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COMPREHENSIVE FACILITY INVESTIGATION WORK PLAN

TEXACO EXPLORATION AND PRODUCTION, INC.
EUNICE #2 (NORTH) GAS PLANT
LEA COUNTY, NEW MEXICO

February 1997

Prepared for

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COMPREHENSIVE FACILITY INVESTIGATION WORK PLAN
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1.0 INTRODUCTION

Texaco Exploration and Production, Inc. (Texaco) has retained Highlander Environmental Corp. (Highlander) to prepare a comprehensive work plan (Plan) for the Texaco Eunice #2 (North) Gas Plant (Site). The Plan was required by the State of New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD) after its review of the report prepared by Highlander, titled, "Subsurface Environmental Assessment, Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant, Lea County, New Mexico, September 1996." Appendix A presents correspondence from the OCD to Texaco dated November 12, 1996. The Plan was prepared in accordance with the State of New Mexico Ground and Surface Water Quality Protection Regulations for Stage 1 Abatement Plan (20 NMAC 6.2, 4106 C).

1.1 Background and Location

The Site was constructed in the 1940's, subsequently modified and currently operates as a turbo expander type natural gas processing plant for extraction of NGLC natural gas liquids. The Site is located approximately 0.25 miles north of Eunice, New Mexico, in the southeast quarter (SE/4), of the northeast quarter (NE/4), and the NE/4 of the SE/4, Section ~~21~~ 28, Township 21 South, Range 37 East. Figure 1 presents a Site location and topographic map. Figure 2 presents a drawing for the Site.

1.2 Previous Investigations

1.2.1 Compressor Building Investigation

During October 1995, Texaco requested Highlander to conduct a subsurface investigation in the vicinity of the compressor building at the Site. The subsurface investigation was conducted to determine if impacts to the shallow soil were present as a result of leaks from the compressor engines. The subsurface investigation consisted of installing thirteen (13) shallow hand auger borings (AH-1 through AH-13), which were spaced approximately fifty feet apart along the north and south sides of the compressor building. The soil borings were advanced to a maximum depth of approximately fifteen feet below ground. Soil samples were collected at approximately one and two foot increments from each boring for visual examination and field screening. The soil samples were field screened for petroleum hydrocarbons using a photoionization detector (Thermo Environmental Instruments, Model 580 B Organic Vapor Meter (OVM)). The soil sample field screening results indicated that detectable levels of petroleum hydrocarbons were present in soil samples from borings AH-4, AH-5, AH-6, AH-7, AH-9, AH-10, and AH-11. Ten (10) additional soil borings were installed to determine the horizontal extent of the hydrocarbon affected soils at these locations.

Based on the field screening results, soil samples were selected from each boring for laboratory testing. The soil samples were submitted to Trace Analysis, Inc., Lubbock, Texas. Soil samples from all borings were analyzed for total petroleum hydrocarbons (TPH) by EPA Method 418.1. Soil samples from borings AH-4, AH-5, AH-6, AH-7 and AH-10 were analyzed for benzene, toluene, ethylbenzene, and xylene (collectively referred to as BTEX) by EPA Method SW-846-8020. Samples from borings AH-6, AH-7, AH-10, and AH-11 were analyzed for polychlorinated biphenyl (PCB). Soil samples from borings AH-4, AH-5, AH-6, AH-7, AH-10,

and AH-11 were analyzed for total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) by EPA Method SW-846-6010.

The laboratory test results reported that TPH was present in samples from all borings, except AH-5. The highest TPH measurement was reported at 142,000 milligrams per kilogram (mg/kg) in sample AH-4, 4.0 to 4.5 feet.. The laboratory test results revealed that the TPH level in soil at location AH-4 decreased to 226 mg/kg at a depth of approximately 10 to 10.5 feet below ground. Assuming a TPH cleanup level of 1000 mg/kg for soil, based on the OCD's Recommended Remediation Action Levels (RRAL), as presented in, "Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993", the TPH levels reported in soil samples from borings AH-4, AH-6, AH-7, AH-8, AH-9, AH-11, and AH-12, exceed the RRAL. The vertical extent of TPH impact to soil was defined at locations AH-1, AH-2, AH-3, AH-4, AH-5, AH-9, AH-10, and AH-12. The analysis also indicated that the horizontal extent of impact at locations AH-4, AH-6 and AH-7, about 7 to 10 feet from the compressor building.

The results of BTEX analysis of soil samples from borings AH-4 through AH-7, and AH-10 did not report benzene, toluene, and ethylbenzene above test method detection limit concentrations. Xylene was reported in soil samples from borings AH-5 and AH-7 at 0.555 mg/kg and 0.211 mg/kg, respectively. The highest total BTEX level reported in the soil samples, 0.555 mg/kg from boring AH-5, was below the OCD's RRAL of 50 mg/kg. No PCB compounds were reported in the soil samples from borings AH-6, AH-7, AH-10, and AH-11.

The results of metals analysis of soil samples from borings AH-4 through AH-7, AH-10, and AH-11 only reported detectable levels of barium, cadmium, chromium, lead and mercury. Barium was reported at concentrations ranging from 25.8 mg/kg in sample AH-4 (0 to 0.5 feet) to 1900 mg/kg in sample AH-5 (0 to 0.5 feet). Chromium ranged in concentration from 20.7 mg/kg (AH-11, 0 to 0.5 feet) to 1580 mg/kg (AH-5, 0 to 0.5 feet). Cadmium (2.7 mg/kg) and lead (64.4 mg/kg) were only reported in soil sample AH-5 (0 to 0.5 feet). Mercury (0.34 mg/kg) was only reported in soil sample AH-6 (3.2 to 3.9 feet). The results of laboratory tests determined that the

levels of barium, cadmium, chromium and lead reported in the soil sample from boring AH-5 (0.0 to 0.5 feet), and mercury (0.34 mg/kg) reported in the soil sample from boring AH-6 (3.2 to 3.9 feet) were elevated in comparison to the levels of these constituents reported in the remaining soil samples. However, no Site-specific background concentrations are available to compare to these data.

On March 28, 1996, Highlander installed four (4) additional hand auger soil borings (AH-6-2, AH-7-2, AH-8-2, and AH-11-2) in the vicinity of borings AH-6, AH-7, AH-8 and AH-11 to delineate the vertical extent of the TPH impact to soil at these locations. These soil borings were drilled to depths ranging from approximately 5.5 feet below ground (AH-11-2) to approximately 14 feet below ground (AH-7-2). Soil samples were collected from each boring for field screening, and based on the field screening results, soil samples were selected and analyzed for TPH by EPA Method 418.1. Soil samples from borings AH-6-2 and AH-7-2 were also analyzed for gasoline range petroleum hydrocarbons using EPA Method 8015 modified. The laboratory test results reported that TPH (EPA Method 418.1) was present in the soil samples at concentrations of 1420 mg/kg (AH-6-2, 12.5 to 13.0 feet), and 58, 300 mg/kg (AH-7-2, 13.5 to 14.0 feet). These results indicate that the TPH impact in soil at locations AH-6-2 and AH-7-2 extends to depths greater than 13.0 and 14.0 feet, respectively. The results of the laboratory analysis for gasoline range petroleum hydrocarbons by EPA Method 8015 Modified, reported concentrations of less than the test method detection limit of 10, 000 micrograms per kilogram (ug/kg) or 10 mg/kg in sample AH-6-2, 12.5 to 13.0 feet, and 35,100 ug/kg or 35.1 mg/kg in sample AH-7-2, 13.5 to 14.0 feet. These results suggest that the TPH impact to soil at locations AH-6-2 and AH-7-2 is likely from oil leaks and spills from compressor engines, rather than gasoline associated hydrocarbons. Boring AH-7-2 was terminated on a dense layer of caliche, which prevented further drilling.

Soil samples from borings AH-8-2 and AH-11-2 were analyzed for TPH (EPA Method 418.1), and reported 18 mg/kg and <10 mg/kg, respectively. The laboratory test data indicate that the vertical extent of TPH impact to soil at these locations was defined. The results of the

preliminary subsurface investigation were presented to Texaco in the report titled, "Subsurface Investigation of the Compressor Building at Texaco North Eunice Gas Plant, November 1995", which was included as Appendix A in the report titled, "Subsurface Environmental Assessment, Texaco Exploration and Production, Inc., Eunice # 2 (North) Gas Plant, Lea County, New Mexico, September 1996", which was submitted to the OCD.

Due to dense caliche encountered at location AH-7-2, Highlander was unable to define the vertical extent of TPH impact to soil at this location, and location AH-6-2. The locations of subsurface piping and overhead structures in the vicinity of these locations also prevented use of a conventional drilling rig, therefore, the OCD requested that Texaco install one (1) groundwater monitor well, hydraulically down gradient from the compressor building and soil boring locations AH-6-2 and AH-7-2, to determine if impact to groundwater had occurred, as a result of the oil spills.

The monitor well, MW-1, was installed in accordance with a work plan prepared by Highlander titled, "Monitor Well Work Plan, Texaco Exploration and Production, Inc., North Eunice Gas Plant, Lea County, New Mexico". The Work Plan was submitted to the OCD on April 18, 1996, and approved on June 27, 1996. The monitor well was drilled on July 22, 1996, by Scarborough Drilling, Inc., Lamesa, Texas, under the supervision of a geologist from Highlander. The monitor well was drilled to a depth of approximately 57 feet below ground surface using a truck-mounted rotary drilling rig. Mud additive was used during drilling to prevent caving of the unconsolidated sand formation, which underlies the Site. Soil samples were collected during drilling and field screened for petroleum hydrocarbons using the OVM. Based on the field screening results, soil samples were collected from depths of 25 to 27 feet and 55 to 57 feet below ground and analyzed for BTEX and TPH. The analysis were performed by Trace Analysis, Inc., Lubbock, Texas. The laboratory test results for the sample from 25 to 27 feet did not report BTEX above the test method detection limits. Also, benzene was not reported above the test method detection

limit in the soil sample from 55 to 57 feet below ground. Toluene, ethylbenzene, and xylene were reported in the soil sample from 55 to 57 feet at concentrations of 243 ug/kg, 1130 ug/kg and 3443 ug/kg, respectively. The total BTEX concentration in the soil sample from 55 to 57 feet was 4,816 ug/kg or 4.816 mg/kg. The total BTEX concentration is below the OCD's RRAL of 50 mg/kg. The laboratory test results for TPH reported 17.6 mg/kg (25 to 27 feet) and 90.2 mg/kg (55 to 57 feet). Based on the OCD's RRAL, the TPH levels reported in the soil samples would not normally require remediation.

1.2.2 Groundwater Discharge Plan Investigation

During the period from August 5-15, 1996, Highlander conducted a subsurface investigation to determine if environmental impacts to soil and groundwater had occurred as a result of subsurface releases of petroleum hydrocarbons from Site process area sumps, and waste management areas (i.e., waste oil, water storage area and trash pit). The subsurface investigation was conducted in response to the OCD's review of the document, titled, "Groundwater Discharge Plan, Texaco Exploration and Production Eunice North Gas Processing Plant, Lea County, New Mexico", which was prepared by Texaco. The OCD required that the subsurface investigation be conducted prior to approval of the Groundwater Discharge Plan.The surface investigation consisted of installing eleven (11) hand augered and two (2) machine drilled soil borings. Soil samples were collected from the soil borings for field and laboratory testing. Groundwater samples were also obtained from monitor well MW-1, installed during the previous investigation, and from an active water well (WW-1), to assess the quality of groundwater beneath the Site. Figure 2 presents the locations of the environmental investigation areas, soil borings, and monitor wells.

The investigation results indicated that surface spills from petroleum hydrocarbons had occurred in the vicinity of the waste oil and water storage area, however, the levels of benzene and total BTEX detected in soil samples from borings were below the RRAL established by the

OCD. The investigation results further revealed that no impact to soil was evidenced at the north and south engine room sumps, concluding that no release(s) of petroleum hydrocarbons had occurred. No volatile or semi-volatile organic constituents were reported in soil samples from the trash pit area. Only arsenic (10.4 mg/kg) and barium (163.0 mg/kg) were detected in soil samples from the trash pit area. No Site-specific background level are available for these parameters to determine if an environmental impact has occurred, however, these levels appear to be consistent with regional background concentrations.

Soil samples were collected from depths of 10 to 12 feet and 50 to 52 feet from soil borings BH-1 and BH-2, installed near the North Sumps (Northeast of Facility), and were analyzed for BTEX. The benzene and total BTEX levels reported in the 10 to 12 feet interval soil samples from borings BH-1 and BH-2 were below the OCD's RRAL of 10 mg/kg and 50 mg/kg, respectively. The benzene levels reported in the 50 to 52 feet interval soil samples were also below the RRAL of 10 mg/kg. The total BTEX levels reported in the 50 to 52 feet interval soil samples from borings BH-1 (101,000 ug/kg) and BH-2 (76,960 ug/kg) exceeded the OCD's RRAL of 50 parts per million (ppm). However, the laboratory test results and field observations suggest that the elevated BTEX levels in the soil samples may be from hydrocarbons in groundwater, which have been incorporated into the unsaturated zone soil due to fluctuations of the groundwater surface. The investigation results also suggest that phase-separated hydrocarbons may be present on the groundwater in the vicinity of the North Sumps.

Chromium, nitrate, fluoride and chloride were detected in groundwater from water well WW-1, at concentrations above the New Mexico Water Quality Control Commission (WQCC) standards. No purgeable aromatic or volatile organic hydrocarbons, other than dichlorodifluoromethane (113 ug/L), were detected in groundwater samples from the water well. Dichlorodifluoromethane is a widely used degreasing compound, for which no drinking water standard is available. The water well is located on the north (up gradient) side of the Site. Detectable levels of BTEX were reported in the groundwater sample from monitor well MW-1,

however, the BTEX levels were below the New Mexico WQCC standards for groundwater of less than 10,000 mg/l TDS. The TPH level reported in the groundwater samples from monitor well MW-1 was 582 ug/L, however, there is no New Mexico WQCC standard for TPH in groundwater. The results of the investigation were presented in the report titled, "Subsurface Environmental Assessment, Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant, Lea County, New Mexico, September 1996".

1.3 Site Setting

1.3.1 Topography

The topography of the Site gently slopes from west to east. The elevation of the Site ranges from about 1330 feet above mean sea level (AMSL) along the west side to about 1325 feet AMSL along the east side. Storm water runoff generally follows the topography of the Site. The nearest surface water body to the Site is greater than two miles to the east. There is one water well at the Site (Water Well #1) which is used for industrial purposes (i.e. cooling towers, etc.).

1.3.2 Soils

The Site is underlain by soils of the Pyote Series and Berino Series (Turner, et.al., 1974). The Pyote Series is represented by the Pyote and Maljamar fine sands (0 to 3 percent slopes) soil. The Berino Series is represented by the Berino-Cacique loamy fine sands association (0 to 3 percent) soil.

The Pyote and Maljamar fine sands (PU) is the predominant soil type at the Site and consists of a surface layer of fine grained brown sand, approximately 30 inches thick. The surface layer is underlain by several subsoil strata consisting of fine sandy loam, varying from strong

brown to light brown in color and approximately 30 inches thick. The Pyote and Maljamar fine sands soil has moderately rapid permeability and low corrosivity potential to uncoated steel. The principal uses of Pyote and Maljamar fine sands soil are range, wildlife habitat and recreational areas. The Pyote and Maljamar fine sand soil occupies the central part of the Site.

The Berino-Cacique loamy fine sands association (BE) is present along the north and south boundaries of the Site. The Berino-Cacique loamy fine sands soil consists of a thin surface layer, approximately 6 inches thick of reddish-brown loamy fine sand. The surface layer is underlain by several substrata consisting of sandy clay loam, varying in color from red to light brown and approximately 54 inches thick. The Berino-Cacique loamy fine sands soil has a moderate permeability and moderate corrosivity potential to uncoated steel. Uses of Berino-Cacique loamy fine sands soil include rangeland, recreational areas and wildlife habitat.

1.3.2 Geology

The Site is underlain by deposits of Recent-age windblown sand ranging in thickness from about a few feet to as much as 40 feet. The windblown sand deposits consist of unconsolidated fine to medium grained sand. The windblown sand is underlain by the Pliocene-age Ogallala Formation. The Ogallala Formation consists of semiconsolidated deposits of fine grained calcareous sand, capped by a layer of caliche. The Ogallala Formation also contains minor amounts of clay, silt and gravel (Nicholson and Clebsch, 1961 and Brown, 1976). The Ogallala Formation ranges in thickness from a few inches to about 300 feet.

1.3.4 Groundwater

Groundwater occurs in the Pliocene-age Ogallala Formation. The Ogallala Formation, commonly referred to as the High Plains Aquifer, occurs under unconfined conditions. The regional direction of groundwater flow in the vicinity of the Site is from west-northwest to south-southeast. Recharge to the Ogallala Formation occurs through infiltration of precipitation from

rainfall and snow melt. Discharge from the Ogallala Formation occurs principally through pumping from wells. Based on Site-specific data, the depth-to-groundwater beneath the Site is approximately fifty-three feet below ground surface.

2.0 STAGE 1 ABATEMENT PLAN

In accordance with Title 20 of the New Mexico Administrative Code (NMAC) Chapter 6, 4102 C, the purpose of the Stage 1 Abatement Plan is to design and conduct a Site investigation that will adequately define Site conditions, and provide data necessary to select and design an effective abatement option. The Site investigation work plan should define the 1) Site geology and hydrogeology, 2) the vertical extent and magnitude of vadose zone and groundwater contamination, 3) subsurface hydraulic parameters, including hydraulic conductivity, transmissivity, storativity, rate and direction of contaminant migration, 4) inventory of water wells inside and within one (1) mile from the perimeter of the three-dimensional body where WQCC and toxic pollutant standards are exceeded, and 5) the location and number of identified wells actually or potentially affected by the pollution. Highlander has prepared a Stage 1 Abatement Plan to meet the requirements of 20 NMAC 6, 4102 C. A summary of proposed Stage 1 Abatement Plan activities is presented below.

2.1 Unsaturated (Vadose Zone) Soil Impact Assessment

Based on the results of sampling and analysis of unsaturated (vadose zone) soils at the Site, levels of total metals (barium, chromium, cadmium, lead, and mercury) from soil sample location AH-5, collected during the compressor building investigation, were elevated in comparison to the remaining data. However, no Site-specific background concentrations were available for

comparison to these data. Highlander has also evaluated the total metals data using the Rule of Twenty. The Rule of Twenty is applied to a total metal analysis to determine if there is a likelihood of a sample failing the Toxicity Characteristic Leaching Procedure (TCLP). If the total analyte concentration, divided by twenty (20), is near or above a Maximum Contaminant Level (MCL), than there is a high possibility that an extract of the sample, using the TCLP method, may exceed the MCL. However, the sample must be analyzed by the TCLP method to determine if the sample is characteristically hazardous. Based on the Rule of Twenty evaluation, only barium and chromium were detected at levels that may exceed the MCL by TCLP method. The soil sample from location AH-5 was collected from a depth of 0.0 to 0.5 feet below ground.

Highlander proposes to delineate the vertical and horizontal extent of the elevated barium and chromium levels in soil in the vicinity of sample location AH-5. Highlander will install approximately five (5) shallow hand augered soil borings to depths of approximately 2 feet below ground. The borings will be installed using a stainless steel bucket-type hand auger, and soil samples will be collected from depths of 0.0 to 0.5 feet and 1.5 to 2.0 feet and analyzed for total barium and total chromium. The analytical data from these soil samples will be evaluated using the Rule of Twenty, and soil samples indicating analyte concentrations in close concentration or above the MCL will be analyzed using the TCLP method to determine if the soil is considered hazardous.

During the Groundwater Impact Assessment (Section 2.2), Highlander will collect soil samples from a proposed background monitor well location, to be installed near the northwest (up gradient) corner of the Site. Approximately five (5) soil samples will be collected from the rotary drilled boring and analyzed for total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). The results of the total metals analysis will be compared to Site soil data to determine if impact to soils has occurred at the Site.

2.2 Groundwater Impact Assessment

Impacts to groundwater in excess of the New Mexico WQCC standards for chromium, nitrate, fluoride, and chloride were reported at water well location WW-1. Groundwater from water well WW-1 also reported a detectable concentration of dichlorodifluoromethane (113 ug/L), for which there is no New Mexico WQCC standard. Groundwater from monitor well MW-1 showed detectable levels of BTEX and TPH. However, the BTEX concentrations were below standards established by the New Mexico WQCC for drinking water. There is no New Mexico WQCC drinking water standard for TPH.

Highlander proposes to install three (3) monitor wells for the purpose of evaluating the extent of volatile organic, dissolved metals, and chloride concentrations in groundwater at the Site. One (1) monitor well will be drilled hydraulically up gradient, near the northwest corner of the Site to characterize the background groundwater chemistry for the Site. One (1) monitor well will be drilled hydraulically down gradient (southeast) of the North Sumps, near the east side of the Site The remaining monitor well will be installed hydraulically down gradient of the central part of the gas plant surface, near the south fence of the Site. The monitor wells will be drilled and constructed in accordance with industry accepted and EPA approved practices. The wells will be completed with 4-inch schedule 40 PVC screw threaded screen and casing. The screen interval will be approximately 20-feet in length and will be placed into the upper fifteen (15) feet of the saturated portion of the aquifer. Drill cuttings from monitor well installations will be stockpiled on plastic, covered and retained at the Site until disposal is arranged. Figure 2 presents the locations for the proposed monitor wells.

Appendix C presents a typical monitor well completion diagram. Surface completions will depend upon traffic patterns.

2.3 Phase Separated Hydrocarbon Product Assessment

During the previous investigation, phase separated hydrocarbons were suspected as being present on the groundwater in the vicinity of the North Sumps, near the east side of the Site. Highlander proposes to drill two (2) monitor wells to determine the thickness and distribution of phase separated hydrocarbons in the vicinity of the North Sumps. The monitor wells will be installed using industry and EPA accepted practices and will be completed using 4-inch schedule 40 PVC screw threaded screen and casing. The well screens will be approximately twenty (20) feet in length and will be placed into the upper fifteen (15) feet of the saturated portion of the aquifer. Figure 2 presents the locations of the proposed monitor wells. Appendix C presents a typical well completion diagram. The surface completions will depend upon traffic patterns.

Monitor wells showing the presence of phase separated hydrocarbons will be tested to determine the actual thickness of hydrocarbon product in the formation. The test will consist of a bailout test whereby hydrocarbon product present in the well will be purged by hand bailing and the thickness of hydrocarbon product returning into the wells following bailing will be measured using an electronic oil and water interface probe. The hydrocarbon product purged from the wells will be containerized in 55-gallon drums and retained at the Site until disposal is arranged.

2.4 Hydraulic Conductivity (Pumping and Slug) Testing

In accordance with the Stage 1 Abatement Plan requirements, Highlander proposes to conduct a pumping test to define the hydraulic conductivity, transmissivity, and storativity of the aquifer. The pumping test may be conducted using a designated monitor well or plant water well as a pumping well and a select number of observation wells. Highlander will work with Texaco personnel to schedule use of the plant water supply well as the pumping well. However, the use of this well for a pumping well will be dependent on plant's need for process water (i.e.,

equipment cooling, etc.). If the well is not available for use as a pumping well, Highlander proposes to conduct falling head and rising head slug tests at approximately three (3) monitor well locations, in lieu of the pumping test. If the pumping test is conducted, measurements of depth-to-groundwater will be obtained at the pumping well and observation wells during pumping, and following pumping during the recovery phase of the test. The pumping test will be conducted for a period of approximately 24 hours to achieve steady state conditions in the aquifer. Prior to conducting the pumping test, a step drawdown test will be performed on the pumping well to determine the capacity of the well and pumping rate for the 24 hour pumping test. The results of the pumping test will be evaluated using the methods of C.E. Jacobs or equivalent to calculate aquifer transmissivity and storativity.

If necessary, Highlander will conduct horizontal hydraulic conductivity (slug) tests at three (3) monitor well locations. At each well location, a rising head and falling head slug test will be conducted. The slug tests will be conducted using a solid slug of known displacement. The recovery of the potentiometric surface following insertion and removal of the slug in each well will be measured using a pressure transducer and environmental data logger. The field data from the slug tests will be evaluated using the method of Bouwer and Rice ("A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells") or equivalent.

2.5 Groundwater Sampling and Analysis

Following installation and development of the proposed monitor wells, Highlander will collect samples of groundwater from all monitor wells at the Site, including the plant water supply well . Prior to groundwater sampling, the monitor wells will be purged to remove a minimum of three (3) casing volumes of groundwater or until the groundwater removed from the wells is as visually free of suspended sediment as possible. Purging will be accomplished using a

submersible pump, or hand bailed using PVC well bailers. The pump and bailers will be thoroughly decontaminated using a laboratory grade detergent, followed by rinsing with deionized water. The purged groundwater will be containerized in 55-gallon drums and retained at the Site until disposal is arranged. The plant water supply well will be pumped for a sufficient time to yield a representative groundwater sample.

Following purging, groundwater samples will be collected using dedicated disposable PVC well bailers and monofilament line. The groundwater samples will be carefully poured from the bailers into appropriate sample containers, which will be precleaned and preserved by the analytical laboratory. The samples will be shipped under chain-of-custody control and analyzed for the prescribed parameters within specified holding times. The groundwater samples will be analyzed for volatile organic and semi volatile organic compounds using EPA methods 8240 and 8270, respectively, dissolved metals by EPA methods 3015, 6010, 7470, chloride by EPA method 9252, and TDS by EPA method 160.1. The results of the water sample analyses will be compared to New Mexico WQCC standards to determine if sufficient data has been collected to evaluate the extent of groundwater impacts in excess of the WQCC standards and to prepare a remediation plan for the Site.

Should phase separated hydrocarbons be observed in any well during groundwater sampling, a sample of the hydrocarbon product will be collected, if a sufficient volume is available, and analyzed by Chromatographic fingerprint analysis. Groundwater samples will not be collected for laboratory testing from monitor wells exhibiting phase separated hydrocarbons on the groundwater.

2.6 Water Well Inventory

Highlander will conduct an inventory of water wells within a one (1) mile radius of the Site. The water well inventory will be conducted using information available from files and

reports at the Site, and a review of water well records the State of New Mexico, U.S. Geological Survey publications and other published sources. A visual inspection of the area within a one (1) mile radius of the Site will be conducted to confirm the locations of water wells.

2.7 Well Survey and Depth-to-Groundwater Measurements

Following installation of the proposed monitor wells, Highlander will contract a New Mexico registered professional land surveyor to survey the locations and elevations for the monitor wells. The well survey will also include a field check of the existing monitor wells to confirm that top of casing, ground elevations and locations are accurate and consistent with the previous survey(s).

Depth-to-groundwater measurements will be obtained from all monitor wells and available water wells at the Site. These measurements will be used to prepare an accurate groundwater potentiometric surface map for the Site to determine the direction and gradient of groundwater flow across the Site. Should phase separated hydrocarbons be observed in the monitor wells or water wells, the thickness of the hydrocarbons will be measured and the elevation of the potentiometric surface will be corrected to account for the hydrocarbon product. All depth-to-groundwater measurements will be collected within a period of 24 hours.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

During the course of this project, Highlander will conduct its activities in strict adherence to procedures and protocol contained in its corporate Quality Assurance and Quality Control (QA/QC) Program. Highlander's corporate QA/QC program contains procedures and protocol for proper collection of such time-sensitive media as groundwater samples, surface water samples

and phase separated hydrocarbon product. Analytical laboratory testing will be conducted in strict adherence to the laboratories QC/QC policy and EPA required instrument calibration procedures and QA/QC samples.

4.0 PERSONNEL SAFETY AND MONITORING

Highlander will conduct field work in a manner consistent with Occupational Safety and Health Administration (OSHA) guidelines and exposure standards. All field personnel will have successfully completed A 40-hour initial training and maintain a mandatory 8-hour refresher training for Hazardous Waste Operations under 29 CFR 1910.120.

5.0 SCHEDULE

Highlander will begin its field activities within 45 days of approval of the Stage 1 Abatement Plan by the OCD. Highlander will prepare its final report for submittal to the OCD within 45 days following receipt of laboratory data and completion of field investigation activities. Highlander anticipates that the duration of time required to complete field activities associated with this work plan will be approximately 60 days. However, completion of vadose zone soil characterization activities will be dependent on the schedule submitted by Texaco for excavation and replacement of the process area sumps. Progress will also be a function of decisions made in the field based upon sampling results as they are obtained.

FIGURES

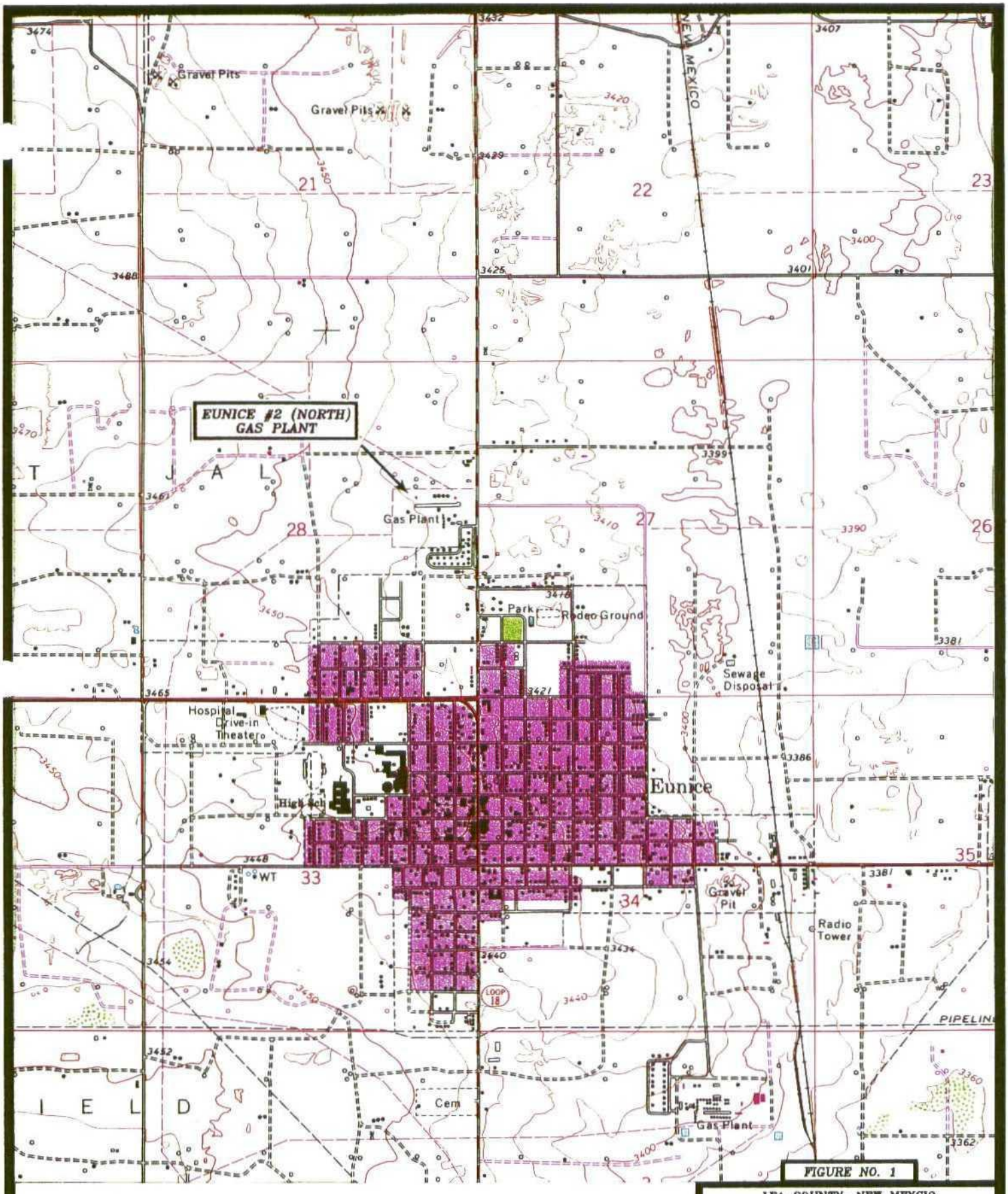


FIGURE NO. 1

LEA COUNTY, NEW MEXCIO

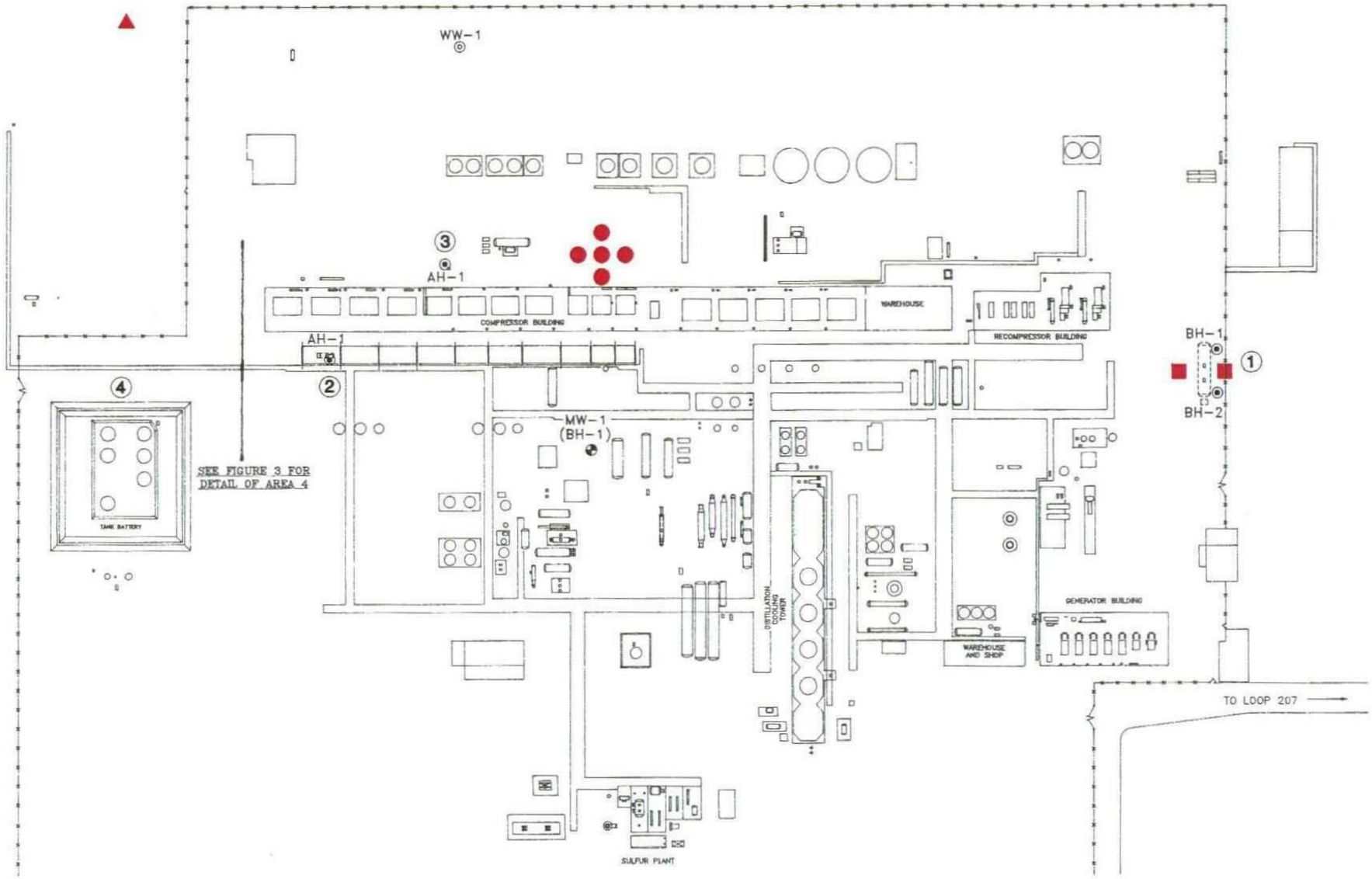
TEXACO
EXPLORATION & PRODUCTION

TOPOGRAPHIC MAP

HIGHLANDER ENVIRONMENTAL
MIDLAND, TEXAS

TAKEN FROM U.S.G.S.
RATTLESNAKE CANYON, NM
7.5' QUADRANGLE

SCALE: 1"=2,000'



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AH-1

LEGEND

- BH-1 — BOREHOLE LOCATION
- MW-1 — MONITOR WELL LOCATION
- WW-1 — WATER WELL LOCATION
- PROPOSED GROUNDWATER MONITOR WELL LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED PHASE SEPARATED HYDROCARBON MONITOR WELL LOCATION

NOTES: WELL AND SAMPLE LOCATIONS ARE APPROXIMATE.

ENVIRONMENTAL INVESTIGATION AREAS

1. NORTH SUMP
2. SUMP SOUTH OF ENGINE ROOM
3. SUMP NORTH OF ENGINE ROOM
4. WASTE OIL & WATER STORAGE AREA
5. TRASH PIT

SCALE
(IN FEET)
25 0 50 100

FIGURE NO. 2

LEA COUNTY, NEW MEXICO

TEXACO
EXPLORATION & PRODUCTION, INC.

EUNICE #2 (NORTH) GAS PLANT
SITE MAP

HIGHLANDER ENVIRONMENTAL
MIDLAND, TEXAS

DATE: 9/18/96
DWN. BY: R.C.P.
FILE: C:\787\NTH-SITE

APPENDICES

APPENDIX A

Regulatory Correspondence

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

November 12, 1996

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-258-679

Mr. Robert W. Browning
Texaco Exploration and Production, Inc.
P.O. Box 3109
Midland, Texas 79702

RE: DISCHARGE PLAN MODIFICATION FOR WATER POLLUTION
EUNICE NORTH GAS PLANT
DISCHARGE PLAN GW-004
LEA COUNTY, NEW MEXICO

Dear Mr. Browning:

The New Mexico Oil Conservation Division (OCD) met with Texaco Exploration and Production, Inc. (TEPI) on November 5, 1996 to discuss the results of the recent TEPI Eunice #2 (North) Gas Plant soil and ground water investigations as contained in the following document:

- September 1996 "SUBSURFACE ENVIRONMENTAL ASSESSMENT, TEXACO EXPLORATION AND PRODUCTION, INC., EUNICE #2 (NORTH) GAS PLANT, LEA COUNTY, NEW MEXICO".

As discussed in this meeting this report shows that:

1. A number of current and past potential ground water contaminant source areas exist at the facility.

2. The monitor well MW-1 shows groundwater to be impacted at the water table.

Therefore, pursuant to WQCC regulation 3109.E, the OCD requires that TEPI modify the facility discharge plan to abate water pollution. As an initial action the OCD requires that TEPI submit a comprehensive facility investigation work plan to determine the extent of soil and ground water contamination related to TEPI's activities. Please use the Stage 1 WQCC Abatement Regulations (20 NMAC 6.2.4106) in preparation of the investigation work plan. The OCD requires that the work plan be submitted to the OCD by February 17, 1997. Please submit the work plan to the OCD Santa Fe Office and a copy to the OCD Hobbs District Office.

Note: All OCD rules, regulations, and guidelines are available on the Internet at the following website address: **www.emnrd.nm.us/ocd.htm**

If you have any questions, please contact Pat Sanchez of my staff at (505) 827-7156.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

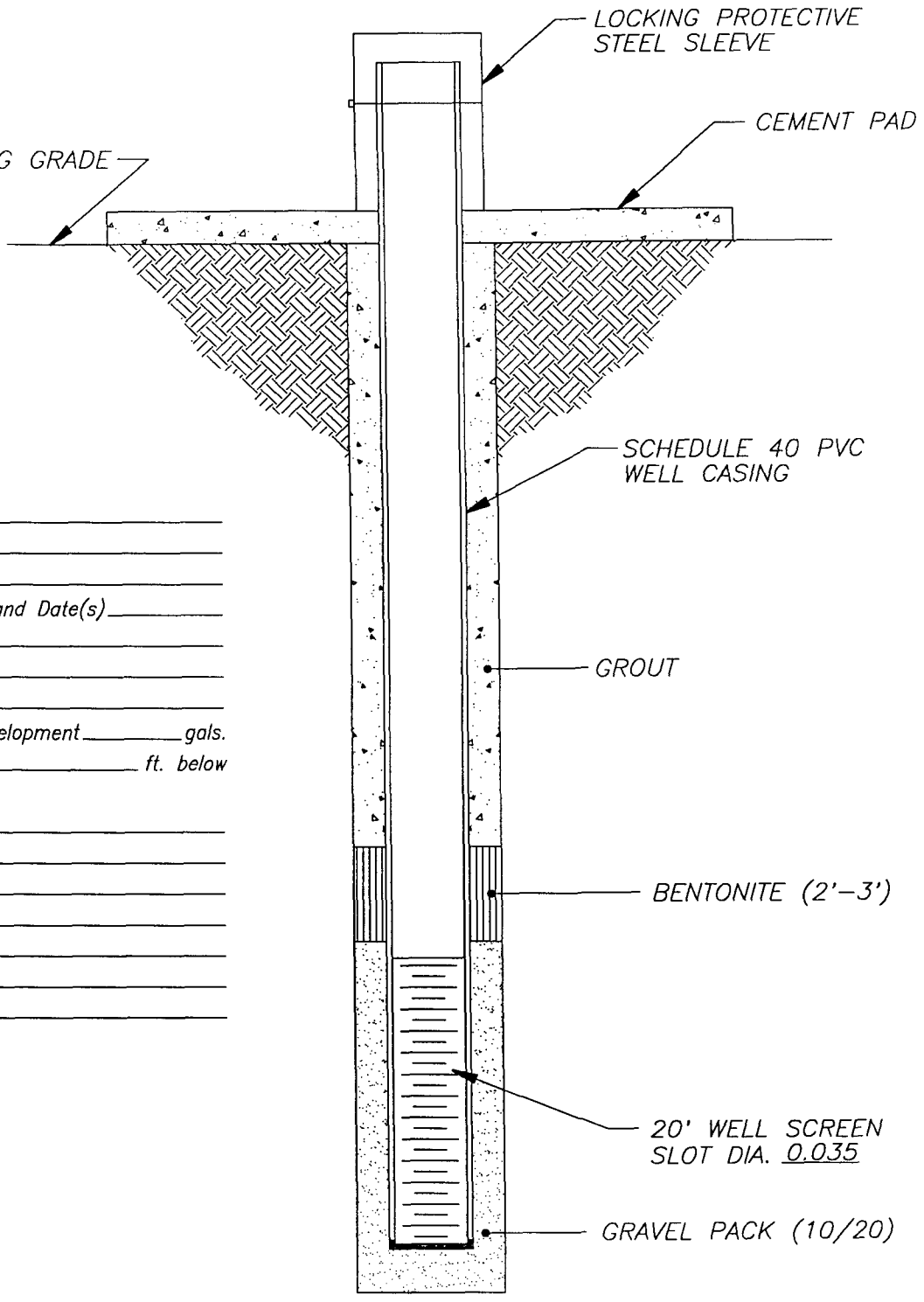
RCA/pws

xc: Mr. Jerry Sexton, OCD Hobbs District Supervisor
Mr. Wayne Price, OCD Hobbs Office
Mr. Rodney G. Bailey, Texaco Exploration and Production, Inc.

APPENDIX B

Typical Monitor Well Completion Diagram

TYPICAL
WELL CONSTRUCTION LOG



Installation Date(s) _____

Drilling Method _____

Drilling Contractor _____

Development Technique(s) and Date(s) _____

_____

_____

_____

Water Removed During Development _____ gals.

Static Depth to Water _____ ft. below Ground Level

Well Purpose _____

_____

Remarks _____

_____

_____

_____

_____

DATE:		WELL NO.
Highlander Environmental	CLIENT: PROJECT: LOCATION:	MW