GW - 55

WORK PLANS

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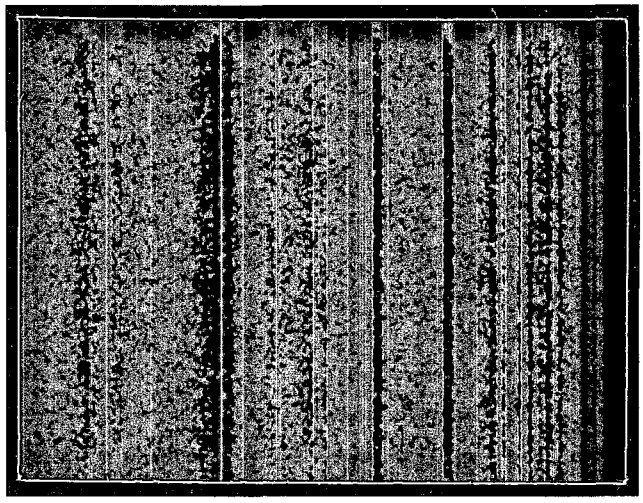

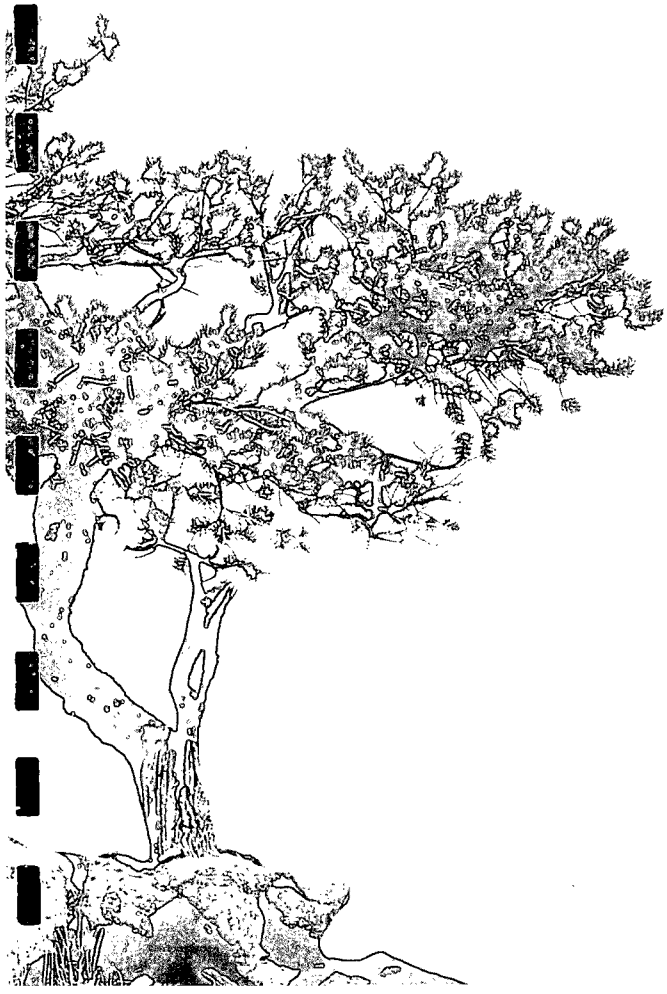

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GW-55

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Site Characterization and Pilot Study Workplan

Thriftway Refinery
626 Road 5500
Bloomfield, New Mexico

April 16, 2008

Prepared on behalf of:
Thriftway Company
501 Airport Drive, Suite 100
Farmington, New Mexico 87401

Prepared by:
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Appendices

1.0 Introduction

Animas Environmental Services, LLC (AES) has prepared this workplan on behalf of Thriftway Company (Thriftway) for the Thriftway Refinery, located at 626 County Road 5500, Bloomfield, San Juan County, New Mexico, for review and approval by the New Mexico Oil Conservation Division (NMOCD) and New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB).

This workplan details the proposed investigative activities for the site in order to develop a conceptual site model (CSM) and corrective action plan (CAP). A topographic site location map of the facility is included as Figure 1.

2.0 Site History and Existing Site Conditions

2.1 Facility Location

The Thriftway Refinery is a small oil refinery located along County Road 5500 south of Bloomfield in San Juan County, New Mexico. The site is legally described as being in the SE¼ SE¼ Section 32, SW¼ SW¼ Section 33 Township 29 North, Range 11 West and in the NW¼ SE¼ and NE¼ SE¼ of Section 9 Township 28 North, Range 11 West, NMPM, San Juan County, New Mexico, approximately three miles south of Bloomfield, New Mexico.

2.2 Facility Description

The facility previously processed light sweet San Juan Basin crude oil but has not done so for several years. The facility currently remains semi-active as a crude oil storage facility for Western Refining, formerly known as Giant Industries. Thriftway and Western are currently in negotiations to terminate Western's lease and tank use agreement. The parties anticipate the lease and tank use agreement to terminate some time during the Summer of 2008.

2.3 Sensitive Receptors

The facility is located in a generally rural area. The closest residence is approximately one mile west of the facility. No schools, day care centers, or nursing homes are located within 500 feet of the facility.

2.4 Surface Waters

Kutz Wash borders the refinery site to the north of the property line and is an ephemeral drainage, which typically runs only with storm runoff. Kutz Wash discharges into the San Juan River (USGS Hydrologic Unit Catalog #14080101) approximately 1.5 miles northwest of the refinery property.

2.5 Geology/Hydrogeology

Bloomfield, San Juan County, New Mexico, is located along the San Juan River within the Colorado Plateau. The San Juan Basin is a structural depression containing deep Tertiary fill resting on rocks of the late Cretaceous age. The local geology consists of

alluvial deposits that are composed of clays, silty sands, and poorly sorted sands with terrace gravels and cobbles. Strata are composed predominantly in a flat-lying sequence in stream and river cuts throughout the plateau. Clay materials (nodules and lenses), such as clayey sands and silty clays, are common in the subsurface of this area.

The soil types within the subject area have been surveyed by the U.S. Department of Agriculture (USDA) Soil Conservation Service and summarized in the Soil Survey Report for San Juan County, Eastern Part. Generalized soil types for the subject area include clays to sandy clay loam, generally shallow to very deep. Slopes are level to gently sloping on floodplains and terraces. Soils are generally poorly drained. The parent material is typically alluvium derived from sandstone and shale. The soil types in the vicinity of the project area are Stumble loamy sand (St) and Fruitland loam, 5 to 8 percent slopes (Fw).

Fruitland loam soils typically consist of a surface layer of light brownish gray loam approximately 3 inches thick with a light olive brown to light gray sandy loam below that to about 60 inches below ground surface. Permeability is moderately rapid, and available water capacity is moderate.

Stumble loamy sand is a deep, somewhat excessively drained soil with a surface layer that typically includes a yellowish brown loamy sand about 5 inches thick. The upper 24 inches below the surface layer is a pale brown and light yellowish brown sand and loamy sand. The lower depths, to about 81 inches below ground surface, is brownish yellow gravelly sand, gravelly loamy, sand and sand. Permeability of the Stumble soil is rapid, and available water capacity is low.

Site soils have been reported as loamy sand and light brown fine to medium grain sands. Shallow groundwater is present at the site at a depth of approximately 15 feet below ground surface. Hydraulic gradient is to the northwest with a magnitude of approximately 0.007 foot/foot.

3.0 Previous Site Work

3.1 Groundwater Monitoring and Sampling

BioTech Remediation, Inc. (BioTech) has been conducting semi-annual groundwater monitoring and sampling at the site since about 1990. Annual reports have been prepared and submitted on behalf of Thriftway Company to the NMOCD.

The most recent groundwater monitoring and sampling event was conducted by BioTech personnel in December 2007. The 2007 Annual Report is being submitted along with this workplan.

3.1.1 Measurement of Groundwater Elevations

Groundwater elevations across the site during the sampling event in December 2007 ranged from 5434.29 feet AMSL in MW-13 down to 5424.56 feet AMSL in MW-20.

Groundwater gradient was measured between MW-1 and MW-18 with a magnitude of 0.007 ft/ft to the northwest.

3.1.2 Measurement of Free Product

Measured thicknesses of "non-aqueous phase liquid" (NAPL) or free product ranged from a sheen in MW-3 in December 2007 up to a maximum of 1.32 feet in RW-24 in December 2007. Free product thickness contours for December 2007 are presented in Figure 4 of the Annual Report.

3.1.3 Volatile Organics

In December 2007, benzene concentrations that exceeded the New Mexico Water Quality Control Commission (WQCC) standard of 10 µg/L were detected in MW-1, MW-2, MW-14, and RW-26. Benzene concentrations exceeding the WQCC standard of 10 µg/L ranged from 16 µg/L in MW-14 up to 730 µg/L in MW-2 for December 2007. Benzene concentration contours for July and December 2007 are presented as Figures 5 and 6, respectively, in the Annual Report.

MTBE concentrations were reported in MW-20 at 360 µg/L in December 2007. All other wells were either below the laboratory detection limit or below applicable WQCC standards in the wells included in the sampling events. MTBE concentration contours for July and December 2007 are included in Figure 7 of the Annual Report.

TPH-GRO (C_6-C_{10}) concentrations ranged from below the laboratory detection limit up to 4.3 in December 2007 in MW-2. TPH-DRO (C_{10}-C_{22}) concentrations ranged from below laboratory detection limit up to 395 mg/L in MW-2 in December 2007.

3.1.4 Polynuclear Aromatic Hydrocarbons

Groundwater samples from MW-1, MW-2, MW-10, MW-14, MW-18, and MW-20 through MW-22 were analyzed for PAHs per EPA Method 8270C during the December 2007 sampling event. Total naphthalenes (including 1- and 2-methyl naphthalene) exceeded the WQCC standard of 30 µg/L in MW-2 with 272 µg/L.

3.1.5 RCRA 8 Metals

RCRA 8 metals were analyzed by EPA Method 6020 and 7470 from groundwater samples collected from MW-1, MW-2, MW-10, MW-14, MW-18, and MW-20 through MW-22 during the December 2007 sampling event. Arsenic was detected above the WQCC standard of 0.10 mg/L in MW-18 with a concentration of 0.108 mg/L. All other wells sampled for arsenic were below the WQCC standard. Laboratory results for barium, cadmium, chromium, lead, selenium, silver, and mercury had reported concentrations either below applicable WQCC standards or below laboratory detection limits.

3.1.6 Dissolved Metals, Chlorides, Carbon Dioxide, and Forms of Alkalinity

Groundwater samples from MW-1, MW-2, MW-10, MW-14, MW-18, and MW-20 through MW-22 were also analyzed for calcium, magnesium, potassium, sodium, bromide, chloride, fluoride, sulfate, hardness (as $CaCO_3$), TDS, and forms of alkalinity during the December 2007 sampling event. TDS concentrations were above the WQCC standard of 1,000 mg/L in all wells sampled, with the highest TDS detected in MW-22 with 10,000

mg/L. Sulfate concentrations exceeded the applicable WQCC standard of 600 mg/L in all wells sampled, with the exception of MW-2 with 68.4 mg/L sulfate. The highest sulfate concentration was detected in MW-22 with 5,610 mg/L. Chloride concentrations did not exceed the WQCC standard of 250 mg/L in any of the wells sampled. Bicarbonate concentrations ranged from 253 mg/L as $CaCO_3$ in MW-10 up to 1,490 mg/L as $CaCo_3$ in MW-2. Carbonate concentrations ranged from below the laboratory detection limit of 0.100 mg/L as $CaCo_3$ up to 3.1 mg/L as $CaCo_3$ in MW-18. Dissolved calcium concentrations ranged from 47.1 mg/L in MW-2 up to 450 mg/L in MW-20, and dissolved magnesium concentrations ranged from 11.0 mg/L in MW-2 up to 89.2 mg/L in MW-18. Dissolved potassium concentrations ranged from 2.47 mg/L in MW-2 up to 7.05 mg/L in MW-22, and dissolved sodium concentrations ranged from 438 mg/L in MW-1 up to 2,340 mg/L in MW-22.

3.2 Remediation Unit Operations and Sampling

An airstripper was installed in the western portion of the facility in about 1990 and has pumped groundwater for treatment and then subsequent discharge to the evaporation ponds at the facility. Water from the airstripper influent and effluent was previously sampled on a monthly basis in order to calculate the removal efficiency. Results of the monthly sampling events were included within the Annual Report. However, during 2007 the airstripper was not operational because of declining removal efficiency of the airstripper in conjunction with increasing mechanical problems. Thriftway Company proposes to re-evaluate correction action alternatives and technologies for the site after additional site investigation and pilot study work at the site.

4.0 Proposed Scope of Work

In an effort to obtain more data for site characterization, AES proposes the following scope of work:

4.1 Additional Groundwater Monitoring and Sampling, June 2008

In addition to the regularly scheduled groundwater monitoring and sampling event in June 2008, AES proposes to include groundwater monitoring and sampling of additional existing site wells, including MW-4, MW-6, MW-8, MW-9, MW-19, MW-24, and MW-25. All groundwater monitoring and sampling will be conducted in accordance with applicable American Society for Testing and Materials (ASTM) standards, U.S. Environmental Protection Agency (USEPA) *Contract Laboratory Program (CLP) Guidance for Field Samplers* (USEPA, 2001), and AES Standard Operating Procedures, which are included in Appendix A.

4.1.1 Depth to Groundwater Measurements

A Keck electronic water level with an accuracy of 0.01 foot will be utilized to record the distance from the top of the well casing to the top of groundwater. For wells with free product, an electronic oil/water interface will be utilized to measure to the top of oil and to the oil water interface. All data will be recorded onto a Water Sample Collection Form for each well.

4.1.2 Purging

Prior to sample collection, at least three well volumes will be purged from each well with a disposable bailer. During purging, pH, temperature, and conductivity will be monitored. Purging data will be documented on a Water Sample Collection Form along with purged water volume. All purging equipment will be thoroughly decontaminated between uses.

4.1.3 Sample Collection

Groundwater sample collection will follow applicable ASTM standards, USEPA CLP Guidance for Field Samplers and AES SOPs for sample preservation, quality assurance and quality control (QA/QC), and sample collection procedures. Groundwater samples will be collected with a disposable bailer equipped with a low-flow release valve. Duplicate groundwater samples will be collected and held in the event that further laboratory analyses are required. All sample collection data will be documented on a Water Sample Collection Form.

4.1.4 Groundwater Laboratory Analyses

In order to identify potential contaminants of concern, groundwater samples will be analyzed for volatile organics per EPA Method 8260 (Extended), GRO/DRO per EPA 8021, and lead per EPA Method 6010 at Pinnacle Laboratories in Albuquerque, New Mexico. The travel blank will be analyzed for volatile organics per EPA Method 8260.

4.2 Installation of Additional Groundwater Monitor Wells

In order to better characterize subsurface contaminants at the site, AES proposes the installation of 21 additional groundwater monitor wells (MW-30 through MW-50) and 5 replacement monitor wells (RMW-11, RMW-15, RMW-23, RMW-25, and RMW-28). All groundwater monitor well installation will be completed in accordance with applicable New Mexico State Engineer's Office regulations, NMED GWQB *Ground Water Pollution Prevention Section Monitoring Well Construction And Abandonment Guidelines (*January 200), ASTM standards, USEPA's *Expedited Site Assessment Tools for Underground Storage Tanks Sites* (1997), and AES SOPs, which are included in Appendix A.

4.2.1 Property Access, Permitting, and Utility Notification

Before any site activities are initiated, AES will obtain written property access agreements from Thriftway Company and adjacent property owners, as necessary.

AES will permit proposed groundwater monitor wells through the New Mexico State Engineers Office prior to beginning site activities.

AES will notify New Mexico One Call prior to conducting any site activities to arrange for location of buried utilities. AES will contact separately any utilities not participating in New Mexico One Call to arrange for line location.

4.2.2 Agency Notification

AES will notify Thriftway Company and the NMOCD by telephone or in writing, preferably within seven days, but not less than 96 hours, before the start of any field activities. This notification will include a schedule of the proposed work. Additionally,

AES will make no modification to the approved work plan without consultation and written approval of the owner.

4.2.3 Health and Safety Plan Preparation

AES has a company health and safety plan in place, and each employee is required to complete a health and safety orientation prior to participating in field operations for the first time. All on-site personnel are 40-hour HazWoper trained in accordance with OSHA regulations outlined in 29 CFR 1910.120(e). A site-specific health and safety plan (HASP) was developed for this site and includes monitoring and sampling tasks. The HASP will be updated to reflect well installation activities. The HASP will be present on-site during all field work. Daily tailgate safety meetings will be held by the site safety officer to address safety concerns and will be fully documented.

4.2.4 Soil Boring Installation

Site soils have been reported as loamy sand and silty light brown fine to medium grain sands, which extend to at least 14 feet bgs. Based upon this information, AES proposes to utilitze a CME-75 hollow stem auger drill rig to complete soil borings and groundwater monitor well installation. The locations of the proposed monitoring wells are included on Figure 2.

4.2.5 Soil Sample Collection Methods

Soil borings will be sampled at 5-foot intervals for the entire boring depth in order to better define site lithology and saturated zones. Observations will be recorded on respective Soil Boring Logs. Split spoon samplers, 1.5-inch diameter by 18 inches in length, will be used for sample collection.

4.2.6 Field Screening

At a minimum, one heated headspace photo-ionization detector (PID) organic vapor meter (OVM) measurement will be taken from each split-spoon sample in order to assess the presence of vapors in the subsurface soils. Field screening data for the soil boring will be recorded on a Soil Boring Log. The methods of sample collection, preparation, and analysis will be in strict accordance with the applicable ASTM standards, USEPA *CLP Guidance for Field Samplers* (USEPA, 2001), and AES SOPs, which are included in Appendix A.

4.2.7 Sample Identification and Handling

Field PID-OVM sample containers will be labeled at the time of sample collection. Field analysis results will be recorded onto the Soil Boring Log. Laboratory samples will be properly labeled and logged onto the chain-of-custody record. All laboratory samples will be preserved on ice in an insulated cooler at 4°C until delivered to the analyzing laboratory.

4.2.8 Laboratory Analyses

At a minimum, two soil samples will be collected from each boring and held for possible laboratory analysis. Based on the highest field screening value, visible contaminant staining, and maximum boring depth, two samples from each boring will be collected for laboratory analysis and will include one sample from the zone from which the highest

OVM readings were measured and one sample from the base of the boring or just above the zone of saturation.

From every 10 soil samples collected, one high bias sample will be submitted for laboratory analysis (i.e. one sample from the advancement of five soil borings). Laboratory analyses will consist of the following:

- Volatile organics per EPA Method 8260 (Extended);
- GRO and DRO per EPA Method 8015M;
- RCRA 8 metals (including arsensic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), selenium (Se) and silver (Ag).

Analytical sampling will be performed by Pinnacle Laboratories or Hall Environmental Analysis Laboratory (HEAL), Albuquerque, New Mexico.

4.2.9 Monitoring Well Construction

Subsequent to soil boring advancement, the boring will be completed as a 2-inch diameter groundwater monitor well. Based upon available site data, depth to groundwater is approximately 15 feet bgs, and total well depth will be approximately 25 feet. AES proposes to construct the 2-inch diameter groundwater monitoring wells as follows:

- Two-inch diameter Schedule 40 PVC screen and blank casing;
- The screened interval will extend 15 feet across the water table and will be constructed of 0.010-inch (0.26 mm) slotted screen;
- The sand pack, which will extend from the bottom of the well up to approximately two feet above the top of the screen, will consist of 10/20 Colorado silica sand;
- A two feet thick bentonite plug will be installed directly above the sand pack;
- Concrete grout with approximately five percent bentonite will be poured from the top of the bentonite plug up to within a half foot of the top of casing;
- A well vault, locking well plug, and concrete pad will be installed on each well to prevent damage to the monitoring well and unauthorized access;

A proposed monitor well construction schematic is included as Figure 3.

4.2.10 Monitor Well Completion

Surface completion will consist of a flush-mounted well vault that is rated for traffic. A concrete slab with a minimum two-foot radius and six-inch thickness will be poured around the well vault and sloped appropriately so that runoff flows away from the well.

4.2.11 Monitor Well Development

The new monitor wells will be developed using a disposable bailer or pneumatic well development pump in order to remove sands and fine sediments. If NAPL is present within the development water, it will be drummed, properly labeled, and proper disposal will be arranged through Envirotech. It is estimated that approximately 25 to 50 gallons will be purged from each well to ensure proper well development.

4.2.12 Groundwater Monitoring and Sampling

After monitor well installation and development, each well will be sampled following the procedures outlined in Section 4.1. Groundwater monitor wells will be analyzed for volatile organics per EPA Method 8260 (Extended), GRO/DRO per EPA 8021, and lead per EPA Method 6010 at Pinnacle Laboratories or HEAL, Albuquerque, New Mexico. The travel blank will be analyzed for volatile organics per EPA Method 8260.

4.2.13 Professional Well Survey

The top of casing of the newly installed wells will be professionally surveyed by a New Mexico registered surveyor to determine USGS elevation, which will be established to an accuracy of 0.01 foot and tied to a USGS bench mark. The horizontal location of the well will be determined to an accuracy of 0.1 foot. The newly installed monitor wells will be surveyed in a manner to tie the elevations and locations to existing wells.

4.3 Equipment Decontamination Protocols

In order to ensure data validity and prevent cross-contamination augers and split-spoon samplers will be decontaminated by steam cleaning prior to and between each use. For small sampling equipment, the following decontamination protocols will be employed prior to and between each use:

- Hand wash with detergent (Alconox) and water
- Hand rinse with water
- Repeat hand wash with detergent (Alconox) and water
- Repeat hand rinse with water

4.4 Waste Disposal

4.4.1 Contaminated Drill Cuttings Disposal

In accordance with NMOCD Soil and Groundwater Disposal Guidelines, drill cuttings will be temporarily stored on plastic and then transported to the Envirotech Landfarm for proper disposal.

4.4.2 Contaminated Groundwater Disposal

Waste water resulting from well development and sample purging will be disposed of in the lined on-site evaporation ponds.

4.5 Multi-Phase Extraction (MPE) Pilot Study

After installation and sampling of additional groundwater monitor wells, AES proposes to complete a high vacuum multi-phase extraction (MPE) pilot study to the east of the former refinery process area. Findings associated with installation of additional monitor wells along with the results of the MPE pilot study will be used to develop a conceptual site model (CSM) and remediation plan for the facility.

AES proposes to install and utilize one MPE extraction well (MPE-PS) for the pilot study. Four MPE observation wells (OW-1 through OW-4) will also be installed prior to conducting the pilot study. The wells will be placed at respective distances of 5 feet, 10 feet, 20 feet, and 30 feet from MPE-PS. Each observation well will contain nested wells to monitor separate portions of the vadose zone at intervals from 4 to 5 feet, 8 to 9 feet, and 12 to 13 feet bgs.

The MPE pilot study will be performed by AES using a mobile Remediation Services International (RSI) V3 MPE system. The V3 system is a trailer-mounted, multi-phase high vacuum extraction system powered by an 8-cylinder modified Ford 460 engine that utilizes volatile organic compounds generated as part of the free product/vapor extraction process as a partial fuel source. The engine creates up to 20 in Hg vacuum using the engine intake manifold.

The results of the pilot study will be utilized to design the remediation system, and all test data will be included within the Corrective Action Plan. The proposed MPE pilot study details, including well locations, well construction details, and RSI unit layout, are presented on Figure 4.

4.3.1 Completion of MPE Pilot Study

In order to complete the pilot study, multi-phase extraction will be conducted continually for approximately 120 hours. Vacuum and groundwater monitoring will be routinely conducted at observation wells identified above. Additionally, groundwater drawdown will be monitored within MW-24, MW-29, RMW-23, RMW-27, and RMW-28. A temporary propane tank will be set in order to provide supplemental fuel for the pilot study unit.

The pilot study will include a series of step-increased applications (a minimum of four) in the applied vacuum/flow in order to fully evaluate flow processes. During the pilot study, the following parameters will be continuously monitored in order to finalize the system design: **1)** applied vacuum at the vacuum extraction wellhead; **2)** observed vacuum in each observation well; **3)** soil chemistry parameters, including oxygen and carbon dioxide (in order to estimate pore volume exchanges); **4)** vapor flow rate, including the flow stream temperature and pressure at the location of the flow rate measurement, to accurately convert the rate to standard temperature and pressure; **5)** recovered fluids flow rate; **6)** volume of groundwater recovered and free product recovered; and **7)** water table and free product measurements at each observation well.

4.3.2 MPE Pilot Study Waste Disposal

Recovered water will be stored in a 6,000 gallon tank secured on-site. Once the water is properly characterized, it will be disposed of in the lined on-site evaporation pond.

5.0 Proposed Project Schedule

AES has tentatively scheduled work as follows:

Task	*Date*
1. Conduct regularly scheduled groundwater sampling	June 2008
2. Install additional monitor and replacement wells *Note: Because of heavy activity typically associated with tank cleaning, tank removal and dismantling of processing equipment, AES proposes to install wells after at least most of the work is complete. Thriftway Company is currently negotiating the terms of the removal of the process equipment. AES will immediately notify OCD once a schedule is finalized.*	TBD
3. Conduct MPE pilot study – estimated to occur within about 90 days of well installation.	TBD
4. Prepare and submittal of Corrective Action Plan – estimated to occur within about 90 days of completion of MPE pilot study.	TBD

6.0 Statement of Familiarity

I, the undersigned, am personally familiar with the information submitted in this annual groundwater monitoring report and attached documents for the Thriftway Refinery, located at 626 County Road 5500, Bloomfield, San Juan County, New Mexico, prepared on behalf of Thriftway Company. I attest that it is true and complete to the best of my knowledge.

EM for Ross Kennemer

Ross Kennemer
Project Manager

Elizabeth D. McNally

Elizabeth McNally, P.E.
New Mexico Registration #15799

7.0 References

American Society for Testing and Materials (ASTM) International. *Standard Practice for Design and Installation of Groundwater Monitor Wells.* ASTM D5092-04e1. 2004.

ASTM International. *Standard Practice for Expedited Site Characterization of Vadose Zone and Groundwater Contamination at Hazardous Waste Contaminated Sites.* ASTM D6235-04. 2004.

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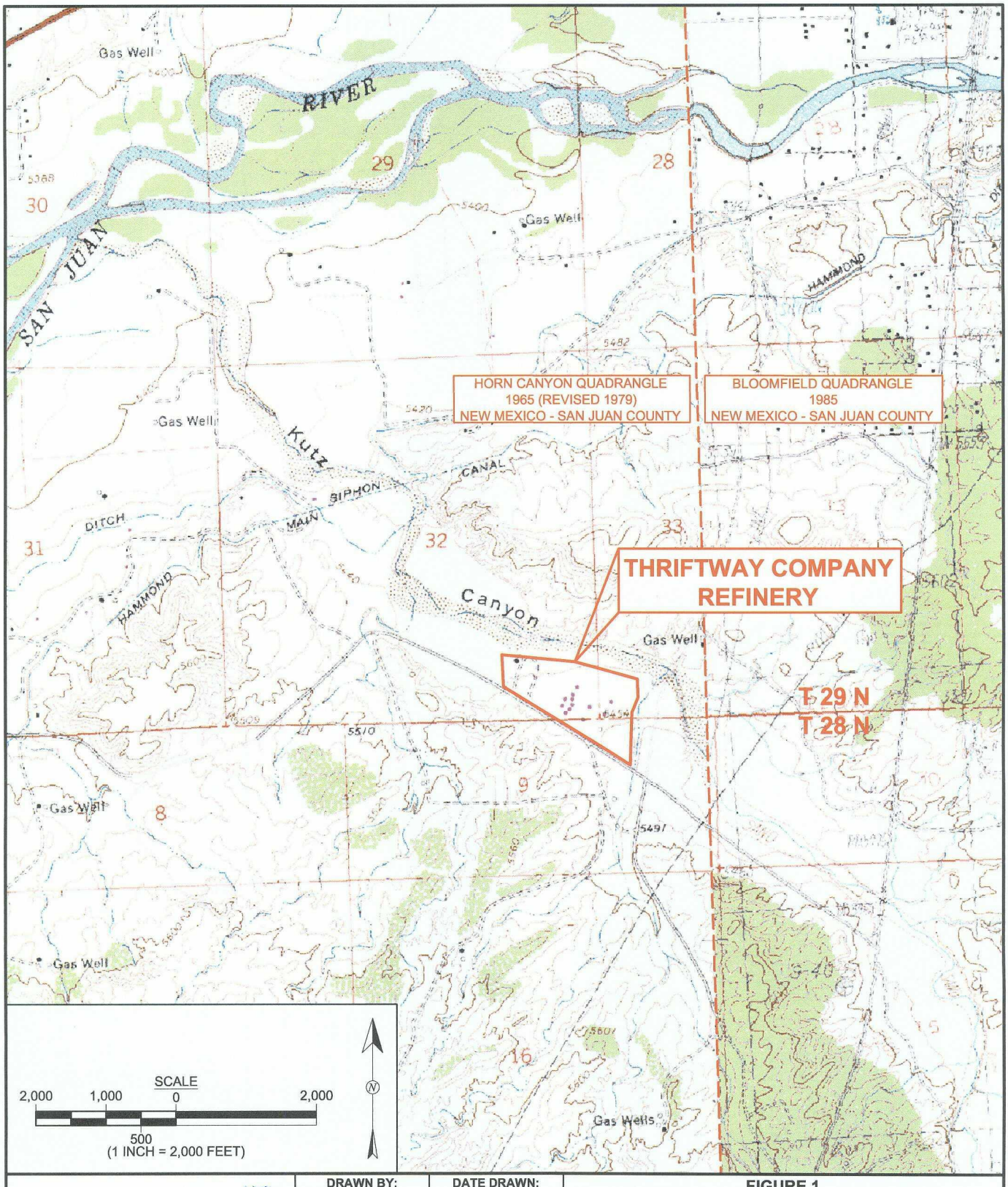
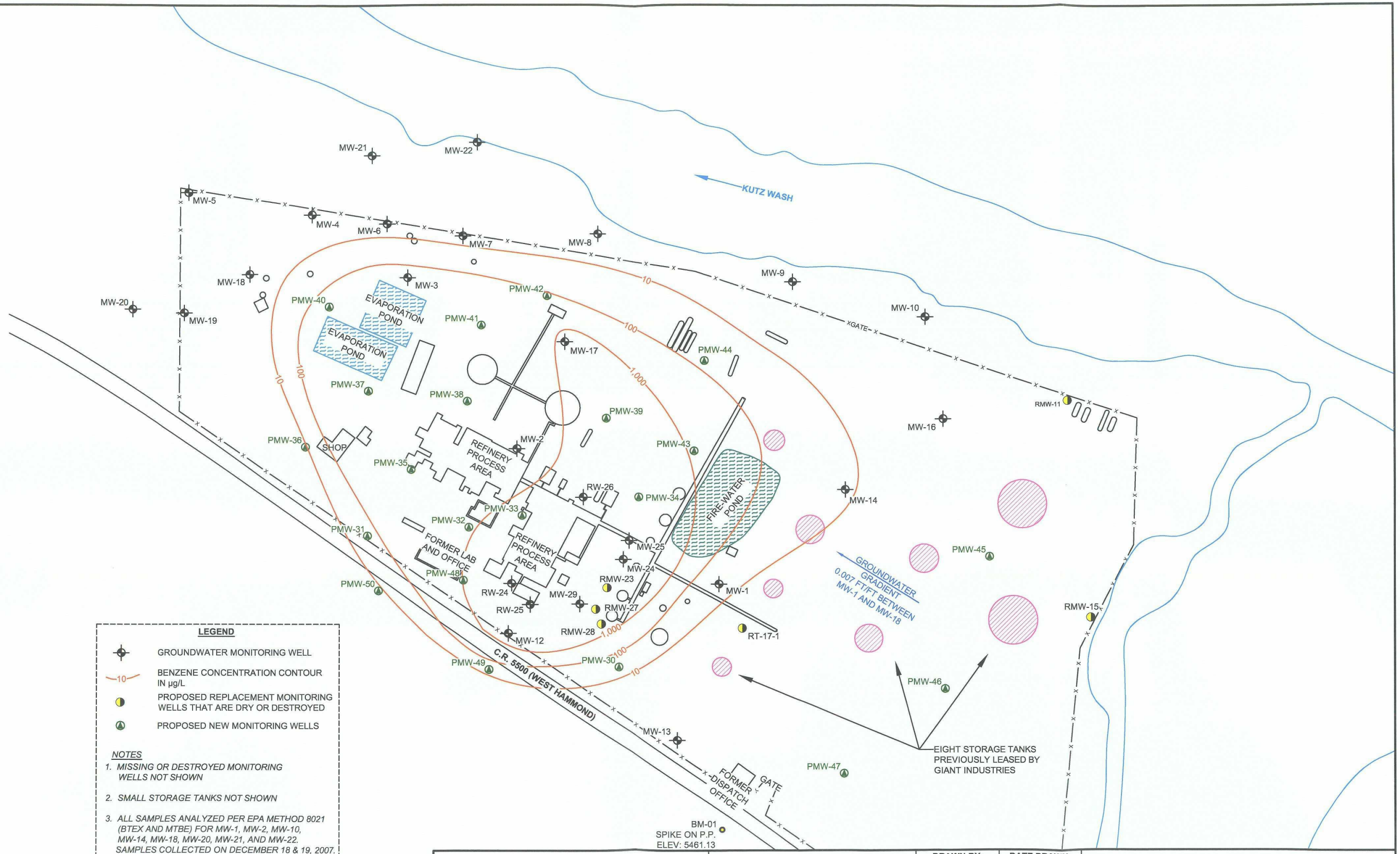


DRAWN BY: R. Kennemer	**DATE DRAWN:** February 26, 2008
REVISIONS BY: R. Kennemer	**DATE REVISED:** February 26, 2008
CHECKED BY: E. McNally	**DATE CHECKED:** February 26, 2008
APPROVED BY: E. McNally	**DATE APPROVED:** February 26, 2008

AES
Animas Environmental Services, LLC

FIGURE 1
TOPOGRAPHICAL SITE LOCATION MAP
THRIFTWAY COMPANY REFINERY
SE ¼, SE ¼, SEC. 32, T29N, R11W
SW ¼, SW ¼, SEC. 33, T29N, R11W
NW ¼, NE ¼, SEC. 9, T28N, R11W
SE ¼, NE ¼, SEC. 9, T28N, R11W
BLOOMFIELD, SAN JUAN COUNTY, NEW MEXICO
N36° 40' 33.545" W108° 0' 24.131"

S:\ANIMAS 2000\2008 PROJECTS\THRIFTWAY\810 REFINERY\DRAWINGS\FIGURE 1 TOPOGRAPHIC LOCATION MAP 022608



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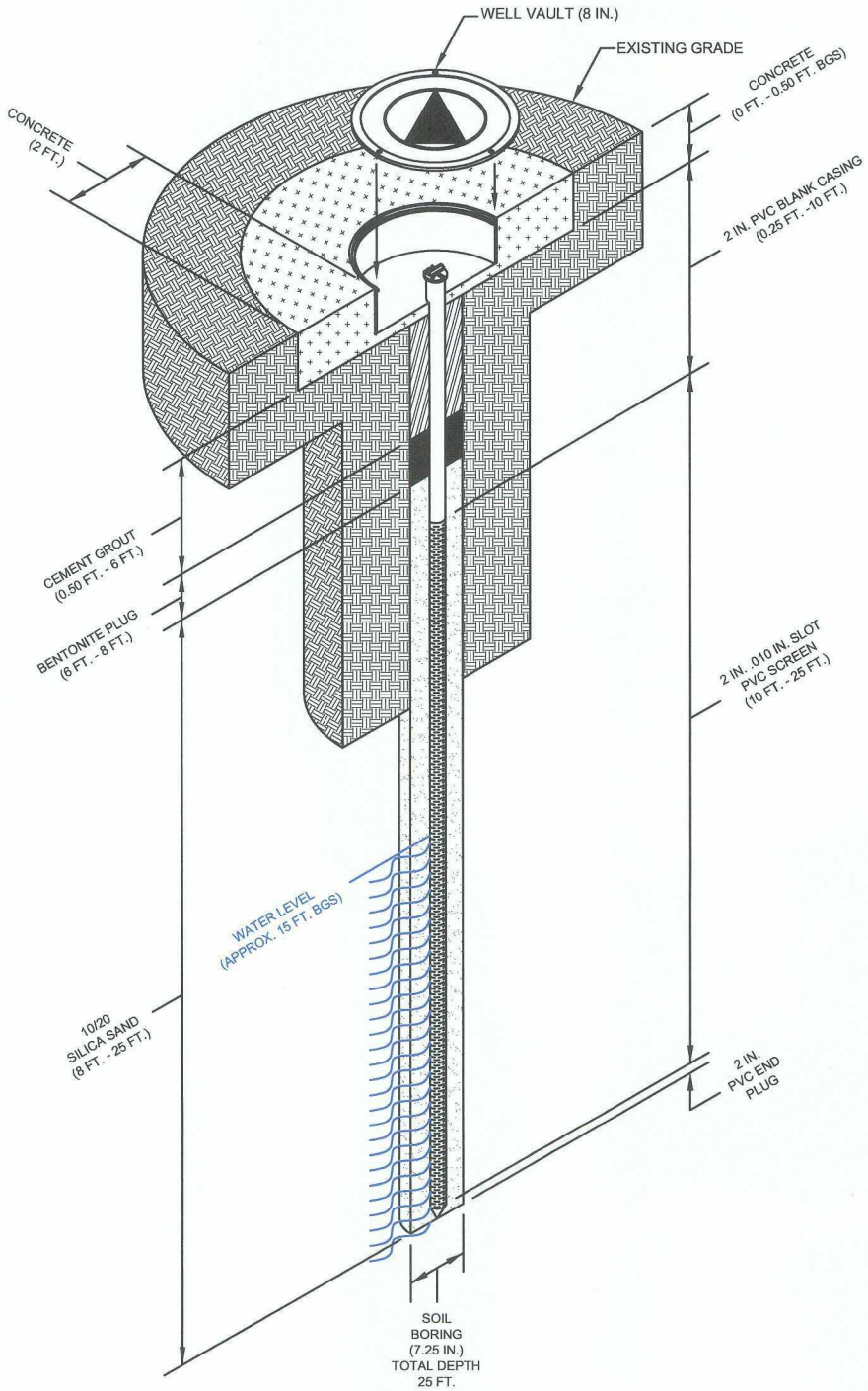
APPROVED BY: E. McNally	DATE APPROVED: April 13, 2008

FIGURE 2
SITE PLAN AND PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
THRIFTWAY REFINERY
626 ROAD 5500
BLOOMFIELD, NEW MEXICO

S:\ANIMAS 2000\2008 PROJECTS\THRIFTWAY\810 REFINERY\DRAWINGS\PILOT STUDY WORKPLAN\FIGURE 2 PROPOSED MONITORING WELL LOCATIONS



AES Animas Environmental Services, LLC	**DRAWN BY:** Nathan Willis	**DATE DRAWN:** November 15, 2007
	REVISIONS BY: R. Kennemer	**DATE REVISED:** April 13, 2008
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	APPROVED BY: E. McNally	**DATE APPROVED:** April 13, 2008

FIGURE 3
PROPOSED
GROUNDWATER MONITORING WELL CONSTRUCTION SHEMATIC
THRIFTWAY REFINERY
626 ROAD 5500
BLOOMFIELD, NEW MEXICO

S:\ANIMAS 2000\2008 PROJECTS\THRIFTWAY\810 REFINERY\DRAWINGS\PILOT STUDY WORKPLAN\FIGURE 3 PROPOSED MONITORING WELL CONSTRUCTION SCHEMATIC

STANDARD OPERATING PROCEDURE
HOLLOW STEM AUGER DRILLING AND SOIL SAMPLING

Soil borings will be drilled using a CME 75 hollow-stem auger drilling rig (or equivalent) equipped with 6 5/8-inch nominal diameter augers. AES will attempt to obtain representative soil samples at 5-foot intervals in each boring using a using a standard 1.5-inch outside diameter split-barrel sampler in accordance with ASTM Method D 1586-84. Each sample will be collected in a 1-inch brass sample tube contained within the sampler. Soil samples will be collected by inserting the sampler through the augers and driving the sampler with a 140-pound drop hammer free-falling 30 inches. The sampler will be driven a maximum of 18 inches below the bottom of the auger, or to sampler refusal. The number of blows required to drive the sampler each 6-inch interval will be recorded in the boring logs to provide data to evaluate the consistency of the soil. If an insufficient sample volume is recovered during the initial sampling event, a maximum of two additional attempts will be made to obtain an adequate sample volume.

Following sampler retrieval, the sampler will be opened and the bottom brass sleeve will be collected. The collected brass sample sleeve will be sealed with Teflon® liners followed by aluminum foil liners and capped with plastic end-caps, marked for identification, and preserved on ice for delivery to an approved laboratory. Chain-of-custody records will be maintained and will accompany the samples to the laboratory.

To minimize the potential for cross-contamination, all downhole sampling equipment will be washed in an Alconox® and tap water solution, rinsed with tap water and rinsed again with distilled water prior to each sampling event. If necessary, the augers and sample hammer bit will be high pressure washed between bore holes. Decontamination water will be stored in labeled 55-gallon drums and will remain on-site pending proper disposition. Drill cuttings will be placed in transport trailer and will remain on-site pending proper disposition.

STANDARD OPERATING PROCEDURE
GROUNDWATER MONITOR WELL INSTALLATION AND DEVELOPMENT

Prior to drilling, AES will complete a notice of intent (NOI) to drill a monitoring well and obtain groundwater monitor well permits from the New Mexico State Engineers Office. Copies of the NOIs/permits will be on-site during drilling operations.

Following completion of each well boring, a well will be constructed using 2-inch nominal diameter, Schedule 40, 0.010-inch machine slotted, polyvinylchloride (PVC) well screen from the bottom of the borehole to 10 feet above the static depth to groundwater to account for any season water level fluctuations. The remaining well string will be constructed of 2-inch nominal diameter Schedule 40 blank PVC casing.

The bottom of the perforated interval will be capped with a sediment sump and flush-threaded PVC cap. Monitor well casing will be assembled and lowered into the augers. No PVC cement of other solvents or glues will be used in construction of the monitor well. All well casing and screen material will be delivered to the site in factory containers.

The annulus of the well will be backfilled with clean 10/20 Colorado silica sand (or equivalent) filter pack to approximately 2 feet above the top of the well screen. The top of the filter pack will be direct measured with a weighted tape. A minimum 1.5-foot layer of bentonite pellets will be placed on top of the filter pack and hydrated to form an annular seal. The bentonite pellets will be hydrated by adding approximately 1 gallon of water for each linear foot of bentonite. The remaining annular space to the surface will be filled with cement grout. The well will be completed at the ground surface with water-tight, flush-mounted, traffic rated vault and concrete apron.

A minimum of 24 hours after well completion, the groundwater monitor well will be developed to remove sediment and to stabilize the filter pack by a combination of surging and pumping groundwater from the well. Purging will continue until movement of the fine sediment stabilizes or ceases and turbidity stabilizes. Groundwater purged from the well will be contained in 55-gallon drums and will remain on-site pending the groundwater analytical results.

STANDARD OPERATING PROCEDURE
GROUNDWATER MONITOR WELL PURGING AND SAMPLING

Prior to purging the well, the static water level will be measured using an electronic interface probe to evaluate the presence of any phase separated hydrocarbons. The measurement will be obtained from a reference point on the north side of the top of the well casing. Fluid measurements will be recorded to the nearest 0.01-foot. Depth to groundwater will be measured from all site wells on the same day. The total depth of the well will also be recorded. If phase separated hydrocarbons are noted, a measurement of the apparent thickness will be obtained and the well will not be sampled. To prevent cross-contamination, all monitoring equipment that is in contact with groundwater will be washed with Alconox® detergent and rinsed with distilled water prior to use in each well.

After the static groundwater level and total depth of the well has been determined, the volume of water in the well will be calculated. Based on this data, if free floating hydrocarbons are not present, a minimum of three well volumes of water will be purged from the well using a 2-inch variable speed Fultz positive displacement pump or a PVC bailer. Periodic measurements (at approximate 1-gallon intervals) of temperature, pH, dissolved oxygen (DO), specific electrical conductivity, and oxidation reduction potential (ORP) will be collected during purging. When three successive stabilized readings are obtained, the well will be sampled. If the well is low yielding and is pumped or bailed dry, the well will be allowed to recover at least 80% of the static groundwater level. If the well does not recover 80% within a 24-hour time frame, a sample will be collected and recovery noted on the Groundwater Sampling Log.

Groundwater purged from the well will be stored on-site in 55-gallon drums pending proper disposition. To prevent cross-contamination, equipment will be washed with Alconox® detergent and rinsed with distilled water prior to use in the well.

Groundwater samples will be collected from the well using a disposable polyethylene bailer. Each sample will be collected in laboratory-preserved 1-liter glass bottles and in 40-milliliter volatile organic analysis (VOA) vials. Each vial will be filled completely with sample and preservatives to eliminate headspace and create a positive meniscus. The vial will be capped with convex Teflon® septa. Each vial will be observed to ensure that no air bubbles are present within the vial. Samples will be marked for identification, placed on ice, and transported to an approved laboratory for analysis. Chain-of-custody records will be maintained and accompany all samples to the analytical laboratory.

STANDARD OPERATING PROCEDURE
FIELD SOIL VAPOR MONITORING

A representative soil sample will be collected from each sample interval and placed in a Ziplock® plastic bag or clean 16 ounce jar with threaded ring and cap. The bag or jar will be sealed and the soil dissaggregated. At least ten minutes will be allowed for the soil to be heated and for any VOCs in the soil to accumulate in the head space of the bag or jar. Volatile gases will then be monitored by inserting the probe of a Photovac 2020 photoionization detector (PID). The PID is equipped with a 10.6 eV lamp which is capable of detecting VOCs at concentrations of 0.1 parts per million (ppm). The PID will be calibrated on-site using 100 ppmV isobutylene-in-air span gas (equivalent to benzene) prior to drilling operations. PID readings will be recorded in the boring logs.