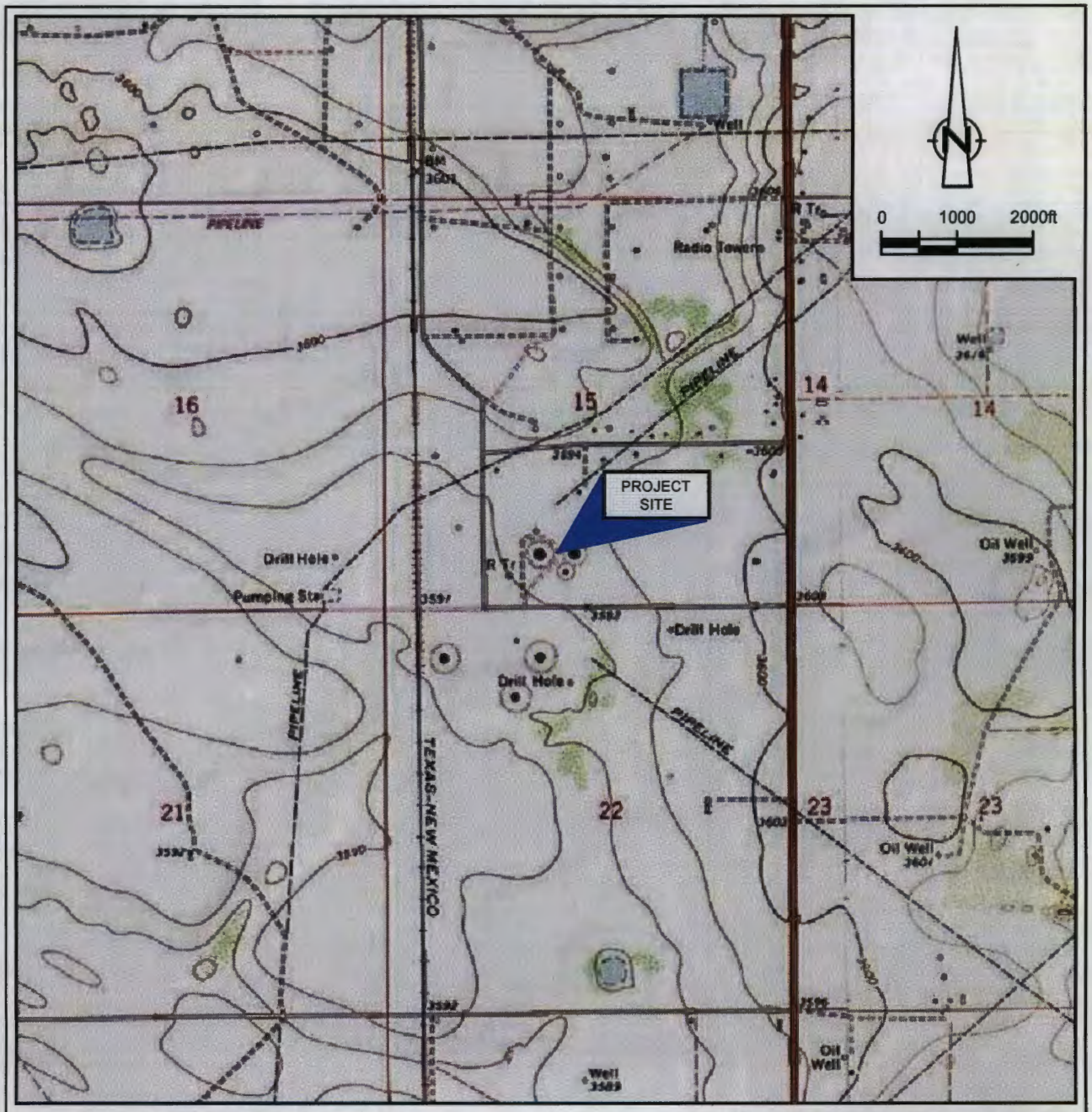
NOTE:

Topographic contours taken from USGS Topo map "Hobbs West, NM" dated 2010.

figure 1

SITE LOCATION MAP
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-98(CLIENTREF)GN-DL001 NOV 6/2012



SOURCE: USGS 7.5 MINUTE QUAD
"HOBBS WEST AND HOBBS EAST, NEW MEXICO"

LAT/LONG: 32.6549° NORTH, 103.1382° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO EAST

figure 2

SITE TOPOGRAPHIC MAP
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-01(000)GN-DL001 MAY 16/2012

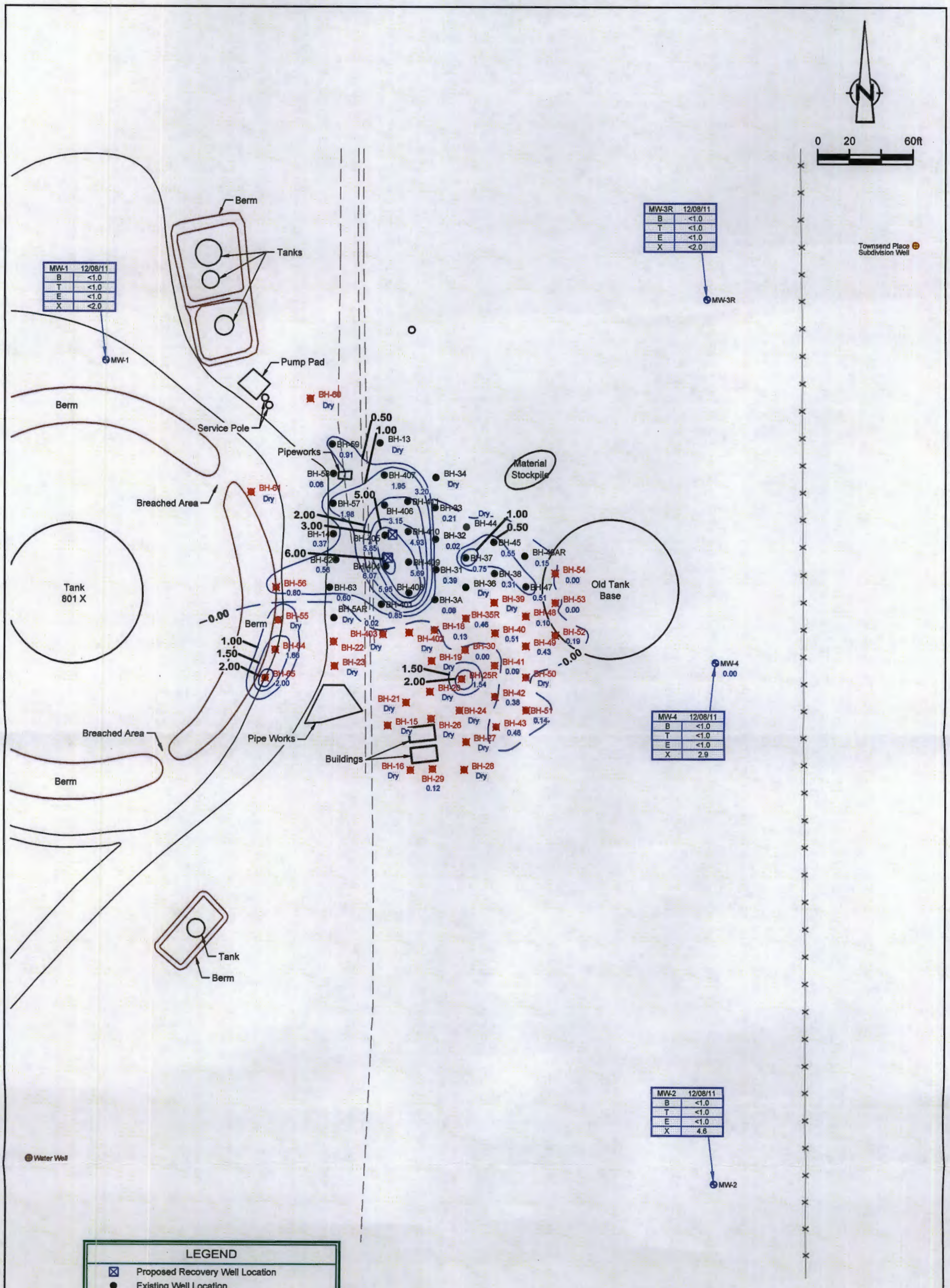


figure 3

SITE MAP AND PRODUCT THICKNESS - AUGUST 2012
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-01(000)GN-DL001 NOV 6/2012

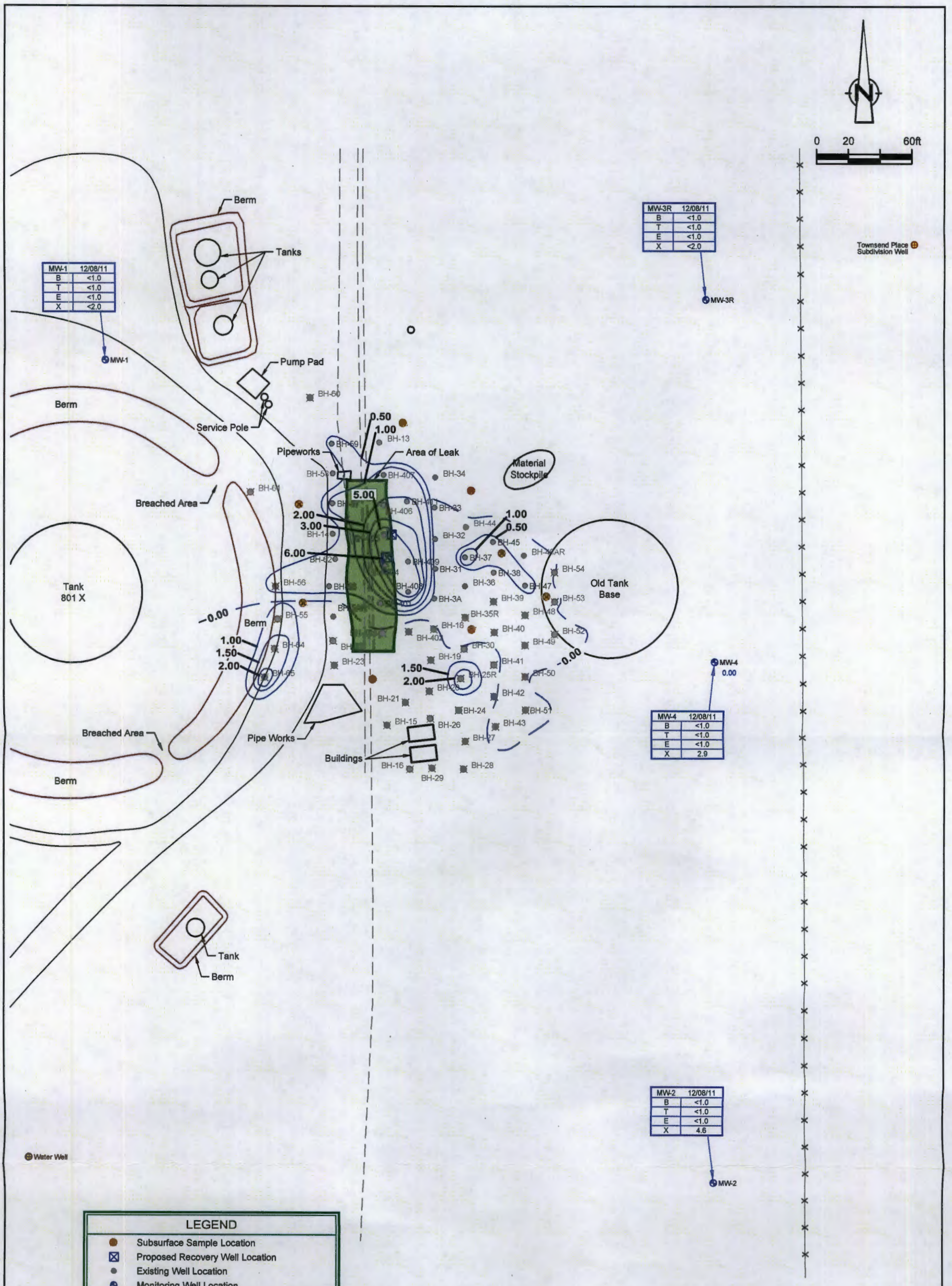
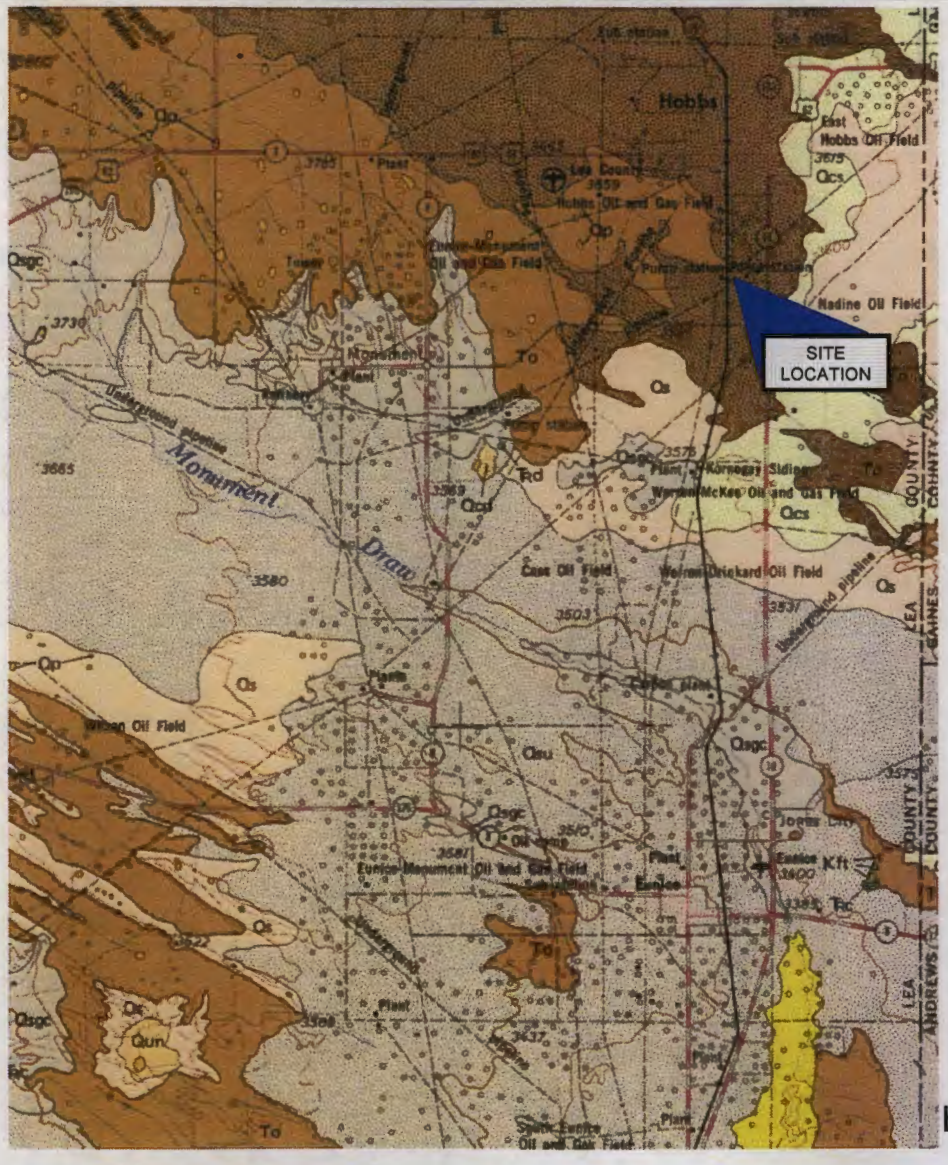
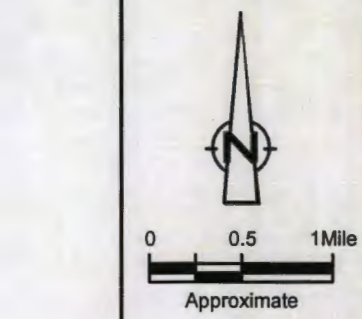


figure 4

RECOVERY WELL AND SOIL BORING LOCATIONS
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-01(000)GN-DL005 NOV 9/2012





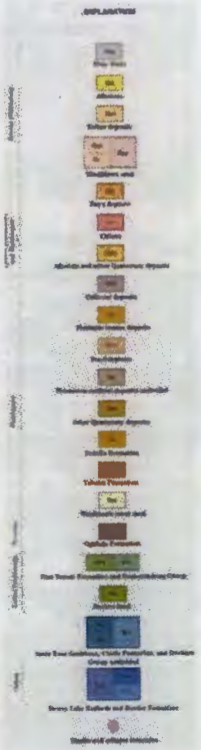


figure 5

HOBBS, NM AREA GEOLOGIC MAP
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-01(000)GN-DL004 NOV 6/2012

NOTE:

Topographic contours taken from USGS Topo map "Hobbs West, NM" dated 2010.

figure 6

WELLS WITHIN 1 MILE
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-01(000)GN-DL002 NOV 6/2012

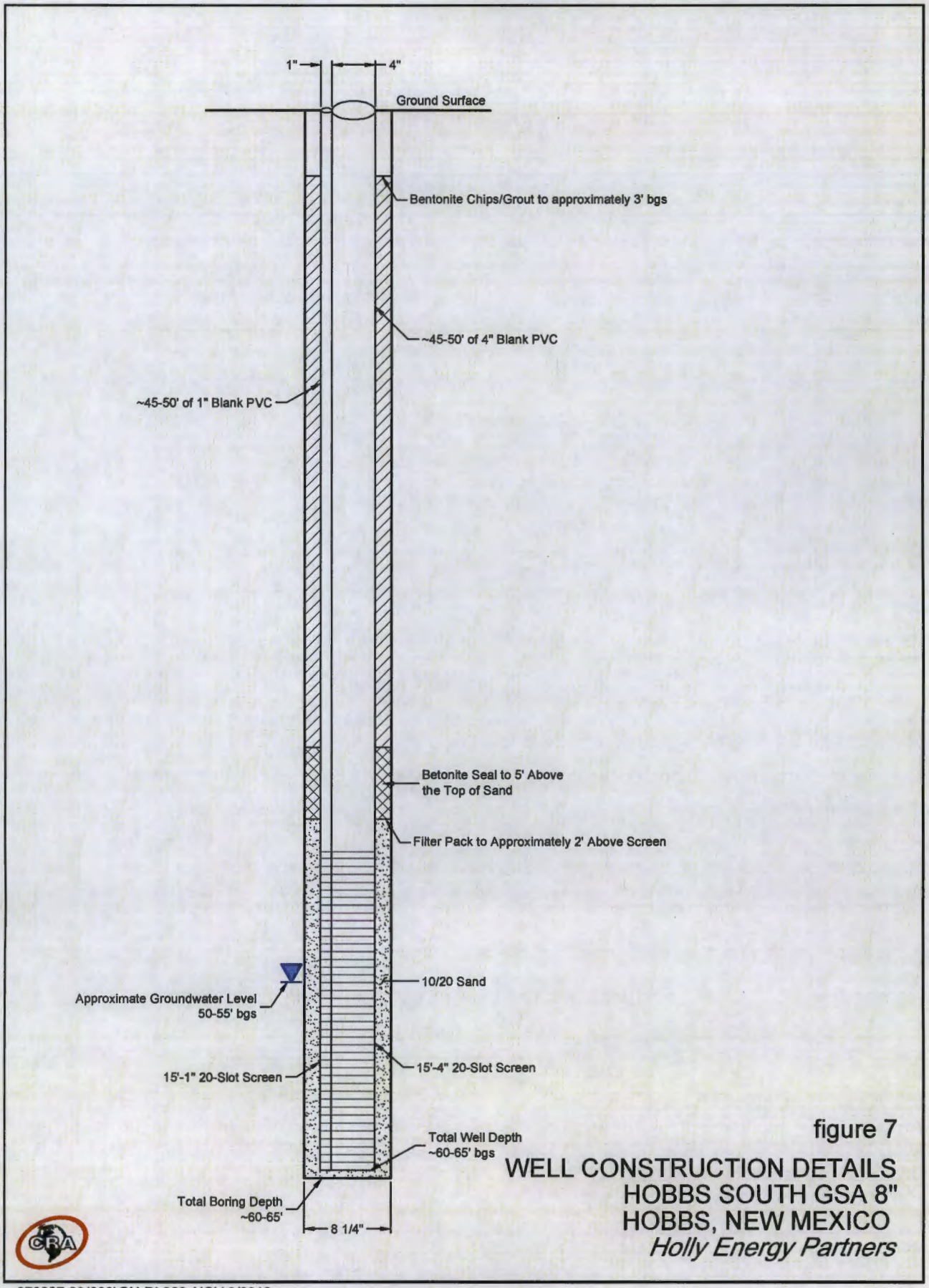


figure 7

WELL CONSTRUCTION DETAILS
HOBBS SOUTH GSA 8"
HOBBS, NEW MEXICO
Holly Energy Partners

078807-98(000)GN-DL002 NOV 9/2012

TABLES

Table 1
Water Well Information

Well #	Diversion	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Installed	Death to Water (feet)	Distance from Site (feet)	Total Well Depth (feet)
L03424		Yates Drilling Co.	PRO	19S	38E	21 1 2	32.651	-103.151	1/26/1957	45	4,100	102
L02146		Coroce Drilling Co.	PRO	19S	38E	22 2 2	32.649	-103.132	1/12/1955	60	3,050	110
L04335		McAllister Fueling Co.	PRO	19S	38E	16 4 4	32.654	-103.147	12/7/1959	35	2,700	110
L10503	3	Augila Oil & Cattle Co.	STK	19S	38E	15 4	32.653	-103.131	7/21/1995	70	2,400	100
L11015	3	Martin Romero	DOM	19S	38E	15 3 4	32.653	-103.135	12/8/1999	45	850	120
L09821	3	Benny Boddy	DOM	19S	38E	15 4	32.656	-103.132	5/2/1986	51	1,900	100
L03658	3	Younger Construction Co.	DOM	19S	38E	14 1 3	32.658	-103.125	8/26/1957	50	4,050	120
L04612	3	A.D Hall	DOM	19S	38E	5 4 2 2	32.664	-103.128	3/29/1961	32	4,600	100
L04978		Moran Oil Prod. And Drilling Co.	PRO	19S	38E	16 2 2	32.665	-103.146	9/20/1962	46	4,400	102
L06858	3	Francisco Warroquin	DOM	19S	38E	15 3 2	32.662	-103.134	11/29/1971	45	3,050	100
L07359	3	Wilbur Sherill	DOM	19S	38E	15 1 1 1	32.666	103.143	4/10/1975	57	4,700	117
L08890		Arco Pipe Line Co.	DOM	19S	38E	22	32.649	-103.14	7/15/1982	38	2,200	130
L07882		Gerald Weldy	DOM	19S	38E	15	32.659	-103.135	4/18/1979	32	1,800	100
L09052		Bobby Lee Buffington	DOM	19S	38E	15	32.657	-103.139	1/25/1983	58	1,100	120
L08279		G.D. Lee	DOM	19S	38E	15	32.654	-103.138	6/9/1980	58	200	130
L08046		G.D. Lee	DOM	19S	38E	15	32.661	-103.128	3/20/1980	58	3,900	130

APPENDIX A

Form C-141

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	Holly Energy Partners	Contact	William Green
Address	1602 W. Main, Artesia, NM 88210	Telephone No.	575.748.8968
Facility Name	South GSA	Facility Type	Crude Oil Gathering Line

Surface Owner	Plains All American	Mineral Owner		API No.	

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
N	15	19S	38E					Lea

Latitude 32.654949°N **Longitude** 103.137432°W

NATURE OF RELEASE

Type of Release Crude Oil	Volume of Release unknown	Volume Recovered 1,061 bbls 12/2011
Source of Release Pipeline Corrosion	Date and Hour of Occurrence 3/27/2002	Date and Hour of Discovery 3/27/2002
Was Immediate Notice Given? ☐ Yes ☐ No ☐ Not Required	If YES, To Whom? Original notification unknown – believed to have been by Plains All American	
By Whom? unknown	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. Not Applicable	

If a Watercourse was Impacted, Describe Fully.*

Not Applicable

Describe Cause of Problem and Remedial Action Taken.*
Pipeline corrosion is the suspected cause of the release. No surface flow noted in historical records. Leak source determined to be 8" South GSA line. Impacted soils at the source was excavated in 2002, final disposal in 2004.

Describe Area Affected and Cleanup Action Taken.*
Approximate 150 X 50 X 14 feet deep trench excavated in release area. Excavation backfilled in May 2004, and 68 borings/wells installed for LNAPL recovery. Records to date indicate 1,061 bbls of crude recovered. Stage II Abatement Plan being submitted for enhanced remediation effort.

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:	OIL CONSERVATION DIVISION	
Printed Name: William D. Green, PG	Approved by Environmental Specialist:	
Title: Environmental Specialist	Approval Date:	Expiration Date:
E-mail Address: Bill.Green@hollyenergy.com	Conditions of Approval:	Attached ☐
Date: 11/7/2012 Phone: 575.748.8968		

* Attach Additional Sheets If Necessary

APPENDIX B

Historical Data

APPENDIX B-1

Historical Soil Data Information

Sample ID	Date	TPH (418.1) (mg/Kg)	GRO (mg/Kg)	DRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl benzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)
BH-3, 22 ft.		186	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
BH-3, 37 ft.		599	--	--	<0.005	0.010	0.009	0.045	0.064
BH-3, 40-41 ft.		9,280	--	--	0.069	0.264	11.1	4.88	16.3
BH-4, 30-35 ft.		360	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
BH-4, 41-42 ft.		2,710	--	--	<0.005	<0.005	1.22	0.038	1.26
BH-4, 50 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
BH-5, 13-14 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
BH-5, 32-33 ft.		9,520	--	--	0.171	0.805	11.5	49.6	62.1
BH-5, 50 ft.		8,180	--	--	0.068	0.373	6.90	16.7	24.0
BH-6, 36 ft.		2,890	65.5	524	<0.005	<0.005	0.013	<0.015	0.013
BH-6, 43 ft.		10,900	993	1,720	0.029	0.011	30.4	0.064	30.5
BH-6, 46-47 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
BH-6, 50 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
BH-7, 17-22 ft.*	01/29/03	--	842	1,040	0.388	<0.050	10.8	27.6	38.8
BH-7, 31 ft.*	01/29/03	--	2,180	2,300	0.440	7.06	21.6	99.7	129
BH-7, 44-45 ft.*	01/29/03	--	3,700	5,340	2.56	7.58	51.1	155	216
BH-7, 50 ft.*	01/29/03	--	9,450	9,440	2.80	7.95	39.2	142	192
BH-8, 17 ft.*	01/29/03	--	647	860	<0.050	0.092	3.34	13.4	16.8
BH-8, 19 ft.*	01/29/03	--	946	1,020	<0.050	<0.050	6.60	24.0	30.6
BH-8, 31 ft.*	01/29/03	--	1,360	1,350	0.095	4.41	11.6	63.0	79.1
BH-8, 42 ft.*	01/29/03	--	3,000	3,990	0.296	<0.050	21.1	112	133
BH-8, 46 ft.*	01/29/03	--	12,200	11,600	3.23	0.400	102	531	637
BH-11, 22-23 ft.	02/17/03	--	158	612	<0.005	<0.005	1.18	1.99	3.17
BH-11, 38-39 ft.	02/18/03	--	292	528	0.038	<0.005	2.76	6.18	8.98
BH-11, 44-47 ft.	02/18/03	--	98.9	274	0.022	0.192	4.17	4.40	8.78
BH-13, 17-19 ft.	02/19/03	--	177	556	<0.005	0.007	2.09	0.204	2.30
BH-13, 33-34 ft.	02/19/03	--	198	606	0.010	<0.004	4.00	0.945	4.96
Below 10" line**	01/16/03	--	2,120	12,300	--	--	--	--	--
10" ditch line**	01/16/03	--	10,600	20,700	--	--	--	--	--
Release point, 6 ft. BGS**	01/16/03	--	1,380	3,130	--	--	--	--	--
East wall, N. of 10"**	01/16/03	--	1,170	5,090	--	--	--	--	--
Excavation bottom**	01/16/03	--	4,600	9,750	--	--	--	--	--
MW-1, 43-44 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-1, 47 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-1, 60-65 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-2, 43-44 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-2, 47-48 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-2, 52-53 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-2, 60 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-3, 40-41 ft.		15,700	33.9	1,320	<0.005	<0.005	0.028	0.008	0.036
MW-3, 45 ft.		1,970	<10.0	202	<0.005	<0.005	<0.005	<0.015	<0.005
MW-3, 46-47 ft.		15	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-3, 52 ft.		<10	--	--	<0.005	<0.005	<0.005	<0.015	<0.005
MW-4, 20 ft.	01/02/03	--	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015	<0.005
MW-4, 44-45 ft.	01/02/03	--	<10.0	116	<0.005	<0.005	<0.005	<0.015	<0.005
MW-4, 46 ft.	01/02/03	--	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015	<0.005
MW-4, 49-50 ft.	01/02/03	--	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015	<0.005

Notes:

* Sample sheets show depth as depth from bottom of excavation to sampling point and depth from land surface to bottom of excavation. Distance shown here is total from land surface to sampling point.

** Further identification of samples: 1. Below 10" line -- east side of excavation at end and below 10" pipe.

2. 10" ditch line -- west side of excavation at location of removed pipe.

3. Release point 6' BGS -- Navajo release point, 6 ft. below ground surface

4. East wall N. of 10" -- east wall, approx. 10 ft. north of the 10" line

5. Excavation Bottom -- bottom at release point

Safety & Environmental Solutions
703 E. Clinton #102, P.O. Box 1613
Hobbs, New Mexico 88241
(505) 397-0510
Fax (505) 393-4388

Memorandum

Date: 12/15/04

To: Larry Johnson, NMOCD District 1, Hobbs

cc: Bob Allen, SESI; Albert Reyes, Johnny Lackey, Navajo Pipeline

From: David G. Boyer, P.G.

RE: Request to Close Open Excavation at Navajo S. GSA Location (Plains Pipeline Terminal)

I. Contact Information

The following are company and SESI contacts:

Albert Reyes	Crude Operations Manager, Navajo Pipeline	505-748-8940 (O), 505-365-6199 (C)	albert@navajo-refining.com
Johnny Lackey	Safety/Environmental Supervisor, Navajo Pipeline	505-748-8940 (O) 505-703-0312	johnny.lackey@hollyenergy.com
David Boyer	Hydrogeologist, SESI	505-397-0510	dgboyer@sesi-nm.com
Bob Allen	President, SESI	505-397-0510	ballen@sesi-nm.com

II. Request for Approval

As part of the ongoing remediation work at the pipeline leak location, we request permission to close the open excavation at the site. The excavation was dug to remove highly saturated surface soils and to determine the horizontal and vertical extent of the leak. Also, we request permission to use the excavated soil currently stockpiled on site to backfill the excavation.

III. Background Information

The leak location and excavation are located at the Plains Pipeline terminal off of Arco Road (County Road 61). The physical address is 214 CR-61 (Unit N, Section 15, T19S, R38E).

The main excavation, dug in January 2003, is approximately 11 ft. deep, 10 to 12 ft. wide at the bottom, and 220 ft. long (including ramps). A secondary shallow excavation to the east was dug to allow access for pumpers to remove product from tanks in the bottom of the main excavation. No excavation was possible to the west as the pipeline abuts a Plains pipeline and numerous pipeline valves and manifolds. All soil from the main and secondary excavations is currently stockpiled on site.

Samples taken of the remaining material in the excavation sidewalls and bottom in January 2003 show highly elevated levels of TPH. The results of the sampling are shown on the attached table.

Additional soil samples to a depth of 50 ft. were taken during borehole drilling; all analysis results are available for review if requested.

Six boreholes were drilled in the bottom of the excavation to recover free product using 12-volt purge pumps. The boreholes were purged hourly using a power-supply and timer system. However, during heavy rainstorms earlier this year the excavation flooded and debris entered five of the six boreholes rendering them useless and these five have been plugged using bentonite. Recovery has continued from the sixth borehole. Current depth to water from the surface is 50 ft. The sixth borehole will be plugged back to the bottom of the trench with bentonite prior to backfilling.

IV. Justification

The excavated soil (approximately 2,040 cubic yards) was stockpiled on site. The stockpiled soil has been tested and the results are also shown in the attached table.

Sampling of the stockpiled soil was performed by taking five samples each dug from three areas of the pile and compositing them for transport to the laboratory for analysis. The first set (labeled "Waste Pile Comp") was taken from the southern area of the pile, the second set was taken from the north side of the pile and the third set was taken from the top center of the pile. No BTEX or gasoline range organics (GRO) were detected in the samples but diesel range organics (DRO) were found ranging from 133 to 594 mg/Kg.

Though the TPH of the backfill exceeds 100 mg/Kg, it will not contribute to additional contamination of the groundwater due to the fact that groundwater is currently impacted by crude oil from this or possibly earlier leaks at this location. Additionally, a large portion of the stockpiled material is caliche rock; only the soil in the pile was analyzed for TPH. Also, given that a large volume of contaminated soil remains in the approximately 35 ft. soil thickness not excavated from the trench and under the Plains pipeline and manifold area, it is unnecessarily costly and only marginally beneficial (if that) to haul the excavated material to a disposal location and to replace with clean material.

V. Future Work Following Trench Backfill

Following backfill of the trench, Navajo is planning to drill an additional ten or more oil recovery boreholes at the location to recover the free product. The boreholes will be located on 25 ft. centers, which is a pattern similar to current boreholes. Pumps will be installed in the boreholes and product will be recovered as described above or, alternately, pumped a minimum of once per week by SESI technicians. The pumps have been highly useful in recovering product; to date 662 barrels have been recovered from over 50 boreholes.

Additionally, Navajo has installed four monitor wells at the site to measure water levels for determination of groundwater flow direction and to sample groundwater quality for dissolved phase BTEX. The wells are sampled quarterly and results to date have not shown any impact on the monitor wells.

If this request is approved, we propose to provide you a semi-annual update of activities including groundwater maps and sampling results, and an update of oil recovery efforts. We are currently in process of entering data and graphing water and product levels. This will be made

available to the OCD with updated maps and water quality data when the effort is completed in the next 30 days.

Our goal is to remove as much as practical the hydrocarbon product and then address dissolved phase contamination. The semi-annual updates will include progress toward these goals and anticipated work for the following six-month period.

Your approval of this request would be appreciated. If you have any questions, please contact me at 505-397-0510.

DGB/DGB

Table 1. Soil Sampling Analytical Results

Sample ID	Date, Analysis ID	GRO (mg/Kg)	DRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)
Excavation Samples							
Release point, at ~6 ft. below ground surface	01/17/03 H7411-3	1,380	3,130	N/S	N/S	N/S	N/S
Excavation bottom, under release point	01/17/03 H7411-5	4,600	9,750	N/S	N/S	N/S	N/S
10" line ditch trace, west wall excavation, ~80 ft. south of leak	01/17/03 H7411-2	10,600	20,700	N/S	N/S	N/S	N/S
West end of 10" line, east side excavation	01/17/03 H7411-1	2,120	12,300	N/S	N/S	N/S	N/S
Excavation east wall, ~10 ft. north of 10" line	01/17/03 H7411-4	1,170	5,090	N/S	N/S	N/S	N/S
Stockpile Samples							
Waste pile composite (south side pile)	04/29/04 H8655-1	<10.0	133	<0.005	<0.005	<0.005	<0.015
North side pile composite	04/29/04 H8655-1	<10.0	176	<0.005	<0.005	<0.005	<0.015
Center (top) side pile composite	04/29/04 H8655-1	<10.0	594	<0.005	<0.005	<0.005	<0.015

Notes:

N/S Not sampled.

Additional soil samples to 50 ft. taken during borehole drilling; analysis results available on request.

The last three excavation samples were taken from the vicinity of an out-of-service 10" line (not Navajo) uncovered when the ditch was excavated.

Attachment (Site Plan PDF file)

APPENDIX B-2

Historical Groundwater Quality Data

Monitor Well Water Quality, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µ/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)
MW-1	12/04/02	<2	<2	<2	<6	<2	104	795
	05/20/03	<2	<2	<2	<6	<2	128	686
	11/12/03	<2	<2	<2	<6	<2	- -	- -
	06/02/04	<2	<2	<2	<6	<2	108	749
	10/12/04	<2	<2	<2	<6	<2	84	956
	01/11/05	<2	<2	<2	<6	<2	88	890
	10/26/05	<2	<2	<2	<6	<2	100	990
	03/08/06	<2	<2	<2	<6	<2	128	1,160
	07/11/06	<2	<2	<2	<6	<2	120	1,245
	09/07/06	<0.5	<0.5	<0.5	<1	<0.5	88	1,000
	12/19/06	<0.5	<0.5	<0.5	<1.0	<0.5	160	1,100
	03/13/07	<0.5	<0.5	<0.5	<1.0	<0.5	85	1,100
	06/21/07	<0.5	<0.5	<0.5	<1.0	<0.5	29	820
	09/21/07	<0.5	<0.5	<0.5	<1.0	<0.5	62	700
	12/07/07	<0.5	<0.5	<0.5	<1.0	<0.5	68	510
	03/04/08	<0.5	<0.5	<0.5	<1.0	<0.5	60	590
	06/03/08	<0.5	<0.5	<0.5	<1.0	<0.5	76	750
	09/23/08	<0.5	<0.5	<0.5	<1.0	<0.5	78	590
	12/18/08	<0.5	<0.5	<0.5	<1.0	<0.5	66	530
	03/19/09	<0.5	<0.5	<0.5	<1.0	<0.5	72	580
	06/22/09	<1.0	<1.0	<1.0	<2.0	<1.0	79	600
	09/08/09	<1.0	<1.0	<1.0	<2.0	<1.0	82	637
	12/17/09	<1.0	<1.0	<1.0	<2.0	<1.0	72	631
	03/09/10	<1.0	<1.0	<1.0	<1.5	<1.0	83	634
	06/18/10	<1.0	<1.0	<1.0	<2.0	<1.0	77	656
	09/01/10	<1.0	<1.0	<1.0	<2.0	<1.0	86	678
	12/06/10	<1.0	<1.0	<1.0	<2.0	<1.0	86	769
	03/18/11	<1.0	<1.0	<1.0	<2.0	<1.0	83	798
	06/23/11	<1.0	<1.0	<1.0	<2.0	<1.0	79	800
	10/07/11	<1.0	<1.0	<1.0	<2.0	<1.0	85	826
	12/08/11	<1.0	<1.0	<1.0	<2.0	<1.0	94	852

Monitor Well Water Quality, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µ/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)
MW-2	12/04/02	<2	<2	<2	<6	<2	96	722
	05/20/03	<2	<2	<2	<6	<2	96	755
	11/12/03	<2	<2	<2	<6	<2	- -	- -
	06/02/04	<2	<2	<2	<6	<2	120	817
	10/12/04	<2	<2	<2	<6	<2	112	1,129
	01/11/05	<2	<2	<2	<6	<2	112	1,038
	10/26/05	<2	<2	<2	<6	<2	100	750
	03/08/06	<2	<2	<2	<6	<2	116	768
	07/11/06	<2	<2	<2	<6	<2	108	863
	09/07/06	<0.5	<0.5	<0.5	<1	<0.5	110	760
	12/19/06	<0.5	<0.5	<0.5	1.8	1.8	100	780
	03/13/07	<0.5	<0.5	<0.5	2.5	2.5	120	830
	06/21/07	<0.5	<0.5	<0.5	1.4	1.4	150	770
	09/21/07	<0.5	<0.5	<0.5	2.2	2.2	130	850
	12/07/07	<0.5	0.6	<0.5	2.5	3.1	120	820
	03/04/08	<0.5	<0.5	<0.5	2.0	2.0	120	780
	06/03/08	<0.5	<0.5	<0.5	2.1	2.1	130	920
	09/23/08	<0.5	<0.5	<0.5	1.7	1.7	120	800
	12/18/08	<0.5	<0.5	<0.5	1.9	1.9	110	800
	03/19/09	<0.5	<0.5	<0.5	2.0	2.0	120	800
	06/22/09	<1.0	<1.0	<1.0	<2.0	<1.0	150	830
	09/08/09	<1.0	<1.0	<1.0	<2.0	<1.0	140	831
	12/17/09	<1.0	<1.0	<1.0	3.3	3.3	140	839
	03/09/10	<1.0	<1.0	<1.0	<1.5	<1.0	140	848
	06/18/10	<1.0	<1.0	<1.0	2.5	2.5	140	861
	09/01/10	<1.0	<1.0	<1.0	2.4	2.4	160	858
	12/06/10	<1.0	<1.0	<1.0	3.1	3.1	150	910
	03/18/11	<1.0	<1.0	<1.0	2.1	2.1	140	985
	06/23/11	<2.0	<2.0	<2.0	<4.0	<2.0	150	1,060
	10/07/11	<1.0	<1.0	<1.0	3.3	3.3	130	920
	12/08/11	<1.0	<1.0	<1.0	4.6	4.6	130	1,190

Monitor Well Water Quality, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µ/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)
MW-3R[2]	12/04/02	<2	<2	<2	<6	<2	60	587
	05/20/03	<2	<2	<2	<6	<2	64	633
	11/12/03	<2	<2	<2	<6	<2	- -	- -
	06/02/04	<2	<2	<2	<6	<2	64	639
	10/12/04	<2	<2	<2	<6	<2	60	685
	01/11/05	<2	<2	<2	<6	<2	68	798
	10/26/05	<2	<2	<2	11	<2	51	560
	03/08/06	<2	<2	<2	<6	<2	48	562
	07/11/06	<2	<2	<2	<6	<2	60	634
	09/07/06	<0.5	<0.5	<0.5	<1	<0.5	47	560
	12/19/06	<0.5	<0.5	<0.5	<1	<0.5	44	570
	03/13/07	<0.5	<0.5	<0.5	<1	<0.5	49	630
	06/21/07	<0.5	0.6	<0.5	1.1	1.7	58	520
	09/21/07	<0.5	<0.5	<0.5	2.2	2.2	50	630
	12/07/07	<0.5	<0.5	<0.5	<1.0	<0.5	51	550
	03/04/08	<0.5	<0.5	<0.5	<1.0	<0.5	40	530
	06/03/08	<0.5	<0.5	<0.5	<1.0	<0.5	51	700
	09/23/08	<0.5	<0.5	<0.5	<1.0	<0.5	50	560
	12/18/08	<0.5	<0.5	<0.5	<1.0	<0.5	44	520
	03/19/09	<0.5	<0.5	<0.5	<1.0	<0.5	43	580
	06/22/09	<1.0	<1.0	<1.0	<2.0	<1.0	54	570
	09/08/09	<1.0	<1.0	<1.0	<2.0	<1.0	57	594
	12/17/09	<1.0	<1.0	<1.0	<2.0	<1.0	50	595
	03/09/10	<1.0	<1.0	<1.0	<1.5	<1.0	55	590
	06/18/10	<1.0	<1.0	<1.0	<2.0	<1.0	52	594
	09/01/10	<1.0	<1.0	<1.0	<2.0	<1.0	60	549
	12/06/10	<1.0	<1.0	<1.0	<2.0	<1.0	55	582
	03/18/11	<1.0	<1.0	<1.0	<2.0	<1.0	51	595
	06/23/11	<1.0	<1.0	<1.0	<2.0	<1.0	53	591
	10/07/11	<1.0	<1.0	<1.0	<2.0	<1.0	50	613
	12/08/11	<1.0	<1.0	<1.0	<2.0	<1.0	53	631

Monitor Well Water Quality, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µ/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)
MW-4	01/13/03	<2	<2	<2	<6	<2	124	646
	05/20/03	<2	<2	<2	<6	<2	120	781
	11/12/03	<2	<2	<2	<6	<2	- -	- -
	06/02/04	<2	<2	<2	<6	<2	128	639
	10/12/04	<2	<2	<2	<6	<2	124	921
	01/11/05	<2	<2	<2	<6	<2	124	971
	10/26/05	<2	<2	<2	<6	<2	99	710
	03/08/06	<2	<2	<2	<6	<2	116	729
	07/11/06	<2	<2	<2	<6	<2	124	823
	09/07/06	<0.5	<0.5	<0.5	<1	<0.5	120	760
	12/19/06	<0.5	2.1	0.9	2.9	5.9	110	750
	03/13/07	<0.5	1.7	<0.5	2.4	4.1	130	840
	06/21/07	<0.5	1.8	0.8	1.5	4.1	130	760
	09/21/07	<0.5	2.4	1.2	2.2	5.8	140	800
	12/07/07	0.8	1.7	0.8	19	22.3	120	760
	03/04/08	<0.5	<0.5	<0.5	<1.0	<0.5	50	750
	06/03/08	<0.5	1.5	0.8	18	20.3	120	910
	09/23/08	<0.5	1.1	<0.5	5.5	6.6	130	730
	12/18/08	<0.5	0.9	<0.5	7.7	8.6	94	700
	03/19/09	<0.5	1.3	0.6	5.6	7.5	90	740
	06/22/09	<1.0	<1.0	<1.0	<2.0	<1.0	120	770
	09/08/09	<1.0	<1.0	<1.0	<2.0	<1.0	120	803
	12/17/09	<1.0	<1.0	<1.0	21	21	130	822
	03/09/10	<1.0	<1.0	<1.0	<1.5	<1.0	130	830
	06/18/10	<1.0	<1.0	<1.0	6.2	6.2	130	843
	09/01/10	<1.0	<1.0	<1.0	5.0	5.0	140	789
	12/06/10	<1.0	<1.0	<1.0	5.8	5.8	140	850
	03/18/11	<1.0	<1.0	<1.0	<2.0	<1.0	140	865
	06/23/11	<1.0	<1.0	<1.0	7.4	7.4	140	861
	10/07/11	<1.0	<1.0	<1.0	4.9	4.9	130	861
	12/08/11	<1.0	<1.0	<1.0	2.9	2.9	120	843
NM Groundwater Standard[3]:		**0.01**	**0.75**	**0.75**	**0.62**	**- -**	**250**	**1,000**

Monitor Well Water Quality, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µ/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)
Notes: 1.	Complete cation/anion analysis on file for Cardinal analyses.							
2.	MW-3R replacement for MW-3; lost augers in hole during drilling.							
3.	Water Quality Control Commission Standards adopted by the NM Oil Conservation Division							
Analyses performed at Cardinal Laboratories, Hobbs, NM through July 2006								
Analyses performed at Argon Laboratories, Hobbs, NM and Ceres, CA September 2006 to March 2009								
Analyses performed at Hall Environmental Analysis Laboratory, Albuquerque, NM June 2009 to present								
Analyses using EPA SW-846 methods 8021B or 8260B (volatile organics), SM 2540C or EPA 160.1 (TDS),								
	and EPA 300.0 or SM 4500-Cl B (Cl).							

Domestic Water Wells

Monitoring Well	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total, mg/L)	Total BTEX (mg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)
Terminal water well	10/21/02	<0.002	<0.002	<0.002	<0.006	<0.002	- -	- -
106 Townsend	12/02/02	<0.002	<0.002	<0.002	<0.006	<0.002	90	362
Lenard South DW	12/04/02	<0.002	<0.002	<0.002	<0.006	<0.002	64	453
Lenard West DW	12/04/02	<0.002	<0.002	<0.002	<0.006	<0.002	104	511
Townsend DW #1 W.	12/10/02	<0.002	<0.002	<0.002	<0.006	<0.002	76	580
Townsend DW #2	12/10/02	<0.002	<0.002	<0.002	<0.006	<0.002	96	549
NM Groundwater Standard[2]:		**0.010**	**0.750**	**0.750**	**0.620**	**- -**	**250**	**1,000**
Notes: 1.	Complete cation/anion analysis on file.							
2.	Water Quality Control Commission Standards adopted by the NM Oil Conservation Division							
Analyses performed at Cardinal Laboratories, Hobbs, NM								
Analyses using EPA SW-846 methods 8260 (volatile organics) and 160.1 (TDS), and Standard Method 4500-Cl B (Cl).								

APPENDIX B-3

Borehole Logs

Safety & Environmental Solutions, Inc.

LOG OF BORING BH-1

Hydrocarbon Site Investigation
Hobbs South GSA Crude Gathering Line

Navajo Refining Company
Artesia, New Mexico

Date, Time Started: : 10/18/02, 0830
Date, Time Completed : 10/18/02, 1130
Hole Diameter: : 8-1/4 in.
Drilling Method: : Hollow-stem auger, CME-75
Sampling Method: : Cuttings, core barrel

Drilled By: : Eco Drilling
Logged By: : D.G. Boyer

Sample Condition
- Remoulded
- Undisturbed
- Lost
- Rock Core

Sample Type:
- AR Air Rotary Cuttings
- CB Core Barrel (2.5' or 5')
- CT Auger Cuttings
- NR No recovery

Depth in Feet	Samples	Sample Type	Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.
0							
5		CT		AR		0-17 ft. Cuttings, fill material (from pipeline trench excavation), caliche and dirt, strong H/C odor	
10							
15							
20		CT		CA/SW		17-20 ft. Cuttings, native material, caliche fragments and sand, sand well-sorted, fine to coarse grained, gray, H/C odor	
		CB	5	SS		20-25 ft. SANDSTONE, light brown, poor to medium cementation, occasional caliche cementation, strong H/C odor	
25						25-27 ft. SANDSTONE, light brown, poorly cemented with caliche rock inclusions, caliche medium cemented, H/C odor	

Notes:
Boring drilled by ECO Drilling using CME-75
Measurements from auger stem: Top of oil 48.62 ft., top of water 50.35 ft., total depth 50.60 ft., auger 0.5 ft. above land surface.

Plugged back to 15 ft. with bentonite, hydrated every 5 ft., then cuttings to surface.
H/C - petroleum hydrocarbon

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Safety & Environmental Solutions, Inc.

LOG OF BORING BH-1

Hydrocarbon Site Investigation
Hobbs South GSA Crude Gathering Line

Navajo Refining Company
Artesia, New Mexico

Date, Time Started: : 10/18/02, 0830
Date, Time Completed : 10/18/02, 1130
Hole Diameter: : 8-1/4 in.
Drilling Method: : Hollow-stem auger, CME-75
Sampling Method: : Cuttings, core barrel

Drilled By: : Eco Drilling
Logged By: : D.G. Boyer

Sample Condition: Remoulded; Undisturbed; Lost; Rock Core

Sample Type: AR Air Rotary Cuttings; CB Core Barrel (2.5' or 5'); CT Auger Cuttings; NR No recovery

Depth in Feet	Samples	Sample Type	Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.
25				SS			
		CB	5	SW		27-30 ft. SAND, fine grained, occasional caliche rock or sandstone cementation, strong H/C odor, oil sheen on core barrel	
30				CA			
				SW		30-30.2 CALICHE, light brown, poorly cemented	
				CA		SAND, fine grained, occasional caliche rock to 1/2 in.	
				CA/SW		30.6-31.2 ft. CALICHE, chalk-color, soft, laminated	
		CB	3.4	SW/CA		31.2-32 ft. CALICHE, soft and SAND, fine grained	
						32-33.4 ft. SAND, with very soft CALICHE, sand very fine to fine grained, strong H/C odor. Hard caliche in tip at 35 ft.	
				CA		35 ft CALICHE,	
35				SW		35-36.2 ft. SAND, fine grained, occasional caliche rock, clayey at 36.2 ft.	
				CA		36.2-37.3 ft. CALICHE with sand matrix, sand grey, H/C saturated	
		CB	2.3			37.3-40 ft. No recovery	
40				CA/Chert		40 ft. CALICHE and CHERT, very hard, fractured	
						40-40.8 ft. CALICHE and sand, increasing sand from 40.5-40.8 ft.	
						40.8 ft. CALICHE and CHERT, massive fragments	
		CB	2.8	SW		40.8-42.8 SAND, brown (dark brown in tip), very fine to fine grained, uniform, no clay, H/C odor 45-45.5 ft. SAND with fractured caliche rock	
45				CA		45.5-45.9 ft. CALICHE, sandy	
				SW		45.9-46.4 ft. SAND, with fractured caliche	
				CA		46.4-46.8 ft. CALICHE, hard, with sand	
		CB	3.0	SW		46.8-50 ft. SAND with fractured caliche, gravelly Core from 45 to 50 ft. is hydrocarbon saturated	
50							

Notes:
Boring drilled by ECO Drilling using CME-75
Measurements from auger stem: Top of oil 48.62 ft., top of water 50.35 ft., total depth 50.60 ft., auger 0.5 ft. above land surface.

Plugged back to 15 ft. with bentonite, hydrated every 5 ft., then cuttings to surface.
H/C - petroleum hydrocarbon

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Safety & Environmental Solutions, Inc.

LOG OF BORING BH-2

(Page 1 of 2)

Hydrocarbon Site Investigation
Hobbs South GSA Crude Gathering Line

Navajo Refining Company
Artesia, New Mexico

Date, Time Started: : 10/18/02, 1300
Date, Time Completed : 10/18/02, 1500
Hole Diameter: : 8-1/4 in.
Drilling Method: : Hollow-stem auger, CME-75
Sampling Method: : Cuttings, core barrel

Drilled By: : Eco Drilling
Logged By: : D.G. Boyer

Sample Condition
- Remoulded
- Undisturbed
- Lost
- Rock Core

Sample Type:
- AR Air Rotary Cuttings
- CB Core Barrel (2.5' or 5')
- CT Auger Cuttings
- NR No recovery

Depth in Feet	Samples	Sample Type	Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.
0				AR		0-9 ft. Cuttings, fill material (from pipeline trench excavation), caliche and dirt, strong H/C odor	
5		CT					
10				SW		9-15 ft. SAND, gravelly, light gray and brown, fine-grained with frequent small caliche gravels (coarse sand-sized to 3/4 in.)strong H/C odor	
15				CA		15-15.3 ft. Slough. 15.3-16.3 ft. CALICHE, hard, fractured, sand and root remnants seen in fractures, sand gray-black, H/C odor	
				SW		16.3-17.2 ft. SAND, light brown, fine grained, small amount of clay, occasional small gravel, H/C odor	
		CB	3.2	CA		17.2-17.9 ft. CALICHE, hard, fractured, gray sand in joints	
				SS		17.9-18.2 ft. SANDSTONE, light brown, well cemented, H/C odor	
						18.2-20 ft. No recovery	
20				CA		20-20.4 ft. CALICHE, light brown, laminar	
				SS		20.4-22.6 SANDSTONE, light brown, very fine to fine grained, hard	
		CB	3.8	CA		22.6-23.8 ft. CALICHE, massive, hard, with fine grained sand, strong H/C odor	
						23.8-25 ft. No recovery	
25							

Notes:
Boring drilled by ECO Drilling using CME-75
After 10 minutes, measurements from auger stem: Top of oil 48.50 ft., top of water 50.11 ft., total depth 50.40 ft., auger 0.5 ft. above land surface.
Plugged back to 15 ft. with bentonite, hydrated every 5 ft., then cuttings to surface.
H/C - petroleum hydrocarbon

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Safety & Environmental Solutions, Inc.

LOG OF BORING BH-2

Hydrocarbon Site Investigation
Hobbs South GSA Crude Gathering Line

Navajo Refining Company
Artesia, New Mexico

Date, Time Started: : 10/18/02, 1300
Date, Time Completed : 10/18/02, 1500
Hole Diameter: : 8-1/4 in.
Drilling Method: : Hollow-stem auger, CME-75
Sampling Method: : Cuttings, core barrel

Drilled By: : Eco Drilling
Logged By: : D.G. Boyer

Sample Condition: Remoulded; Undisturbed; Lost; Rock Core

Sample Type: AR Air Rotary Cuttings; CB Core Barrel (2.5' or 5'); CT Auger Cuttings; NR No recovery

Depth in Feet	Samples	Sample Type	Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.
25		CB	4.4	SS		25-28.6 ft. SANDSTONE, light brown, with frequent caliche inclusions, poorly cemented, small, hard caliche gravels, hard drilling at 28 ft., strong H/C odor	
				SW		28.6-29.4 ft. SAND, light brown, with caliche and sandstone fragments, strong H/C odor	
30						30-31.5 ft. SAND, light brown, fine grained, with caliche, laminar caliche at 31.5 ft.	
		CB	3.4	CA		31.5-33.4 ft. CALICHE, sandy, light brown and chalk colored, poorly cemented, soft when broken, strong H/C odor	
35				CA/SW		35-36.2 CALICHE and SAND, caliche soft to hard, fragmented, sand fine grained	
				SW		36.2-37 ft. SAND, dark brown, fine grained, caliche inclusions, H/C saturated	
		CB	3.4	CA		37-38.4 CALICHE, hard, fractured, sandy in fractures, H/C product seen in fractures, cherty at base	
				Chert		40-40.3 ft. Chert, sandy, H/C saturated	
40				SW		40.3-42.3 ft. SAND, dark brown, fine grained, H/C odor (H/C sheen on core barrel and protective gloves)	
		CB	2.5	CA		42.3-42.5 ft. CALICHE (in core tip), hard	
						42.5-45 ft. No recovery	
45				SW		45-47 ft. SAND, dark brown, fine grained, occasional caliche gravel, H/C saturated	
		CB	3.5	GW		47-48.3 ft. SANDY GRAVEL, caliche gravels in sand matrix, gravels range from 1/2 in. to 3 in., H/C saturated in sand	
				CA		48.3-48.5 ft. CALICHE, hard, H/C odor	
50						48.5-50 ft. No recovery	

Notes:
Boring drilled by ECO Drilling using CME-75
After 10 minutes, measurements from auger stem: Top of oil 48.50 ft., top of water 50.11 ft., total depth 50.40 ft., auger 0.5 ft. above land surface.

Plugged back to 15 ft. with bentonite, hydrated every 5 ft., then cuttings to surface.
H/C - petroleum hydrocarbon

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Borehole 1		
Date Drilled: 10/18/02		
Total Depth: 50 ft.		
Description from cuttings to 20 ft., then core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-17 ft.	- -	Cuttings, fill material, caliche and dirt, hydrocarbon (H/C) odor
17-20 ft.	- -	Cuttings, native material - caliche fragments and sand, sand well-sorted, fine to coarse grained, gray, H/C odor
20-25 ft.	5 ft.	Sandstone, light brown, fine grained, poor to medium cementation, occasional caliche cementation, strong H/C odor
25-30 ft.	5 ft.	0-2 ft. Sandstone, lt. brown, poorly cemented with caliche rock inclusions, caliche medium cemented, H/C odor 2-5 ft. Sand, fine grained, occasional caliche rock or sandstone cementation, strong H/C odor, oil sheen on core barrel
30-35 ft.	3.4 ft.	0-0.2 ft. Caliche, light brown, poorly cemented 0.2-0.6 ft. Sand, fine grained, occasional caliche rock to 1/2 in. 0.6-1.2 ft. Caliche, soft, chalk color, laminated 1.2-2.0 ft. Caliche and sand, caliche soft, sand fine grained 2.0-3.4 ft. Sand with very soft caliche, sand very fine to fine grained, strong H/C odor. Hard caliche in tip at 35. H/C sheen on core barrel
35-40 ft.	2.3 ft.	0-1.2 ft. Sand, fine grained, occasional caliche rock, clayey at 1.2 1.2-2.3 ft. Caliche with sand matrix, sand gray, hydrocarbon saturated, caliche and chert at 40 ft., very hard, fractured
40-45 ft.	2.8 ft.	0-0.8 ft. Caliche and sand, increasing sand from 0.5-0.8 ft. At 0.8 ft., caliche and chert, and massive fragments. 0.8-2.8 ft. Sand, brown, fine grained to very fine grained, uniform, no clay. Hydrocarbon odor, sand dark brown in tip.
45-50 ft.	3.0 ft.	0-0.5 ft. Sand with fractured caliche rock 0.5-0.9 ft. Caliche, sandy 0.9-1.4 ft. Sand with fractured caliche
		1.4-1.8 ft. Caliche, hard with sand
		1.8-3 ft. Sand with caliche, fractured, gravelly
		Core is hydrocarbon saturated
		Measurements from auger stem: Top of oil 48.62 ft., top of water 50.35 ft., total depth 50.60 ft., auger 0.5 ft. above land surface. Plugged back to 15 ft. with bentonite, hydrated every 5 ft., then cuttings to surface.
Log by D. G. Boyer, 10/20/02		

Borehole 3, 3A		
Date Drilled: 11/09/02, 4/30/03		
Total Depth: 53, 51 ft. ft.		
Description from cuttings to 20 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Silt with caliche, silt brown, caliche white, rock fragments and small gravels, no H/C odor
5-10 ft.	Cuttings	Silty gravel, caliche gravels with caliche fragments. Silt with sand, light brown to chalk white, possible H/C odor
10-15 ft.	Cuttings	Silty sand, light brown to chalk white, occasional small caliche, sand very fine grained, possible H/C odor
15-20 ft.	Cuttings	Silty sand, same as above, no H/C odor
20-25 ft.	2.0 ft.	Hard drilling at 22.5 ft. 20-20.8 ft. Sand, fine to very fine grained, light brown, occasional small gravel or coase sand 20.8-21.8 ft. Calche, soft, sandy, chalk white to light brown 21.8-22 ft. Caliche rock in tip (22.5-23 ft.?), no H/C odor
25-30 ft.	4.8 ft.	25-25.8 ft. Gravelly sand, sand fine to very fine grained, gravels rounded to 2 in. and caliche fragments. 25.8-26.5 ft. Caliche, sandy, hard 26.5-29.8 ft. Sand with soft sandstone, small gravels. Sand fine grained, brown, partially cemented but friable, possible H/C odor
30-35 ft.	2.9 ft.	30-32 ft. Gravelly sand, sand light brown, very fine grained. Gravels sandy, friable 32-32.9 ft. Sand and partially cemented sandstone, sand very fine grained, light brown, poss. light odor
35-40 ft.	2.7 ft.	Very hard drilling 39-40 ft. 35-35.8 ft. Gravelly sand, brown, damp, strong H/C odor 35.8-36.4 ft. Caliche with sand, hard with rock fragments 36.4-36.6 ft. Sand, gray-brown, H/C odor 36.6-37.9 ft. Caliche (chert?, quartz silica) with sand, H/C staining/product 37.2-37.9 ft.
40-45 ft.	1.9 ft.	Returns damp, brown, very strong H/C odor, 40-41.9 ft. Sand, brown, fine grained, damp, H/C odor through out, with occasional chert/quartz rock fragments
45-50 ft.	3.6 ft.	45-46.4 ft. Sand with occasional sandstone, rock to 2 in., increasing cementation with depth, brown, H/C saturated (free product) 46.4-49.6 ft. Sandstone, loosely cemented, fine grained, brown, H/C odor but no saturation
3A, 35-40 ft.	--	35-38 ft. Silty sand, hard drilling 38-40 ft.
3A, 40-45 ft.	2.7 ft.	40-40.2 Slough, chert 40.2-41 ft. Sand, brown, fine grained, occasional sandstone pieces, strong H/C odor 41-41.4 ft. Sandstone, hard, well cemented 41.4-42.3 ft. Sand, fine grained, occasional sandstone pieces, very strong H/C odor 42.3-42.7 ft. Sandstone and sand, sandstone partially consolidated, poor to medium cementing
3A, 45-51 ft.	5.0 ft.	45-45.9 ft. Sandstone, planar (similar to sugar cookies), poorly cemented 45.9-46.9 ft. Sand, dark brown, fine to medium grained, H/C saturated 46.9-48.2 ft. Sandstone, consolidated, hard, well cemented 48.2-50.0 ft. Sandstone, partially consolidated, poor to medium cement, H/C streaks where not consolidated
	BH-3	Left hole open overnight; 11/20/02, borehole caved to 45 ft. BLS, plugged to surface with 21 bags bentonite, hydrated every 5 ft.
	BH-3A	Completed with 20 ft. screen, 20 slot, 12 bags 8/16 Oglebay -Norton sand to 21 ft., 2 bags bentonite to 15 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

Borehole 8		
Date Drilled: 1/29/03		
Total Depth: 53 ft.		
Drilled in bottom of excavation, 13 ft. below surface		
Log of borehole:		
Depth	**Recovery**	**Description**
13-18 ft.	4 ft.	13-13.6 Slough, sand and rock. 13.6-14.7 ft. Sandstone, caliche and sand. Large sandstone fragments with fine to very fine grained sand, very light (creme) to light brown, clayey at 14.7 ft. 4.7-15.9 ft. Sandstone and sandstone fragments with fine grained sand. 15.9-17.1 ft. Poorly cemented sandstone and fine grained sand, light brown, some light gray, turpentine odor
18-23 ft.	4.2 ft.	Gray returns. 18-18.5 slough 18.5-19.3 ft. Silty sand, mottled, light gray and brown, sand very fine grained. 19.3-19.8 ft. Sandstone and sandstone fragments, gray, H/C odor 19.8-22.2 ft. Sandstone, partially consolidated, brown, strong odor (lacquer?)
23-28 ft.	4.8 ft.	23-23.7 slough 23.7-26.7 ft. Sandstone, partially/poorly consolidated, light brown, sand fine to very fine grained, slight odor 26.7-27.8 ft. Sand, light brown, some cementation, fine to very fine grained
28-33 ft.	4.8 ft.	28-31.5 ft. Sand, fine to very fine grained, light brown, some cementation, H/C odor 31.5-32.8 ft. Sandstone, light brown, poorly cemented
33-38 ft.	2.2 ft.	33-34 ft. Sand, some minor cementation, light brown (some crème color), fine to very fine grained. 34-35.2 ft. Sandstone, well cemented. Chert from 34.6-34.7 ft., H/C odor
38-43 ft.	3.2 ft.	38-39.3 ft. Sandstone with zones of chert and sand, light brown, sandstone not layered, massive 39.3-41.2 ft. Sand, brown, fine grained, uniform, H/C odor
43-48 ft.	4.5 ft.	43-45.5 ft. Sand, brown, same as above, H/C odor 45.5-46 ft. Gravelly sand, dark brown, sand in sandstone gravels, some saturation. 46.0-47.5 ft. Sandstone, gravel and sand, sandstone partially cemented, brown, some slightly damp zones
48-53 ft.	4.8 ft.	48-51 ft. Sandstone, partially cemented and sand, H/C saturated in places, major saturation 50.5-51.0. 51-52.8 ft. Sandstone, partially cemented, vertical pathways with oil at 52.8 ft.
		Completed with 35 ft. screen, 20 slot, 10 ft. riser, 20 bags bags 8/16 Oglebay -Norton sand to 3 ft, 2 bags bentonite to surface. Plugged by mud after excavation flooded April 4, 2004.

Borehole 18		
Date Drilled: 04/30/03, 05/07/03		
Total Depth: 50 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	0-1 ft. Top soil 1-5 ft. Caliche and silty sand, light brown, very fine grained, caliche fragments to 1 in.
5-10 ft.	Cuttings	Caliche and silty sand, as above, frequent fine gravels/caliche fragments, slight H/C odor
10-15 ft.	Cuttings	Sandy silt, light brown, turning light gray at 15 ft., frequent fine gravels/fragments, slight H/C odor
15-20 ft.	Cuttings	Hard drilling at 18 ft. Sandy silt/silty sand, gray, frequent fine gravels/fragments, H/C odor
20-25 ft.	Cuttings	Contiued occasional hard drilling, sandy silt/silty sand, light brown, very fine grained sand, slight H/C odor
25-30 ft.	Cuttings	Silty sand, light brown, with frequent fine gravels/caliche fragments, slight H/C odor
30-35 ft.	Cuttings	Sand, light brown, very fine to fine grained, with frequent chips/fragments fine grained size, no H/C odor,
35-40 ft.	Cuttings	35-37 ft. Sand as above. 37-39 ft. Hard drilling, cher and/or hard limestone, drill drive shaft parts.
40-45 ft.	3.6 ft.	Resume drilling 5/7, 40-42.7 ft., sand, brown, very fine to fine grained, uniform, occasional small sandstone gravel, strong H/C odro 42.7-43.6 ft. Sandstone, light brown, partially consolidated, poorly cemented
45-50 ft.	3.7 ft.	45-47.9 ft. Sand and sandstone, brown, sand fine grained becoming very fine grained at 47.9 ft., sandstone planar ("cookies"), poorly consolidated, poor to medium cementing, H/C saturated frome 46-47 ft. 47.9-48.7 ft. Sandstone and sand, chalk white to very light brown, poorly cemented
		Completed with 20 ft. screen, 20 slot, 12 bags 8/16 Oglebay -Norton sand to 16 ft, 2 bags bentonite to 12 ft., backfill cuttings to 2 ft, then 1 bag bentonite plug to surface.

Borehole 19		
Date Drilled: 05/07/03, 05/09/03		
Total Depth: 50 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Caliche and silty sand, chalk white, sand very fine grained, caliche fragments, no H/C odor
5-10 ft.	Cuttings	Caliche and sand, very light brown, sand very fine to fine grained, caliche gravels/fragments to 1 in.
10-15 ft.	Cuttings	Silty sand with caliche gravels, sand very light brown, very fine to fine grained, fine gravels to 3/4 in. occ larger caliche fragments, no H/C odor
15-20 ft.	Cuttings	Drill rod breaks, resume 5/9. Sand, light brown, (tint of gray), fine grained, with fine gravels/caliche chips, H/C odor
20-25 ft.	Cuttings	Silty sand, light brown, very fine to fine grained, with fine gravels and occasional caliche gravels to 3/4 in.
25-30 ft.	Cuttings	Hard drilling 28-29 ft. Silty sand, light brown, sand very fine grained
30-35 ft.	Cuttings	Hard drilling 33-34 ft. Silty sand, light brown, very fine grained, with caliche or sandstone chip/fragments <1/4"
35-40 ft.	Cuttings	Silty, clayey sand, light brown, with large sandstone fragments to 1 in., chert fragments at 40 ft., possible H/C odor
40-45 ft.	2.8 ft.	40-40.3 ft. slough, clayey 40.3-40.6 ft. Clayey sand, light brown, damp 40.6-42.4 ft. Sand, brown, fine grained, very strong H/C odor 42.4-42.8 ft. Sandstone, consolidated, well cemented, H/C staining on pieces
45-50 ft.	5.0 ft.	45-45.3 ft. Sandstone as above 45.3-46.3 ft. Sand, brown, fine grained, H/C saturated 46.3-48.2 ft. Sand and partially consolidated sandstone, sandstone poorly cemented, H/C saturated to 47.2 ft. 48.2-49 ft. Sandstone, medium consolidation, medium cementation 49-50 ft. Sand, very fine grained, with some partially consolidated sandstone, poorly cemented.
		Note: Sand shows previous H/C saturation from approx. 42 ft to 45.5 ft. Current saturation in core approximately 1.6 ft. thick. Sand and sandstone below 47 ft. to 50 ft. show vertical fingers of oil, but not more than 1/16-1/8 in. wide.
		Completed with 20 ft. screen, 20 slot, 12 bags 8/16 Oglebay -Norton sand to 20 ft, 2 bags bentonite to 14 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.
		After 30 minutes, Top oil 49.01, Top water 50.60 ft. BTOC.

Borehole 20		
Date Drilled: 05/09/03		
Total Depth: 50 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Silty sand, light brown, with caliche gravels/fragments to 1.5 in., H/C odor
5-10 ft.	Cuttings	Silty sand, very light brown, with caliche gravels/fragments to 1.5 in., strong H/C odor
10-15 ft.	Cuttings	Gravelly, silty sand, light brown (weathers to light gray in pile on surface after 15-20 minutes), sand very fine to fine grained, gravels to 1 in., slight H/C odor
15-20 ft.	Cuttings	Sand, very fine to fine grained, light brown (weathers to light gray in pile on surface after 15-20 minutes), occasional caliche fragments/gravel to 1/2-3/4 in., no H/C odor
20-25 ft.	Cuttings	Silty sand, light brown, sand very fine grained, with frequent fine gravels/fragments, very strong H/C odor
25-30 ft.	Cuttings	Silty sand as above, less H/C odor
30-35 ft.	Cuttings	Sandy silt, light brown, sand very fine grained, frequent small caliche gravels/fragments
35-40 ft.	Cuttings	Sandy, clayey silt, frequent large caliche/sandstone fragments, hard drilling 38-40 ft., H/C odor
40-45 ft.	2.7 ft.	40-40.4 ft. slough 40.4-42.4 ft. Sand, brown, fine grained, slightly moist, strong H/C odor 42.4-42.7 ft. Sandstone, light brown, planar, well cemented, evidence of prior H/C from staining
45-50 ft.	4.7 ft.	45-46.8 ft. Sand and sandstone, brown, sand very fine to fine grained, sandstone planar, poorly consolidated, poorly cemented, H/C saturated 46.8-47.4 ft. Sand, some sandstone, H/C saturated 47.4-47.9 ft. Sandstone, partially consolidated, poorly cemented 47.9-49.7 ft. Sand, some sandstone, sand light brown, very fine to fine grained, H/C odor, some H/C staining
		Completed with 20 ft. screen, 20 slot, 12 bags 8/16 Oglebay -Norton sand to 21 ft, 2 bags bentonite to 16 ft., backfill cuttings to 2 ft, then 1 bag bentonite plug to surface.
		After 5 hours, Top oil 48.67, Top water 50.81 ft. BTOC.

Borehole 26		
Date Drilled: 07/15/03		
Total Depth: 51.5 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Sand, silty, light brown but weathers to light gray in air, fine grained, caliche chips/fragments to 1 in., none or only slight H/C odor.
5-10 ft.	Cuttings	Sand, as above, very light brown, no H/C odor
10-15 ft.	Cuttings	Sand, as above, very light brown, possible slight H/C odor
15-20 ft.	Cuttings	Sand, as above, H/C odor
20-25 ft.	Cuttings	Very hard drilling 23-25 ft. Sand, as above, H/C odor
25-30 ft.	Cuttings	Sand, as above, H/C odor, cuttings turn very light gray in sun
30-35 ft.	Cuttings	Sand, some silt, light brown, very fine grained, few fragments, H/C odor
35-40 ft.	Cuttings	35-38 ft. Sand, as above 38-40 ft. Sand and zones of quartz silica and very hard sandstone
40-45 ft.	3.5 ft.	40-40.7 ft. slough (sandy, clayey silt) 40.7-43.3 ft. Sand, brown, fine to very fine grained, uniform, very strong H/C odor, evidence of H/C staining 43.3-43.5 ft. Sandstone, consolidated, medium cementing
45-51.5 ft.	3.0 ft.	45-45.8 ft. Sandstone, partially consolidated "cookies", H/C staining 45.8-48.0 ft. Sand, very fine to fine grained, tightly packed, occasional poorly consolidated sandstone, H/C saturated from 45.8-46.8 ft. H/C staining remainder of core.
		Completed with 20 ft. screen, 20 slot, 12 bags 8/16 Oglebay -Norton sand to 25 ft, 2 bags bentonite to 19 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.
		Broken screen casing, replaced 9/8/03 with 20 ft. screen, 20 slot, 12 bags 8/16 Oglebay -Norton sand to 24 ft, 2 bags bentonite to 19.5 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

Borehole 29		
Date Drilled: 08/05/03		
Total Depth: 51 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Surface soil and silty sand, brown, sand fine grained, frequent caliche fragments, H/C odor
5-10 ft.	Cuttings	Silty sand, light brown, fine grained, occasional caliche chips/fragments to 1/2 in. strong H/C odor
10-15 ft.	Cuttings	Silty sand, light brown, fine grained, occasional caliche chips/fragments to 1/2 in. strong H/C odor
15-20 ft.	Cuttings	Silty sand, light brown, with frequent caliche chips/fragments to 3/4 in., H/C odor
20-25 ft.	Cuttings	Silt, light brown, occasional caliche frags to 1/4 in., powdery, dry, H/C odor
25-30 ft.	Cuttings	Sandy silt/silty sand, light brown, very fine grained, H/C odor (very few fragments)
30-35 ft.	Cuttings	Silty sand, light brown, very fine grained, frequent chips/frags to 1/2 in., H/C odor
35-40 ft.	Cuttings	Hard drilling 37-39 ft., then very soft. Silty sand, light brown, very fine grained, with sandstone chips/fragments/pieces to 3/4 in., strong H/C odor
40-45 ft.	3.4 ft.	40-41 ft. slough (includes silica quartz pieces) 41-43.4 ft. Sand, brown, fine grained, uniform, very strong H/C odor
45-51.5 ft.	3.8 ft.	45-45.8 ft. Sand, brown, fine grained, H/C odor. 45.8-46.7 ft. Sand and partially consolidated, poorly cemented sandstone, H/C saturated. 46.7-48.8 ft. Sand, brown, very fine to fine grained, with zones of partially consolidated well cemented sandstone. Less sandstone at 51 ft., slight H/C odor at 51 ft.
		Hole had obstruction on 8/6/03, redrilled on 8/6 and 8/7 after casing parted. Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 29 ft, 2 bags bentonite to 24 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.
		After 5 hours, Top oil 48.67, Top water 50.81 ft. BTOC.

Borehole 31		
Date Drilled: 09/08/03		
Total Depth: 52 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Silty sand, light brown, sand very fine grained, abundant caliche fragments/graveles to 1 in., no H/C odor
5-10 ft.	Cuttings	Silty sand, very light brown, sand very fine grained, freq fine caliche gravels and occasional larger frags
10-15 ft.	Cuttings	Sandy silt, chalk color, sand very fine grained, occasional small caliche gravels, no H/C odor
15-20 ft.	Cuttings	Sandy silt, chalk color, as above, dry, abundant soft coarse grained size caliche fragments, occasional fragments to 3/4 in, no H/C odor
20-25 ft.	Cuttings	Very hard drilling starting at 20 ft. , silt, chalk color (powdered caliche?), with abundant coarse grained size small caliche fragments, no H/C odor
25-30 ft.	Cuttings	Silt and ground up caliche, chalk color, abundant med-coarse grained caliche chips, no H/C odor
30-35 ft.	Cuttings	Silty sand with caliche/sandstone chips, very light brown, very fine grained sand, chips soft, slight H/C odor
35-40 ft.	Cuttings	Silt and sandstone, very light brown, abundan sandstone chips to 1/2 in., H/C odor
40-45 ft.	- -	No recovery, soft, calcium carbonate cemented sandstone in tip
45-52 ft.	3.6 ft.	45-45.9 ft. Sand, brwon, fine grained, H/C saturated 45.9-47.1 ft. Sand, light brown to brown, occasional streaks of hydrocarbon, very fine to fine grained 47.1-48.6 ft. Sand and sandstone, light brown, sandstone poorly consolidated, occasional well cemented, slight H/C odor at tip.
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 28 ft, 1 bag bentonite to 25 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

Borehole 32		
Date Drilled: 09/09/03		
Total Depth: 52 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Sandy silt, light brown, very fine grained sand, frequent fine caliche gravels to 1/2 in, no H/C odor
5-10 ft.	Cuttings	Sandy silt, same as above, abundant caliche gravels to 1 in.
10-15 ft.	Cuttings	Silty sand, light brown, very fine to fine grained, frequent fine caliche gravels/fragments to 1/4 in., slight H/C odor
15-20 ft.	Cuttings	Gravelly sand (sand and caliche?), sand very light brown, very fine to fine grained, abundant caliche/sandstone gravels/fragments, mostly V1/2 in., occasional larger to 1 in., slight odor
20-25 ft.	Cuttings	Driller reports hard drilling, silty sand, light brown, frequent small caliche/sandstone fine gravels/fragments, no H/C odor
25-30 ft.	Cuttings	Silt, very light brown, some sand (very fine grained), frequent small sandstone/caliche gravels/cuttings, no H/C odor
30-35 ft.	Cuttings	Silt as above, increasing sandstone/caliche gravels/fragments (abundant) to 1/2 in. No H/C odor
35-40 ft.	Cuttings	35-38 ft. Silty sand to 38 ft., chert, quartz silica, limestone frags. 38-40 ft. Sand, very fine grained, silty with sandstone fragments, light brown, but light gray when exposed to air, slight H/C odor
40-45 ft.	4.0 ft.	40-42.5 ft. Sand, light brown, fine grained, uniform, occasional small sandstone fragments 42.5-43 ft. Sandstone, "rose"-brown, hard, well cemented, fine grained, H/C odor 43-44 ft. Sand, very fine to fined grained, uniform, occasional sandstone, strong H/C odor
45-52.5 ft.	4.4 ft.	45-47 ft. Sand, brown, fine grained, occasional, sandstone, H/C saturated. 47-48.2 ft. Sand, brown, very fine to fine grained, less H/C, increasing sandstone, sandstone poorly consolidated, poorly cemented. 48.2-49.4 ft. Sand and sandstone, light brown, occasional H/C streaks, sand very fine grained, sandstone poorly cemented, H/C odor
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 28 ft, 1 bag bentonite to 25 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

Borehole 33		
Date Drilled: 09/10/03		
Total Depth: 50 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Silt, chalk white, with frequent fine caliche gravels/fragments to 1/2", no H/C odor
5-10 ft.	Cuttings	Sandy silt/silty sand, light brown, very fine grained, abundant caliche gravels/fragments to 1/2 in., no H/C odor
10-15 ft.	Cuttings	Silt, chalk white, frequent fine caliche gravels/fragments, no H/C odor
15-20 ft.	Cuttings	Silty sand, light brown, very fine grained sand, with abundant caliche gravels/fragments to 3/4 in to 1 in., no H/C odor
20-25 ft.	Cuttings	Silty sand/sandy silt, light brown, very fine grained sand, frequent small (fine) gravels/cuttings to 1/4 in,, slight H/C odor
25-30 ft.	Cuttings	Silty sand/sandy silt as above, caliche fragments 1/2 in. to 3/4 in., possilble H/C odor
30-35 ft.	Cuttings	Silty sand, light brown, very fine grained sand, abundant fine gravels/cuttings to I/4 in.., occasional sandstone/limestone fragments, no H/C odor
35-40 ft.	Cuttings	Very hard drilling 38-40 ft., added water. Cuttings silt, light brown, no H/C odor
40-45 ft.	3.2 ft.	40-40.2 ft. slough 40.2-43.2 ft. Sand, light brown with white streaks, very fine to fine grained, uniform, strong H/C odor
45-52.5 ft.	4.1 ft.	45-46 ft. Sand, same as above, H/C saturated 46-47.1 ft. Sand and partially consolidated sandstone, poorly consolidated. 47.1-47.3 ft. Sandstone, consolidated, well cemented. 47.3-49.1 ft. Silty sand/sandy silt, light brown, very fine grained sand, damp, little H/C odor at 52 ft.
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 27 ft, 1 bag bentonite to 25 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

Borehole 34		
Date Drilled: 09/10/03		
Total Depth: 52 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Sandy silt, chalk white, calice fragments to 3/4", no H/C odor
5-10 ft.	Cuttings	Silty sand, light brown, very fine grained, frequent fine caliche fragments, no H/C odor
10-15 ft.	Cuttings	Same as above, no H/C odor
15-20 ft.	Cuttings	Silty sand, as above and caliche. Caliche fragments to 1 in., no H/C odor
20-25 ft.	Cuttings	Sandy silt, light brown with frequent caliche fragments. Harder drilling starting at 20 ft.
25-30 ft.	Cuttings	Silty sand, light brown, very fine grained, with abundant caliche/sandstone gravels/fragments <3/4 in., no H/C odor
30-35 ft.	Cuttings	Sand, very fine grained, some silt, light brown with abundant caliche/sandstone gravels/fragments <1/2 in. slight H/C odor
35-40 ft.	Cuttings	Sand, very fine grained, some silt, light brown with abundant caliche/sandstone gravels/fragments to 1 in., hard drilling 38-40 ft., slight H/C odor
40-45 ft.	4.2 ft.	40-42.7 ft. Sand, fine grained, light brown, with white streaks and frequent small gravels ?1/4 in., H/C odor 42.7-42.9 ft. Sandstone, hard, light brown, very fine grained 42.9-44.2 ft. Sand, light brown, fine grained, H/C odor but no staining
45-52.5 ft.	3.7 ft.	45-48.7 ft. Sand, light brown, fine grained grading to very fine grained at approximately 48 ft., occasional thin sandstones, H/C saturated from 46.5 to 47 ft, damp 47-48.7 ft. H/C odor through out.
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 21 ft, 1 bag bentonite to 18 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

Borehole 36		
Date Drilled: 09/11/03		
Total Depth: 52.5 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Surface soil, silty sand, brown, organic residue and abundant caliche fragments to 3/4"
5-10 ft.	Cuttings	Silty sand, light brown, very fine grained sand, frequent sandstone and caliche fragments to 1/2 in., slight H/C odor
10-15 ft.	Cuttings	Sand, light brown, very fine grained, uniform, no H/C odor
15-20 ft.	Cuttings	Silty sand/sandy silt, light brown, occasional caliche fragments to 3/4 in., no H/C odor
20-25 ft.	Cuttings	Hard drilling at 20 ft. Silt, light brown, with frequent fine caliche gravels to 1/4 in., no H/C odor
25-30 ft.	Cuttings	Sandy silt, light brown, very fine grained sand with frequent caliche fragments to 3/4", no H/C odor
30-35 ft.	Cuttings	Silty sand, very fine grained, light brown, with abundant fine caliche gravels/fragments, no H/C odor
35-40 ft.	Cuttings	35-38 ft. Silty sand as above 38-40 ft. very hard drilling, chert, quartz silica fragments
40-45 ft.	4.1 ft.	40-40.4 slough 40.4-42.2 ft. Sand, light brown, fine grained, uniform, H/C staining and odor 42.2-43.5 ft. Sand, same as above with occasional poorly cemented sandstone, H/C staining and odor 43.5-44.1 ft. Sandstone partially consolidated, poorly cemented, very light brown.
45-52.5 ft.	4.0 ft.	45-45.5 slough 45.5-46 ft. Sand and poorly consolidated sandstone, H/C saturated 46-46.5 ft. Sandstone, poorly consolidated, poorly cemented 46.5-46.8 ft. Sand, fine grained, brown, uniform, H/C saturated 46.8-47.2 ft. Sandstone, partially to well consolidated, well cemented 47.2-48.7 ft. Sand and partially consolidated sandstone, partially H/C saturated 48.7-49.4 ft. Sand, light brown, very fine grained, water saturated (damp), slight H/C odor
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 24 ft, 1 bag bentonite to 21 ft., backfill cuttings to 3 ft, then bentonite plug to surface.

Borehole 38		
Date Drilled: 10/06-07/03		
Total Depth: 51 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Silty sand, brown, surface soil, caliche chips/fragments, sand fine grained, no H/C odor
5-10 ft.	Cuttings	Sand as above, increasing caliche chips
10-15 ft.	Cuttings	Silty sand, light brown, abundant caliche chips/fragments/gravels to 1/4", no H/C odor
15-20 ft.	Cuttings	Caliche and silty sand, caliche chips/gravels to 1 in., very light brown, no H/C odor
20-25 ft.	Cuttings	Silty sand, light brown, with abundant caliche chips/fragments (soft) to 1/2", no H/C odor
25-30 ft.	Cuttings	Sand, light brown, very fine to fine grained, with abundant coarse grained caliche fragments and occasional larger fragments to 1 in., no H/C odor
30-35 ft.	Cuttings	Silty sand, light brown, very fine to fine grained, with abundant caliche chips to 1/4", no odor
35-40 ft.	Cuttings	Medium to hard drilling 39-40 ft. Silty sand, light brown (light gray when air exposed), sand very fine to fine grained, caliche/sandstone chert chips to 3/4 in., abundant, sandstone coarse grained, H/C odor
40-45 ft.	3.2 ft.	40-40.3 slough, including quartz silica chert fragments from 39-40 ft. 40.3-42.8 ft. Sand, brown, fine grained, uniform, clean, H/C staining, odor 42.8-43.2 ft. Sand, same as above but with light mottling
45-51 ft.	2.6 ft.	45-46.2 ft. Sand, same as above 46.2-47.6 ft. Sand and sandstone, sand light brown, very fine grained, H/C staining. Sandstone poorly consolidated, poorly cemented, traces of product at 50 ft, water saturated, auger refusal at 51 ft.
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 26.5 ft, 1 bag bentonite to 24 ft., backfill cuttings to 2 ft, then 1 bag bentonite plug to surface.

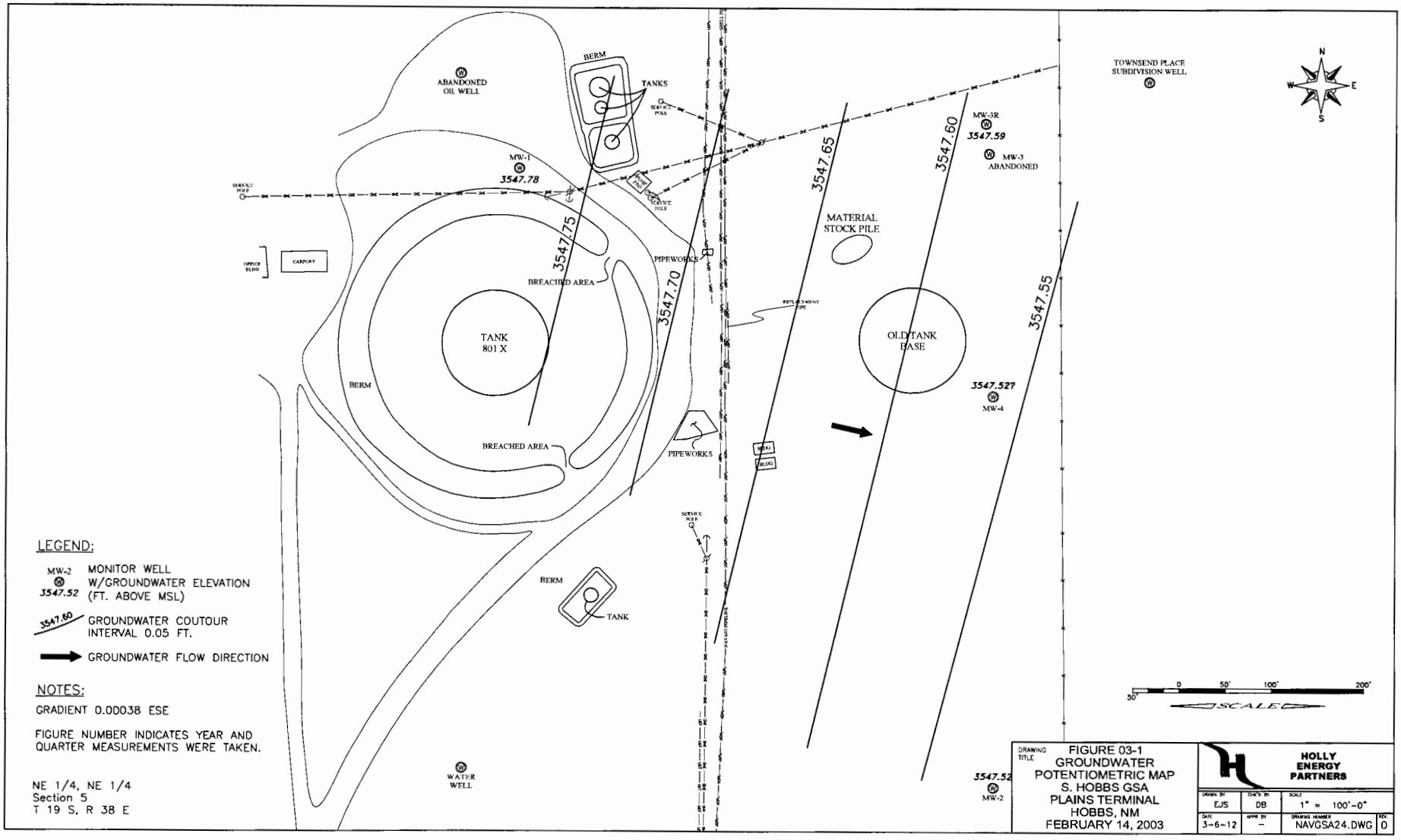
Borehole 47		
Date Drilled: 11/05/03		
Total Depth: 52 ft.		
Description from cuttings to 45 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Sandy Silt (powdered caliche?), very light brown, sand very fine grained, frequent caliche chips/fragments to 1/4", no H/C staining or odor
5-10 ft.	Cuttings	Sand, light brown, very fine to fine grained, abundant caliche fragments to 1 in., no H/C staining or odor
10-15 ft.	Cuttings	Sand, same as above, no H/C staining of odor
15-20 ft.	Cuttings	Sand, very fine to fine grained, light brown, abundant caliche fragments to 1/2 ", no H/C staining or odor
20-25 ft.	Cuttings	Silty sand, light brown, very fine grained, abundant caliche chips/fragments to 1 in., no H/C staining, odor
25-30 ft.	Cuttings	Gravelly, silty sand, light brown, very fine grained sand, gravels are caliche, chips/fragments from coarse grained size to 1/2 in., no H/C staining, odor
30-35 ft.	Cuttings	Gravelly sand, light brown to brown, very fine to fine grained sand, less silt, gravels to 1 in., no H/C stain, odor
35-40 ft.	Cuttings	Gravelly sand, same as above, strong H/C odor, driller reports hard drilling 30-40 ft.
40-45 ft.	Cuttings	Sand, brown, fine grained, occasional sandstone/caliche fragment to 1/2", H/C staining, odor
45-50 ft.	3.1 ft.	Sand, light brown to brown, very fine grained, with frequent sandstone pieces, sandstone poorly consolidated, poorly cemented. H/C odor throughout, H/C show at 46.6 ft.
50-52 ft.	- -	Sand, as above
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 22 ft, 1 bag bentonite to 20 ft., backfill cuttings to 3 ft, then 1 bag bentonite plug to surface.

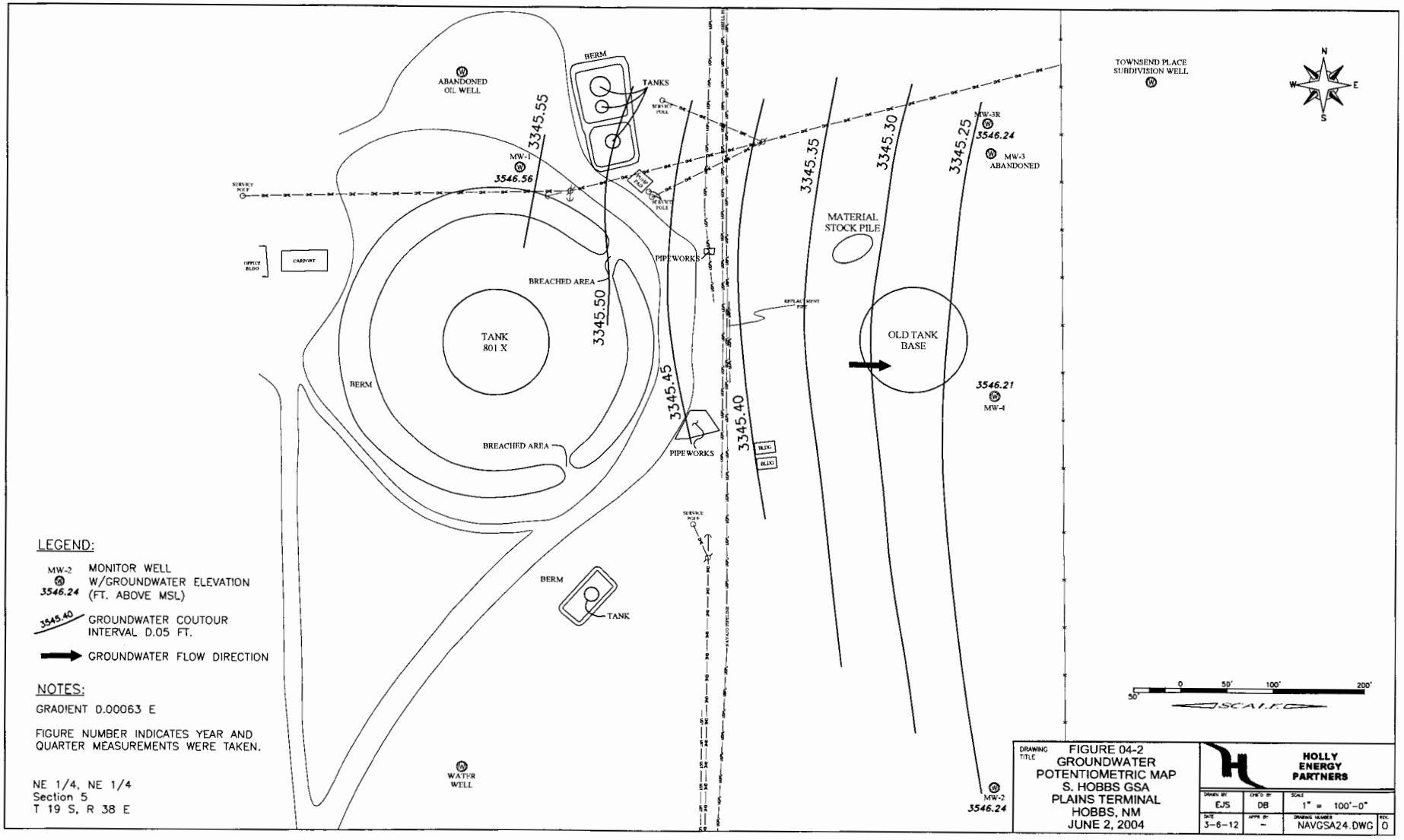
Borehole 56		
Date Drilled: 11/14/03		
Total Depth: 52 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Hand augered approx 24 in. on 11/13, ran line detector (Magmatrak 100) in hole, no response, drilled and checked hole ever few inches to 4 ft., no obstructions. 0-5 ft. Silty sand, light brown, very fine grained, abundant caliche chips/frags to 1 in., no H/C staining, odor
5-10 ft.	Cuttings	Same as above
10-15 ft.	Cuttings	Sandy silt, light brown, abundant chips/frags to 3/4 in., sand very fine grained, no H/C S,O
15-20 ft.	Cuttings	Silty sand, reddish-brown, very fine grained sand, abundant caliche chips/frags to 1/4", no H/C S,O
20-25 ft.	Cuttings	Sandy silt, reddish-brown, sand very fine grained, freq caliche chips/frags to 1/4", no H/C S,O
25-30 ft.	Cuttings	Silt, very light brown, occasional small caliche chips/frags < 1/4", no H/C S,O
30-35 ft.	Cuttings	Sandy silt, light brown, very fine grained sand, frequent caliche chips/frags < 1/4", no H/C S,O
35-40 ft.	Cuttings	Hard drilling at 36 ft. Sandy silt, light brown (gray tint?), sand very fine grained, frequent caliche/chert/sandstone chips 1/4-1/2 in. slight H/C odor
40-45 ft.	3.2	Very hard drilling 40-41 ft. 40-40.4 ft. Silty sand, black, H/C odor 42 ft. Chert, quartz, massive, very hard 43-45 ft. Sand, very fine to fine grained, brown, H/C staining and odor
45-50 ft.	4.6 ft.	45-48.9 ft. Sand and sandstone, sand very fine to fine grained, brown, sandstone blocky, tabular, poorly consolidated, medium cementing, H/C saturated from 45 to 47 ft. 48.9-49.6 ft. Silty sand, light brown, very fine grained sand, slight H/C odor, moist, some staining at top
50-52 ft.	- -	Silty sand, brown, H/C odor.
		3.3 ft. crude oil in bore hole
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 31 ft, 1 bag PDSCO bentonite 1/4" chips to 29 ft., backfill cuttings to 2 ft, then bentonite plug.

Borehole 63		
Date Drilled: 1/14/04		
Total Depth: 51.5 ft.		
Description from cuttings to 40 ft., then 5 ft. core barrel		
Log of borehole:		
Depth	**Recovery**	**Description**
0-5 ft.	Cuttings	Located surface lines and manually dughole to 4 ft. with shovel, bar and hand auger. 0-4 ft. fill material including pieces of wood and wire. Native material at ~ 4 ft.
5-10 ft.	Cuttings	Silty sand, light brown, very fine grained with abundant caliche fragments/chips to 3/4" Cuttings turning light gray/brown after exposure to air, slight H/C odor
10-15 ft.	Cuttings	Sandy silt, light brown, very fine grained sand with frequent caliche chips/fragments to 1/2 in. H/C odor, cuttings light-gray/brown after exposure to air
15-20 ft.	Cuttings	Silty sand, light brown, very fine grained with frequent caliche fragments/chips to 1/4" Srong H/C odor
20-25 ft.	Cuttings	Silty sand, same as above with few chips/frags, very strong H/C odor
25-30 ft.	Cuttings	Sand, silty, light brown, very fine grained, with abundant soft caliche/sandstone chips to 1/4", strong H/C odor
30-35 ft.	Cuttings	Sand, some silt, light brown, very fine grained with abundant sandstone/caliche chips to 1/4", hard drilling 32-33 ft, very strong H/C odor.
35-40 ft.	Cuttings	Sand, same as above, hard drilling at 40 ft., very strong H/C odor
40-45 ft.	2.8 ft.	40-40.8 ft. Chert/quartz, badlyfractured, oil saturated 40.8-42.6 ft. Sand, brown, very fine grained, uniform, H/C staining and odor 42.6-42.8 ft. Sandstone rock in tip
45-51.5 ft.	4.0 ft.	45-46.5 ft. Sand and sandstone, sand very fine grained, brown, H/C staining, sandstone partially consolidated, medium cementing, saturated oil from 46.2 to 46.5 ft. 46.5-49 ft. Sandy silt/silty sand with some sandstone, less sandstone than above. Some oil saturation at tip, very hard drilling at 51.5 ft.
		Four feet oil in auger stem.
		Completed with 15 ft. screen, 20 slot, 9 bags 8/16 Oglebay -Norton sand to 32 ft, backfill cuttings to 2 ft, then bentonite plug to surface.

APPENDIX B-4

Historical Groundwater Gradient Maps


ABANDONED OIL WELL
BERM
TANKS
MW-1
3547.78
MW-3R
3547.59
MW-3
ABANDONED
TOWNSEND PLACE SUBDIVISION WELL
N
S
E
W
3547.75
3547.70
3547.65
3547.60
3547.55
OFFICE BLDG
CARPORT
PIPEWORKS
BREACHED AREA
MATERIAL STOCK PILE
TANK 801 X
OLD TANK BASE
BERM
BREACHED AREA
PIPEWORKS
3547.527
MW-4
BERM
TANK
WATER WELL
3547.52
MW-2
0
50'
100'
200'
SCALE
LEGEND:
MW-2
3547.52
MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
3547.60
GROUNDWATER COUTOUR INTERVAL 0.05 FT.
GROUNDWATER FLOW DIRECTION
NOTES:
GRADIENT 0.00038 ESE
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 03-1
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
FEBRUARY 14, 2003
HOLLY ENERGY PARTNERS
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 100'-0"
DATE 3-6-12
APPR BY –
DRAWING NUMBER NAVGSA24.DWG
REV. 0



LEGEND:

- MW-2 / 3546.24 — MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
- 3545.40 — GROUNDWATER COUTOUR INTERVAL 0.05 FT.
- GROUNDWATER FLOW DIRECTION

NOTES:

GRADIENT 0.00063 E

FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

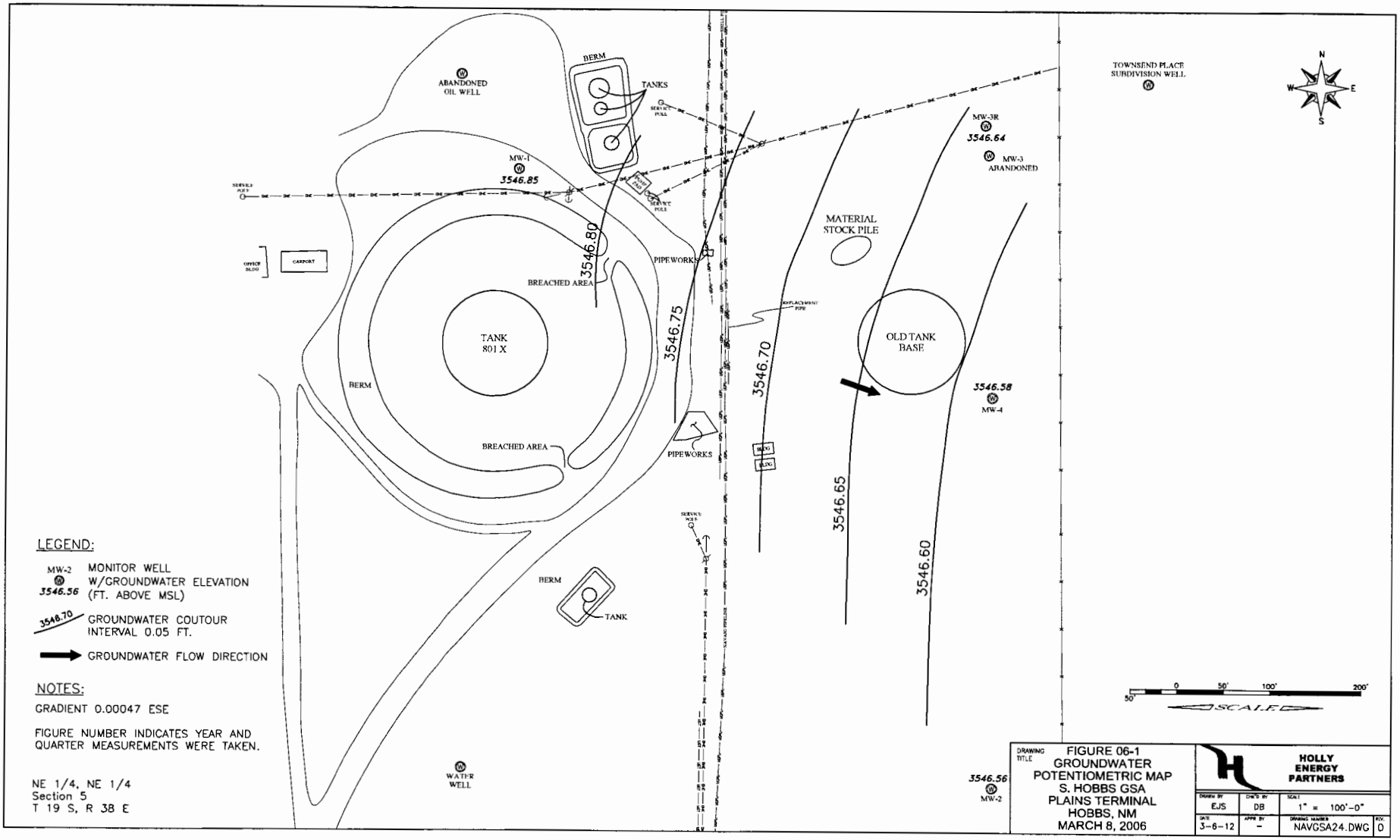
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE

FIGURE 04-2
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
JUNE 2, 2004

HOLLY ENERGY PARTNERS

DRAWN BY	CHK'D BY	SCALE
EJS	DB	1" = 100'-0"
DATE	APPR BY	DRAWING NUMBER / REV.
3-6-12	-	NAVGSA24.DWG / 0



LEGEND:

- MW-2 / 3546.56 — MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
- 3546.70 — GROUNDWATER COUTOUR INTERVAL 0.05 FT.
- GROUNDWATER FLOW DIRECTION

NOTES:

GRADIENT 0.00047 ESE

FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE: FIGURE 06-1
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
MARCH 8, 2006

HOLLY ENERGY PARTNERS

DRAWN BY	CHK'D BY	SCALE
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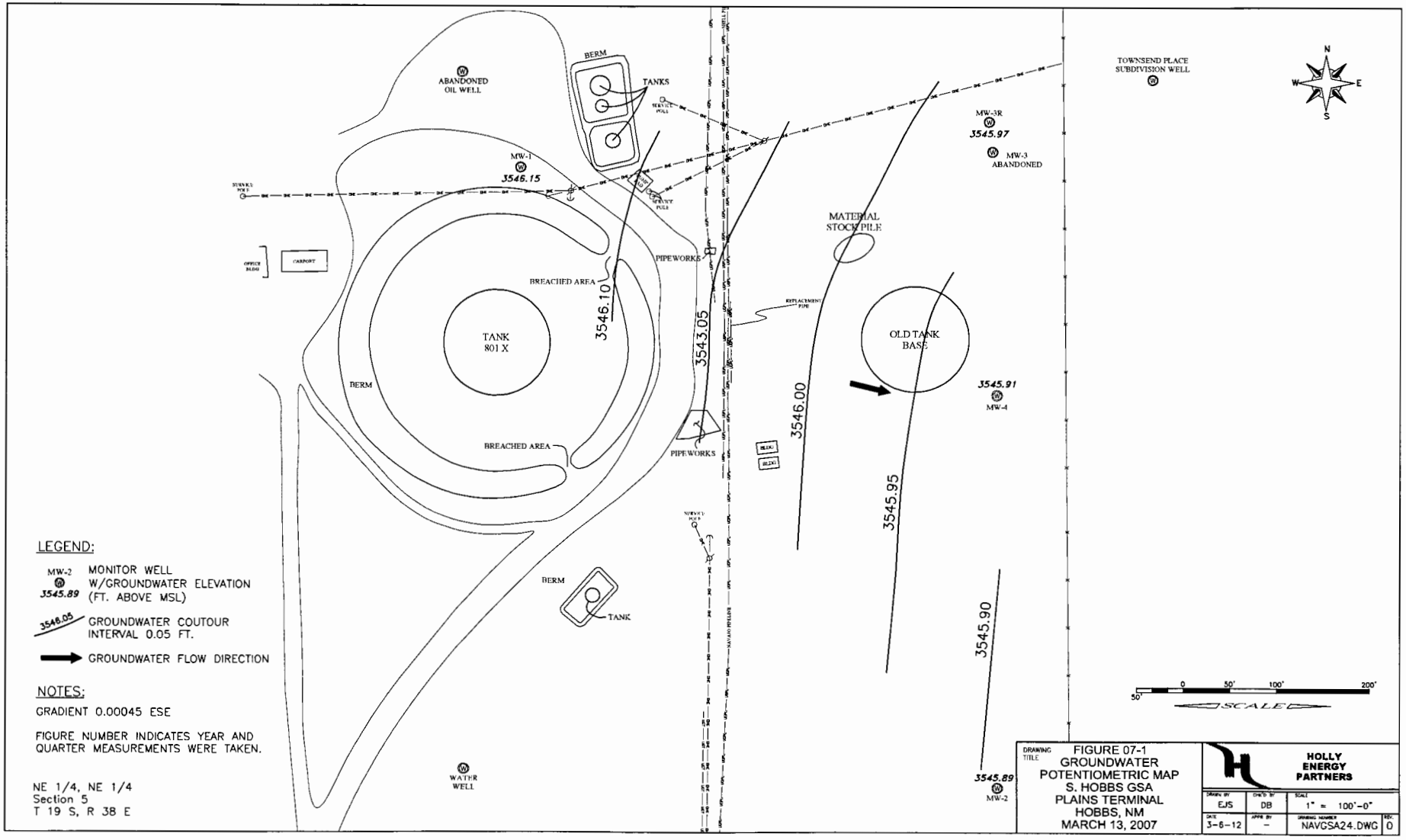
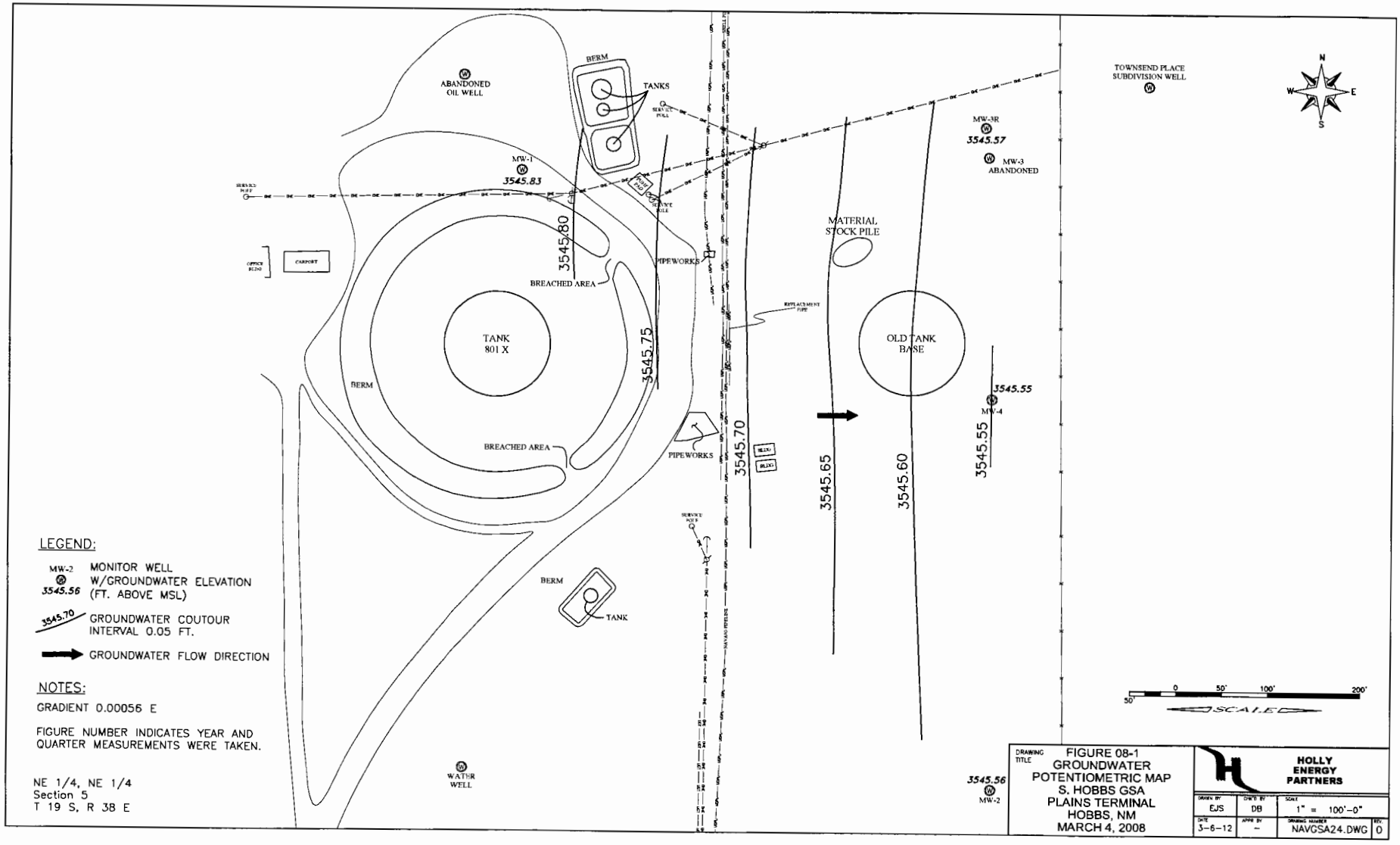
DATE	APPR BY	DRAWING NUMBER / REV.
3-6-12	-	NAVGSA24.DWG / 0


ABANDONED OIL WELL
BERM
TANKS
MW-1
3546.15
MW-3R
3545.97
MW-3 ABANDONED
TOWNSEND PLACE SUBDIVISION WELL
N
W
E
S
MATERIAL STOCK PILE
OFFICE BLDG
CARPORT
PIPEWORKS
BREACHED AREA
3546.10
3543.05
TANK 801 X
OLD TANK BASE
3545.91
MW-4
BERM
BREACHED AREA
PIPEWORKS
3546.00
3545.95
3545.90
BERM
TANK
WATER WELL
3545.89
MW-2
0
50'
100'
200'
SCALE
LEGEND:
MW-2
3545.89
MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
3546.05
GROUNDWATER COUTOUR INTERVAL 0.05 FT.
GROUNDWATER FLOW DIRECTION
NOTES:
GRADIENT 0.00045 ESE
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 07-1
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
MARCH 13, 2007
HOLLY ENERGY PARTNERS
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 100'-0"
DATE 3-6-12
APPR BY –
DRAWING NUMBER NAVGSA24.DWG
REV. 0



LEGEND:

MW-2 3545.56 — MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)

3545.70 — GROUNDWATER COUTOUR INTERVAL 0.05 FT.

GROUNDWATER FLOW DIRECTION

NOTES:

GRADIENT 0.00056 E

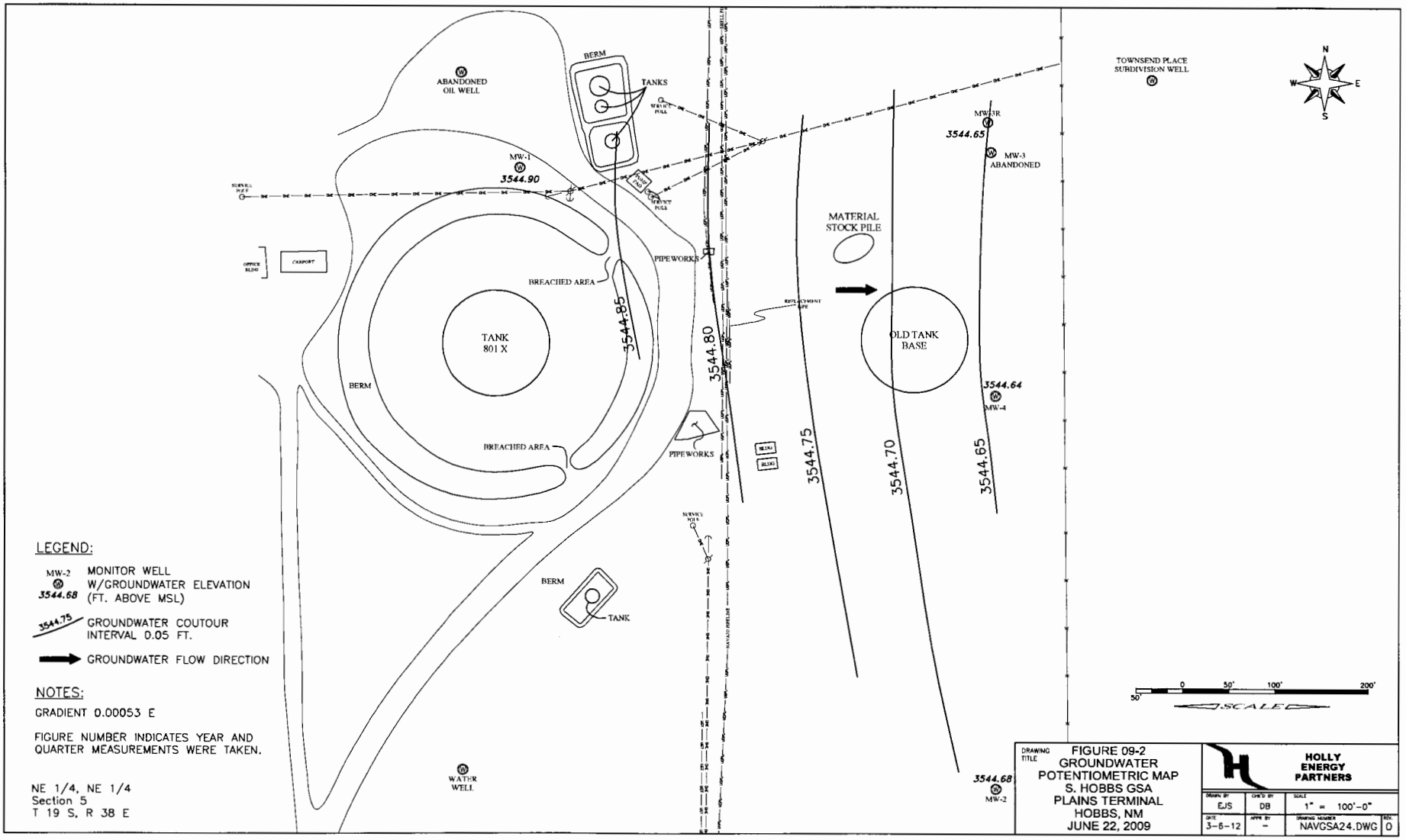
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

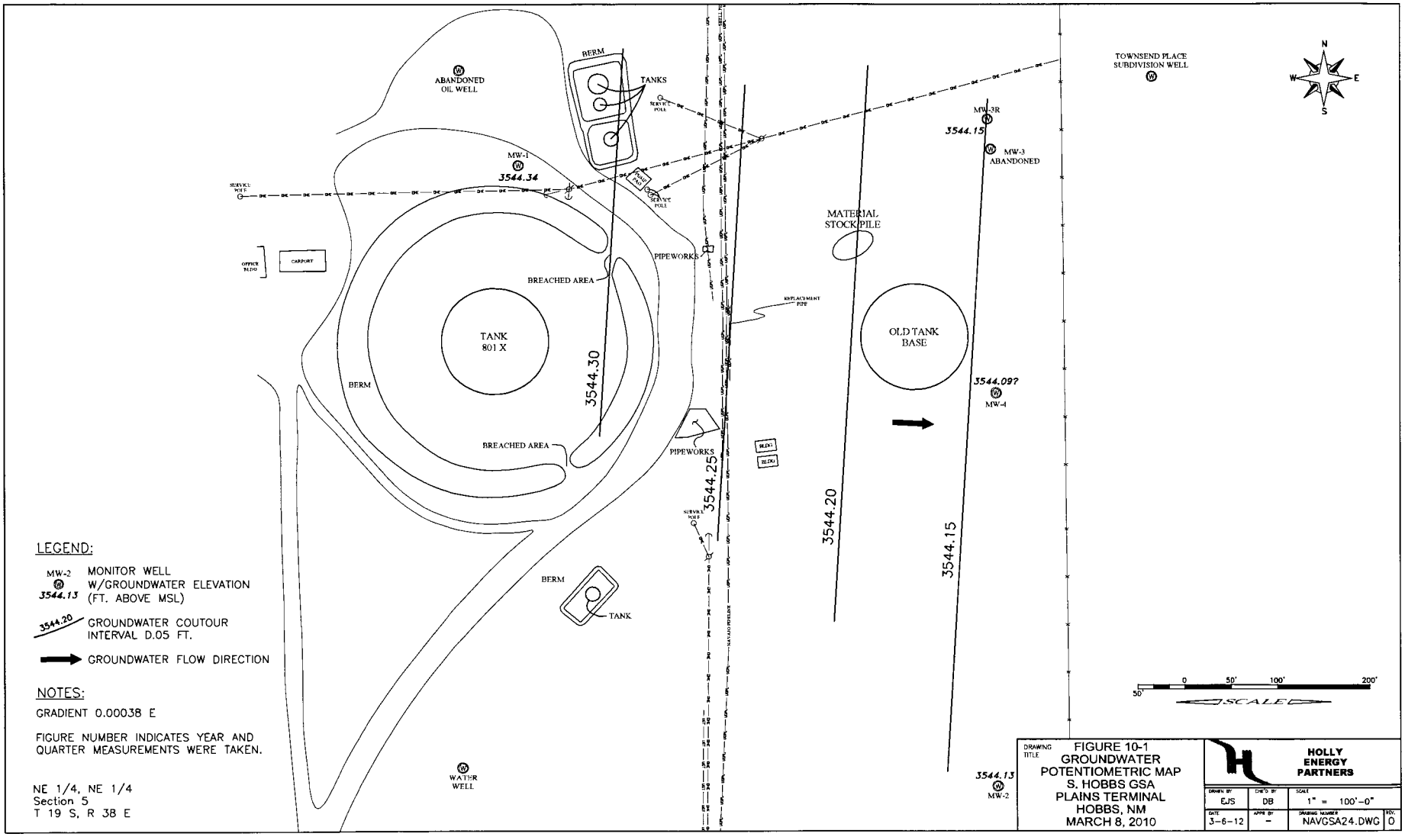
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE: FIGURE 08-1
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
MARCH 4, 2008

HOLLY ENERGY PARTNERS

DRAWN BY	CHK'D BY	SCALE
EJS	DB	1" = 100'-0"
DATE	APP'D BY	DRAWING NUMBER / REV.
3-6-12	–	NAVGSA24.DWG / 0


ABANDONED OIL WELL
BERM
TANKS
MW-1
3544.90
MW-3R
3544.65
MW-3 ABANDONED
TOWNSEND PLACE SUBDIVISION WELL
MATERIAL STOCK PILE
OFFICE BLDG
CARPORT
PIPEWORKS
BREACHED AREA
TANK 801 X
3544.85
3544.80
OLD TANK BASE
BERM
3544.64
MW-4
BREACHED AREA
PIPEWORKS
3544.75
3544.70
3544.65
BERM
TANK
WATER WELL
3544.68
MW-2
N
S
E
W
0
50'
100'
200'
SCALE
LEGEND:
MW-2
3544.68
MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
3544.75
GROUNDWATER COUTOUR INTERVAL 0.05 FT.
GROUNDWATER FLOW DIRECTION
NOTES:
GRADIENT 0.00053 E
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 09-2
GROUNDWATER
POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
JUNE 22, 2009
HOLLY ENERGY PARTNERS
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 100'-0"
DATE 3-6-12
APPR BY -
DRAWING NUMBER NAVGSA24.DWG
REV. 0



LEGEND:

MW-2 / 3544.13 — MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)

3544.20 — GROUNDWATER COUTOUR INTERVAL 0.05 FT.

GROUNDWATER FLOW DIRECTION

NOTES:

GRADIENT 0.00038 E

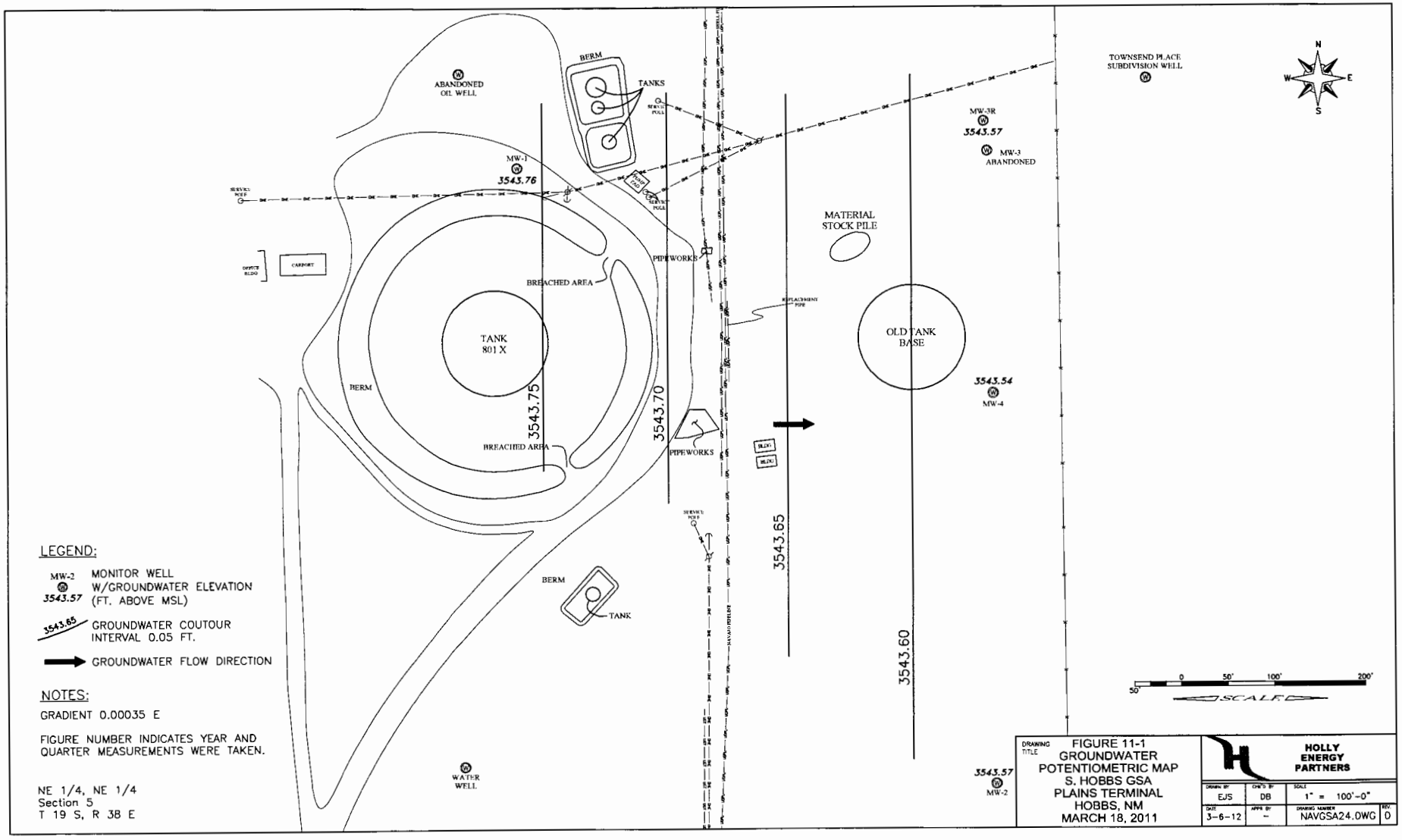
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE: FIGURE 10-1
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
MARCH 8, 2010

HOLLY ENERGY PARTNERS

DRAWN BY	CHK'D BY	SCALE
EJS	DB	1" = 100'-0"
DATE	APPR BY	DRAWING NUMBER / REV.
3-6-12	-	NAVGSA24.DWG / 0


ABANDONED OIL WELL
BERM
TANKS
MW-1
3543.76
MW-3R
3543.57
MW-3
ABANDONED
TOWNSEND PLACE SUBDIVISION WELL
MATERIAL STOCK PILE
PIPEWORKS
BREACHED AREA
TANK 801 X
OLD TANK BASE
BERM
3543.75
3543.70
3543.54
MW-4
BREACHED AREA
PIPEWORKS
3543.65
BERM
TANK
3543.60
WATER WELL
3543.57
MW-2
N
S
E
W
0
50'
100'
200'
SCALE
LEGEND:
MW-2
3543.57
MONITOR WELL W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
3543.65
GROUNDWATER COUTOUR INTERVAL 0.05 FT.
GROUNDWATER FLOW DIRECTION
NOTES:
GRADIENT 0.00035 E
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
DRAWING TITLE
FIGURE 11-1
GROUNDWATER POTENTIOMETRIC MAP
S. HOBBS GSA
PLAINS TERMINAL
HOBBS, NM
MARCH 18, 2011
HOLLY ENERGY PARTNERS
DRAWN BY: EJS
CHK'D BY: DB
SCALE: 1" = 100'-0"
DATE: 3-6-12
APP'D BY: --
DRAWING NUMBER: NAVGSA24.0WG
REV: 0

APPENDIX B-5

Historical Fluid Level Data

Monitor Well Water Levels, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitor Well Name	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Water Level Elev. (feet)	Total Depth (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)
MW-1	3,595.19	12/04/02	47.32	3,547.87	66.74	19.4	- -
		01/14/03	47.41	3,547.78	66.74	19.3	-0.09
		05/20/03	47.73	3,547.46	65.78	18.1	-0.32
		11/12/03	48.33	3,546.86	66.86	18.5	-0.60
		06/02/04	48.63	3,546.56	66.83	18.2	-0.30
		10/12/04	48.45	3,546.74	66.83	18.4	0.18
		01/11/05	47.91	3,547.28	66.85	18.9	0.54
		10/26/05	48.26	3,546.93	66.81	18.6	-0.35
		03/08/06	48.34	3,546.85	67.00	18.7	-0.08
		07/11/06	48.83	3,546.36	67.00	18.2	-0.49
		09/07/06	48.88	3,546.31	67.00	18.1	-0.05
		12/19/06	48.85	3,546.34	67.00	18.2	0.03
		03/13/07	49.04	3,546.15	67.00	18.0	-0.19
		06/21/07	49.16	3,546.03	66.98	17.8	-0.12
		09/21/07	49.26	3,545.93	66.98	17.7	-0.10
		12/07/07	49.17	3,546.02	66.82	17.7	0.09
		03/04/08	49.36	3,545.83	66.82	17.5	-0.19
		06/03/08	49.52	3,545.67	66.82	17.3	-0.16
		09/23/08	49.85	3,545.34	66.85	17.0	-0.33
		12/18/08	50.00	3,545.19	67.85	17.9	-0.15
		03/19/09	52.75	3,542.44	67.85	15.1	-2.75
		06/22/09	50.29	3,544.90	66.69	16.4	2.46
		09/08/09	50.53	3,544.66	66.68	16.2	-0.24
		12/17/09	50.69	3,544.50	66.68	16.0	-0.16
		03/08/10	50.85	3,544.34	66.68	15.8	-0.16
		06/18/10	51.09	3,544.10	66.47	15.4	-0.24
		09/01/10	51.12	3,544.07	66.33	15.2	-0.03
		12/06/10	51.24	3,543.95	65.61	14.4	-0.12
		03/18/11	51.43	3,543.76	65.45	14.0	-0.19
		06/23/11	51.74	3,543.45	64.99	13.3	-0.31
		10/07/11	52.15	3,543.04	64.56	12.4	-0.41
		12/08/11	52.30	3,542.89	64.18	11.9	-0.15
Note:	Meter malfunction 03/19/09						

Monitor Well Water Levels, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitor Well Name	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Water Level Elev. (feet)	Total Depth (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)
MW-2	3,596.84	12/04/02	49.23	3,547.61	65.10	15.9	- -
		01/14/03	49.32	3,547.52	65.10	15.8	-0.09
		05/20/03	49.61	3,547.23	62.67	13.1	-0.29
		11/12/03	50.20	3,546.64	65.20	15.0	-0.59
		06/02/04	50.60	3,546.24	64.85	14.3	-0.40
		10/12/04	50.34	3,546.50	64.85	14.5	0.26
		01/11/05	49.89	3,546.95	65.10	15.2	0.45
		10/26/05	50.25	3,546.59	65.10	14.9	-0.36
		03/08/06	50.28	3,546.56	65.29	15.0	-0.03
		07/11/06	50.70	3,546.14	65.29	14.6	-0.42
		09/07/06	50.78	3,546.06	65.29	14.5	-0.08
		12/19/06	50.76	3,546.08	65.29	14.5	0.02
		03/13/07	50.95	3,545.89	65.29	14.3	-0.19
		06/21/07	51.06	3,545.78	65.22	14.2	-0.11
		09/21/07	51.14	3,545.70	65.22	14.1	-0.08
		12/07/07	51.10	3,545.74	64.88	13.8	0.04
		03/04/08	51.28	3,545.56	64.88	13.6	-0.18
		06/03/08	51.39	3,545.45	64.88	13.5	-0.11
		09/23/08	51.73	3,545.11	64.53	12.8	-0.34
		12/18/08	51.84	3,545.00	64.33	12.5	-0.11
		03/19/09	51.99	3,544.85	64.33	12.3	-0.15
		06/22/09	52.16	3,544.68	64.22	12.1	-0.17
		09/08/09	52.34	3,544.50	64.03	11.7	-0.18
		12/17/09	52.55	3,544.29	64.03	11.5	-0.21
		03/08/10	52.71	3,544.13	64.03	11.3	-0.16
		06/18/10	52.96	3,543.88	63.45	10.5	-0.25
		09/01/10	52.97	3,543.87	63.13	10.2	-0.01
		12/06/10	53.07	3,543.77	62.28	9.2	-0.10
		03/18/11	53.27	3,543.57	61.70	8.4	-0.20
		06/23/11	53.58	3,543.26	61.11	7.5	-0.31
		10/07/11	53.96	3,542.88	60.88	6.9	-0.38
		12/08/11	54.08	3,542.76	66.28	12.2	-0.12
Note:	Meter malfunction 03/19/09						

Monitor Well Water Levels, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitor Well Name	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Water Level Elev. (feet)	Total Depth (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)
MW-3R	3,598.80	12/04/02	51.17	3,547.63	65.10	13.9	- -
		01/14/03	51.21	3,547.59	65.10	13.9	-0.04
		05/20/03	51.57	3,547.23	66.07	14.5	-0.36
		11/12/03	52.19	3,546.61	65.10	12.9	-0.62
		06/02/04	52.56	3,546.24	64.95	12.4	-0.37
		10/12/04	52.30	3,546.50	64.95	12.7	0.26
		01/11/05	51.55	3,547.25	65.10	13.6	0.75
		10/26/05	52.03	3,546.77	65.11	13.1	-0.48
		03/08/06	52.16	3,546.64	65.30	13.1	-0.13
		07/11/06	52.66	3,546.14	65.30	12.6	-0.50
		09/07/06	52.82	3,545.98	65.30	12.5	-0.16
		12/19/06	52.71	3,546.09	65.30	12.6	0.11
		03/13/07	52.83	3,545.97	65.30	12.5	-0.12
		06/21/07	53.00	3,545.80	65.21	12.2	-0.17
		09/21/07	53.05	3,545.75	65.21	12.2	-0.05
		12/07/07	53.02	3,545.78	65.01	12.0	0.03
		03/04/08	53.23	3,545.57	65.01	11.8	-0.21
		06/03/08	53.35	3,545.45	65.01	11.7	-0.12
		09/23/08	53.71	3,545.09	65.12	11.4	-0.36
		12/18/08	53.80	3,545.00	65.10	11.3	-0.09
		03/19/09	51.29	3,547.51	65.10	13.8	2.51
		06/22/09	54.15	3,544.65	65.04	10.9	-2.86
		09/08/09	54.34	3,544.46	65.06	10.7	-0.19
		12/17/09	54.52	3,544.28	65.06	10.5	-0.18
		03/08/10	54.65	3,544.15	65.06	10.4	-0.13
		06/18/10	54.94	3,543.86	65.07	10.1	-0.29
		09/01/10	54.93	3,543.87	65.26	10.3	0.01
		12/06/10	56.31 ?	- -	65.04	- -	- -
		03/18/11	55.23	3,543.57	65.27	10.0	- -
		06/23/11	55.58	3,543.22	65.27	9.7	-0.35
		10/07/11	56.00	3,542.80	65.05	9.1	-0.42
		12/08/11	56.11	3,542.69	65.03	8.9	-0.11
Note:	Meter malfunction 03/19/09						

Monitor Well Water Levels, Hobbs South GSA Product Recovery, Holly Energy Partners

Monitor Well Name	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Water Level Elev. (feet)	Total Depth (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)
MW-4	3,598.12	01/13/03	50.58	3,547.54	67.92	17.3	- -
		01/14/03	50.60	3,547.52	67.92	17.3	-0.02
		05/20/03	50.93	3,547.19	68.02	17.1	-0.33
		11/12/03	51.52	3,546.60	68.04	16.5	-0.59
		06/02/04	51.91	3,546.21	67.55	15.6	-0.39
		10/12/04	51.62	3,546.50	67.55	15.9	0.29
		01/11/05	51.04	3,547.08	68.04	17.0	0.58
		10/26/05	51.47	3,546.65	68.05	16.6	-0.43
		03/08/06	51.54	3,546.58	68.22	16.7	-0.07
		07/11/06	51.99	3,546.13	68.22	16.2	-0.45
		09/07/06	52.09	3,546.03	68.22	16.1	-0.10
		12/19/06	52.05	3,546.07	68.22	16.2	0.04
		03/13/07	52.21	3,545.91	68.22	16.0	-0.16
		06/21/07	52.34	3,545.78	68.14	15.8	-0.13
		09/21/07	52.49	3,545.63	68.14	15.7	-0.15
		12/07/07	52.39	3,545.73	68.04	15.7	0.10
		03/04/08	52.57	3,545.55	68.04	15.5	-0.18
		06/03/08	52.69	3,545.43	68.04	15.4	-0.12
		09/23/08	53.04	3,545.08	68.04	15.0	-0.35
		12/18/08	53.15	3,544.97	68.14	15.0	-0.11
		03/19/09	60.63	3,537.49	68.14	7.5	-7.48
		06/22/09	53.48	3,544.64	67.98	14.5	7.15
		09/08/09	53.69	3,544.43	67.99	14.3	-0.21
		12/17/09	53.85	3,544.27	67.99	14.1	-0.16
		03/08/10	54.03	3,544.09	67.99	14.0	-0.18
		06/18/10	54.29	3,543.83	68.00	13.7	-0.26
		09/01/10	54.29	3,543.83	68.21	13.9	0.00
		12/06/10	54.37	3,543.75	68.00	13.6	-0.08
		03/18/11	54.58	3,543.54	68.21	13.6	-0.21
		06/23/11	54.94	3,543.18	68.21	13.3	-0.36
		10/07/11	55.32	3,542.80	67.98	12.7	-0.38
		12/08/11	55.45	3,542.67	67.99	12.5	-0.13
Note:	Meter malfunction 03/19/09						
Notes:	TOC -Top of Casing						
	MW-3R replacement for MW-3; lost augers in hole during drilling.						

APPENDIX C

Site Photographs


08/01/2012


08/01/2012


08/01/2012


08/01/2012


08/01/2012


08/01/2012

APPENDIX D

Well Evaluations

Hobbs South GSA Well Evaluations - Holly Energy Partners

Well ID	Date	PID (ppm)	Casing Dia (in)	DTP (ft)	DTW (ft)	Thickness (ft)	TD (ft)	Saturated (ft)	Stick up (ft) Y/N	DTW (ft-bgs)	Well Marked Y/N	Surface Condition	Well Log Y/N
BH-19	8/2/2012	3	2	dry	dry		51.58	0.00	1.92		Y	No concrete collar	
BH-30	8/2/2012	99	2		52.48		52.82	0.34	1.75	50.73	Y	No concrete collar	
BH-49	8/1/2012	103.2	2	53.25	53.68	0.43	53.84	0.59	1.86	51.82	Y	No concrete collar	
BH-52	8/1/2012	0	2	51.79	51.93	0.14	52.40	0.61	1.46	50.47	Y	No concrete collar	
BH-48	8/1/2012	0	2	52.30			52.40	0.10	1.72		Y	No concrete collar	
BH-53	8/1/2012	0	2		52.99	52.99	53.40	0.41	1.77	51.22	Y	No concrete collar	
BH-54	8/1/2012	0	2		54.35	54.35	55.83	1.48	???		Y	No concrete collar	
BH-47	8/1/2012	0	2	52.99			53.50	0.51	1.64		Y	No concrete collar	
BH-46R	8/1/2012	0	4	54.99	55.14	0.15	53.20	-1.79	2.86	52.28	Y	No concrete collar	
BH-40	8/2/2012	65	2	53.32	53.83	0.51	53.93	0.61	1.92	51.91	Y	No concrete collar	
BH-39	8/2/2012	44	2	dry	dry		53.60	0.00	1.50		Y	No concrete collar	
BH-38	8/2/2012	69	2	52.92			53.23	0.31	1.70		Y	No concrete collar	
BH-45	8/2/2012	82	2	53.43	53.92	0.49	54.60	1.17	1.75	52.17	Y	No concrete collar	
BH-35R	8/2/2012	55	4	54.54	55.00	0.46	55.03	0.49	2.98	52.02	Y	No concrete collar	
BH-36	8/2/2012	71	2	dry	dry		52.00	0.00	1.58		Y	No concrete collar	
BH-37	8/2/2012	100	2	53.30			54.05	0.75	1.82		Y	No concrete collar	
BH-44	8/2/2012	47	2	dry	dry		53.21	0.00	2.00		Y	No concrete collar	
BH-18	8/2/2012	39	2	52.18			52.31	0.13	2.00		Y	No concrete collar	
BH-3A	8/2/2012	9	2	62.65			62.73	0.08	2.12		Y	No concrete collar	
BH-31	8/2/2012	50	2	53.12	53.51	0.39	53.51	0.39	1.96	51.55	Y	No concrete collar	
BH-32	8/2/2012	3	2	51.79	51.81	0.02	52.18	0.39	1.63	50.18	Y	No concrete collar	
BH-34	8/2/2012	2	2	dry	dry		50.29	0.00	1.58		Y	No concrete collar	
BH-13	8/2/2012	23	2	dry	dry		51.31	0.00	1.13		Y	No concrete collar	
BH-407	8/2/2012		4	53.61	55.56	1.95	67.51	13.90	1.88	53.69	Y	No concrete collar	
BH-411	8/2/2012	2	4	54.61	57.81	3.20	68.20	13.59	2.54	55.27	Y	No concrete collar	
BH-406	8/2/2012	41	4	53.79	56.94	3.15	65.93	12.14	2.02	54.92	Y	No concrete collar	
BH-410	8/2/2012	6	4	53.61	58.54	4.93	63.14	9.53	2.00	56.54	Y	No concrete collar	
BH-65	8/2/2012	54	2	53.36	55.36	2.00	55.56	2.20	2.29	53.07	Y	No concrete collar	
BH-64	8/2/2012	115	2	53.29	54.95	1.66	55.43	2.14	1.96	52.99	Y	No concrete collar	
BH-55	8/2/2012	115	2	dry	dry		53.10		2.04		Y	No concrete collar	
BH-56	8/2/2012	34	2	53.16	53.96	0.80	54.24	1.08	1.91	52.05	Y	No concrete collar	
BH-61	8/2/2012	59	2	dry	dry		53.30		2.00		Y	No concrete collar	
BH-23	8/2/2012	100	2	dry	dry		52.48		1.13		Y	No concrete collar	
BH-22	8/2/2012	83	2	dry	dry		53.06		1.79		Y	No concrete collar	
BH-5AR	8/2/2012	71	4	dry	dry		53.76		???		Y	No concrete collar	
BH-63	8/2/2012	62	2	53.20			54.40	1.20	2.50		Y	No concrete collar	
BH-57	8/2/2012	99	2	53.22	55.20	1.98	55.21	1.99	2.00	53.20	Y	No concrete collar	
BH-58	8/2/2012	98	2	53.90	53.96	0.06	54.10	0.20	2.00	51.96	Y	No concrete collar	
BH-59	8/2/2012	116	2	53.09			54.00	0.91	1.83		Y	No concrete collar	

Hobbs South GSA Well Evaluations - Holly Energy Partners

Well ID	Date	PID	Casing Dia	DTP	DTW	Thickness	TD	Saturated	Stick up	DTW	Well Marked	Surface Condition	Well Log
		(ppm)	(in)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft) Y/N	(ft-bgs)	Y/N		Y/N
BH-60	8/2/2012	17	2	dry	dry		52.99		1.50		Y	No concrete collar	
BH-62	8/2/2012	61	2	53.43	53.99	0.56	54.30	0.87	2.03	51.96	Y	No concrete collar	
BH-14	8/2/2012	26	2	53.01	53.38	0.37	53.38	0.37	2.25	51.13	Y	No concrete collar	
BH-16	8/2/2012	91	2	dry	dry		51.84		2.50		Y	No concrete collar	
BH-15	8/2/2012	34	2	dry	dry		**47.70**		**0.00**		Y	No concrete collar	Casing broke off
BH-29	8/2/2012	61	2	52.49	52.61	0.12	52.86	0.37	1.58	51.03	Y	No concrete collar	
BH-28	8/2/2012	65	2	dry	dry		51.56		1.70		Y	No concrete collar	
BH-27	8/2/2012	0.1	2	dry	dry		51.76		1.75		Y	No concrete collar	
BH-26	8/2/2012	7	2	dry	dry		41.72		1.47		Y	No concrete collar	casing crushed
BH-21	8/2/2012	4	2	dry	dry		48.80		???		Y	No concrete collar	**casing off**
BH-24	8/2/2012	2	2	dry	dry		**38.57**		1.37		Y	No concrete collar	**cracked bad**
BH-20	8/2/2012	42	2	dry	dry		52.41		2.21		Y	No concrete collar	
BH-43	8/1/2012	144	2	53.15	53.61	0.46	**53.38**	0.23	2.40	51.21	Y	No concrete collar	
BH-51	8/1/2012	2	2	51.68	51.82	0.14	51.84	0.16	**1.54**	50.28	Y	No concrete collar	
BH-42	8/1/2012	22	2	53.17	53.55	0.38	53.81	0.64	1.72	51.83	Y	No concrete collar	
BH-25R	8/2/2012	144	2	54.81	**56.55**	1.74	63.30	8.49	2.92	53.63	Y	No concrete collar	
BH-50	8/1/2012	123.2	2	**52.00**			**53.02**	1.02	2.01		Y	No concrete collar	
BH-41	8/2/2012	2	2	52.83	52.92	0.09	**52.94**	0.11	1.66	51.26	Y	No concrete collar	
BH-409	8/2/2012	24	4	54.41	60.10	5.69	67.02	12.61	2.75	57.35	Y	No concrete collar	
BH-408	8/2/2012	4	4	54.29	60.24	5.95	67.76	13.47	2.58	57.66	Y	No concrete collar	
BH-402	8/2/2012	72	4	dry	dry		52.62		2.83		Y	No concrete collar	
BH-403	8/2/2012	34	4	53.68	53.70	0.02	53.91	0.23	2.88	50.83	Y	No concrete collar	
BH-401	8/2/2012	67	4	55.10	**55.45**	0.35	64.14	9.04	3.00	52.45	Y	No concrete collar	
BH-404	8/2/2012	61	4	**53.31**	59.38	6.07	66.52	13.21	1.94	57.44	Y	No concrete collar	
BH-405	8/2/2012	65	4	53.53	59.38	5.85	66.11	12.58	2.08	57.30	Y	No concrete collar	
BH-33	8/2/2012	4	4	52.75			52.96	0.21	1.58		Y	No concrete collar	
MW-1	8/1/2012	0	2		52.94		64.24	11.30	2.44	50.50	Y	**No concrete collar**	
MW-2	8/1/2012	0	2		54.77		60.38	5.61	2.38	52.39	Y	**No concrete collar**	
MW-3R	8/1/2012	1	2		56.84		65.24	8.40	2.43	54.41	Y	**No concrete collar**	
MW-4	8/1/2012	1	2		56.14		68.18	12.04	2.86	53.28	Y	**No concrete collar**	

CONESTOGA-ROVERS
& ASSOCIATES

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November 5, 2012

Glenn Von Gonten
NMED OCD Environmental Bureau
1220 South St. Francis Drive
Santa Fe, NM 87505

Re: Holly Energy Partners – Stage 1 Abatement Plan for the Hobbs Tank 5201 Release, NW 1/4 of the NW 1/4 of Section 22, Township 19 South, Range 38 East, Lea County, New Mexico

Dear Mr. Von Gonten:

Attached please find the Stage 1 Abatement Plan for the Holly Energy Partners, Tank 5201 Release site located in Section 22, Township 19 South, Range 37 East, Lea County, New Mexico for your review.

Please call William Green (HEP - 575.748.8968) (bill.green@hollyenergy.com) or myself (720.974.0942) (bstephenson@craworld.com), if you have any questions or comments.

Sincerely,

Brad Stephenson, P.G.

Project Manager

cc: William Green

Attachments

STAGE 1 ABATEMENT PLAN

HOLLY ENERGY PARTNERS
HOBBS TANK 5201
NW 1/4 of the NW 1/4 of SECTION 22
TOWNSHIP 19 SOUTH, RANGE 38 EAST
LEA COUNTY, NEW MEXICO

Prepared For:

William Green
Holly Energy Partners
P.O. Box 1260/1602 W Main
Artesia, New Mexico 88211

Prepared by:
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OCTOBER 2012
REF. NO. 078863 (1)

TABLE OF CONTENTS

LIST OF FIGURES
(Following Text)

LIST OF TABLES
(Following Text)

LIST OF APPENDICES

1.0 INTRODUCTION

This Stage 1 Abatement Plan is submitted on behalf of Holly Energy Partners (HEP) for the Hobbs Tank 5201 release (Site) located in Section 22, Township 19 South, Range 38 East, Lea County, New Mexico (Figure 1). The notification of the release was submitted to New Mexico Oil Conservation District (NMOCD) on July 22, 2004 (Appendix A). This Stage 1 Abatement Plan proposes to complete the lateral extent of groundwater impacts and to initiate the removal of crude oil found on groundwater in the area of Tank 5201. The plan is being required pursuant to NMOCD Rule 19.15.30 NMAC. The Stage 1 Abatement Plan presented herein complies with the requirements of these rules and incorporates work already performed at the site since detection of the crude oil release described below.

1.1 DESCRIPTION OF THE SITE

The Site is located approximately 3.5 miles south of Hobbs, New Mexico. The site is located in the NW ¼ of the NW ¼ of Section 22, Township 19 South, Range 38 East in Lea County, New Mexico (32°39.079'N, 103°8.530'W). The topography at the site is relatively flat and the elevation is at approximately 3595 feet mean sea level (Figure 2). The Site is located on the HEP Tank Farm on County Road 61. The surrounding land contains crude oil storage tanks and open range land.

1.2 SITE HISTORY AND NATURE OF THE RELEASE

On July 22, 2004, a leak was discovered in a 6-inch pipeline line from the crude oil truck unloading rack to the 5201 storage tank. The line was exposed and clamped and the section was eventually replaced. Petroleum stained soil in an area of approximately 4 feet by 20 feet by 18 feet deep was immediately excavated. Additional staining observed close to the tank was not excavated due to the proximity of the tank and fear of compromising the 1930-vintage tank's structural integrity. No fluid was observed in the excavation. The Site is located on land owned by Enterprise, Inc.

1.3 SUMMARY OF PREVIOUS INVESTIGATIONS

All of the available data collected prior to 2012 is contained in Appendix B. Six groundwater monitoring wells, seven boreholes and one recovery well have been used to characterize the release and initially recover the released crude oil in the area of the tank. Five boreholes and two monitor wells were installed inside of the berm area in 2004 as illustrated in Figure 3. The first borehole was completed as a 2-inch monitor well (MW-1) adjacent to the leak location when crude oil was observed in the borehole. An existing well installed by Teppco in 2004 was used to establish groundwater flow direction (Figure 3). Two monitor wells, MW-2 and MW-3, were installed outside the

bermed area in 2004. A 4-inch recovery well (RW-1) was also installed in the area near the tank and MW-1 in 2004. In 2010, two additional monitoring wells were installed, MW-4 outside the bermed area and MW-5 inside the bermed area (Figure 3). The Teppco well was abandoned in 2010.

In 2004 crude oil was measured in MW-1 to be approximately 6 feet thick. Outside the tank berm area and approximately 200 feet southeast from the release point, dissolved phase hydrocarbon concentrations were detected in MW-2 above the New Mexico Water Quality Control Commission (NMWQCC) standards for benzene, toluene, ethylbenzene and xylenes (BTEX) (Appendix B-4).

2.0 GEOLOGY AND HYDROGEOLOGY

The *Geologic Map of New Mexico* (2003) prepared by the New Mexico Bureau of Geology and Mineral Resources, and *Geology and Ground-Water Conditions in Southern Lea County, New Mexico* (Ground-Water Report 6) prepared on behalf of the USGS was reviewed in association with the evaluation of regional geology and hydrogeology for the Site.

The geologic map for the area of site is shown in Figure 4. The surficial geologic unit (Qep) mapped for the location is described as Quaternary aged "Eolian and piedmont deposits (Holocene to middle Pleistocene) – Interlayered eolian sands and piedmont slope deposits along the eastern flank of the Pecos River Valley. Typically capped by thin eolian deposits." This sediment ranges from zero to 20-feet in thickness in this portion of Lea County. The Quaternary sediment unconformably overlies the Tertiary age Ogallala Formation. The Ogallala Formation is comprised of sands, silts, indurated calcium carbonate, gravel and some clay.

Groundwater in this area is primarily produced from the Ogallala aquifer. The Ogallala Formation unconformably overlies the Triassic age Dockum group. The Dockum group consists of red shale and sandstone and is commonly referred to as "red beds". The red beds can exceed 1,000 feet in thickness in this region and may produce small amounts of poor quality water at the bottom of the formation.

The regional groundwater flow direction in the Ogallala is toward the southeast and follows the Triassic subcrop surface. Groundwater quality is very good with total dissolved solids (TDS) concentrations typically below 1,000 mg/L. Recharge primarily occurs via infiltration from precipitation events.

2.1 SITE GEOLOGY AND HYDROGEOLOGY

The surface soils encountered at the Site are silty to fine sands approximately 10-feet thick. This surface soil is consistent with the surface soil description (Quaternary sediment) for this physiographic province. The soil types encountered below this surface layer at the Site are indurated (hardened) calcium carbonate intervals of variable thickness locally referred to as "caliche", fine-grained sand, sandstone with caliche and the saturated zone consisting of fractured sandstone.

Groundwater at the Site is found in fractured sandstone consistent with the Ogallala aquifer. The depth to groundwater at the Site is approximately 45 feet-below ground surface (ft-bgs). Not all of the wells have been surveyed; however, based on the

available data, the groundwater flow is towards the east-southeast and the groundwater gradient is approximately 0.0013ft/ft.

No water wells are known to have been affected by the leak. An evaluation of water well information obtained from the New Mexico Office of the State Engineer and the USGS indicated that there are domestic, agricultural or public water supply wells within a 1-mile radius of the Site (Figure 5, Table 1).

2.2 CURRENT SITE CONDITIONS

Petroleum stained soil in an area of approximately 4 feet by 20 feet by 18 feet deep was excavated near the tank. Additional staining was observed close to the tank but was not excavated due to the proximity of the tank. No fluid was observed in the excavation. Monitoring well MW-1, located within the area of the release indicated soil staining and soil samples collected from20 to 35 ft-bgs indicated hydrocarbon impacts (Appendix B, BH-1). Borehole BH-4, located approximately 80 feet from the release did not have staining or detectable hydrocarbon compounds of interest (Appendix B, BH-4).

Presently, there are five groundwater monitoring wells and one recovery well at the Site. The recovery of the crude oil from wells MW-1 and RW-1 at the Site was initiated in 2004 and continued to 2011(Appendix B, Tank 5201 Product Thickness).The cumulative amount of recovered product at this Site is unknown, as the records from the previous consultant are sporadic and incomplete.

Based on available information, crude oil thickness has decreased from 7.90 feet (RW-1) in 2004, to 3.62 feet (MW-1) and 2.95 feet (RW-1) respectively in August 2012 (Figure 3). Historically, BTEX constituents above NMWQCC standards have been only detected in monitoring well MW-2 from 2004 through 2006 (Appendix B, Water Quality Data). Monitoring wells MW-2 through MW-5 were sampled on August 7, 2012 for BTEX. There were no detections of any BTEX constituents above NMWQCC standards. Current site condition photographs are presented in Appendix C.

2.3 SITE CONCEPTUAL MODEL

The Site stores crude oil in a 55,000 barrel tank located within a bermed area (Figure 3). Tanker trucks off-load crude oil to the tank through a 6-inch pipe. The Site impacts are the result of a leak in a 6-inch pipeline from the truck unloading rack to the 5201 storage tank. The 5201 tank is one of 4 tanks located in the area. The primary chemicals of concern are hydrocarbon constituents that originated from the crude oil.

Hydrocarbon impacts at the Site appear to be limited to soil and groundwater in the area near the tank. Petroleum stained soil in an area of approximately4 feet by 20 feet by 18feet deep was excavated in the area near the tank in 2004. No fluid was observed in the excavation. Soil borings within close proximity to the tank did detect hydrocarbons in vadose soil above the NMOCD action levels (Appendix A). A borehole located approximately 80 feet from the release did not show any staining or detection of hydrocarbons in the vadose soil. The impacts to groundwater appear to be limited to the area within the bermed area.

Groundwater at the Site is found at approximately 45 ft-bgs and groundwater flow direction is towards the southeast. The wells located within close proximity to the release or to the tank contained initially contained 7.90 feet of crude oil decreasing to 3.62 feet in August 2012. Dissolved phase hydrocarbons were detected outside the berm only in MW-2 from 2004 to 2006. Dissolved phase hydrocarbons have not been detected in any of the wells since 2006.

The Site is located in a crude oil tank-farm area about 3.5 miles south of Hobbs, New Mexico. The closest residences are approximately 0.50 miles northeast and cross-gradient from the Site and three water wells are located within 0.50 miles. The well for the residences has been sampled for hydrocarbons in association with another release site, and no hydrocarbons were detected above NMWQCC standards.

There appears to be no immediate threat to the environment or to drinking water wells in the area caused by the release and any remaining impacts. The crude oil has a very low mobility and does not readily desorb nor dissolve and therefore, any remaining impacts are only apparent in the immediate area of the release.

The low mobility rate may be attributed to the high percentage of paraffin in the crude oil which is characteristic of this type of crude oil found in the eastern New Mexico Permian Basin area. The crude oil has been measured on groundwater at the Site since 2004 and has not migrated from the area, suggesting that soil impacts have been mitigated and the released crude oil has a low mobility rate and is not readily dissolved in groundwater.

The extent of dissolved phase hydrocarbons is not completely understood in the immediate area down-gradient from the release point and within the bermed area due to the lack of monitoring wells. To date, product recovery has been minimal using total fluid pumps that have been fouled by sand and grit, suggesting inadequate well design and pump selection. The removal of the crude oil by the current method, which is predominantly a total fluid pumping method that recovers some product and mostly

water, is not effective because the groundwater table is not being depressed in the area so that that the crude oil can be removed more effectively from groundwater.

The lowering of groundwater table in the area of the crude oil would be more effective and would allow for more of the crude oil to be removed efficiently under a depressed water table. However, the current groundwater regulations for Lea County, New Mexico do not allow for the removal of any groundwater if the TDS in groundwater is less than 10,000 mg/L. The TDS at his site is less than 2,000 mg/L.

The remedial strategy for site closure is based on the current NMOCD requirements. To close the Site for no further action, the crude oil would have to be removed separately from groundwater (19.15.17.13 NMAC). Once the phase-separated hydrocarbons (crude oil) have been removed to a *de minimus* thickness, remedial actions would then focus on the low-level dissolved phase concentrations. Based on existing conditions, it is likely that monitoring of the dissolved phase hydrocarbons and natural attenuation parameters, the state standards could be met as a site closure strategy.

The proposed remedial technology for the Site uses a crude oil or product only pumping system that does not depress the groundwater table to remove the crude oil. This system is a low maintenance product only system that shuts down automatically when water is encountered in the pump and can be restarted remotely without visiting the Site.

3.0 CHARACTERIZATION, MONITORING AND PRODUCT RECOVERY PLAN

This section presents the plan for further site characterization, groundwater monitoring and product recovery.

3.1 DOCUMENTATION

All information collected will be documented in such a manner that it can be easily transferred and interpreted by those not familiar with the field activities being conducted for the investigation. In accordance with this goal, bound field logbooks will be maintained throughout the project. Each page will be legible when copied and written using an indelible ink pen for all records. The pages in the logbook will be dated, numbered and initialed by the recorder. All field data such as monitoring well number, depth to water and product, total well depth, and any other qualitative observations will be documented in the field log book. In addition to the field data, general information will also be recorded, such as equipment used, daily weather conditions, personnel onsite, site safety and any anomalies that may have occurred during field activities.

3.2 GROUNDWATER CHARACTERIZATION

Four additional wells will be installed to further characterize the lateral extent of impacts down-gradient of the present location of the crude oil (Figure 3) at the Site. These wells will be used to monitor groundwater conditions and to remove crude oil, if present in the wells. The wells will be constructed using 4-inch PVC and installed with 15 feet of 20-slot (0.020 inches) screen so that 5 feet of the screen is above the static fluid level and 10 feet is below the static fluid level (Figure 6).

The four wells will be installed according to New Mexico Office of the State Engineer rules (19.27.4 NMAC) using an air rotary drill rig within the bermed area of the tank (Figure 3). The boring diameter is expected to be 8¼ inches and the total depth of the well will be approximately 10 feet below the top of the fluid, approximately 45 to 50 ft-bgs. Total depths of the wells may vary based on observations of subsurface conditions and the fluid level of the product, as determined by the on-site geologist. The well borings will be logged by the on-site geologist based on the cuttings.

Figure 6 depicts a typical well construction log. The wells will be constructed with 4-inch diameter schedule 40 PVC casing and screen, consisting of 15 feet of 20 (0.020 inch) slot screen. A 10/20 sand filter pack will be placed in the boring from the bottom of the well to approximately 2 feet above the well screen. A bentonite seal will be placed from the top of the sand pack to approximately 5 feet above the sand pack. The

bentonite will be hydrated with potable water to create a seal. A grout seal will be placed from the top of the bentonite seal to 3 ft-bgs. A 3 feet manhole cover will be placed on each well and cemented in place.

If soil staining is observed or if volatiles are detected with the Photo ionization detector (PID) in the cuttings, a sample will be collected and analyzed for BTEX compounds. The cuttings will be collected and temporarily stockpiled on plastic. The cuttings may be separated on-site into impacted and non-impacted soil, based on visual observation and head space analysis for waste management. The cuttings will be sampled for BTEX, total petroleum hydrocarbons (TPH) and RCRA metals analyses at the conclusion of drilling activities. If the results indicate the waste is above state standards, the waste will be handled and disposed of properly at an offsite disposal facility.

The final well locations are based on historical crude oil thickness data, utility clearances and will be determined by the Site geologist. Prior to drilling, private and public utilities will be cleared and additionally, each well location will be cleared to 5 ft-bgs using a Hydrovac, if necessary. The NMOCD will be notified approximately one-week prior to drilling activities, as required by 19.15.30.14.B NMAC.

If product is not measured, each well will be surged with a surge block assembly 24-hours after the bentonite seal is placed, and developed further with a bailer or pump to remove any sediment. All development water will be placed in totes and disposed of properly.

All drilling and well development equipment will be cleaned prior to initiation of drilling activities and in between all borings using a high pressure washer.

The locations of the wells and the relative elevation of the top of the PVC casing of each well will be surveyed by a licensed surveyor to an accuracy of +/- 0.01 ft. The ground surface in the area of the well will also be surveyed to +/- 0.1 ft. The wells will be plugged and abandoned according to state regulations upon completion of all groundwater monitoring activities.

3.3 PRODUCT RECOVERY

A Small Diameter Filter Scavenger™ product recovery system manufactured by Geotech, Inc. will be installed in the well containing the most crude oil. This pump will be moved and utilized for all wells that contain product at the Site, on an as needed basis. This system will separate product from water in the recovery well eliminating the need for an above ground product separation system. The recovered product will be placed into a collection tank for recycling.

This pump is designed to pump product only off the top of groundwater. The pump utilizes a floating intake cartridge to recover hydrocarbons and will turn on and off in response to signals sent to the control module by a conductivity/density (reservoir) probe, the tank full probe, onsite control panel and remote telemetry system. A portion of the conductivity probe is located inside the pump's product reservoir to turn the pump off when water is encountered during pumping. The reservoir probe consists of a HI and LO float actuated sensors. When the reservoir fills with product and water is encountered, the float rises, trips the HI sensor and turns on the product pump. When the product level falls, the float trips the LO sensor and shuts off the pump. A water override conductivity sensor is located inside the product reservoir. Once the pump canister is filled via gravity, the magnetically coupled gear pump pressurizes the system and pumps the recovered fluid to the surface and into the tank. The floating cartridge follows the water table and consists of a float with a treated oleophilic/hydrophobic screen. The stainless steel screen allows hydrocarbons to enter the pump cartridge while repelling water.

The system will be monitored on a monthly basis in the field to assess the amount of recovered crude oil, the effectiveness of the pump and equipment maintenance. Fluid levels will be measured in the newly installed wells and all other wells that contain crude oil using an oil/water interface probe. Additionally, the fluid level will be measured in the recovery tank. The recovered crude oil will be scheduled for recycling when the tank is at 80 percent of capacity.

3.4 GROUNDWATER MONITORING

Groundwater monitoring will be conducted at the Site in June and December. Prior to groundwater sampling, fluid levels will be measured using a water level indicator or an oil/water interface probe. Dissolved oxygen will be measured using a downhole probe, if crude oil is not measured in the monitoring wells. Groundwater samples will only be acquired from the monitoring wells that do not contain crude oil.

The wells will be purged and groundwater samples will be collected using the low flow purging technique and monitored during purging of each well for chemical stability. All purged water will be managed in accordance to state and federal requirements and temporarily placed in a plastic tote. The samples sent to the laboratory for analysis will be given the well name, date and time of the sample collection, requested analyses and the initials of the sampler. Field parameters obtained during purging will include temperature, specific conductance, pH, and oxidation reduction potential (ORP). The meter used for the field parameters will be calibrated daily when in use and the calibration will be recorded in the log book. Groundwater samples will be placed into

the appropriate laboratory provided containers following field parameter measurements. The samples will be placed in an ice chilled cooler for transport to the laboratory under chain-of-custody procedures.

The fluid levels will be used for analysis of the product recovery system. The groundwater sampling will be used to characterize the extent of dissolved-phase hydrocarbon distribution. An annual report containing the results of the product recovery, groundwater monitoring, and any recommendations for the monitoring and recovery network will be submitted at the end of each calendar year.

3.5 ANALYTICAL PROGRAM

All groundwater and quality assurance and quality control (QA/QC) samples will be analyzed for BTEX by Method 8120B or 8260B. Soil samples will be analyzed for BTEX by Method 8120B or 8260B and TPH by Method 8015M, and if needed, for RCRA metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver) by Method 6010/6020. The laboratory reporting limits are expected to meet the state cleanup levels.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

With the report of results, evidence will be presented that the sampling and analysis is consistent with the techniques listed in Subsection B of the 20.6.3107 NMAC and with 20.6.4.13 NMAC of the NMWQCC standards. Each groundwater sampling event will include one duplicate sample, which will be analyzed for BTEX. A trip blank will be included in each cooler shipped to the laboratory and analyzed for BTEX. A temperature blank will be included with each submitted cooler and used to determine temperature at the time of submission to the laboratory. One equipment blank (pump) will be submitted for each sampling event and analyzed for BTEX.

5.0 POST CLOSURE PLAN

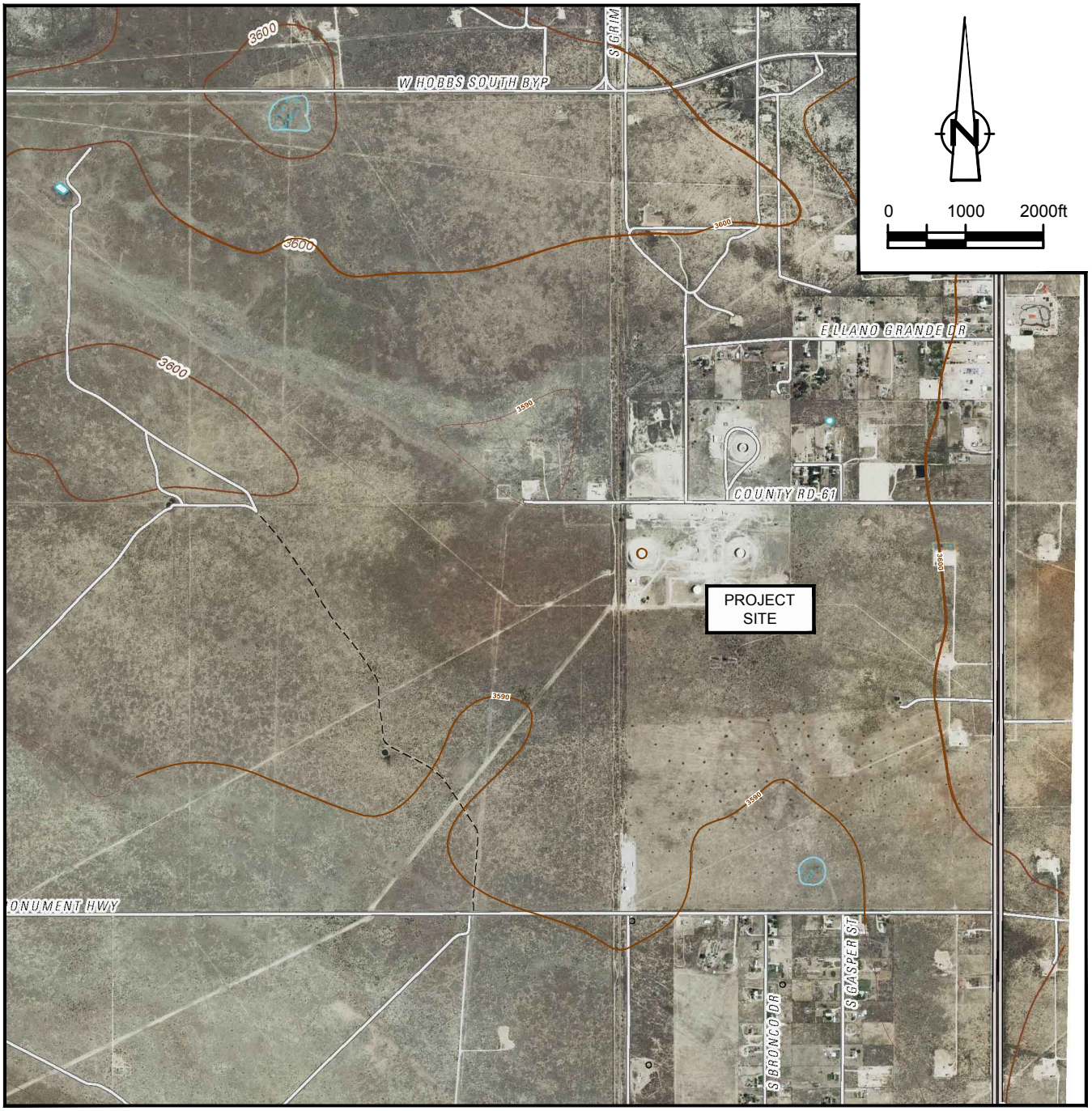
HEP will petition for closure of the Abatement Plan, when eight consecutive sampling events or evidence demonstrates to the satisfaction of the NMOCD that the NMWQCC standards of 20.6.4 NMAC are met. HEP will plug and abandon all wells according to the New Mexico Office of the State Engineer Rules and restore the site.

6.0 SCHEDULE

The schedule anticipated at this time for abatement plan is as follows:

- Well installations – 30 days after Abatement Plan approval
- Completion of the pump system – 60 days after approval of Abatement Plan
- Installation of conveyance piping – 60 days after approval of Abatement Plan
- Groundwater Monitoring – June and December
- Annual Report – 30 days following the receipt of the December laboratory analytical report.

FIGURES

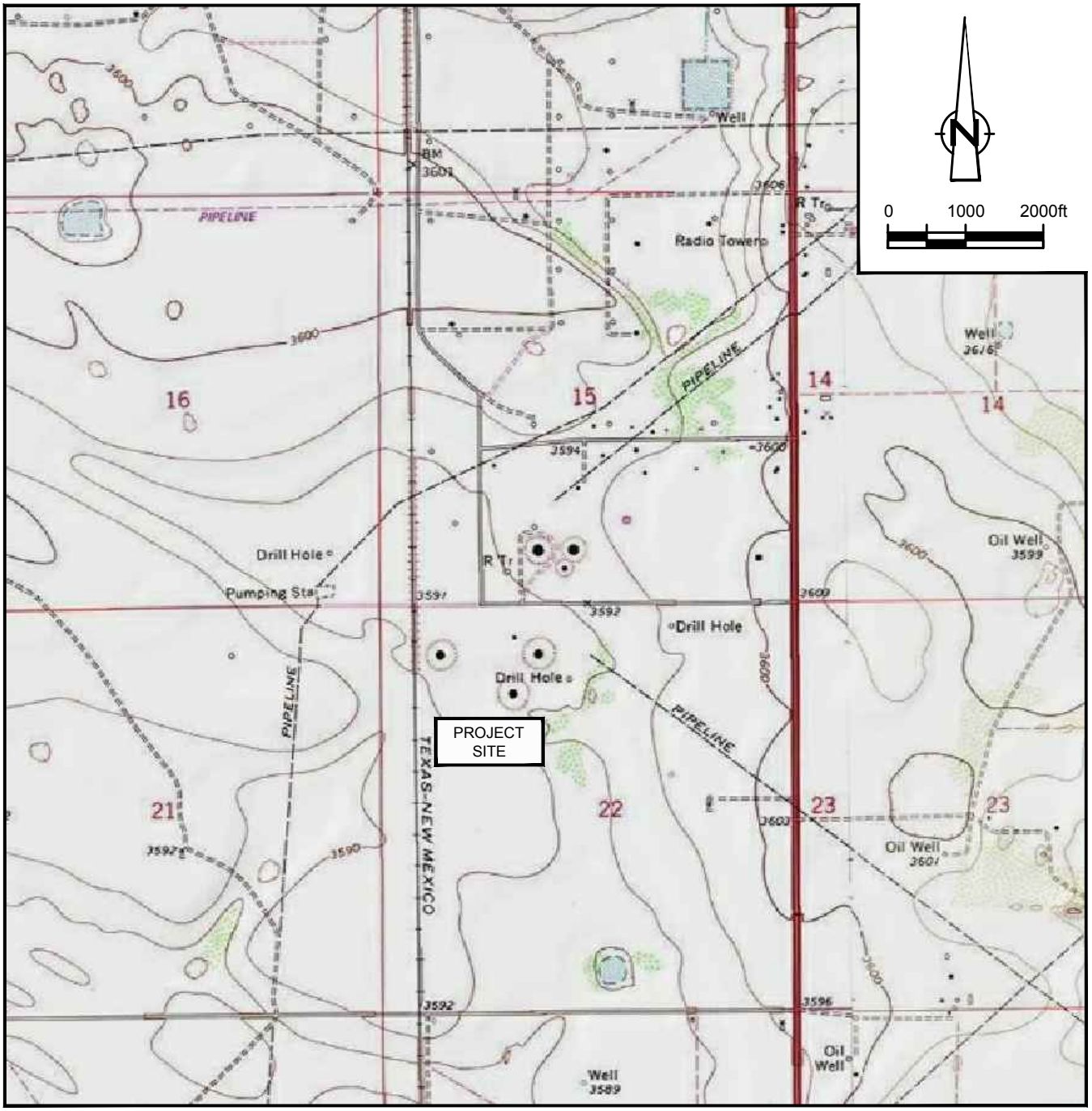


SOURCE: USGS 7.5 MINUTE QUAD
"HOBBS WEST AND HOBBS EAST, NEW MEXICO" DATED 2010

LAT/LONG: 32.6549° NORTH, 103.1382° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO EAST

figure 1

SITE LOCATION MAP
HOBBS STATION TANK 5201
HOBBS, NEW MEXICO
Holly Energy Partners



SOURCE: USGS 7.5 MINUTE QUAD
"HOBBS WEST AND HOBBS EAST, NEW MEXICO"

LAT/LONG: 32.6549° NORTH, 103.1382° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO EAST

figure 2

SITE LOCATION MAP
HOBBS STATION TANK 5201
HOBBS, NEW MEXICO
Holly Energy Partners

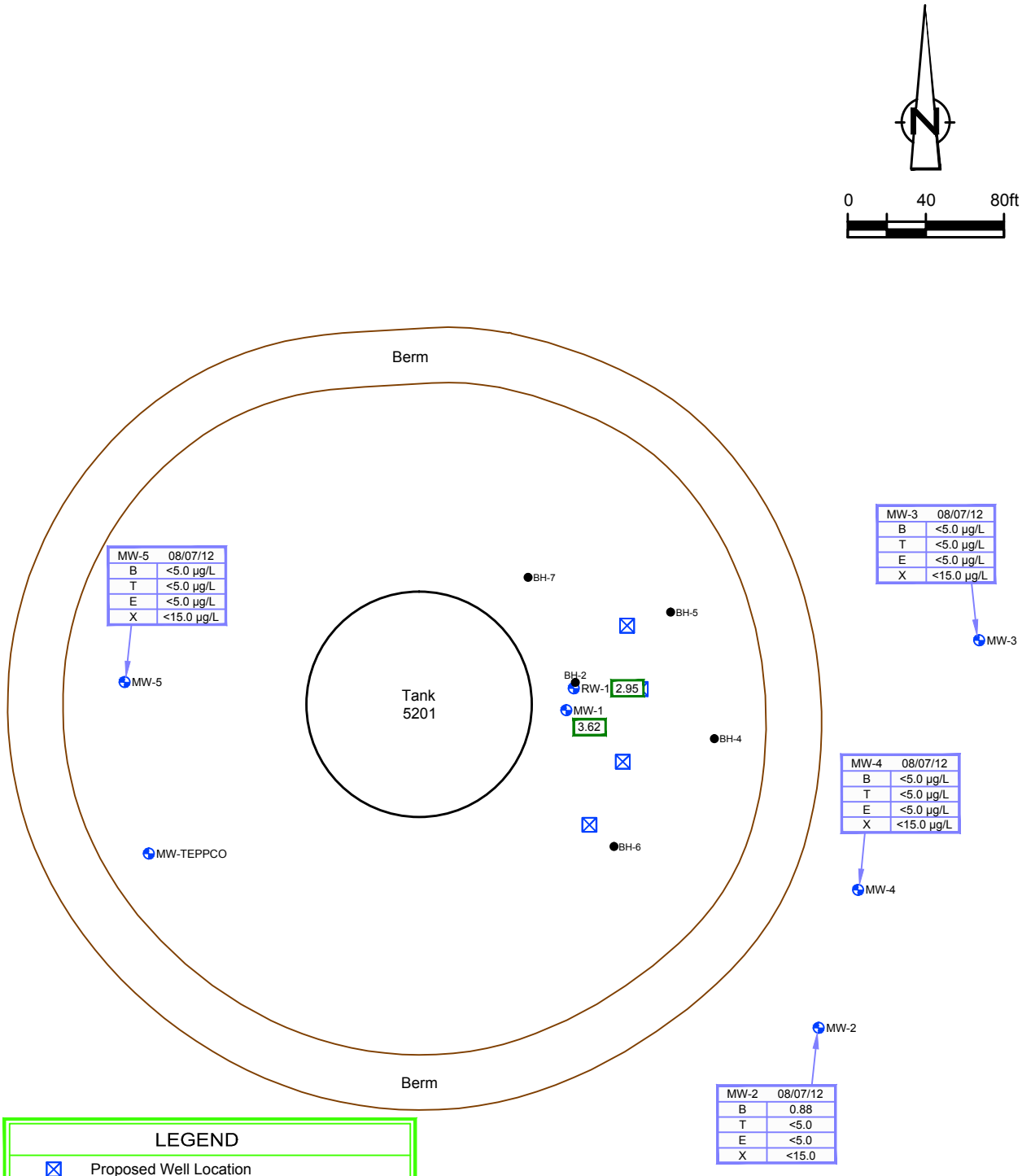
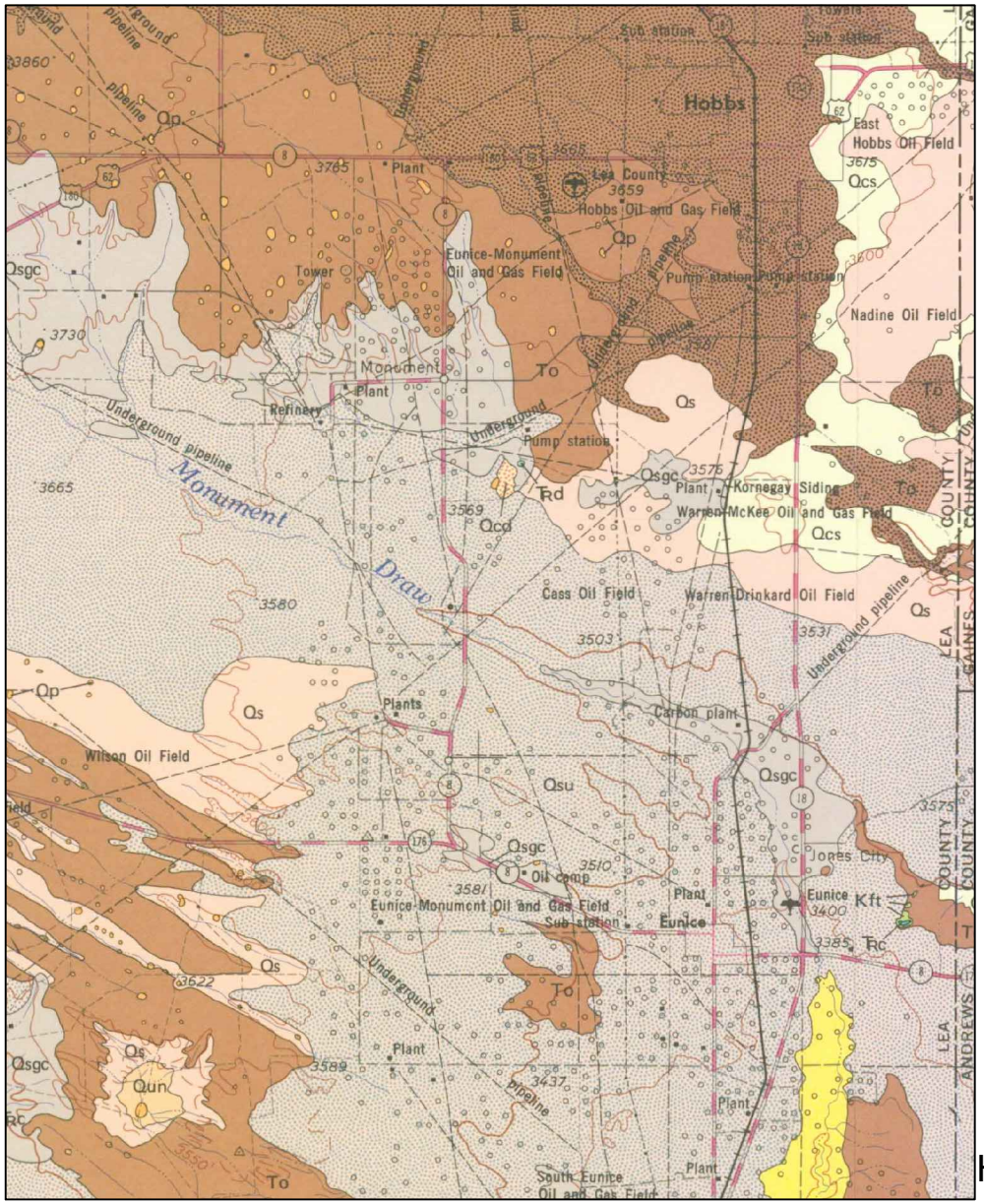


figure 3

PRODUCT THICKNESS (ft) MAP - AUGUST 7, 2012
HOBBS STATION TANK 5201
HOBBS, NEW MEXICO
Holly Energy Partners



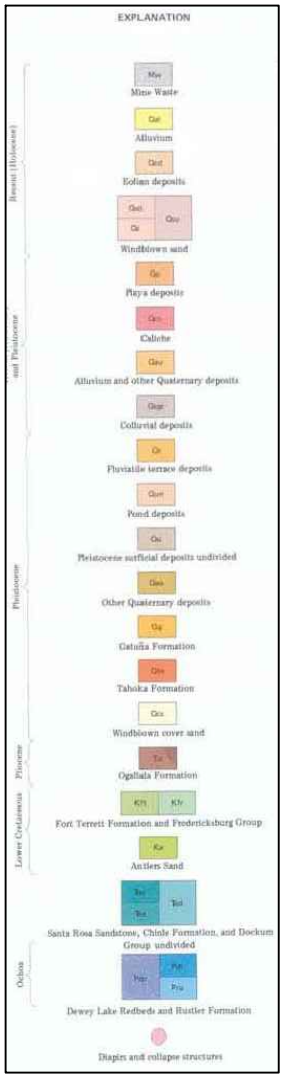
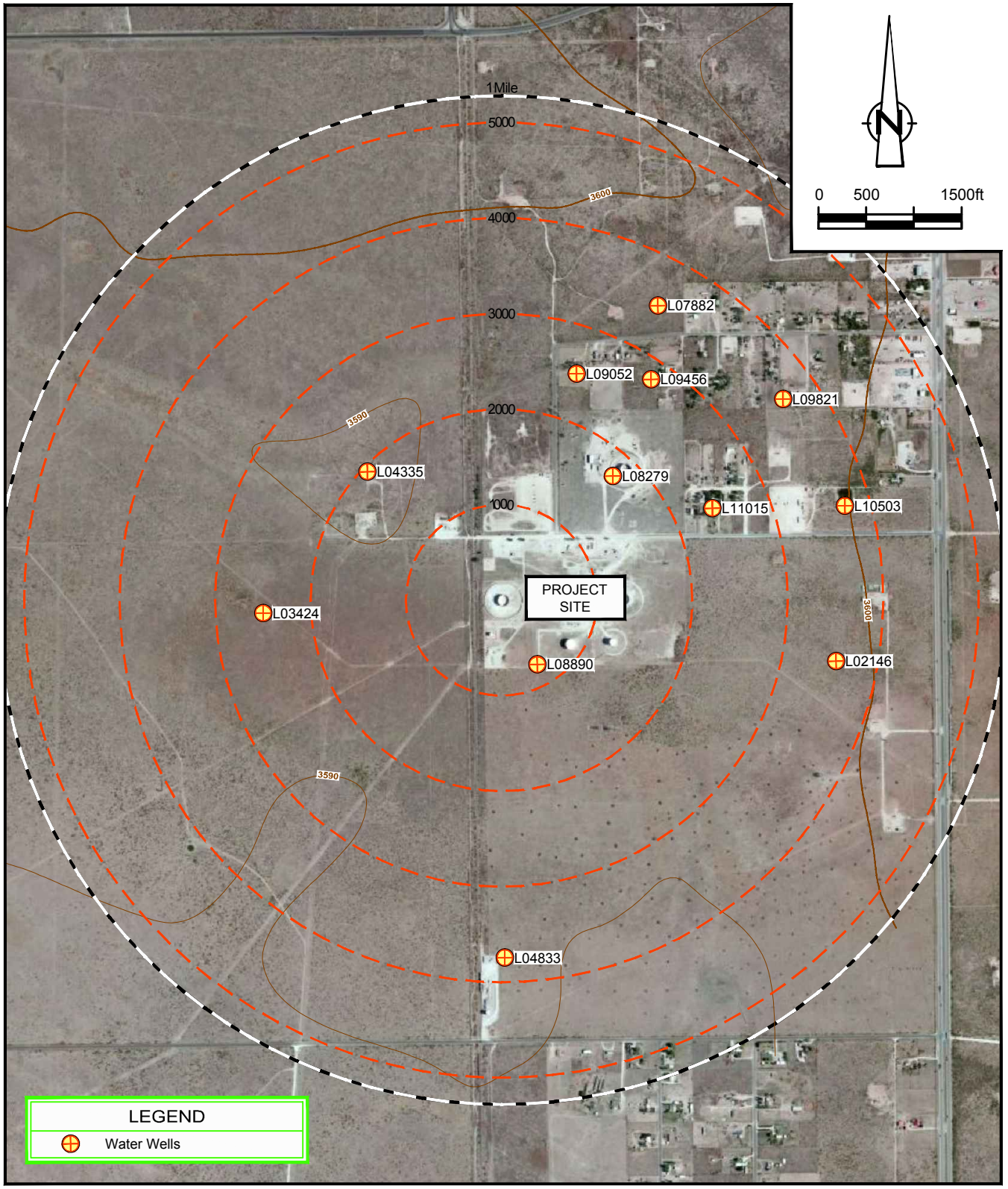


figure 4

HOBBS, NM AREA GEOLOGIC MAP
HOBBS STATION TANK 5201
HOBBS, NEW MEXICO
Holly Energy Partners



NOTE:

Topographic contours taken from USGS Topo map "Hobbs West, NM" dated 2010.

figure 5

WELLS WITHIN 1 MILE
HOBBS STATION TANK 5201
HOBBS, NEW MEXICO
Holly Energy Partners

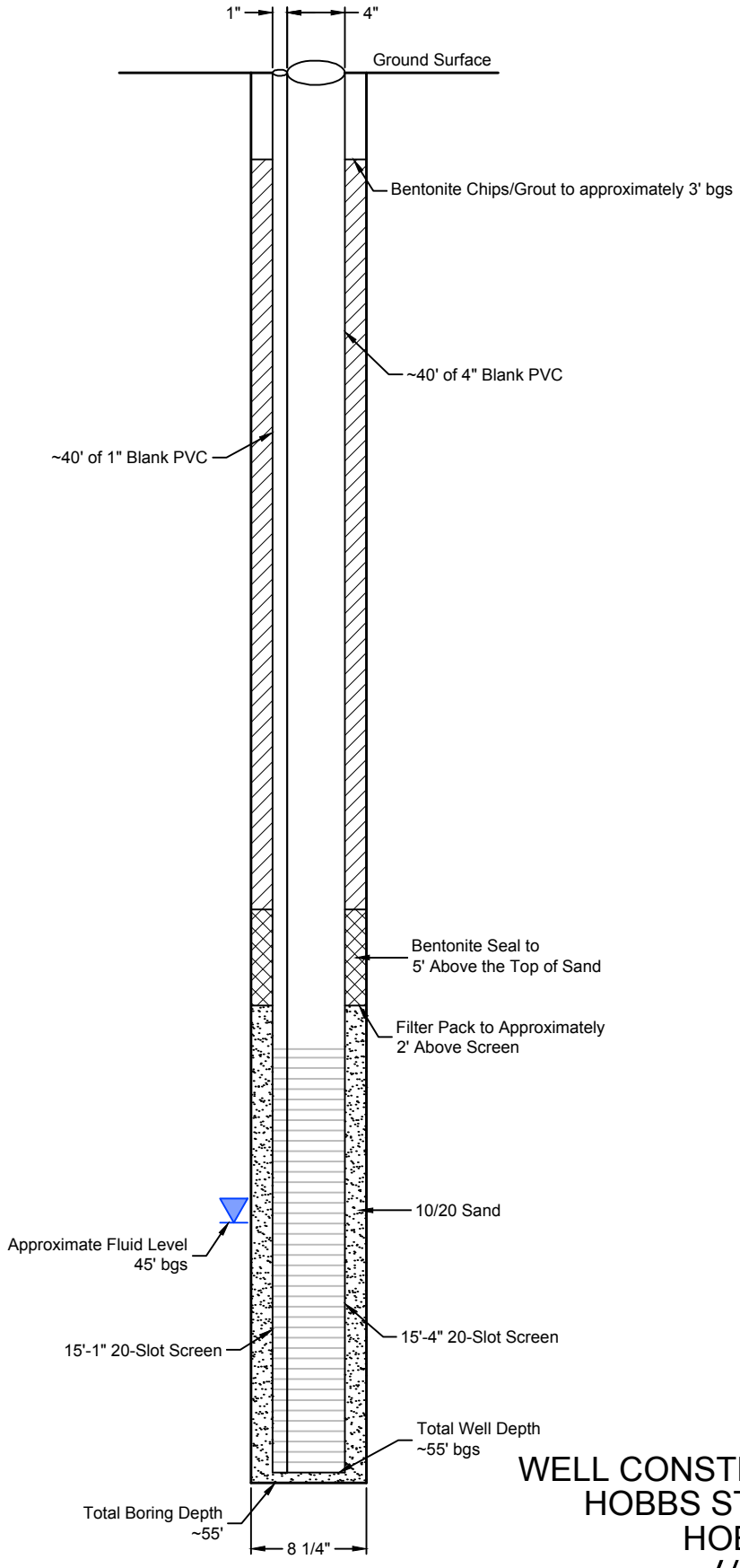


figure 6

WELL CONSTRUCTION DETAILS
HOBBS STATION TANK 5201
HOBBS, NEW MEXICO
Holly Energy Partners

Tables

Table 1

Water Well Information for the Hobbs Tank Farm area

Well #	Diversion	Owner	Use	Twsp	Rng	Sec q q q	Latitude	Longitude	Date Installed	Surface Elevation	Death to Water (feet)	Distance from Site (feet)	Total Well Depth (feet)
L04833		Cactus Drilling Corp.	PRO	19S	38E	22 3 3	32.64	-103.142	3/3/1962		50	3,900	115
L03424		Yates Drilling Co.	PRO	19S	38E	21 1 2	32.651	-103.151	1/26/1957		45	2,500	102
L02146		Coroce Drilling Co.	PRO	19S	38E	22 2 2	32.649	-103.132	1/12/1955		60	3,600	110
L04335		McAllister Fueling Co.	PRO	19S	38E	16 4 4	32.654	-103.147	12/7/1959		35	2,000	110
L10503	3	Augila Oil & Cattle Co.	STK	19S	38E	15 4	32.653	-103.131	7/21/1995		70	3,800	100
L11015	3	Martin Romero	DOM	19S	38E	15 3 4	32.653	-103.135	12/8/1999		45	2,400	120
L09821	3	Benny Boddy	DOM	19S	38E	15 4	32.656	-103.132	5/2/1986		51	3,600	100
L08890		unknown		19S	38E		32.649	-103.14	7/15/1982		130	900	unknown
L09456		unknown		19S	38E		32.657	-103.137	5/24/1984		74	2,900	unknown
L07882		unknown		19S	38E		32.659	-103.135	4/18/1979		32	3,500	unknown
L09052		unknown		19S	38E		32.657	-103.139	1/25/1983		58	2,600	unknown
L08279		unknown		19S	38E		32.654	-103.138	6/9/1980		58	1,900	unknown

APPENDIX A

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, 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 March 17, 1999

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company Navajo Pipeline	Contact Johnny Lackey
Address 311 West Quay, Artesia, NM 88210	Telephone No. 505-748-8942
Facility Name Hobbs Tank Farm	Facility Type Crude Oil Storage

Surface Owner	Mineral Owner	Lease No. N/A

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
	NE 1/4 Sec 22	19S	38E					Lea

NATURE OF RELEASE

Type of Release Crude Oil	Volume of Release	Volume Recovered
Source of Release Pipeline leak	Date and Hour of Occurrence 7/22/04, unknown	Date and Hour of Discovery 7/22/04, 2:00pm
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Gary Wink	
By Whom? Johnny Lackey, Holly Energy Partners	Date and Hour 7/22/04, 4:45pm	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

The 6" unloading line from the truck unloading rack to Tank 5201 developed a leak inside the tank retaining dike. The line was blocked in at the tank, line depressured and a clamp was installed at the leak. Leak was a result of external corrosion.

Describe Area Affected and Cleanup Action Taken.*
An area approximately 4 feet wide and 20 feet long and 18 feet deep was stained with crude oil. There was no free liquid. Stained soil will be dug out and disposed of at permitted disposal site and fresh dirt placed in the excavated area.

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: Johnny Lackey	OIL CONSERVATION DIVISION Approved by District Supervisor:	
Printed Name: Johnny Lackey		
Title: Safety/Environmental Supervisor	Approval Date:	Expiration Date:
Date: 10/11/04 Phone: 505-748-8942	Conditions of Approval:	Attached ☐

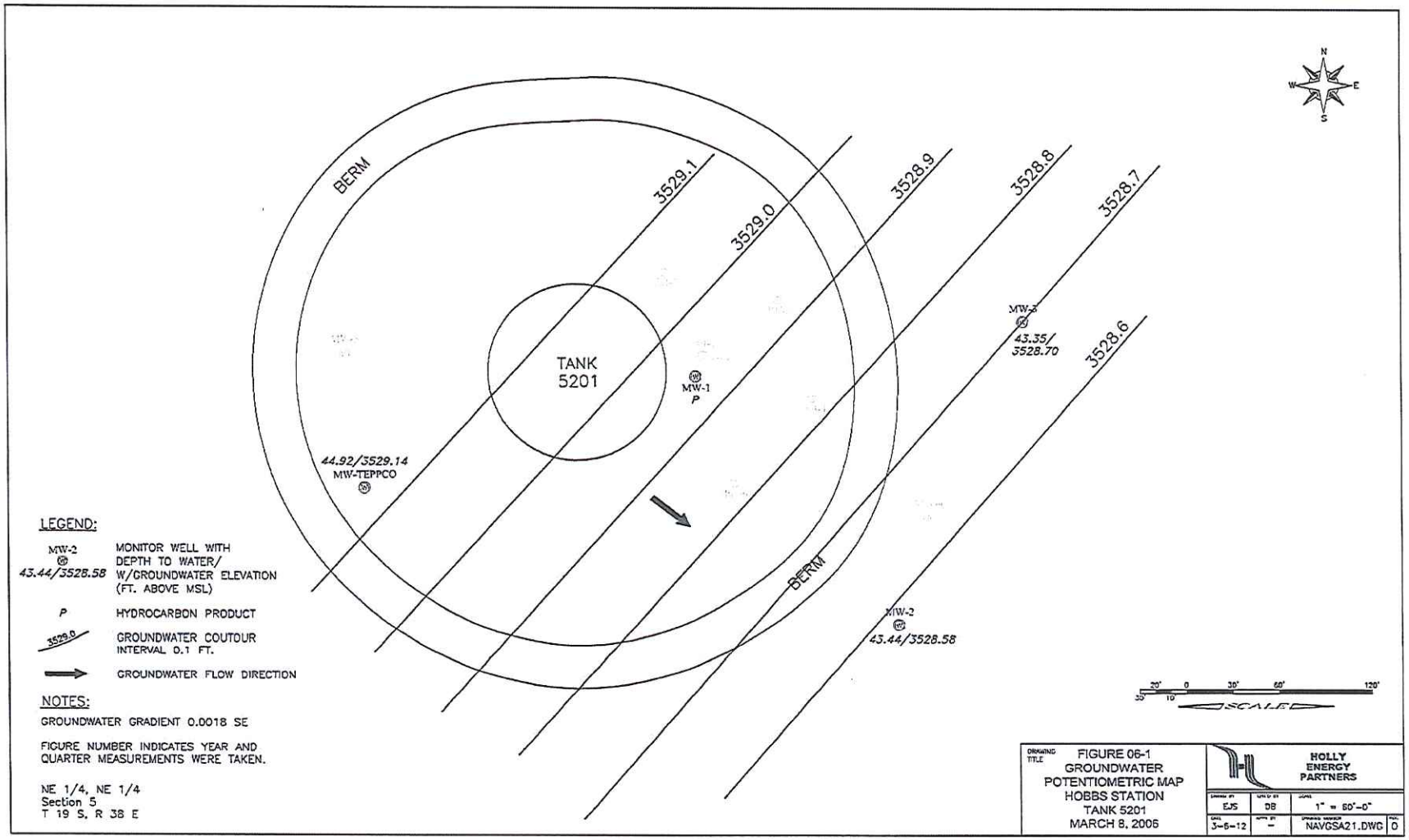
* Attach Additional Sheets If Necessary

APPENDIX B

Historical Data

APPENDIX B-1

Historical Groundwater Gradient Maps



LEGEND:

MW-2 43.44/3528.58	MONITOR WELL WITH DEPTH TO WATER/ W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
P	HYDROCARBON PRODUCT
3529.0	GROUNDWATER COUTOUR INTERVAL 0.1 FT.
	GROUNDWATER FLOW DIRECTION

NOTES:

GROUNDWATER GRADIENT 0.0018 SE

FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

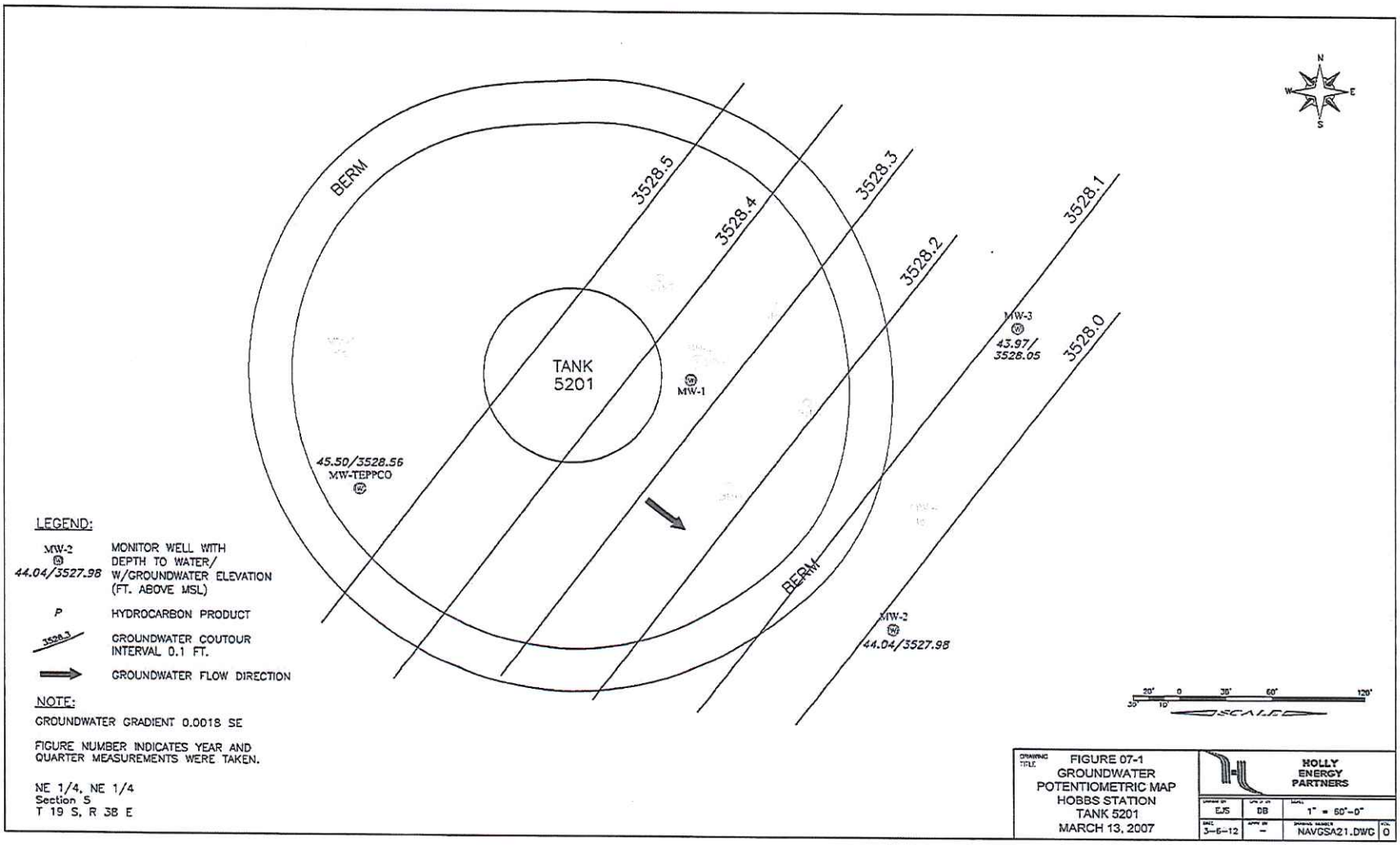
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE: FIGURE 06-1
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS STATION
TANK 5201
MARCH 8, 2006

HOLLY ENERGY PARTNERS

DRAWN BY: EJS	DATE OF DR: DB	SCALE: 1" = 60'-0"
DATE: 3-6-12	APPR BY: —	DRAWING NUMBER: NAVGSA21.DWG

REV: 0



LEGEND:

MW-2 (W) 44.04/3527.98	MONITOR WELL WITH DEPTH TO WATER/ W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
P	HYDROCARBON PRODUCT
3528.3	GROUNDWATER COUTOUR INTERVAL 0.1 FT.
⟹	GROUNDWATER FLOW DIRECTION

NOTE:

GROUNDWATER GRADIENT 0.0018 SE

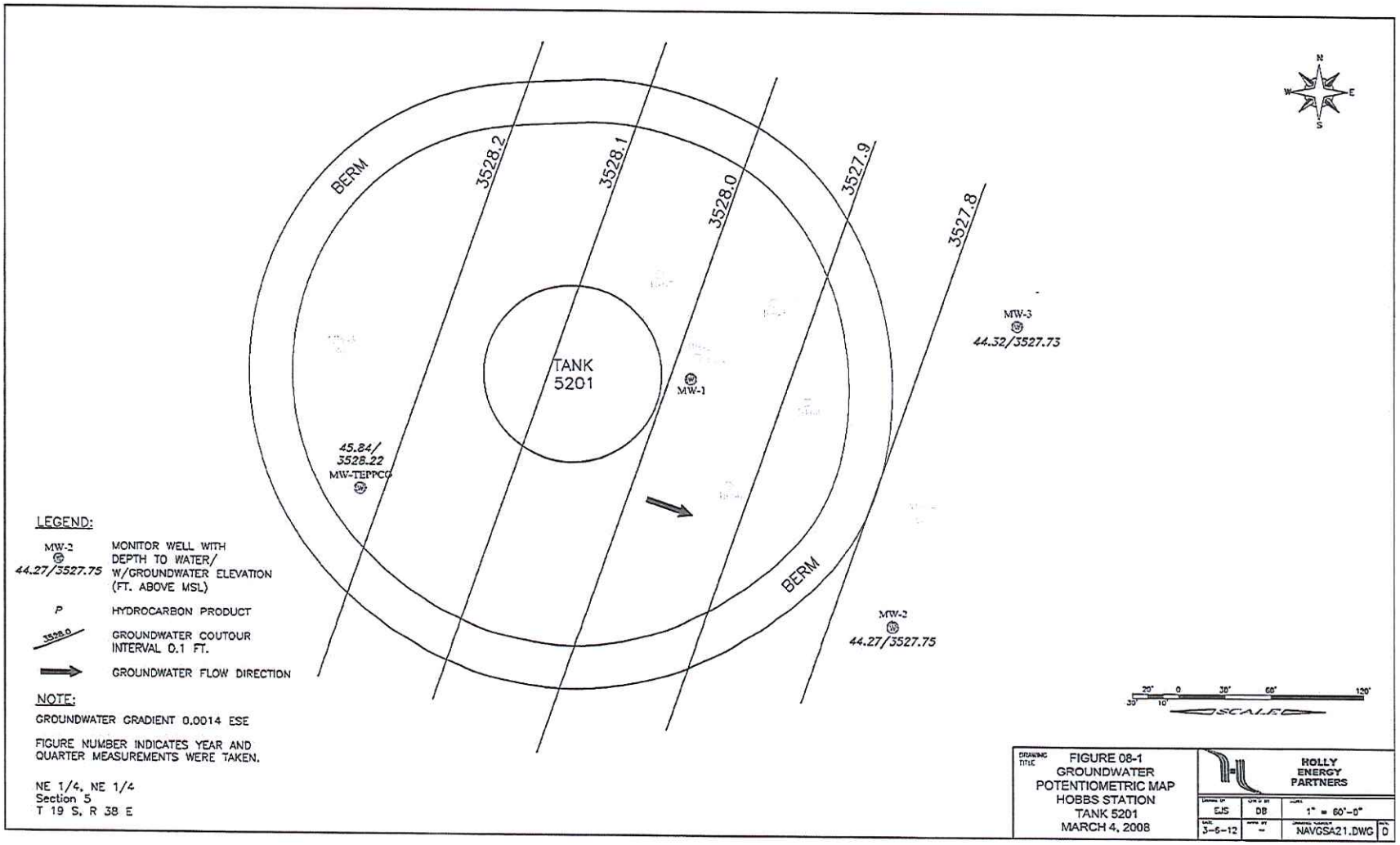
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE: FIGURE 07-1
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS STATION
TANK 5201
MARCH 13, 2007

HOLLY ENERGY PARTNERS

EJS	DB	1" = 60'-0"
3-6-12	–	NAVGSA21.DWG 0



LEGEND:

MW-2 ⊕ 44.27/3527.75	MONITOR WELL WITH DEPTH TO WATER/ W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
P	HYDROCARBON PRODUCT
3528.0	GROUNDWATER COUTOUR INTERVAL 0.1 FT.
➡	GROUNDWATER FLOW DIRECTION

NOTE:

GROUNDWATER GRADIENT 0.0014 ESE

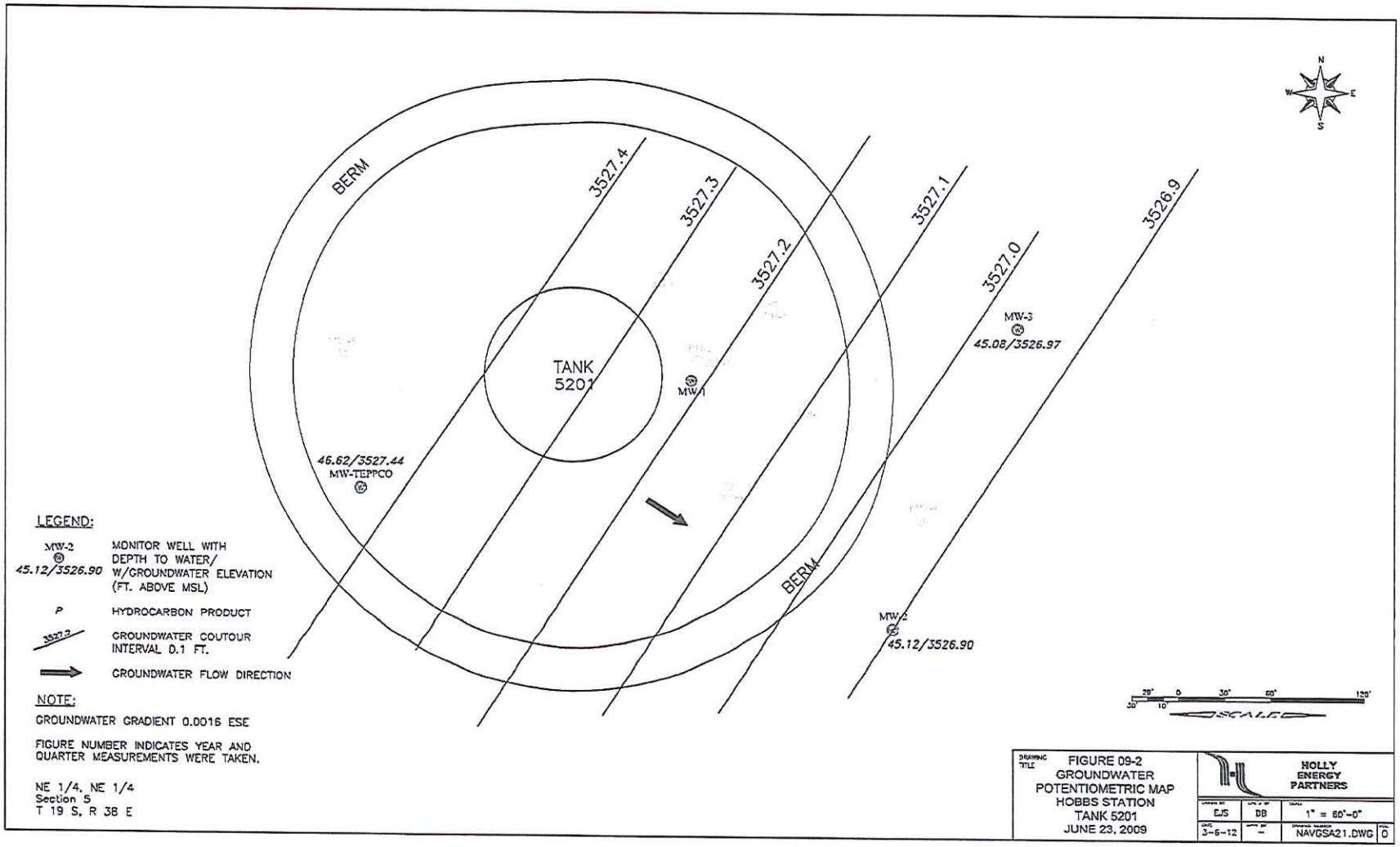
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

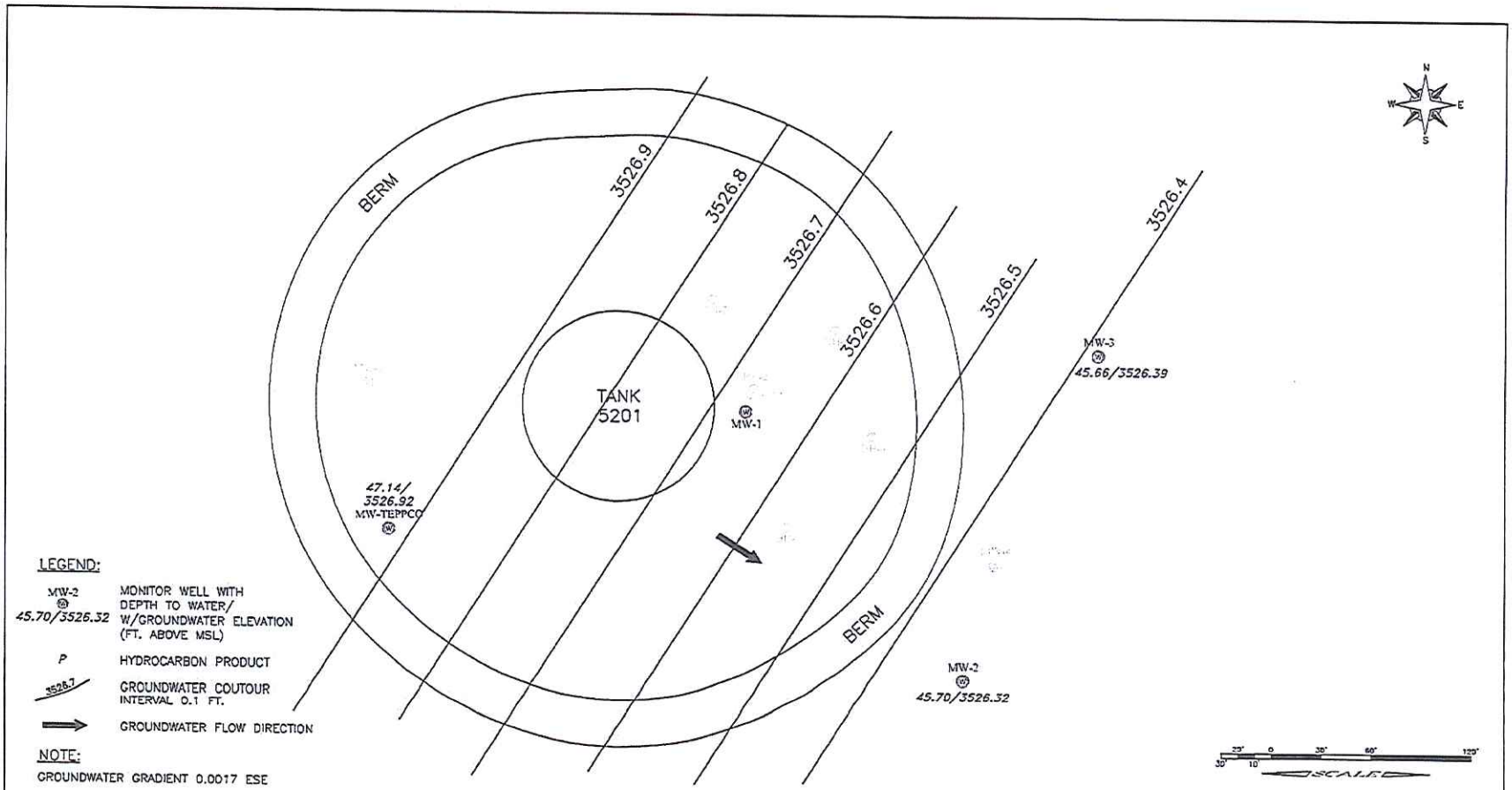
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE
FIGURE 08-1
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS STATION
TANK 5201
MARCH 4, 2008

ROLLY ENERGY PARTNERS

EJS	DB	1" = 60'-0"
3-6-12	--	NAVGSA21.DWG 0


N
W
E
S
BERM
3527.4
3527.3
3527.2
3527.1
3527.0
3526.9
TANK
5201
MW-1
MW-3
45.08/3526.97
46.62/3527.44
MW-TEPPCO
MW-2
45.12/3526.90
BERM
MW-2
45.12/3526.90
LEGEND:
MONITOR WELL WITH DEPTH TO WATER/ W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
HYDROCARBON PRODUCT
GROUNDWATER COUTOUR INTERVAL 0.1 FT.
GROUNDWATER FLOW DIRECTION
NOTE:
GROUNDWATER GRADIENT 0.0016 ESE
FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.
NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E
SCALE
DRAWING TITLE
FIGURE 09-2
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS STATION
TANK 5201
JUNE 23, 2009
HOLLY ENERGY PARTNERS
EJS
DB
1" = 60'-0"
3-6-12
NAVGSA21.DWG
0



LEGEND:

MW-2 45.70/3526.32	MONITOR WELL WITH DEPTH TO WATER/ W/GROUNDWATER ELEVATION (FT. ABOVE MSL)
P	HYDROCARBON PRODUCT
3528.7	GROUNDWATER COUTOUR INTERVAL 0.1 FT.
	GROUNDWATER FLOW DIRECTION

NOTE:

GROUNDWATER GRADIENT 0.0017 ESE

FIGURE NUMBER INDICATES YEAR AND QUARTER MEASUREMENTS WERE TAKEN.

NE 1/4, NE 1/4
Section 5
T 19 S, R 38 E

DRAWING TITLE: FIGURE 10-1
GROUNDWATER
POTENTIOMETRIC MAP
HOBBS STATION
TANK 5201
MARCH 9, 2010

HOLLY ENERGY PARTNERS

EJS	DB	1" = 60'-0"
3-6-12	–	NAVDSA21.DWG | 0

APPENDIX B-2

Historical Well Logs

Safety & Environmental Solutions, Inc.

LOG OF WELL MW-4

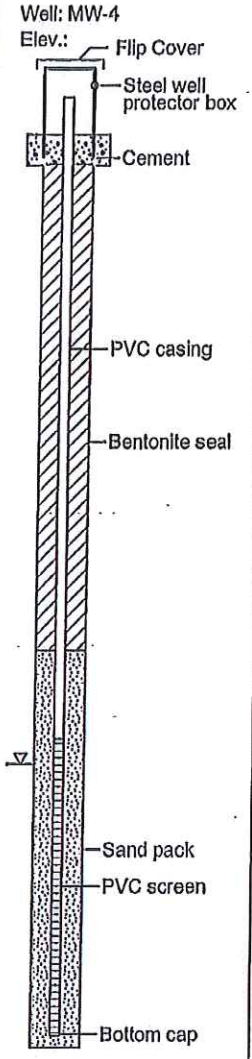
(Page 1 of 1)

Holly Energy Partners
Tank 5201 Release, Hobbs Station
NW/4 NW/4, Sec. 22, T19S, R38E
Lea County, New Mexico
N32.650919°, W103.141777°

Date, Time Started	: 03/09/10, 1230	Drilling Equipment	: GEFCO SD-200
Date, Time Completed	: 03/09/10, 1730	Drilled By	: Eco/Enviro, Lovington
Hole Diameter	: 5-1/4" tricone bit	Logged By	: D.G. Boyer, P.G., SESI
Drilling Method	: Air Rotary	Company Rep.	:
Sample Method	: Air cuttings, 10' core barrel	Survey By	:

Water Levels
▽ Hydrocarbon Product
▽ Measured Water Level

Depth In Feet	USCS	GRAPHIC	DESCRIPTION
0			
5	SM		0-9.5 ft. SANDY/CLAYEY SILT Pull string, add 10 ft. core barrel
10			10-18 ft. CALICHE, soft to 18 ft. then hard drilling.
15	CA		Pulled core barrel, 1.2 ft. recovery 18-20 ft. 18-20 ft. CALICHE, with quartz, light brown, very hard, concordial fracture.
20			20 ft. Very hard drilling
25	CA/SS		20-30 ft. 5 ft. recovery. 0-1 ft. Hard CALICHE, as above 1-5 ft. SILTY SANDSTONE, very light brown (creme colored), soft, very fine grained, sand, roots.
30			30-40 ft. Hard drilling 30-35 feet quartz fragments, size of coarse grained sand, light brown
35			35-37 ft. Soft drilling 40 ft., 0.8 ft. recovery, hard CALICHE rocks in core barrel, cuttings are sandy/silty, very light brown
40			40-50 ft. 4.1 ft. recovery 40-41.5 ft. Fractured SANDSTONE, medium cementing
45			41.5-42.7 ft. SANDSTONE, very well cemented, very fine grained, creme colored 42.7-44.1 ft. SANDSTONE, very hard, quartz cemented
50	SS		50 ft. Stop coring, no progress, install downhole hammer. Hard hammering to 54 ft. then occasional to 61 ft.
55			Pulled rods and hammer, water at 60 ft. and rising.
60			
65			
70			



Well Construction Information

COMPLETION DATA

Hole Depth	: 62 ft. below LS
TD inside casing	: 63.62 ft. below TOC
TD from surface	: 61.1 ft. below LS

CASING, SCREEN & CAP

Material, joints	: PVC, threaded
Diameter	: 2 in. ID
Manufacturer	: Monoflex
Screen type, length	: Slotted, 20 ft.
Screen opening	: 0.020 slot
Scrn. placement	: 41-61 ft. BLS
Sump	: None
Bottom Cap	: 0.2 ft PVC
Protector Casing	: Above-ground steel
Lock Key #	: - -

SEALS & SAND PACK

Cement seal type	: QuikCrete
Cement volume	: 3 bags
Cem't placement	: 0-2 ft. BLS
Annular seal name	: PDS bentonite
Seal size, volume	: 3/8" chips, 4 bags
Seal placement	: 2-35 ft. BLS
Sand pack name	: Oglebay-Norton
Sand pack size	: 20-40 silica
Sand pack volume	: 6 bags
Sand placement	: 35-62 ft. BLS
Native backfill	:

ELEVATIONS.

Ground elevation	:____
Top of casing	:____

WELL INSTALLATION:
03-09-10: Drilled to 62 ft. using 5-1/4" tricone bit. Saturated at 60 ft. Installed 20 ft. 0.020 slot screen, placed sand (5 bags) to 35 ft. Added 4 bags BDS bentonite, 3 bags Quikcrete to cement above-ground steel well protection box and concrete pad.

WELL DEVELOPMENT:
Info not available

Notes:
Sampled 07/08/08. Field chloride test on sample, 0900: 61 ppm, lab result 69 mg/L.

This is: Sample 14e-air drilling-roy, above grade completion.bor

Z:\Company Files\Navajo\2004 Cleanups\NAV-04-004 Tank 5201 Truck Fill Line\Borehole Logs\MW-4.bor

Safety & Environmental Solutions, Inc.

LOG OF BORING BH-1

Tank 5201 Site Investigation
Holly Energy Partners
Hobbs Station, Hobbs, New Mexico
NW NW Section 22, T19S R38E
N32° 39' 4.30", W103° 8' 31.73"

Date/Time Started	: 08/12/04, 1400	Drilled By	: Eco Drilling, Midland TX
Date/Time Completed	: 08/12/04, 1800	Sampling Method	: 5 ft. core barrel
Hole Diameter	: 8 1/4 In.	Logged By	: David Boyer, PG, SESI
Drilling Method	: Hollow Stem Auger		
Drilling Equipment	: CME-75		

Sample Method:
SS Split Spoon (18" or 24")
CB Core Barrel (2.5' or 5')
CT Auger Cuttings
NR No recovery

Depth in Feet	Sample Method	Sample Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.	TPH (mg/Kg)	GRO (mg/Kg)28	DRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl Benzene (mg/Kg)	Total Xylenes (mg/Kg)
0–15	CT		AR		0-15 ft. Fill material, sand, gravel and caliche								
15–20	CB	2.2	CA/SM		15-20 ft. CALICHE Rock and SILTY SAND, light brown, sand very fine grained, 3 In. hard caliche rock in tip, damp, staining in spots, H/C odor throughout								
20–21.5	CB	4.8	SP / SS		20-21.5 ft. SAND, light brown, very fine grained, soft sandstone pieces to 3/4", damp, H/C staining, odor	H9008-1	13,000	3,950	5,210	15.7	105	91.1	120
21.5–24.8					21.5-24.8 ft. SANDSTONE, light brown, massive, fractured, sandy where fractured. Gray discoloration & brown H/C staining at 24.4 ft. H/C odor								
24.8–25	CB	2.4	SS			H9008-2	<10	5,980	8,630	19.1	119	123	150
25–30					25-30 ft. SANDSTONE, fractured with occasional white caliche/sandstone zones, sand in fractures. H/C staining in soft SS & sand zones. H/C odor								
30–31	CB	2.0	SP / SS		30-31 ft. SAND, brown, very fine grained, H/C staining and odor								
31–32			SP		31-32 ft. SANDSTONE, fractured with chert at base. Gray sand in fractures, H/C product on inside sample tube on wall.	H9008-3	<10	8,760	7,460	17.4	181	211	257
32–35	CB	1.6	SS/LS										
35–36			SP/SS		35-36 ft. SAND and sandstone fragments, very dark gray, sand fine grained, H/C saturated.								
36–36.6	CB	2.4	SS/Ch		36-36.6 ft. SANDSTONE & LIMESTONE, hard, fract.								
36.6–40					gray, 40-40.9 ft. SAND and SANDSTONE, dark gray, H/C saturated.								
40–41.5	CB	4.0	SS/SP		40.9-41.5 ft. SANDSTONE and CHERT, H/C staining throughout.								
41.5–42.4					41.5-42.4 ft. SANDSTONE with chert, becoming only slightly stained, H/C odor throughout, likely water at 41.5 ft.	H9008-4		<10.0	21.5	<0.005	<0.005	<0.005	<0.015
42.4–50					45-50 ft. SANDSTONE and SAND, light brown, very fine grained, SS massive to 3 In., well cemented, no H/C staining, slight odor at bottom								

Notes:
H/C - Petroleum hydrocarbon
From 25-30 ft. hydrocarbon follows preferential pathways in fractured sandstone. Free product on outside of core barrel.
Completed as 2 In. temporary well with 20 ft. of 20 slot screen.

Z:\Company Files\Navajo\2004 Cleanups\NAV-04-004 Tank 5201 Truck Fill Line\Borehole Logs\BH-1.bor

Safety & Environmental Solutions, Inc.

LOG OF BORING BH-4

Tank 5201 Site Investigation
Holly Energy Partners
Hobbs Station, Hobbs, New Mexico
NW NW Section 22, T19S R38E
N32° 39' 4.30", W103° 8' 31.73"

Date/Time Started	: 08/17/04, 1030	Drilled By	: Eco Drilling, Midland TX
Date/Time Completed	: 08/17/04, 1400	Sampling Method	: 5 ft. core barrel
Hole Diameter	: 8 1/4 In.	Logged By	: David Boyer, PG, SESI
Drilling Method	: Hollow Stem Auger		
Drilling Equipment	: CME-75		

Sample Method:
SS Split Spoon (18" or 24")
CB Core Barrel (2.5' or 5')
CT Auger Cuttings
NR No recovery

Depth In Feet	Sample Method	Sample Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.	TPH (mg/Kg)	GRO (mg/Kg)28	DRO (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl Benzene (mg/Kg)	Total Xylenes (mg/Kg)
0	CT		SC		0-5 ft. CLAYEY SAND, light brown, very fine grained, wet (from rain), no H/C staining or odor								
5	CT		SP		5-10 ft. SAND, light brown, very fine grained with abuntant caliche chips/fragments to 2/4 In., no H/C staining or odor								
10	CT		SM		10-15 ft. SILTY SAND, light brown, very fine grained, frequent caliche chips/fragments to 1/2 In., no H/C staining or odor								
15	CT				15-20 ft. SILTY SAND, light brown, very fine grained, abundant sandston/caliche chips to 3/4", no H/C staining or odor								
20	CT		SC/SM		20-25 ft. CLAYEY SILTY SAND, light brown, very fine grained, caliche/sandstone chips to 1/2 In., no H/C staining or odor								
25	CT		SM		25-30 ft. SILTY SAND, light brown, very fine grained, abundant fragments/chips to 3/4 In., no H/C staining or odor								
30	CT				30-35 ft. SILTY SAND, light brown, very fine grained, abundant frags/chips to 1/4", no H/C staining or odor								
35	CB	1.9	SS/SP		35-36.9 ft. SANDSTONE and SAND, competent 35.5-35.9 ft., less so 35.9-36.9 ft. Color changing from light brown to light gray at 35.2 to 36 ft. 36-40 ft. light brown, sandy, damp, H/C odor throughout but no free product 40-42 ft. SANDSTONE and SAND, sandstone poorly consolidated, very fine grained	H9026-1	<10.0	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015
40	CB	2.9	SP		42-42.9 SAND, light brown, very fine grained, no sandstone, no H/C staining or odor	H9026-2	<10.0	<10.0	<10.0	<0.005	<0.005	<0.005	<0.015
45													

Notes:
H/C - Petroleum hydrocarbon
Plugged back to surface with 12 bags bentonite, hydrated.

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APPENDIX B-3

Historical Fluid Levels

Monitor Well Water Levels, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

Monitor Well Name	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Water Level Elev. (feet)	Total Depth (feet)	Water Saturated Thickness (feet)	Water Level Change (feet)
MW-Teppco	3,574.06	08/23/04	45.00	3,529.06	48.85	3.9	--
		10/04/04	45.88	3,528.18	48.85	3.0	-0.88
		10/12/04	45.00	3,529.06	48.85	3.9	0.88
		10/18/04	44.60	3,529.46	48.85	4.3	0.40
		01/11/05	44.53	3,529.53	48.85	4.3	0.07
		03/08/06	44.92	3,529.14	49.05	4.1	-0.39
		07/11/06	45.17	3,528.89	49.05	3.9	-0.25
		09/07/06	45.14	3,528.92	49.05	3.9	0.03
		12/19/06	45.34	3,528.72	49.05	3.7	-0.20
		03/13/07	45.50	3,528.56	49.05	3.6	-0.16
		06/21/07	45.60	3,528.46	48.93	3.3	-0.10
		09/21/07	45.42	3,528.64	48.93	3.5	0.18
		12/07/07	45.70	3,528.36	48.87	3.2	-0.28
		03/04/08	45.84	3,528.22	48.87	3.0	-0.14
		06/03/08	45.92	3,528.14	48.87	3.0	-0.08
		09/23/08	46.19	3,527.87	48.87	2.7	-0.27
		12/18/08	47.81	3,526.25	48.87	1.1	-1.62
		03/16/09	45.47	3,528.59	48.86	3.4	2.34
		06/23/09	46.62	3,527.44	49.08	2.5	-1.15
		09/08/09	46.70	3,527.36	49.08	2.4	-0.08
		12/17/09	46.97	3,527.09	49.08	2.1	-0.27
		03/09/10	47.14	3,526.92	48.84	1.7	-0.17
		06/16/10	--	--	--	--	--
		09/01/10					
Notes:	Measurement for MW-Teppco on 10/04/04 believed incorrectly recorded by technician.						
	Meter malfunction 12/18/08 and/or 03/16/09						
	TEPPCO well plugged and abandoned Spring 2010; replaced by MW-5.						

Monitor Well Water Levels, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

MW-2	3,572.02	08/23/04	43.45	3,528.57	53.00	9.6	- -
		10/04/04	43.46	3,528.56	53.00	9.5	-0.01
		10/12/04	43.12	3,528.90	53.00	9.9	0.34
		10/18/04	43.05	3,528.97	53.00	10.0	0.07
		01/11/05	43.02	3,529.00	53.00	10.0	0.03
		03/08/06	43.44	3,528.58	52.60	9.2	-0.42
		07/11/06	43.69	3,528.33	52.60	8.9	-0.25
		09/07/06	43.64	3,528.38	52.60	9.0	0.05
		12/19/06	43.83	3,528.19	52.60	8.8	-0.19
		03/13/07	44.04	3,527.98	52.60	8.6	-0.21
		06/21/07	44.11	3,527.91	52.54	8.4	-0.07
		09/21/07	43.87	3,528.15	52.54	8.7	0.24
		12/07/07	44.17	3,527.85	52.40	8.2	-0.30
		03/04/08	44.27	3,527.75	52.40	8.1	-0.10
		06/03/08	44.42	3,527.60	52.61	8.2	-0.15
		09/23/08	44.69	3,527.33	52.41	7.7	-0.27
		12/18/08	45.82	3,526.20	52.41	6.6	-1.13
		03/16/09	44.98	3,527.04	52.42	7.4	0.84
		06/23/09	45.12	3,526.90	52.64	7.5	-0.14
		09/08/09	45.29	3,526.73	52.39	7.1	-0.17
		12/17/09	45.50	3,526.52	52.39	6.9	-0.21
		03/09/10	45.70	3,526.32	52.40	6.7	-0.20
		06/16/10	45.85	3,526.17	52.37	6.5	-0.15
		09/01/10	45.82	3,526.20	52.60	6.8	0.03
		12/06/10	46.05	3,525.97	52.40	6.4	-0.23
		03/18/11	46.18	3,525.84	52.56	6.4	-0.13
		06/23/11	46.40	3,525.62	52.58	6.2	-0.22
		10/07/11	46.75	3,525.27	52.34	5.6	-0.35
		12/08/11	46.91	3,525.11	52.32	5.4	-0.16
Note:	Meter malfunction 12/18/08 and/or 03/16/09						

Monitor Well Water Levels, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

MW-3	3572.05	08/23/04	43.50	3,528.55	51.78	8.3	- -
		10/04/04	43.38	3,528.67	51.18	7.8	0.12
		10/12/04	43.10	3,528.95	51.18	8.1	0.28
		10/18/04	43.04	3,529.01	51.18	8.1	0.06
		01/11/05	42.93	3,529.12	53.06	10.1	0.11
		03/08/06	43.35	3,528.70	53.25	9.9	-0.42
		07/11/06	43.63	3,528.42	53.25	9.6	-0.28
		09/07/06	43.61	3,528.44	53.25	9.6	0.02
		12/19/06	43.76	3,528.29	53.25	9.5	-0.15
		03/13/07	43.97	3,528.08	53.25	9.3	-0.21
		06/21/07	44.03	3,528.02	53.20	9.2	-0.06
		09/21/07	43.83	3,528.22	53.20	9.4	0.20
		12/07/07	44.11	3,527.94	53.06	9.0	-0.28
		03/04/08	44.32	3,527.73	53.06	8.7	-0.21
		06/03/08	44.35	3,527.70	53.25	8.9	-0.03
		09/23/08	44.65	3,527.40	53.08	8.4	-0.30
		12/18/08	44.77	3,527.28	53.08	8.3	-0.12
		03/16/09	44.92	3,527.13	53.07	8.2	-0.15
		06/23/09	45.08	3,526.97	53.28	8.2	-0.16
		09/08/09	45.24	3,526.81	53.03	7.8	-0.16
		12/17/09	45.44	3,526.61	53.03	7.6	-0.20
		03/09/10	45.66	3,526.39	53.05	7.4	-0.22
		06/16/10	45.80	3,526.25	53.03	7.2	-0.14
		09/01/10	45.80	3,526.25	53.06	7.3	0.00
		12/06/10	46.00	3,526.05	53.05	7.1	-0.20
		03/18/11	46.14	3,525.91	53.25	7.1	-0.14
		06/23/11	46.38	3,525.67	53.24	6.9	-0.24
		10/07/11	46.72	3,525.33	53.03	6.3	-0.34
		12/08/11	46.87	3,525.18	53.04	6.2	-0.15

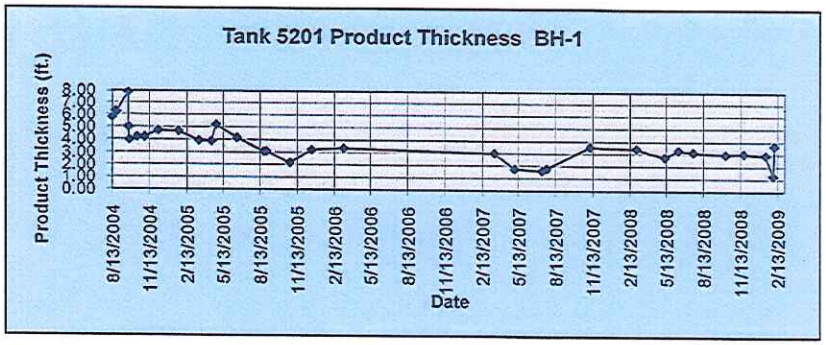
Monitor Well Water Levels, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

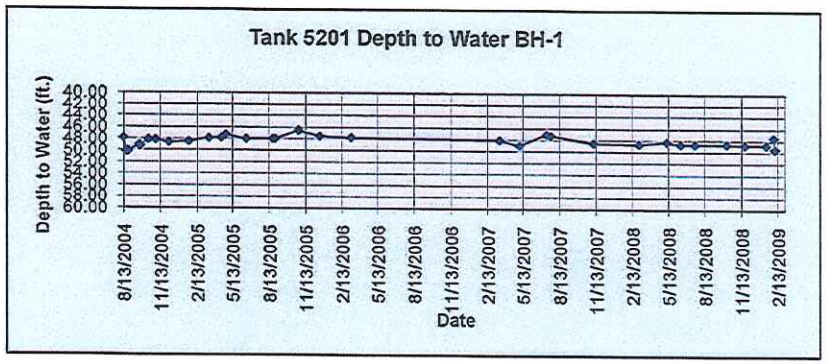
MW-4	--	06/16/10	45.82	--	63.57	17.8	--
		09/01/10	45.81	--	63.62	17.8	0.01
		12/06/10	46.01	--	63.11	17.1	-0.20
		03/18/11	46.16	--	63.30	17.1	-0.15
		06/23/11	46.40	--	63.28	16.9	-0.24
		10/07/11	46.74	--	62.90	16.2	-0.34
		12/08/11	46.88	--	62.72	15.8	-0.14
MW-5	--	03/18/11	47.61	--	58.86	11.3	--
		06/23/11	47.83	--	58.86	11.0	-0.22
		10/07/11	48.17	--	58.64	10.5	-0.34
		12/08/11	48.31	--	58.62	10.3	-0.14
(Table updated 03/04/12)							

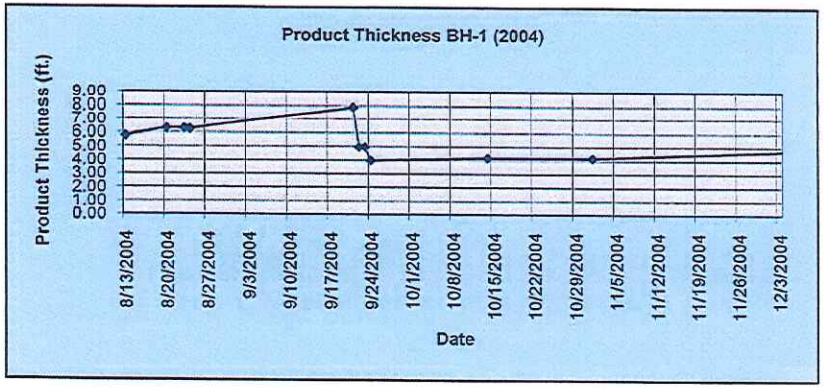
Well # 1

Date	Top of Oil	Top of Water	Product Thickness	Difference
08/13/04	42.06	47.84	5.78	
08/20/04	43.85	50.15	6.30	0.52
08/23/04	43.85	50.15	6.30	0.00
08/24/04	43.90	50.15	6.25	-0.05
09/21/04	41.20	49.10	7.90	1.65
09/22/04	44.10	49.10	5.00	-2.90
09/23/04	44.30	49.30	5.00	0.00
09/24/04	45.20	49.20	4.00	-1.00
10/14/04	43.90	48.10	4.20	0.20
11/01/04	43.95	48.15	4.20	0.00
12/04/04	43.88	48.60	4.72	0.52
01/23/05	43.82	48.48	4.66	-0.06
03/15/05	43.90	47.85	3.95	-0.71
04/15/05	43.90	47.80	3.90	-0.05
04/26/05	42.00	47.20	5.20	1.30
06/17/05	43.79	47.96	4.17	-1.03
08/22/05	44.85	47.95	3.10	-1.07
08/29/05	44.81	47.93	3.12	0.02
10/26/05	44.29	46.49	2.20	-0.92
12/19/05	44.24	47.48	3.24	1.04
03/08/06	44.34	47.72	3.38	0.14
03/15/07	45.00	48.04	3.04	-0.34
05/04/07	47.23	49.00	1.77	-1.27
07/11/07	45.39	47.01	1.62	-0.15
07/22/07	45.38	47.17	1.79	0.17
11/07/07	44.92	48.50	3.58	1.79
02/29/08	45.20	48.65	3.45	-0.13
05/09/08	45.52	48.27	2.75	-0.70
06/12/08	45.34	48.67	3.33	0.58
07/18/08	45.48	48.67	3.19	-0.14
10/07/08	45.63	48.64	3.01	-0.18
11/21/08	45.70	48.76	3.06	0.05
01/14/09	45.82	48.76	2.94	-0.12
02/02/09	46.17	47.47	1.30	-1.64
02/05/09	45.73	49.45	3.72	2.42

Being updated March 2012







APPENDIX B-4

Historical Groundwater Quality Data

Monitor Well Water Quality, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µg/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)	Lab Analysis by:
MW-Teppco	08/23/04	<2	<2	<2	<6	<2	52	668	Cardinal
	01/11/05	<2	<2	<2	<6	<2	28	742	Cardinal
	03/08/06	<2	<2	<2	<6	<2	92	802	Cardinal
	07/11/06	<2	<2	<2	<6	<2	128	1,163	Cardinal
	09/07/06	<0.5	<0.5	<0.5	<1	<0.5	98	930	Argon
	12/19/06	<0.5	<0.5	<0.5	<1	<0.5	84	970	Argon
	03/13/07	<0.5	<0.5	<0.5	<1.0	<0.5	77	1,000	Argon
	06/21/07	--	--	--	--	--	--	--	--
	09/21/07	<0.5	<0.5	<0.5	<1.0	<0.5	63	820	Argon
	12/07/07	--	--	--	--	--	--	--	--
TEPPCO monitor well no longer sampled as per direction of TEPPCO, plugged Spring 2010									

Monitor Well Water Quality, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µg/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)	Lab Analysis by:
MW-2[2]	08/23/04	26	4	5	14	49	124	835	Cardinal
	01/11/05	72	<2	<2	15	87	56	1,198	Cardinal
	03/08/06	<2	<2	<2	<6	<2	48	852	Cardinal
	07/11/06	7	<2	<2	16	23	40	910	Cardinal
	09/07/06	4.2	1.9	<0.5	3.2	9.3	27	830	Argon
	12/19/06	2.1	1.0	0.9	4.3	8.3	28	810	Argon
	03/13/07	<0.5	0.6	1.2	2.3	4.1	28	840	Argon
	06/21/07	0.8	0.7	<0.5	3.8	5.3	23	810	Argon
	09/21/07	1.4	1.1	<0.5	3.2	5.7	17	790	Argon
	12/07/07	1.4	1.0	0.9	3.5	6.8	30	780	Argon
	03/04/08	1.4	0.8	1.8	3.3	7.3	12	800	Argon
	06/03/08	1.7	0.9	1.5	2.1	6.2	76	800	Argon
	09/23/08	1.2	<0.5	0.6	3.8	5.6	17	860	Argon
	12/18/08	1.0	0.8	<0.5	1.2	3.0	17	840	Argon
	03/16/09	0.9	0.7	<0.5	2.9	4.5	19	900	Argon
	06/23/09	1.2	<1.0	<1.0	<2.0	1.2	25	890	Hall
	09/08/09	<1.0	<1.0	<1.0	<2.0	<1.0	26	892	Hall
	12/17/09	<1.0	<1.0	<1.0	<2.0	<1.0	22	870	Hall
	03/09/10	<1.0	<1.0	<1.0	<1.5	<1.0	21	838	Hall
	06/16/10	<1.0	<1.0	<1.0	2.5	2.5	17	860	Hall
MW-2	09/01/10	1.0	<1.0	<1.0	<2.0	1.0	17	788	Hall
	12/06/10	1.6	<1.0	<1.0	<2.0	1.6	18	806	Hall
	03/18/11	1.3	<1.0	14	2.9	18.2	23	844	Hall
	06/23/11	1.1	<1.0	26	3.2	30.3	32	870	Hall
	10/07/11	1.2	<1.0	14	<2.0	15.2	37	1,020	Hall
	12/08/11	1.4	<1.0	5.7	3.6	10.7	51	966	Hall

Monitor Well Water Quality, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µg/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)	Lab Analysis by:
MW-3[2]	08/23/04	<2	<2	<2	<6	<2	88	574	Cardinal
	01/11/05	<2	<2	<2	<6	<2	108	882	Cardinal
	03/08/06	<2	<2	<2	<6	<2	176	755	Cardinal
	07/11/06	<2	<2	<2	<6	<2	192	868	Cardinal
	09/07/06	<0.5	<0.5	<0.5	<1	<0.5	150	770	Argon
	12/19/06	<0.5	<0.5	<0.5	<1	<0.5	160	860	Argon
	03/13/07	<0.5	<0.5	<0.5	<1.0	<0.5	160	850	Argon
	06/21/07	<0.5	<0.5	<0.5	<1.0	<0.5	160	760	Argon
	09/21/07	<0.5	<0.5	<0.5	<1.0	<0.5	120	750	Argon
	12/07/07	<0.5	<0.5	<0.5	<1.0	<0.5	180	830	Argon
	03/04/08	<0.5	<0.5	<0.5	<1.0	<0.5	160	780	Argon
	06/03/08	<0.5	<0.5	<0.5	<1.0	<0.5	170	990	Argon
	09/23/08	<0.5	<0.5	<0.5	<1.0	<0.5	160	860	Argon
	12/18/08	<0.5	<0.5	<0.5	<1.0	<0.5	130	840	Argon
	03/16/09	<0.5	<0.5	<0.5	<1.0	<0.5	150	880	Argon
	06/23/09	<1.0	<1.0	<1.0	<2.0	<1.0	170	900	Hall
	09/08/09	<1.0	<1.0	<1.0	<2.0	<1.0	150	906	Hall
	12/17/09	<1.0	<1.0	<1.0	<2.0	<1.0	160	905	Hall
	03/09/10	<1.0	<1.0	<1.0	<1.5	<1.0	150	905	Hall
	06/16/10	<1.0	<1.0	<1.0	<2.0	<1.0	140	904	Hall
	09/01/10	<1.0	<1.0	<1.0	<2.0	<1.0	140	873	Hall
	12/06/10	<1.0	<1.0	<1.0	<2.0	<1.0	130	899	Hall
	03/18/11	<1.0	<1.0	<1.0	<2.0	<1.0	120	897	Hall
	06/23/11	<1.0	<1.0	<1.0	<2.0	<1.0	110	878	Hall
	10/07/11	<1.0	<1.0	<1.0	<2.0	<1.0	110	886	Hall
	12/08/11	<1.0	<1.0	<1.0	<2.0	<1.0	110	901	Hall

Monitor Well Water Quality, Tank 5201 Product Recovery, Hobbs Station, Holly Energy Partners

Monitoring Well	Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (total, µg/L)	Total BTEX (µg/L)	Chloride[1] (mg/L)	Total Dissolved Solids[1] (mg/L)	Lab Analysis by:
MW-4	06/16/10	<1.0	<1.0	<1.0	<2.0	<1.0	30	505	Hall
	09/01/10	3.3	<1.0	<1.0	<2.0	3.3	24	584	Hall
	12/06/10	<1.0	<1.0	<1.0	<2.0	<1.0	38	670	Hall
	03/18/11	<1.0	<1.0	<1.0	<2.0	<1.0	62	932	Hall
	06/23/11	<1.0	<1.0	<1.0	<2.0	<1.0	48	885	Hall
	10/07/11	<1.0	<1.0	<1.0	<2.0	<1.0	46	853	Hall
	12/08/11	<1.0	<1.0	<1.0	<2.0	<1.0	43	812	Hall
MW-5	03/18/11	<1.0	<1.0	<1.0	<2.0	<1.0	33	510	Hall
	06/23/11	<1.0	<1.0	<1.0	<2.0	<1.0	29	483	Hall
	10/07/11	<1.0	<1.0	<1.0	<2.0	<1.0	32	543	Hall
	12/08/11	<1.0	<1.0	<1.0	<2.0	<1.0	36	558	Hall
NM Groundwater Standard[3]:		**10**	**750**	**750**	**620**	**- -**	**250**	**1,000**	

Notes:
1. Complete cation/anion analysis on file for 08/23/04 and 01/11/05.
2. When first completed, MW-2 (BH2) and MW-3 (BH3) were assigned names MW #1 and MW #2, respectively; their names were later revised to correspond with the borehole numbers.
3. Water Quality Control Commission Standards adopted by the NM Oil Conservation Division

Analyses performed at Cardinal Laboratories, Hobbs, NM and Argon Laboratories, Hobbs, NM

Cardinal analyses using EPA SW-846 methods 8260 (volatile organics) and 160.1 (TDS), and Standard Method 4500-Cl B (Cl).

Argon analyses using EPA SW-846 method 8021B (BTEX) , 160.1 (TDS), and 300.0 (chloride).

Hall analyses using EPA SW-846 methods 8021B or 8260B (BTEX), 300.0 (chloride) and Standard Method 2540C Mod (TDS)

APPENDIX C


5200
08/01/2012


Emergency
1-877-748-4464
575-748-8951
HOLLY ENERGY PARTNERS
HOBBS STATION
NOTICE
10
08/01/2012


Emergency
1-877-748-4464
575-748-8951
HOLLY ENERGY PARTNERS
HOBBS STATION
NOTICE
SPEED LIMIT 10 MPH
HOLLY ENERGY PARTNERS
08/01/2012


08/01/2012


08/01/2012


08/01/2012