AP - 022

STAGE 1 & 2 WORKPLANS

DATE:

July 2, 2001

STAGE 1 ABATEMENT PLAN PROPOSAL
ABATEMENT PLAN AP-22
WILLIAMS PIT SITE
EDDY COUNTY, NEW MEXICO

RECEIVED

JUL 0 5 2001

Environmental Bureau
Oil Conservation Division

Prepared for: Yates Petroleum Corporation
105 South Fourth Street
Artesia, New Mexico 88210

YATES PETROLEUM CORPORATION

Harding ESE Project No. 53470.1

July 2, 2001

Harding ESE
A MACTEC COMPANY

6400 UPTOWN BOULEVARD NE, SUITE 310 E
ALBUQUERQUE, NEW MEXICO 87110
(505) 248-0017 FAX (505) 248-0021

TABLE OF CONTENTS

1.0 INTRODUCTION

Harding ESE has prepared this Stage I Abatement Plan (Plan) Proposal on behalf of Yates Petroleum Corporation (Yates). This Plan is for the Williams Pit Site (Site), located in Eddy County, New Mexico. This Plan has been prepared following the Oil Conservation Division (OCD) request of March 7, 2001, requesting that Yates provide this Plan. The purpose of the Plan is to perform a site investigation that will define existing site conditions and provide adequate data to select an effective groundwater abatement option for the Site. The proposed site investigation activities will include a review of the site history including the nature of the release, a search of water wells within a one-mile radius of the site, an onsite review of surface water hydrology and potential impacts the Site may have had on surface water bodies or water wells in the vicinity, and the installation of three onsite groundwater monitoring wells.

1.1 Background

The Site is a former unlined disposal pit located adjacent to the Williams Tank Battery, south of Artesia in Eddy County, New Mexico. Figure 1 shows the approximate site location. The tank battery consists of three crude oil and natural gas production wells and associated collection, production, and processing equipment. Figure 2 shows the approximate site layout. During its operational life, the Williams pit was used to contain water and oil from blowdown events, spills, and general operations at the tank battery.

In 1997, Yates purchased production facilities, including the Williams Tank Battery from H&S Oil Company (H&S). H&S was a small, privately operated oil and gas producer that did not maintain an effective environmental management or compliance program. Since purchasing the facilities, Yates has made a considerable investment of both time and financial resources which has resulted in significant improvement to the environmental condition at the Site. The following photographs show the condition prior to and following Yates' acquisition of the Site.

Photo 1: Williams Tank Battery unlined disposal pit prior to Yates' acquisition of the site.

Photo 2: Williams Tank Battery pit location following acquisition and closure by Yates.

Harding ESE (formerly Harding Lawson Associates [HLA]) performed a site reconnaissance at the Williams Tank Battery on September 23, 1997, as part of an Environmental Site Assessment (ESA) for the H & S Oil and Gas properties prior to their acquisition by Yates. This acquisition included the Site. At the time of the field inspection, the Williams disposal pit was approximately 40 feet by 40 feet in area and contained water and oil with petroleum saturated soils in the pit walls. Harding ESE collected a sample of the pit water/oil interface for laboratory analyses to determine the petroleum hydrocarbon and benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations. The oil at the surface contained 230,000 parts per million (ppm) of total petroleum hydrocarbons (TPH), exceeding the OCD Soil Guideline of 1,000 ppm. BTEX concentrations of the pit water did not exceed the New Mexico Water Quality Control Commission (NMWQCC) water quality control standards. Harding ESE recommended at that time that contaminated soils should be removed or remediated on-site, and the unlined disposal pit should be closed in accordance with OCD guidelines.

On May 20, 1998, Bioremediation Contractors & Consultants, Inc. (BCC) submitted a proposal to Yates to close the pits at the Site. The proposal included all monitoring, documentation, and soil sampling that BCC indicated would be required in order to be in compliance with the OCD. On May 17, 1999, BCC completed the first phase of their plan. Bird netting and debris were cleared from the pit and excess fluids were vacuumed from the pit area. Affected areas were ripped and power tilled to prepare the soil for treatment. The pit was then sprayed with BCC's SOP 3 microbial solution, treated with nutrients, and watered to promote hydrocarbon degradation. According to BCC, sufficient watering as well as periodic tilling were maintained throughout the project. On September 22, 1999, a soil sample was collected from the pit by BCC to determine BTEX concentrations. BTEX concentrations in that sample did not exceed OCD Soil Guidelines. On January 11, 2000, a second soil sample was collected for laboratory analysis. The soil contained 9,080 ppm of TPH, exceeding the OCD Soil Guideline of 1,000 ppm. A third soil sample was collected from the pit on February 9, 2000. TPH was not detected in this sample at concentrations exceeding the OCD Soil Guideline. On February 28, 2000, BCC submitted a Final Closure Report to the State of New Mexico. Closure of the pit was not granted by the OCD. The OCD indicated the closure request was rejected because the soil and water were not sampled for

chlorides, there was inadequate soil sampling done, and there was no site map or narrative explanation of activities provided in the report. On March 31, 2000, BCC completed the second phase of their plan. The Williams Pit was treated and watered to prepare it for closure, then layered with 10 inches of manure, backfilled , and smoothed.

On October 21, 2000, Environmental Technology Group, Inc. (ETGI) mobilized a drilling rig to the site. A total of five soil borings were advanced at the site. One soil sample each was collected from soil borings SB-1, SB-2, and SB-3 at a depth of 10-12 feet below ground surface (bgs), which was total depth for these borings. Soil boring SB-4 had one sample collected from 17-19 feet bgs, which was also at total depth. Samples were collected from soil boring SB-5 at depths of 10-12, 17-19, and 24-26 feet bgs. A groundwater sample was also collected from SB-5 for analysis. Both the depth to groundwater and the total depth were approximately 40 feet bgs. The groundwater sample contained 30,842 ppm chloride, exceeding the NMWQCC water standard of 250 ppm. Background data for chlorides concentrations in the area, according to the State Engineers' database, are in the range of 400 to 600 ppm. The groundwater sample from SB-5 also contained benzene at a concentration 535 parts per billion (ppb), which exceeded the NMWQCC water standard of 10 ppb.

ETGI submitted a Site Investigation Report for the Williams Pit Site to Yates in November 2000. Yates examined this information as well as the field notes and analytical results of BCC and, in a letter to the OCD dated December 15, 2000, again requested closure of the Williams Pit from the OCD. In a letter to Yates dated March 7, 2001, the OCD again rejected the closure request due to the presence of benzene and chloride in groundwater underlying the site at concentrations in excess of NMWQCC standards. The OCD requested that Yates provide this Stage I Abatement Plan pursuant to OCD Rule 19.E.1 and OCD Rule 19.E.3 and 10NMAC 15.A.19.C.1.

1.2 Objectives

The objectives of the Stage I Abatement Plan Investigation are as follows:

1. Respond to the OCD requirement for groundwater abatement.
2. Examine site history, including the nature of the release that caused the water pollution and a summary of previous investigations and pit closure attempts.
3. Take inventory of water wells within a one-mile radius of the Williams Pit and the location and number of such wells actually or potentially affected by contamination from the site.
4. Examine surface water hydrology at the site and assess any possible impacts pollution from the Williams Pit may have on surface water and stream sediments in the vicinity.
5. Define site and regional geology.
6. Determine suitable sampling locations and install groundwater monitoring wells to define site hydrogeology and the vertical and horizontal extent of the plume.
7. Recommend additional action, if necessary, based on the findings of the groundwater investigation.

These objectives will be attained by evaluating historical data, performing an onsite field investigation which will include drilling and monitoring well installation, soil and groundwater sampling, evaluating the field results, and preparing a Stage I Abatement Plan Investigation Report.

1.3 Site Location

The Williams Pit Site is located in the NE 1/4 of the NW 1/4 of Section 25, Township 18 South, Range 26 East in Eddy County, New Mexico, approximately nine miles south of Artesia (Figure 1).

Harding ESE identified three locations where monitoring wells will be installed as part of the Stage I Abatement Plan Investigation (Figure 2). The monitoring wells will be drilled in locations established to determine groundwater flow direction across the site and define the horizontal extent of the benzene and chlorides in groundwater.

2.0 SCOPE OF WORK

Harding ESE has prepared this scope of work which presents the details of the Stage I Abatement Plan Investigation activities. Harding ESE's scope of work is based on previous investigations and activities at the Site, a site visit conducted by Harding ESE and Yates personnel, and the requirements of the applicable OCD Rules and NMWQCC Regulations.

2.1 Health and Safety Plan

Prior to initiating field activities, Harding ESE will prepare the Occupational Safety and Health Administration (OSHA) required site-specific health and safety plan (HASP). The HASP will detail specific actions to monitor and assess the potential exposure to petroleum hydrocarbon and other volatile organic compounds at the work site during drilling and sampling field activities. The HASP will also address safety issues such as overhead and buried utilities. In addition, all Harding ESE field personnel assigned to this project have successfully completed the OSHA 40-hour hazardous waste operations and emergency response procedures training course, as well as the OSHA 8-hour hazardous waste site supervisors training course. Harding ESE field personnel assigned to this project are part of Harding ESE's OSHA-required medical monitoring program.

2.2 Notifications, Site Access, and Utility Markout

Prior to field mobilization, Harding ESE will coordinate the field schedule and access to the site with Yates and OCD personnel. Additionally, prior to commencing drilling activities, Harding ESE will notify the New Mexico One-Call System to obtain utility clearances. However, because of the remote location of the site, Harding ESE will also coordinate with the Yates field operator to obtain information on subsurface utility lines at the Site.

2.3 Soil Borings and Soil Sampling

Harding ESE will complete three soil borings as part of the drilling, sampling, and well installation activities at the Site. Figure 2 shows the approximate locations of the soil borings. One soil boring/monitoring well will be located within the limits of the former pit, and two borings/wells will be located slightly downgradient of the former pit. The two downgradient borings/wells are staggered so that groundwater flow direction and gradient can be calculated. The wells will be drilled using a hollow stem auger (HSA) rig. Harding ESE will collect drive samples using split-barrel samplers (split-spoons) every five feet in order to determine specific lithology and perform field screening of the drive samples for organic vapors. The following procedures will be utilized during drilling and soil sample collection activities.

Soil samples will be field analyzed for total volatile hydrocarbons using heated headspace analysis. Heated headspace procedures used by Harding ESE field personnel follow the guidance of Section II.D. of the UST Bureau Soil/Water Sampling and Disposal Guidelines. The following procedures will be utilized to perform the heated headspace method:

- Fill a 16-ounce or larger glass jar half full of the soil sample.
- Seal the top of the jar with clean aluminum foil.

- Ensure that the soil sample is at 60 to 80 degrees Fahrenheit.
- Allow the aromatic volatile hydrocarbon concentrations to develop in the sample jar for 5 to 10 minutes. During this headspace development, the soil sample will be shaken vigorously for one minute.
- Immediately pierce the aluminum foil seal with the probe of the photoionization detector (PID) and read the highest measurement. The instrument will be able to detect total volatile hydrocarbons in the range of 0 to 2,000 ppm.

In addition to the field headspace analysis to be performed on the soil samples, the physical characteristics of the soil samples will be logged by the onsite Harding ESE personnel. Logging of the soil samples shall consist of noting the blow counts, lithology, approximate grain size, approximate moisture content, color, plasticity, odor, and Unified Soil Classification System (USCS) name and symbol. Computer generated logs of the borings will be included in the Report.

The downhole drilling equipment will be decontaminated between boring locations. Wash water from the decontamination operations will be placed onto the ground surface in the former pit location and allowed to evaporate. Harding ESE does not anticipate generating large quantities of decontamination wash water at the Site and does not anticipate containerizing the decontamination fluids.

2.4 Monitoring Well Installation

Groundwater monitoring wells will be installed in each of the three soil borings at the Site. Harding ESE will construct the wells with 20 feet of well screen extending from five feet above the water table to 15 feet below the water table to maximize the well service life, should decreases in the local water table occur. The soil borings will not be disturbed for approximately one hour after reaching the proposed total depth to allow the water level to stabilize before determining screen placement.

Harding ESE will construct the wells using the following materials:

- Twenty feet of two-inch diameter, 0.010-inch slot polyvinyl chloride (PVC) well screen will be placed in the borehole inside the augers. The well screen will be threaded onto two-inch diameter blank PVC casing from the top of the well screen to just above the ground surface.
- A filter pack/formation stabilizer will be placed in the annular space around the well screen from the bottom of the borehole to a height of approximately five feet above the top of the well screen. The sand pack will consist of 10/20 size Colorado Silica Sand or equivalent.
- A bentonite pellet or chip seal will be placed in the annular space in the approximately five foot interval directly above the sand pack. The bentonite pellets or chips will be hydrated with a minimum of ten gallons of potable water and allowed to hydrate for 30 minutes prior to continuing with the well construction.
- Cement/bentonite grout will be placed in the annular space from the top of the bentonite seal to just below the ground surface. Each batch of cement/bentonite grout will be composed of 8 gallons of fresh water, 94 pounds of Class A portland cement, and four percent (3.8 pounds) of sodium bentonite powder.
- A six-inch diameter outer protective casing with a hinged cap will be placed over the well casing and set in concrete. The protective casing will extend from approximately two feet bgs to three feet above ground surface. The PVC well casing will be cut so that the top of the casing is approximately three inches below the top of the protective casing. An expansion cap will be placed on the PVC

casing and tightened. A padlock will be placed on the outer protective casing to prevent unauthorized access into the wells.

Construction details for each well will be provided in the soil boring/well completion logs in the Site Investigation Report.

2.5 Well Development and Groundwater Sampling

Immediately upon completion of the well installation, the wells will be developed by surging and bailing. The wells will be developed until a turbidity-free discharge is obtained or until five well casing volumes of groundwater have been removed. Well development water will be discharged to the ground surface adjacent to the well location. During development, Harding ESE personnel will monitor the pH, temperature and electrical conductivity of the groundwater at a frequency of once per well casing volume.

Harding ESE will collect a groundwater sample from each of the three monitoring wells following well development. Groundwater samples will be collected by lowering a dedicated, disposable polyethylene bailer into the well to retrieve a sample. Harding ESE will measure the pH, temperature, and conductivity of the sample. The groundwater samples will be shipped to Hall Environmental Analysis Laboratory, Inc. (HEAL), of Albuquerque, New Mexico, for analyses. The groundwater samples will be analyzed for chlorides by EPA Method 300.0. A summary of the laboratory analytical results as well as a copy of the laboratory deliverable package including the chain-of-custody will be included with the Site Investigation Report.

2.6 Site Restoration

Harding ESE will spread drill cuttings onsite, remove all trash associated with drilling activities at the Site, and will restore the site to its approximate original configuration. The only anticipated permanent features will be the three monitoring wells set in concrete pads.

3.0 REPORTING

3.1 Status Reports

Harding ESE's field personnel will be in direct contact with the Yates Environmental Coordinator, and will provide daily verbal updates to the project manager once onsite activities are underway. Harding ESE will notify Yates immediately if any unexpected conditions arise while onsite.

3.2 Final Site Investigation Report

At the completion of the onsite activities, Harding ESE will compile the data and prepare a Stage I Abatement Plan Investigation Report that presents the details of the project activities.

The Report will include:

- site background information;
- a narrative of the field activities;
- a discussion of the results with emphasis on the development of an abatement plan;
- a Groundwater Abatement Plan for the Site based on analytical results and field observations;
- figures presenting monitoring well locations;
- computer-generated soil boring logs with well construction details;
- analytical results data summary tables; and
- copies of the laboratory deliverable packages.

4.0 SUBCONTRACTORS

4.1 Subcontractors

Based on the experience and cost estimates received from potential subcontractors, Harding ESE has selected the following subcontractors to support this investigation, as listed below:

- Drilling and monitoring well installation – Atkins Engineering Associates, Inc., of Roswell.
- Analytical Laboratory – Hall Environmental Analysis Laboratory, Inc., of Albuquerque.

5.0 SCHEDULE

Harding ESE anticipates approximately four field days to complete the drilling and sampling activities. The time to complete the onsite activities includes:

- Mobilization;
- Drilling and soil sample collection;
- Well completion and development;
- Groundwater sample collection;
- Site restoration; and
- Demobilization.

Immediately upon receiving notice to proceed, Harding ESE will prepare the Health and Safety Plan, contact the NM One-Call System, and schedule the field sampling.

DISTRIBUTION

Stage 1 Abatement Plan Proposal
Abatement Plan AP-22
Williams Pit Site
Eddy County, New Mexico

July 2, 2001

Copies 1-3: Yates Petroleum Corporation
105 South Fourth Street
Artesia, New Mexico 88210
Attn.: Ms. Lisa Norton

Copy 4: New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1120 South St. Francis Drive
Santa Fe, New Mexico 87505
Attn.: Mr. Roger Anderson

Copy 5: New Mexico Oil Conservation Division
District 2
1301 W. Grand Avenue
Artesia, New Mexico 88210
Attn: Mr. Mike Stubblefield

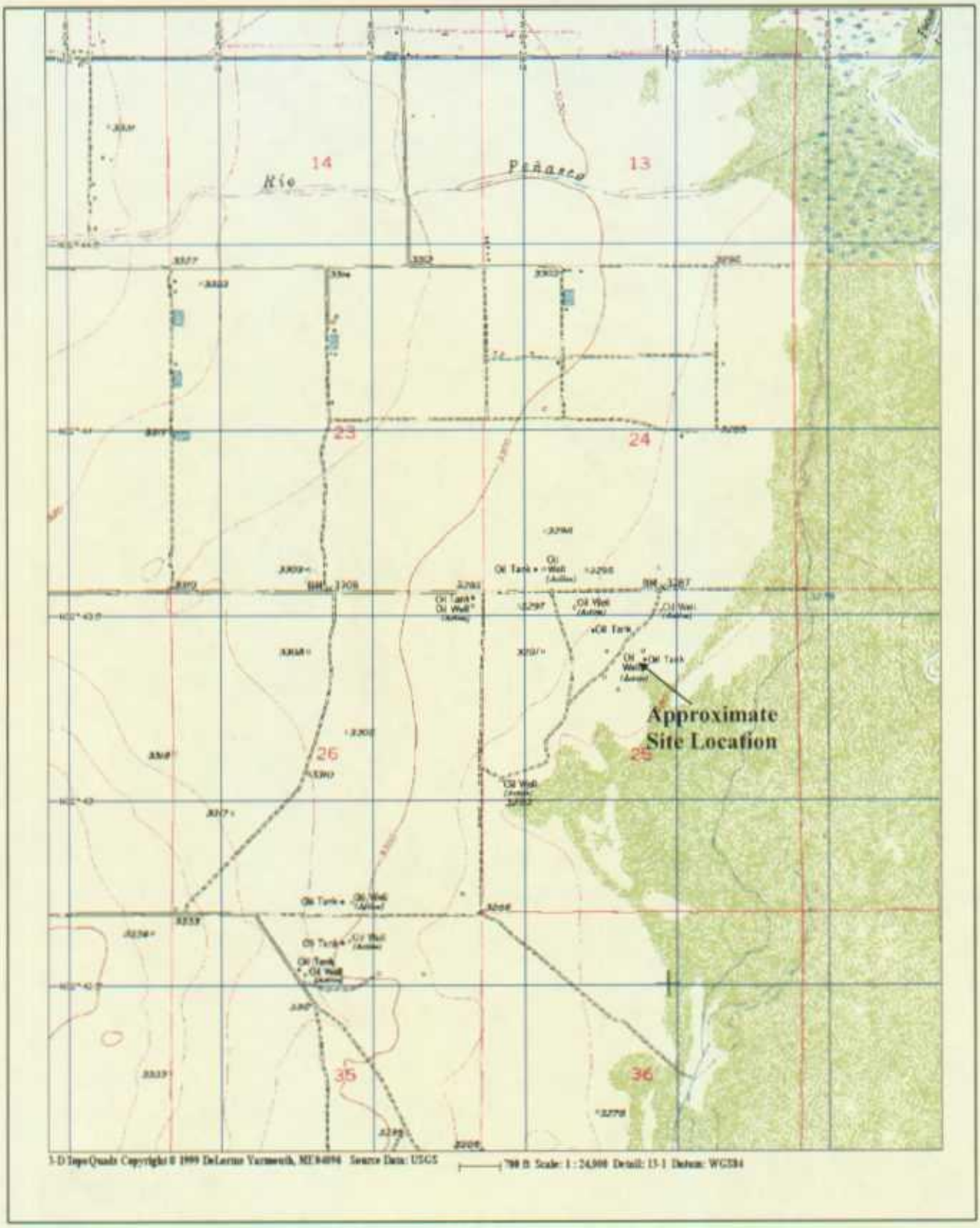
Copies 6-7: Harding ESE Project File 53470.1

Quality Control Reviewer

Jeffrey D. Minchak, P.G.
Senior Project Geologist

FIGURES

(53470\Wp\ Williams Figure 1.cdr)

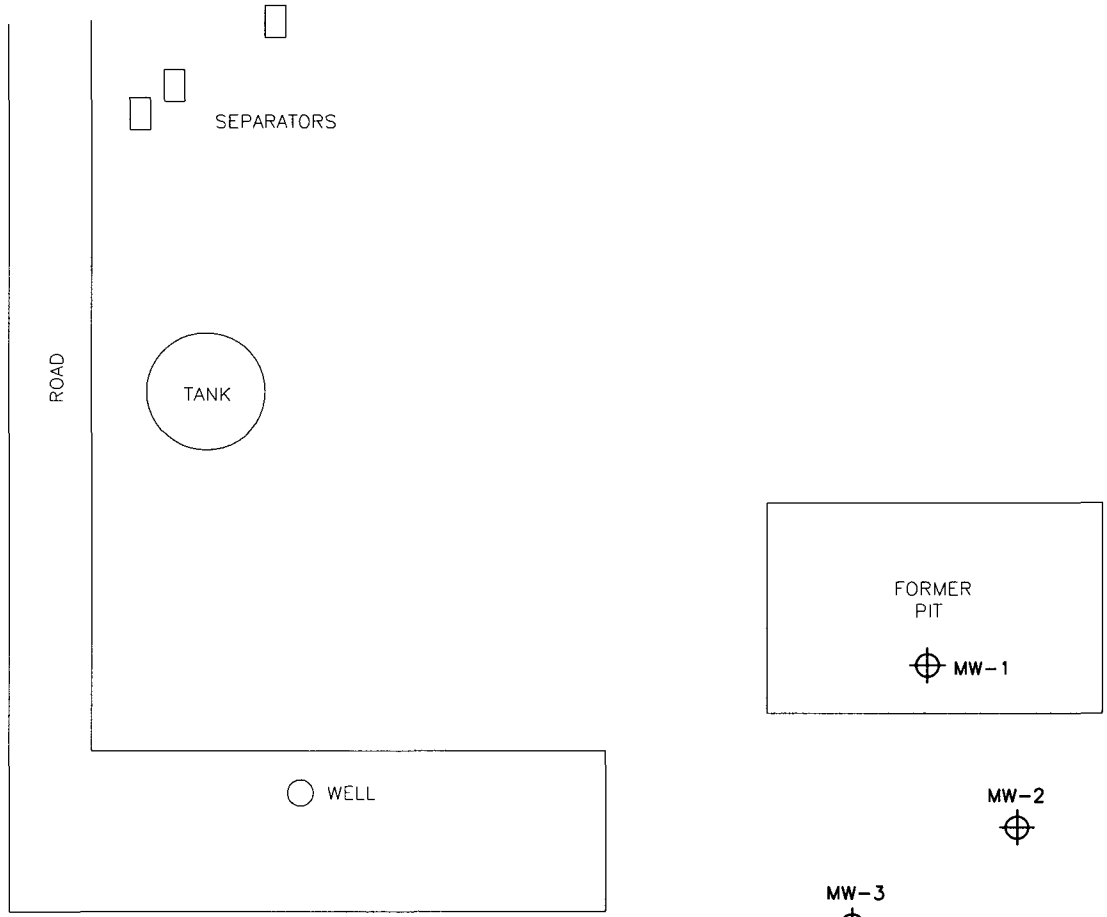


Harding ESE
A MACTEC COMPANY

Figure 1
Site Location Map
Williams Pit Site
Lake McMillan North USGS 7.5-Minute Quadrangle
Eddy County, New Mexico

Harding ESE Project No. 53470

P:\5000\53470\CAD\WILLIAMS.DWG



NOT TO SCALE

MW-1 ⊕ PROPOSED SOIL BORING / MONITORING WELL LOCATIONS

NO	DATE	REVISIONS	BY	CHK

DRAWN: FSM | PROJECT NO: 53470.1
SCALE: NTS
CHECKED: AK | APPROVED:
DATE: 05/06/01 | DATE:

Harding ESE
A MACTEC COMPANY
6400 Uptown Boulevard
Suite 310E
Albuquerque, NM 87110

SOIL BORING / MONITORING WELL LOCATIONS
WILLIAMS PIT SITE
EDDY COUNTY NEW MEXICO

FIGURE 2