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REPORTS

DATE:
APRL 1994

2R-6

PHASE III SUBSURFACE INVESTIGATION
ARTESIA PUMPING STATION
ARTESIA, NEW MEXICO

Prepared for:
AMOCO PIPELINE COMPANY
ARTESIA, NEW MEXICO

April 1994
Laguna Hills, California

Project No.: 2436-02

Prepared by:

Mittelhauser
CORPORATION

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1.0 INTRODUCTION

The Amoco Pipeline Company (Amoco) operates a pipeline pumping station near Artesia, New Mexico designated by Amoco as the "Artesia Pumping Station, Facility 10195". The station is located in Eddy County, within the Empire oil field, approximately 8 miles southeast of the city of Artesia, as depicted in Figure 1. The station acts as a temporary storage and transfer facility along an Amoco crude oil pipeline.

Physiographically, the station is located within the Pecos River Valley drainage basin, approximately 2.6 miles east-northeast of the Pecos River. The station is located immediately west of Scoggin Draw, an intermittent drainage that is a distant tributary of the Pecos River. The local drainage forms a network of connected tributaries which interconnect and transmit surface runoff to the Pecos River.

1.1 *BACKGROUND*

An initial investigation was performed by CURA, Inc., in May of 1993, following the discovery of crude oil leaking from the storage tank at the station. During that investigation, four borings were advanced to indicate whether the hydrocarbon product had impacted subsurface soil and groundwater. Three of the borings were converted to groundwater monitoring wells. Two monitoring wells are located within the site boundaries; MW-2 at the southwest corner and MW-3 just south of the center of the site within the tank berm. Monitoring well MW-1 is located approximately 80 feet east of the southeast corner of the site. The well locations, installed during this phase of work, are shown on Figure 2.

Hydrocarbons were encountered in samples and soil cuttings produced during the CURA drilling operation. Free phase petroleum, ranging in apparent thickness from 0.21 to 1.75 feet was encountered in each of the three monitoring wells.

Subsequent to the initial investigation, AMOCO contracted Mittelhauser Corporation (Mittelhauser) to delineate the lateral extent of the free phase product plume and characterize any impact to the local perched groundwater. Mittelhauser's investigation indicated that a free-phase product plume beneath Scoggin Draw extended approximately 1,500 feet to the south of the station.

In February 1994, field observations of apparent product thicknesses in the onsite wells indicated that the product plume was continuing to migrate southward. Based on this information, an additional investigative phase was proposed to further delineate the limits of the plume. The field program and results of this investigation are discussed in the following sections.

2.0 SCOPE OF WORK

The scope of work performed by Mittelhauser during the Phase III investigation consisted of the following tasks:

- Health and safety oversight, subcontractor coordination, and assistance to AMOCO with regulatory correspondence.
- Drilling 10 soil borings to delineate the occurrence of free-phase hydrocarbons.
- Installation of 5 groundwater monitoring wells and analysis of groundwater samples for benzene, toluene, ethylbenzene and xylenes by EPA Method 8020 and for semi-volatile hydrocarbons by EPA Method 8270.
- Evaluation of free product and groundwater data and preparation of a report presenting results.

2.1 *HEALTH AND SAFETY PLAN*

A site-specific health and safety plan (HSP) was prepared for the Phase II investigation performed by Mittelhauser. This document was also utilized for the third phase of investigation. All parties involved in the field work reviewed and signed the HSP certifying that the plan had been read and understood. In addition, prior to the initiation of the field work, an AMOCO representative reviewed AMOCO safety regulations with the field crew. A copy of the HSP is presented as Appendix A.

2.2 *WORKPLAN*

A letter workplan was prepared by Mittelhauser, outlining the goals of the investigation and the procedures specified to attain those goals. The workplan was submitted to AMOCO and subsequently forwarded to the State of New Mexico; Energy Minerals and Natural Resources Department, Oil Conservation Division (OCD). The OCD forwarded a letter, dated March 9, 1994, to AMOCO approving the workplan.

2.3 *SITE ACCESS*

All drilling activities during Mittelhauser's first investigation (Phase II) were conducted on State Trust lands within Section 10 of Township 18 south, Range 27 east in Eddy County. Access to these lands was granted by the Commissioner of Public Lands, New Mexico State Land Office, State of New Mexico under Right of Entry Permit No. 57 dated August 24, 1993.

Site activities during Mittelhauser's second investigation (Phase III) extended into Section 15 of Township 18 south, Range 27 east in Eddy County. Access to Section

15 was also granted by the Commissioner of Public Lands under amended Right of Entry Permit No. 57 dated February 28, 1994.

3.0 INVESTIGATION PROCEDURES

3.1 *SOIL BORINGS*

Ten soil borings were drilled between March 21 and 24, 1994 to delineate the extent of the free-phase product. The boring locations are presented in Figure 2. The borings were drilled using 8-inch or 10-inch diameter hollow-stem augers. The drilling rig and crew were provided by Harrison Drilling and Environmental Services, Incorporated, located in Hobbs, New Mexico.

Eight borings were drilled to the south of MW-5 to delineate the southward migration of the free-phase product plume. Two borings were drilled to the northeast of MW-4 to provide data on upgradient water quality. The borings ranged in depth from 25 to 47 feet below ground surface (bgs). Copies of the boring logs are presented in Appendix B.

Hydrocarbon-impacted soil, encountered during the drilling activities, was placed in 55-gallon DOT-approved drums and stored onsite temporarily prior to disposal. Soil cuttings and material retrieved from the boreholes by the split-spoon sampler were screened for volatile organics using a photo ionization detector (PID). A combination H_2S, oxygen, LEL meter was also used to monitor the cuttings during drilling activities. Both the PID and H_2S meters were also used to monitor the breathing zone as specified in the health and safety plan. Borings B-30, B-31 and B-32 were each backfilled with bentonite chips to the top of any groundwater encountered. An eight-percent bentonite/cement grout slurry was then placed in the open bores from the top of the bentonite chips to ground surface.

3.2 *GROUNDWATER MONITORING WELL COMPLETION*

A total of seven groundwater monitoring wells were completed during this phase of work. Borings B-24, B-25, B-26, B-27, B-28, B-29 and B-33 were converted to groundwater monitoring wells MW-8, MW-9, MW-10, MW-11, MW-12, MW-13 and MW-14, respectively.

All wells were completed with 4-inch diameter polyvinyl chloride (PVC) casing. Each groundwater monitoring well was constructed with 15 feet of screened casing. The annular space adjacent to the screened interval was filled with silica sand (0.92 to 0.95 mm size range). Prior to placing the seal, the screened intervals of the wells were surged for approximately 5 minutes. Following surging, additional sand was added to bring the top of the filter pack back to the design elevation. A 2-foot bentonite seal was placed on top of the filter pack and an eight-percent bentonite/cement grout slurry was placed from the bentonite seal to the ground surface. Copies of the well construction reports are presented in Appendix C.

3.3 *GROUNDWATER SAMPLING*

Groundwater monitoring wells MW-11, MW-12 and MW-14 were purged using a hand bailer. These wells were sampled because there was no free product in them. A minimum of three well volumes were removed from each well while monitoring the physiochemical parameters of pH, conductivity, temperature and settleable solids. Copies of the well development/sampling data sheets are included in Appendix D.

Each of the wells was sampled within 24 hours of purging. The samples were each collected using dedicated disposable bailers to avoid the possibility of cross

contamination and placed in an insulated chest, chilled to approximately 4° C. The samples were each logged onto a chain of custody form.

A bail-down test was conducted at monitoring well MW-5 to determine the aquifer characteristics beneath Scoggin Draw. The water level in the well was lowered by removing approximately 40 gallons of water with a bailer. Measurements of the water level recovery were then recorded. The water-level recovery data were analyzed to determine the transmissivity of the water-bearing materials.

3.3.1 Chemical Analysis

The groundwater samples were transported to BC Analytical in Anaheim, California for analysis. The water samples were submitted for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8020; and for polynuclear aromatics (PNAs) by EPA Method 8270.

4.0 INVESTIGATION RESULTS

4.1 *GEOLOGY*

The shallow subsurface geology is characterized by three litholigically distinct members. Surface soils, consisting of mixtures of silt and silty clay, extend from ground surface to a maximum of 19 feet. Underlying the surface soils, and extending to at least 40 feet below surface, is an interval of gypsum. The gypsum is, in turn, underlain by silty, very fine sand to the maximum depth explored.

The surface soils are composed primarily of red-brown silt with varying amounts of interbedded clay. Localized concentrations of silty clay and clay are also present. The

surface soils generally exhibit increasing gypsum content with depth. The surface soils are locally underlain by gypsiferous siltstone/mudstone.

The gypsum interval is dense to very dense, fractured, and includes locally interbedded clayey silt, limestone and fine-grained granular limestone. The gypsum occurs as singular gypsum crystals and radial crystal aggregates within a matrix of massive gypsum.

The silty, very fine sand which underlies the gypsum exhibits a characteristic brown-red coloration. The upper few inches of the unit, immediately underlying the gypsum contact, is cemented; however, cementing decreases rapidly with depth.

4.2 *HYDROGEOLOGY*

The hydraulics of the shallow groundwater flow at the site are complex. The interaction of the fractures within the gypsum, the east dipping orientation of the formation, and the lateral discontinuity of the gypsum have allowed the free-phase product to access two distinct horizons within the shallow water-bearing zone.

A shallow, perched, unconfined groundwater zone was encountered in the majority of the borings and, as in the previous investigation, appears to occupy the fractured zone within the gypsum. Groundwater was not always present within the gypsum, and was absent when penetrated in borings B-25, B-27, B-31 and B-33.

The gypsum unit dips gently to the east and appears to influence the occurrence of unconfined, perched water beneath Scoggin Draw. Borings drilled on the western side of the draw do not penetrate unconfined water within the gypsum. The fracture pattern and occurrence of gypsum within the draw influence the occurrence and movement of the perched groundwater zone.

Another water-bearing zone was encountered beneath the gypsum in the silty sand member in wells MW-9, MW-11, and MW-14. When measured after stabilizing, groundwater in each of these monitoring wells had risen above the level encountered during drilling by approximately 20 feet. This indicates that groundwater also occurs beneath Scoggin Draw under semi-confined conditions. Groundwater interaction between the unconfined and confined zones appears to be complex due to the discontinuity of the gypsum. However, groundwater moves in both zones, moves in the same direction and can be addressed as a singular groundwater body.

A preliminary groundwater analysis of the area within the limits of Scoggin Draw suggests that the groundwater flows to the south-southwest beneath the draw. A gross estimate of the hydraulic gradient is 0.008 feet per foot. The transmissivity of the water-bearing zone at monitoring well MW-5, as determined by the bail-down test, is estimated to be 1,700 gallons per day per foot (227 ft^2/day).

4.2.1 Free Phase Product

Apparent free-product thicknesses were measured in 8 monitoring wells at the site. Thicknesses ranged from 0.06 feet to 5.79 feet. Free-phase hydrocarbon product was observed in 7 of the 11 wells that access the gypsum aquifer and in 1 of the 3 wells that access the silty aquifer. At MW-9, upgradient from the pumping station, there was 0.13 foot of product measured. It is postulated that when the crude oil leaked from the storage tank at the station, some mounding of crude oil occurred in the subsurface. The mound would have sloped in all directions away from tank and would have had a temporary upgradient slope component. A portion of the crude oil probably had sufficient head to temporarily move against the general groundwater flow direction to where it was encountered at MW-9. However, the majority of the crude oil moved downgradient to the southwest within Scoggin Draw.

Table 1 presents a summary of fluid measurements for each well. Table 1 presents a summary of groundwater and product levels measured in the monitoring wells. The wellhead elevation is the reference point for both groundwater and product level measurements. Field measurements of groundwater levels and product levels were referenced to the wellhead elevations and are so presented. When free product floats on groundwater, it suppresses the level to which groundwater will rise in a well. Therefore, a correction is made to groundwater levels to take into account the influence of product in the well. The corrected groundwater elevation is presented as its piezometer surface on Table 1. The total depth of each well is presented for reference purposes. The approximate extent of the free-phase hydrocarbon plume is presented in Figure 3.

4.3 *CHEMICAL ANALYSIS RESULTS*

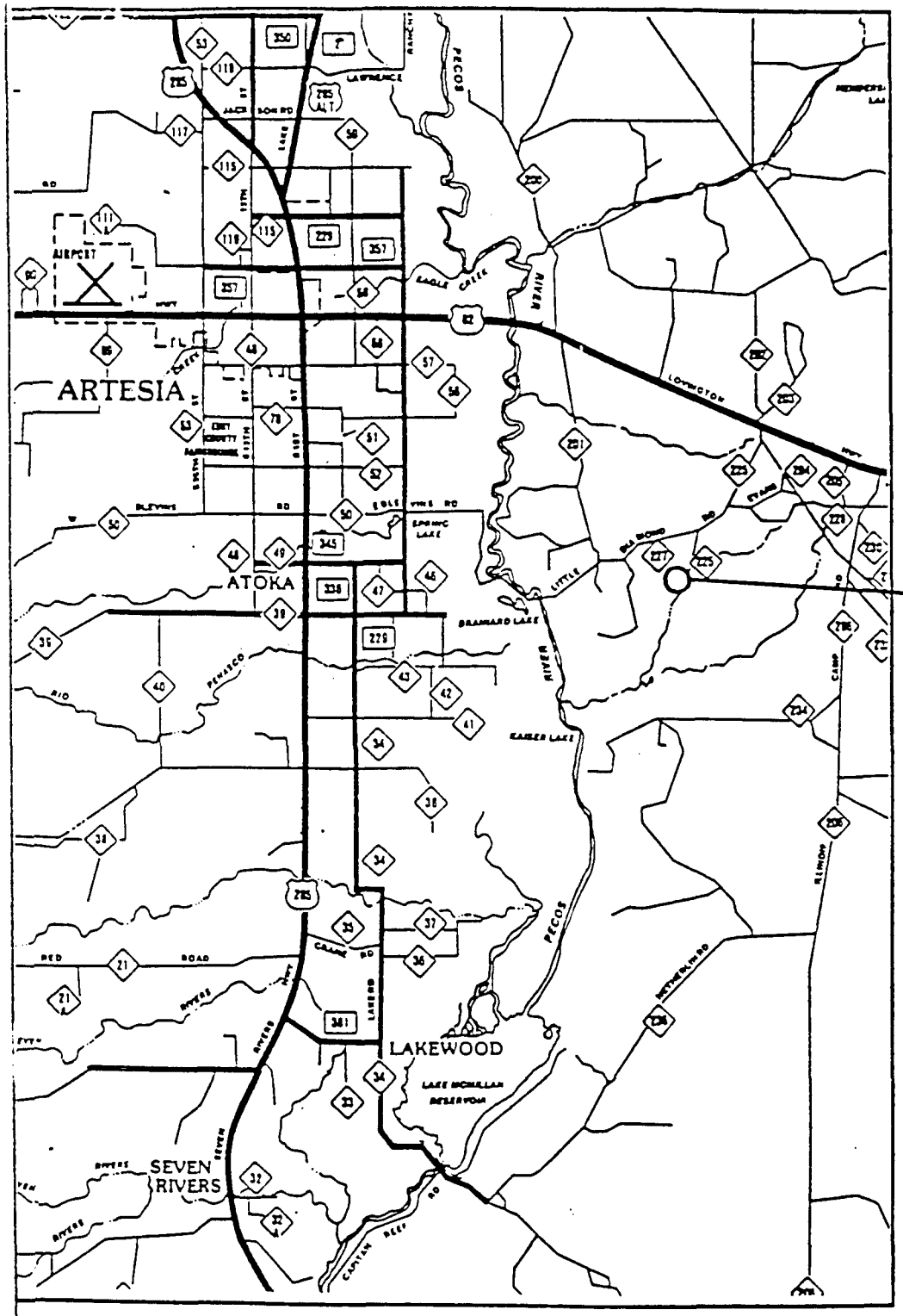
No BTEX or PNA concentrations were identified in the samples collected from MW-11, MW-12 or MW-14. (Monitoring wells MW-11, MW-12 and MW-14 are beyond the limits of the free phase product. The results indicate that no dissolved constituents of BTEX or PNA are at these locations.) No BTEX compounds were detected in the trip blank. The laboratory report, the quality assurance/quality control summary and the chain of custody form are included as Appendix E.

5.0 CONCLUSIONS

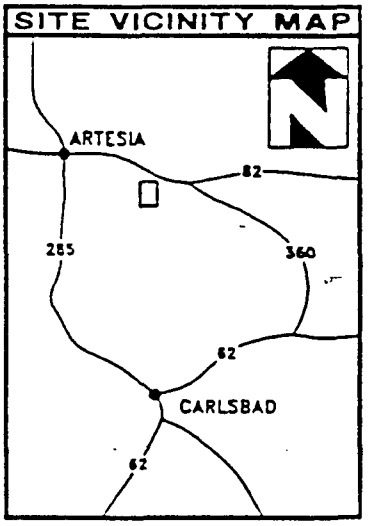
The free-phase hydrocarbon product appears to be limited to the shallow groundwater beneath Scoggin Draw and is currently migrating in a southwest direction beneath the draw. Product was encountered in the unconfined and semi-confined aquifers; however, based upon the results of this investigation, there appears to be a consistent flow direction shared by the unconfined and semi-confined groundwater. It has

become apparent that the areal limits of free phase product is controlled both by the direction of groundwater flow and the topography of Scoggin Draw.

FIGURES



SITE VICINITY MAP



REF: CURA PRELIMINARY SUBSURFACE INVESTIGATION, JUNE 1993

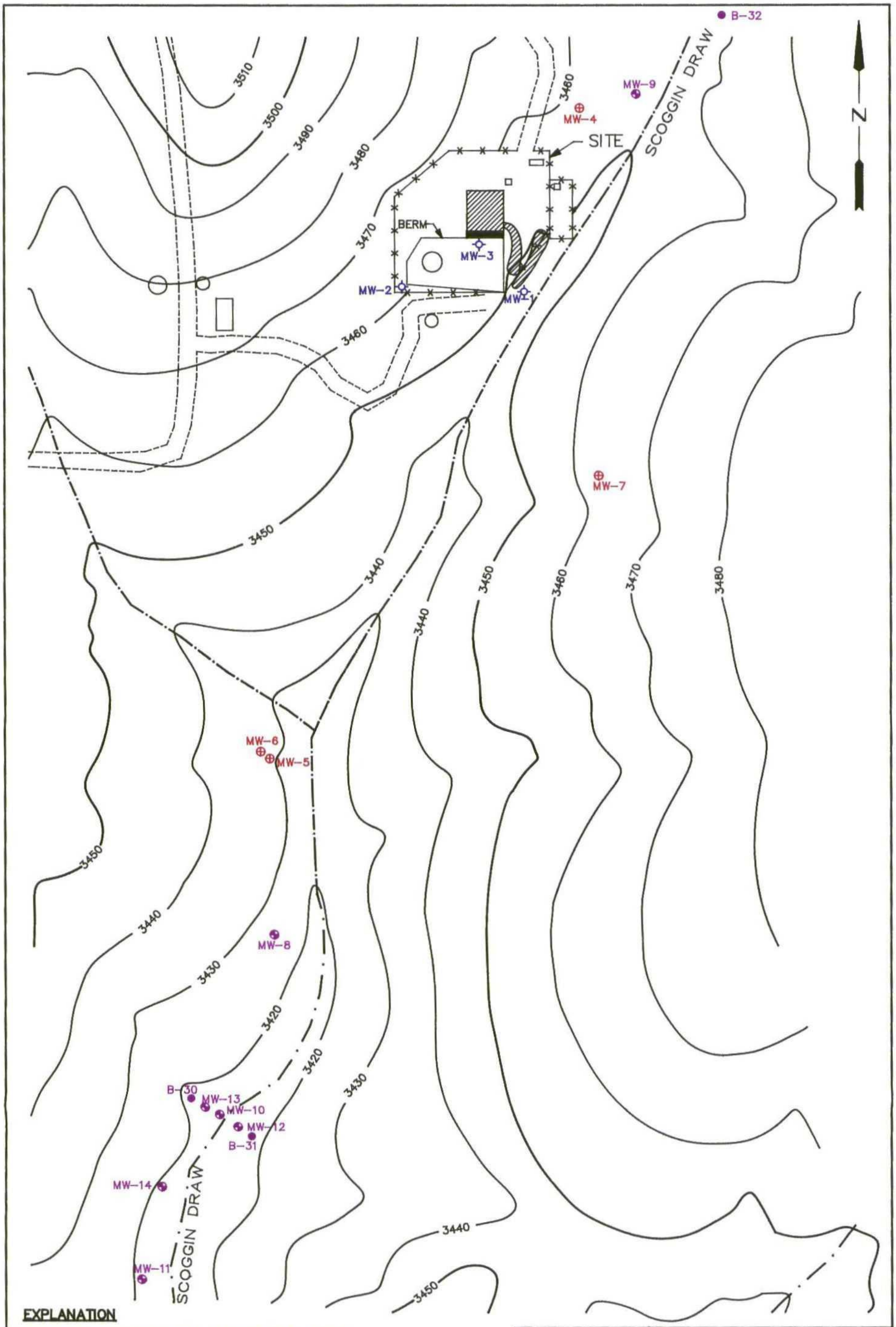
DRN	EJC
CHK BY	
APP BY	
DESIGN	BDB
DATE	10/1/93
SCALE	AS SHOWN
ORG NO	24360010
FILE NO	2436-01

MITTELHAUSER Corporation

SITE MAP
AMOCO OIL PIPELINE CO.
ARTESIA, NEW MEXICO

DRWG NO. FIGURE 1

REV A



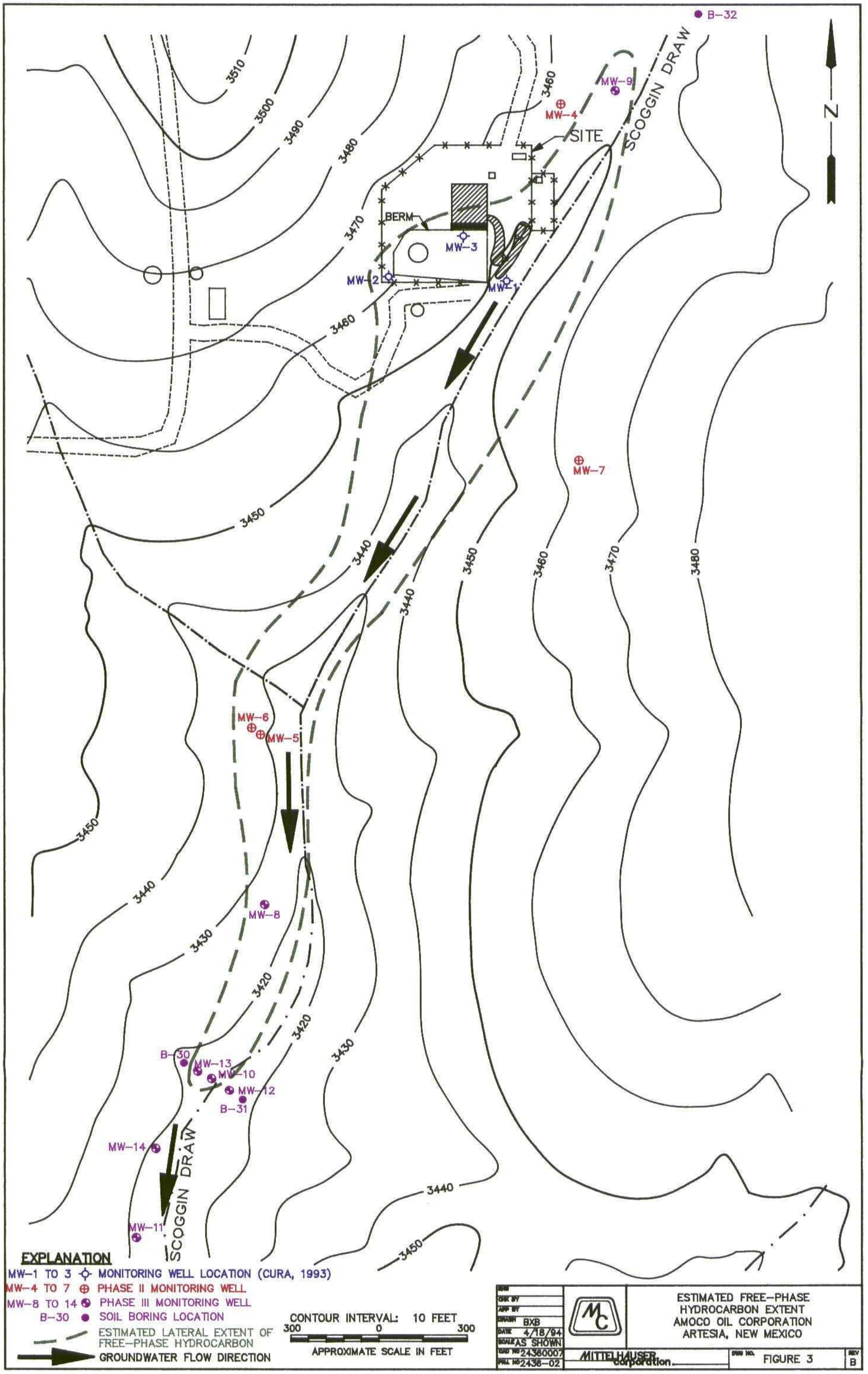
DWN BY	BXB
CHK BY	
APP BY	
DATE	4/18/94
SCALE	AS SHOWN
CAD NO	24360008
FILE NO	2436–02

MONITORING WELL LOCATIONS
AND SOIL BORING LOCATIONS
HYDROCARBON EXTENT
AMOCO OIL CORPORATION
ARTESIA, NEW MEXICO

MITTELHAUSER corporation

DWG NO. FIGURE 2

REV B


B–32
MW–9
MW–4
SITE
SCOGGIN DRAW
N
BERM
MW–3
MW–2
MW–1
MW–7
MW–6
MW–5
MW–8
B–30
MW–13
MW–10
MW–12
B–31
MW–14
MW–11
SCOGGIN DRAW
3510
3500
3490
3480
3470
3460
3450
3440
3430
3420
EXPLANATION
MW–1 TO 3 MONITORING WELL LOCATION (CURA, 1993)
MW–4 TO 7 PHASE II MONITORING WELL
MW–8 TO 14 PHASE III MONITORING WELL
B–30 SOIL BORING LOCATION
ESTIMATED LATERAL EXTENT OF FREE–PHASE HYDROCARBON
GROUNDWATER FLOW DIRECTION
CONTOUR INTERVAL: 10 FEET
300 0 300
APPROXIMATE SCALE IN FEET
DWN
CHK BY
APP BY
DRAWN BXB
DATE 4/18/94
SCALE AS SHOWN
CAD NO 24360007
PRJ NO 2436–02
MC
ESTIMATED FREE–PHASE HYDROCARBON EXTENT
AMOCO OIL CORPORATION
ARTESIA, NEW MEXICO
MITTELHAUSER corporation
DWG NO. FIGURE 3
REV B

TABLES

TABLE 1
AMOCO ARTESIA STATION
MONITORING WELL FLUID LEVELS – MARCH 25, 1994

WELL NUMBER	WELLHEAD ELEVATION	PRODUCT DEPTH	PRODUCT ELEV.	WATER DEPTH	WATER ELEV.	PRODUCT THICKNESS	PRODUCT CORRECTION*	PIEZOMETRIC SURFACE	TOTAL DEPTH
MW–1	3453.62	21.43	3432.19	22.14	3431.48	0.71	0.57	3432.05	NM
MW–2	3461.26	27.20	3434.06	28.17	3433.09	0.97	0.78	3433.87	NM
MW–3	3452.49	17.90	3434.59	18.77	3433.72	0.87	0.70	3434.42	NM
MW–4	3469.34	NP	NA	32.89	3436.45	0.00	0.00	3436.45	36.23
MW–5	3435.28	19.69	3415.59	25.48	3409.80	5.79	4.63	3414.43	27.35
MW–6	3434.29	NP	NA	16.21	3418.08	0.00	0.00	3418.08	20.24
MW–7	3465.70	NP	NA	37.25	3428.45	0.00	0.00	3428.45	55.87
MW–8	3429.57	16.24	3413.33	18.15	3411.42	1.91	1.53	3412.95	25.45
MW–9	3461.53	26.98	3434.55	27.11	3434.42	0.13	0.10	3434.52	NM
MW–10	3423.30	23.06	3400.24	23.12	3400.18	0.06	0.05	3400.23	NM
MW–11	3420.90	NP	NA	20.04	3400.86	0.00	0.00	3400.86	43.52
MW–12	3425.27	NP	NA	17.27	3408.00	0.00	0.00	3408.00	28.08
MW–13	3424.68	22.73	3401.95	23.13	3401.55	0.40	0.32	3401.87	NM
MW–14	3422.67	NP	NA	18.92	3403.75	0.00	0.00	3403.75	43.16

ALL MEASUREMENTS IN FEET
NP = NO PRODUCT LAYER
NA = NOT APPLICABLE
NM = NOT MEASURED
* – PRODUCT CORRECTION – ASSUME API=45, (141.5/sp.gr.)–131.5=API

2436LEVL.WK1

APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

AMOCO ARTESIA STATION
SITE INVESTIGATION

Plan Prepared by:

Mittelhauser Corporation
Laguna Hills Office
23272 Mill Creek Drive
Laguna Hills, California
(714) 472-2444

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1.0 ADMINISTRATIVE INFORMATION

1.1 PROJECT DESCRIPTION

Project Name: AMOCO ARTESIA STATION

Project No.: 2436

Site Location: Section 10, T18S, R27E, Eddy County, New Mexico

Work Summary: Collect advance soil borings to delinate the occurrence of free phase hydrocarbons. Install a minimum of 4 monitoring wells, and sample the wells for BTEX and conduct a pump test (if necessary).

Comments:

Prepared by: Tim Eyres **Date:** 8-2-93

Proposed Date(s) of Operation: 8-9-93 to 8-9-94

Approvals: (Project Manager and one of the other three)

Project Manager: Tim Lester Date: _____

OHSO/A: _____ Date: _____

CHSO: _____ Date: _____

CIH: Irene Fenelli Irene J. Fanelli Date: 8/19/93

Date of Issue: _____ Date of Expiration: _____

1.2 SCOPE OF SAFETY PLAN

This site-specific safety plan is intended to meet the requirements of 29 CFR Part 1910.120 and the EPA Standard Operating Safety Guides for Hazardous Waste Operations (1986). All employees involved in field work at this site have completed the required 40 hours initial training, maintain qualification through annual refresher training, are under a program of medical monitoring, and are certified to wear respiratory protection, as specified in 29 CFR part 1910.134 and 8CCR 5144.

This plan was prepared from the best available evidence concerning site conditions. It is recognized that conditions on a site may change or that more information may become available during the operation. Unless specified in this site-specific safety plan, the field team does not have the option to modify the levels of personal protection in any way. If during the operation, it is determined that the protection specified in the site-specific safety plan requires modifications, work will cease, and the site safety officer (SSO) will contact the project manager and/or Safety Representative. Work will not resume until authorized.

1.3 FIELD TEAM ASSIGNMENTS

DUTY	NAME
TEAM LEADER	Eric Conard / Jeffrey D Bennett
SITE SAFETY	Eric Conard / Jeffrey D Bennett
DECONTAMINATION	Tim Eyres

1.4 SUBCONTRACTORS

The following subcontractors will perform work during this operation. All employees of subcontractors performing work with the potential for exposure to hazardous waste shall meet the requirements of 29 CFR 1910.120 and 8CCR 5144.

1. **Name:** Harrison Drilling

   Telephone No: (505) 397-6437

   Address: PO Box 70, Hobbs New Mexico 88241-0070

   Authorized Representative: Claiborne Harrison

   Services Provided: Drilling

   Contract No: **Date:**

2. **Name:**

   Telephone No:

   Address:

   Authorized Representative:

   Services Provided:

   Contract No: **Date:**

3. **Name:**

   Telephone No:

   Address:

   Authorized Representative:

   Services Provided:

   Contract No: **Date:**

1.5 SAFETY COMPLIANCE AGREEMENT FORM

Site: AMOCO ARTESIA STATION

Project No.: 2436

I the undersigned, acknowledge that I have attended the safety meeting, and received a copy of this site-specific safety plan. I have read and understood the safety plan, and do agree to adhere to the requirements specified by it. I understand that I may be prohibited from continuing work on the project for failing to comply with this safety plan.

Signature (Print name below)	Company	Date
(John D. Guy)	Harrison Drilling	3-21-94
(Donnie Chambless)	Harrison Drilling	3-21-94
(Donny Ryan)	Harrison Drilling	3-21-94
(Miguel Rodriguez)	Amoco Pipeline	3-21-94
( )	Mitchener	3-21-94
( )		
( )		
( )		
( )		

Meeting Conducted by: _____
Signature

1.6 SUBCONTRACTOR COMPLIANCE AGREEMENT

Project Name: Amoco Artesia Station

Project Number: 2436

Company Name: Harrison Drilling

Telephone Number: (505) 397-6437

I acknowledge that as an authorized representative of this company, I have read and understood the Site-Specific Safety Plan to be used for these site activities. I understand that hazardous materials and activities may be encountered during this operation, and that the scope of these operations are covered by 29 CFR 1910.120.

I certify that all employees of this company which will be assigned to this operation will be under the company safety program which is in compliance with all federal and local regulations.

Name (Printed): JOHN GUY

Title: OPERATIONS MANAGER

Signature: [signature]

Date: 3-21-94

2.0 DESCRIPTION OF WORK TO BE PERFORMED (The tasks involved)

Task 1) DELINATION OF THE OCCURRENCE OF FREE PRODUCT- Approximately 30 to 45 soil borings will be taken to delineate the extent of the free phase product.

Task 2) INSTALLATION AND SAMPLING OF GROUNDWATER MONITORING WELLS- A total of four 4-inch PVC groundwater monitoring wells will be installed, developed, and sampled.

Task 3) CONDUCT A PUMP TEST (IF NECESSARY) -Dependent upon findings during Task 2

3.0 SITE BACKGROUND

The facility is a crude oil pipeline pump station operated by Amoco Pipeline Company. Subsurface pipelines, aboveground storage tanks, and sumps containing crude oil are located on site.

3.1 SITE PHYSICAL DESCRIPTION

Amoco Artesia Station is utilized as a crude oil pipeline pumping station in which subsurface crude oil field lines from various oil field leases are manifolded into two main subsurface discharge pipelines operated by Amoco Pipeline Company. One currently inactive 30,00 barrel aboveground crude oil storage tank(Tank 7264) is located near the southwestern corner of the site. The tank is approximately 25 years old and is surrounded by an earthen dike (approximately 200 feet by 300 feet). Seven tempoary crude oil storage tanks (500 barrel tanks) are located near the center of the site within another diked area adjacent to the earthen dike surrounding Tank 7264. The pumping station is located along the east-central portion of the site.

Amoco Artesia Station is surrounded by barbed-wire fencing with a cattleguard entrance located near the northeast corner of the site boundary. The site is located in a rural area within the Empire Oil Field. No residences, public buildings, or surface bodies of water were observed within a one-half mile radius of the facility. A dry arroyo, Scoggin Draw, is located along the eastern boundary and drains from the northeast to southwest. A crude oil pipeline booster station operated by Pride Petroleum is located near the eastern boundary of the site with a subsurface pipeline that runs north-south along the east side of Scoggin Draw. An offsite produced water booster station operated by Arco Oil and Gas Company is located adjacent to the southwest boundary of the site.

3.2 SITE HISTORY (ACTIVITIES, INCIDENTS, ETC.)

3.3 TYPES OF MATERIALS KNOWN TO HAVE BEEN USED ON THE SITE

Chemical Type: Crude Oil

3.4 MATERIALS KNOWN OR SUSPECTED TO REMAIN ONSITE

Chemical Type: Crude Oil

3.5 SITE STATUS (ACTIVE/INACTIVE, AGENCY ACTIONS)

Active pump station

Has the site been characterized to the best of your knowledge?

Yes XXX **No** ____

4.0 HAZARDOUS EVALUATION

Summary of anticipated hazards:
(Please check appropriate box.)

(xx)	Physical Hazards inherent to the site
(xx)	Physical hazards related to the operations
(xx)	Chemical Hazards
( )	Community Hazards
(xx)	Electrical Hazards
(xx)	Mechanical Hazards
(xx)	Biohazards
( )	Radiation Hazards
(xx)	Heat Stress
( )	Confined Space Entry
(xx)	Noise Hazards
( )	Cold Stress
( )	Other

Comments: Drilling operations could present physical threats normally associated with such operations. These include hazards associated with operation of heavy equipment. All equipment should be placed no closer than 15-feet from any overhead electric line. All construction on site should adhere to 29 CFR 1926. Another physical hazard associated with drilling and sampling operations is injury due to vehicular traffic around the site. In addition, proper work procedures , should be observed with reguard to hot and cold weather conditions.

4.1 CHEMICAL HAZARDS (ATTACH REFERENCES)

	Chemical	Range of Conc. in (A)ir, (W)ater, (S)oil	Mode of Intake	Limits (PEL/TLV)	IDLH Level of Concern (H/M/L)
1.	Crude Oil	W, S, Free Product	I, S	N/A	L
2.	Hydrogen Sulfide (H2S)	A, S	I, C	10 ppm	H
3.	Benzene	W, S, A	I, S	1 ppm	H
4.					
5.					
6.					
7.					

* (I) Inhalation (S) Skin Contact (C) Ingestion

Identify locations where the contaminants are of greatest concern on the site:

Comments: Crude oil Liquid and vapors also present a posioning hazard, if exposure is excessive.

References used:

XXX NIOSH/OSHA XXX ACGIH (TLV) ____ SAX

____ PATTY ____ OHS

Describe other:

4.2.1 Physical Hazards Inherent to the Site:

XXX	Fire	XXX	Explosion	____	Anoxia
XXX	Heat Stress	____	Cold Stress	XXX	Noise
____	Radiation	XXX	Biohazards		

Describe Other:

Comments:

4.2.2 Physical Hazards Related to the Operations

XXX	Heat Stress	____	Cold Stress
____	Trenching	XXX	Drilling

Describe Other:

Comments: See section 4.0 for drilling hazards

4.3 COMMUNITY HAZARDS

None

4.3.1 Potential for Contaminant Migration

None

4.3.2 Potential for Community Exposure

None

5.0 HAZARDOUS WASTE FIELD SAFETY DIRECTIVES

- No eating or smoking onsite.
- No contact lenses.
- Hard hats and steel-toed boots will be worn at all times.
- Site access will be restricted to authorized personnel only.

- All operations will have first aid kits, eye washes, and fire extinguishers available.
- No facial hair is allowed that will interfere with the respirator face seal.
- Emergency information will be posted (Section 7.0).
- Safety plan will be available onsite at all times.

5.1 MECHANICAL HAZARDS

- Do not stand near backhoe buckets and earth moving equipment.
- Verify that all equipment is in good condition.
- Do not stand or walk under elevated loads or ladders.
- Do not stand near unguarded excavation and trenches.
- Do not enter excavation or trenches over 5 feet deep that are not properly guarded, shored or sloped.
- Appropriate guards must be used if equipment has potentially hazardous moving parts.

5.2 ELECTRICAL HAZARDS

- Locate and mark buried utilities before drilling or digging.
- Maintain at least 10 foot clearance from overhead power lines.
- Contact utility company for minimum clearance from high voltage power lines.
- If unavoidably close to buried or overhead power lines, have power turned off, with circuit breaker locked and tagged.
- Properly ground all electrical equipment.
- Avoid standing in water when operating electrical equipment.
- If equipment must be connected by splicing wires, make sure all connections are properly taped.
- Be familiar with specific operating instructions for each piece of equipment.

5.3 CHEMICAL HAZARDS

- Conduct direct reading air monitoring on initial entry and periodically at both the work area and downwind to evaluate respiratory and explosion hazards.
- Use water to keep dust under control during all operations.

5.4 HEAT STRESS

- When temperature exceeds 70 degrees F, take frequent breaks in shaded area. Unzip or remove coveralls during breaks. Have cool water or electrolyte replenishment solution available. Drink small amounts frequently to avoid dehydration. Count the pulse rate for 30 seconds as early as possible in the rest period. If the pulse rate exceeds 110 beats per minute at the beginning of the rest period, shorten the work cycle by one third.

5.5 COLD STRESS

- Wear multilayer cold weather outfits. The outer layer should be of wind resistant fabric. 0 degrees to 30 degrees F total work time is 4 hours. Alternate 1 hour in and 1 hour out of the low temperature area. Below 30 degrees F, consult industrial hygienist. Drink warm fluid. Provide warm shelter for resting. Use buddy system. Avoid heavy sweating.

5.6 NOISE HAZARDS

- Use earplugs or earmuffs when noise level prevents conversation in normal voice at distance of three feet. Use hand signals.

5.7 CONFINED SPACE ENTRY

- Confined spaces include trenches, pits, sumps, elevator shafts, tunnels, or any other area where circulation of fresh air is restricted or ability to readily escape from the area is restricted.

- Consult HSO, Corporate Health and Safety Policy, or Certified Industrial Hygienist prior to entering confined space. If confined space entry is required, a confined space entry checklist must be completed, and a permit must be obtained from the OHSO.

5.8 RADIATION HAZARDS

- If radiation meter indicates 2 mR/hr or more, leave the area and consult HSO.

5.9 BIOHAZARDS

- Poison oak, poison ivy.
- Infectious waste.
- Rabid animals.
- Ticks, mosquitoes, and other insects (disease carriers or poisonous).
- Avoid breathing dust in dry desert or central valley areas (valley fever).
- Biological or animal laboratories.
- Venemous reptiles and spiders

6.0 PLANNING/SITE SETUP

6.1 SITE SETUP

Onsite communication method: Line of site

Offsite communication method: Cellular Phone

Site security: N/A

Identify the water and electrical locations:

6.2 LEVELS OF PROTECTION AVAILABLE OR USED

A___ B___ C_X_ D_X_

Modifications/Additions:

6.3 AIR MONITORING GUIDELINES

Device	Action Level	Action to be Taken
OVA	* 25ppm	Upgrade to level "C"
Drager Pump	* 1ppm	Upgrade to level "C"
H2S Monitor	* 10ppm	Stop work/Leave Area

* In breathing zone; stable for 5 secs
** Anywhere in work area
*** Perimeter monitoring

Comments:

6.4 MEASURES TO CONTROL OFFSITE MIGRATION & EXPOSURE

N/A

6.5 SPECIAL SITE CONSIDERATIONS

N/A

7.0 FIELD ACTIVITIES

7.1 SITE ENTRY AND SETUP

To be determined at site

Initial level of protection: "D"

Modifications: Wear sample gloves underneath work gloves

Special Procedures, Precautions, Equipment:

7.2 SITE ACTIVITIES (GENERAL)

Task1- DELINATION OF THE OCCURRENCE OF FREE PRODUCT

Initial level of Protection: "D"

Modifications: Nitrile gloves to be used when handling soil.

Special Procedures, Precautions, Equipment: Personnel must be aware of the physical dangers of drilling operations.

Task 2- INSTALLATION AND SAMPLING OF GROUNDWATER MONITORING WELLS

Initial level of Protection: "D"

Modifications: Sample gloves to be worn underneath work gloves.

Special Procedures, Precautions, Equipment: Personnel must be aware of thephysical dangers of drilling operations.

Task 3- CONDUCT PUMP TEST (IF NECESSARY)

Initial level of Protection: "D"

Modifications: Nitrile gloves and coated tyvek are to be worn during pump test.

Special Procedures, Precautions, Equipment:

7.3 SITE EXIT (SPECIAL PATHWAYS, PROCEDURES, EMERGENCY ACTIONS, ETC.)

Special Procedures, Precautions, Equipment:

7.4 DECONTAMINATION (TO BE COMPLETED PRIOR TO LEAVING SITE)

Personnel: Wash hands And face
Instrumentation: Wipe down
Sampling Equipment: Alconox wash, double rinse with clean water
Heavy Equipment: Wash down affected areas
General LOP for Decontamination: "D", sample gloves, rubber boots
Comments:
Disposal of Investigation-derived materials
Solids: Cover with plastic, sketch layout, and leave on site
Liquids: Drum, label and leave on site

7.5 SAMPLE HANDLING AND PRECAUTIONS

Personnel will wear gloves and other protective equipment as necessary during the handling of contaminated samples. Any analytical or geotechnical laboratory used for this project will be notified prior to shipment of the suspected contaminants at this site.

Sample containers will be decontaminated prior to shipping. Sample containers will be protected from breakage by wrapping in bubble wrap, etc., if required, placed in zip-lock bags, and packed in absorbent material. Shipping containers will be clearly labeled. Samples will be shipped under full chain of custody procedures.

8.0 EQUIPMENT LISTS

Personal Protective Equipment
Place an "X" at the level chosen, and a * (X) at the alternate.

LEVEL A		**LEVEL B**	
SCBA		SCBA	
Spare SCBA Tanks		Spare SCBA Tanks	
Cascade System		Manifold System	
Encapsulated Suit		Cascade System	
Surgical Gloves		Surgical Gloves	
Outer Work Gloves Type:		Outer Work Gloves Type:	
Neoprene Safety Boots	*	Protective Clothing Type: Hooded	
Safety Boots	*	Rain Suit	
Boot Covers		Butyl Apron	
Hard Hat		Hard Hat w/Face Shield	
		Neoprene Safety Boots	
		Steel-Toed Boots	
		Boot Covers	
		Hearing Protection	

LEVEL C		LEVEL D	
APR		APR	
Full Face		Full Face	
Half Mask Cartridge Type:Organic	XXX	Half Mask Cartridge Type:	
Escape Air Pack		Escape Pack	
Surgical Gloves	XXX	Surgical Gloves	
Outer Work Gloves	XXX	Outer Work Gloves	XXX
Type:Nitriles	XXX	Type:Nitriles	XXX
Protective Clothing Type:Coated tyvek Hooded:	XXX	Protective Clothing Type: Hooded	
Rain Suit		Rain Suit	
Butyl Apron		Butyl Apron	
Safety Glasses	XXX	Safety Glasses	XXX
Hard Hat	XXX	Hard Hat	XXX
Neoprene Safety Boots		Neoprene Safety Boots	
Steel-Toed Boots	XXX	Steel-Toed Boots	XXX
Boot Covers		Boot Covers	
Hearing Protection	XXX	Hearing Protection	XXX

INSTRUMENTATION		FIRST AID EQUIPMENT/SUPPLIES	
OVA	XXX	First Aid Kit	XXX
HNU		Oxygen	
OVM		Eye wash	XXX
TIP		Stretcher	
Oxygen/explosimeter		Tool Kit	XXX
Drager kit:	XXX	Thermometer(s)	
Tubes used: Benzene	XXX	Tables Chairs	
Low flow air pumps		Sampler Rack	
High flow air pumps		Fire Extinguishers	XXX
Radiation Monitor-4			
Radiation dosimeters			
Noise meter			
WBGT			
pH meter			
Magnetometer			
GPR			
EM			
H2S Monitor	XXX		

DECONTAMINATION EQUIPMENT		OTHER EQUIPMENT	
Plastic Sheeting	XXX	Blood Pressure Monitor	
Large Washtubs		Drinking Water	XXX
Small Washtubs	XXX	Camera	XXX
Scrub Brushes	XXX	Film	XXX
Pressurized Sprayers		Drum Dolly	
Solvent Sprayer(s)		Trowels	
Plastic Trash Cans		Pick	
Trash Bags	XXX	Site Security	
Water Bottles	XXX	Shovels	XXX
Paper Towels	XXX	Binoculars	
Duct Tape	XXX	Traffic Cones	XXX
Masking Tape		Megaphone	
Ziploc Bags	XXX	Banner Tape	XXX
Detergent	XXX	Radio/Mobil Telephone	XXX
TSP		Flagging Tape	XXX
Sodium Hypochlorite		Fencing	
Sodium Bicarbonate		Warning Signs	
Bleach		Thieving Rods	
Hand Soap	XXX	Waste Drum Labels	XXX
Solvent Rinse		Bung Wrench (Brass)	
Acetone		Security Guard	
Hexane		Step Ladder	
Methanol		Bailers	XXX
Other		Rope	XXX

9.0 EMERGENCY INFORMATION

(Post Onsite)

ACUTE SYMPTOMS*	FIRST AID
Dizziness, Nausea	Rest, Shade, Fresh AiR
Unconsciousness	Get Medical Help

HOSPITAL

Name: Artesia General Hospital,702 North 13 TH. Street, Atesia,New Mexico (505)-748-3333

Take route 82 east (approx. 1.6 miles)
Go past route 285 into Atresia
Route 82 turns into Main St.
Go to 13 TH. St. Hospital is on north corner of 13 TH. & Main
Directions to Hospital: (include map of site and hospital location

Local Resources: 911

Ambulance: 911

Hospital Emergency Room: (505)-748-3333

Law Enforcement: 911

Fire Department: 911

Explosives Unit: 911

Poison Control Center: 1-800-432-6866

Agency Contact:

Client Contact:

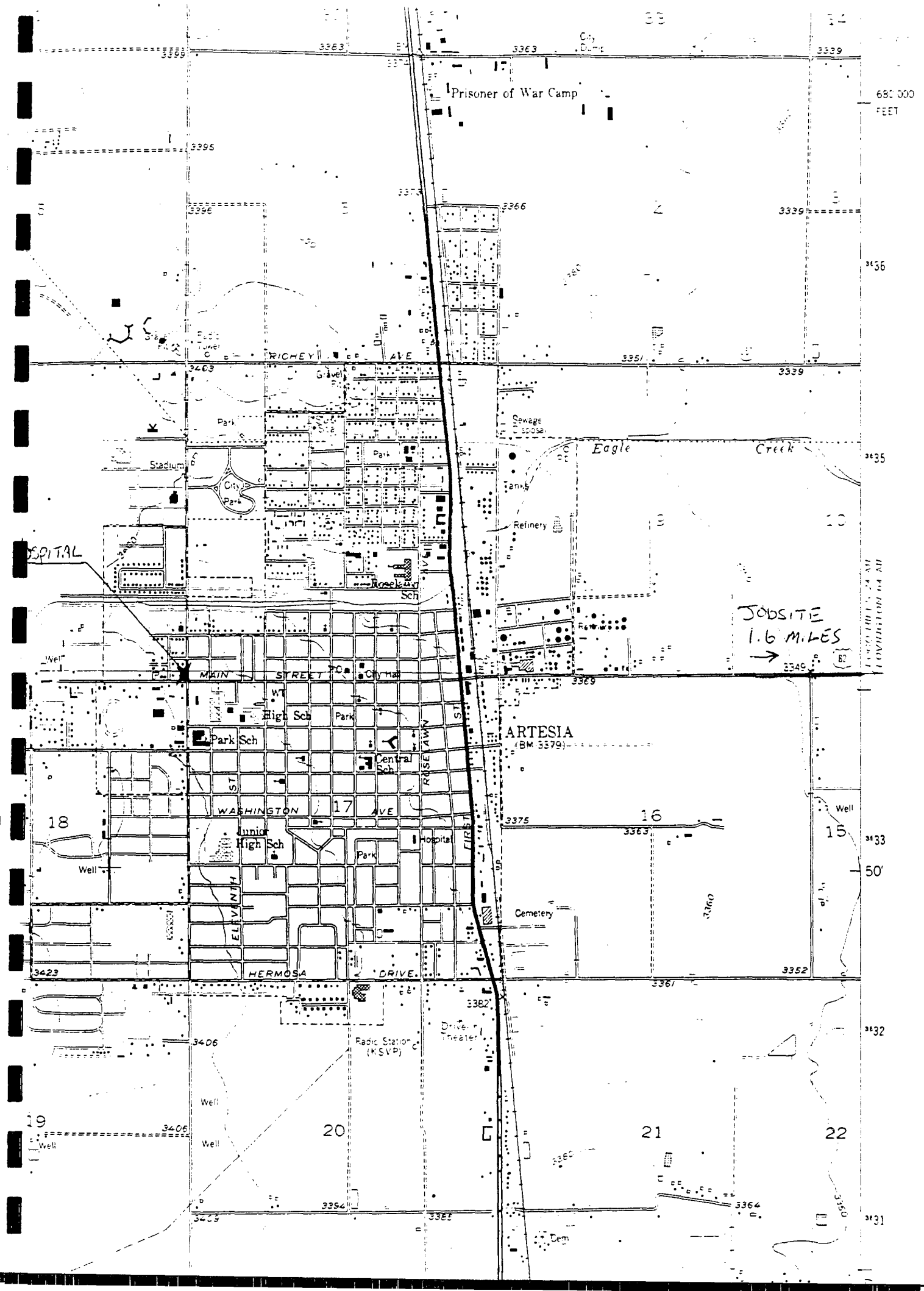
Laboratory:

UPS/Federal Express: 1-800-238-5355 Call before 12:00 noon for same day pick up. Nearest office 260 East College Roswell, N.M.
M-F 8:00am to 5:00pm Sat. 8:00am to 1:00pm

COMPANY RESOURCES

Project Manager: Tim Lester (714) 587-2159

Industrial Hygienist: Irene Fanelli (415) 347-9205


Prisoner of War Camp
City Dump
RICHEY AVE
Gravel
Park
Stadium
City Park
Sewage Disposal
Eagle Creek
Tanks
Refinery
HOSPITAL
Roselawn Sch
JOBSITE
1.6 MILES
Well
MAIN STREET
City Hall
WT
High Sch
Park
Park Sch
ARTESIA
(BM 3379)
Central Sch
ROSELAWN ST
WASHINGTON AVE
17
18
16
15
Junior High Sch
Hospital
FIRST
ELEVENTH
Well
Cemetery
HERMOSA DRIVE
Radio Station (KSVP)
Drive-in Theater
19
20
21
22
Dem
680 000 FEET
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3339
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3331

APPENDIX B

BORING LOGS

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method:
Logged By : JDB
Checked By :

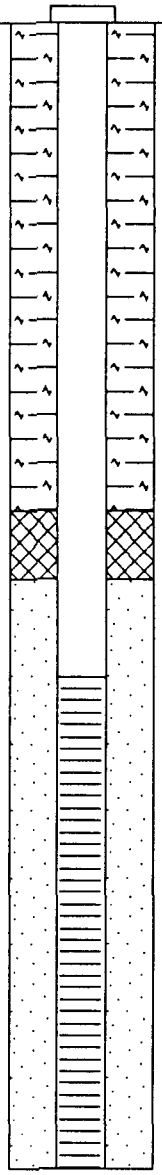
Boring No. : B-24
Location : ~600' S. of MW-5
Grade Elev. : Not Available
Total Depth : 28
First Water : 18
Bedrock Depth: Not Encountered
Started : 3-21-94 0830
Finished : 3-21-94 1015

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0							
0						ML	0-7' SILTY CLAY: Red/Brown, dry, loose.
5							
10		1300			30	GY	7-15' GYPSIFEROUS SILTY CLAY: Tan/White to Dark Gray, gypsum fragments, moderate to strong petroleum odor.
		>2500					
15					15	CL	15-20' CLAY: very moist, coarse grained sand, oily staining thoughout.
		>2500					
20					20		20-28' Yellow/Green layer Dark Gray to Black, gypsum in size to 1.5".
25							
30							TOTAL DEPTH = 28 FEET
35							

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method:
Logged By : JDB
Checked By :

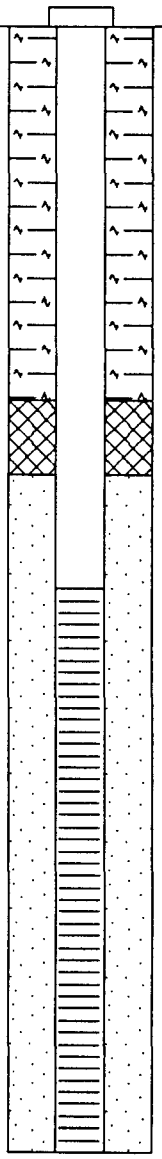
Boring No. : B-25
Location : 100'N. of B-5
Grade Elev. : Not Available
Total Depth : 35
First Water : 27
Bedrock Depth: 13
Started : 3-21-94 1500
Finished : 3-21-94 1806

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0						SM	0-7' SILT: Red/Brown, dry, loose, vegetated in upper 2-3". Color lightens, silt with desseminated grains of gypsum (coarse).
5							
						GY	7-15' SILTY SAND: Red/Brown, 5% fine gravel up to 1/2".
10							10-12' SILTY: Light Red/Brown, dry, fragments of gypsum up to 1.5", tubular shape.
							12-27' GYPSUM: White, dry.
15							
20							
25	▽						
		200					27-35' GYPSUM: Yellow/Green, wet, strong hydrocarbon odor.
30							
35							TOTAL DEPTH = 35 FEET
40							

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method: Hollow Stem Auger
Logged By : JDB
Checked By :

Boring No. : B-26
Location : 600'S. of B-24
Grade Elev. : Not Available
Total Depth : 30
First Water : 20
Bedrock Depth: 7
Started : 3-22-94 0810
Finished : 3-22-94 0950

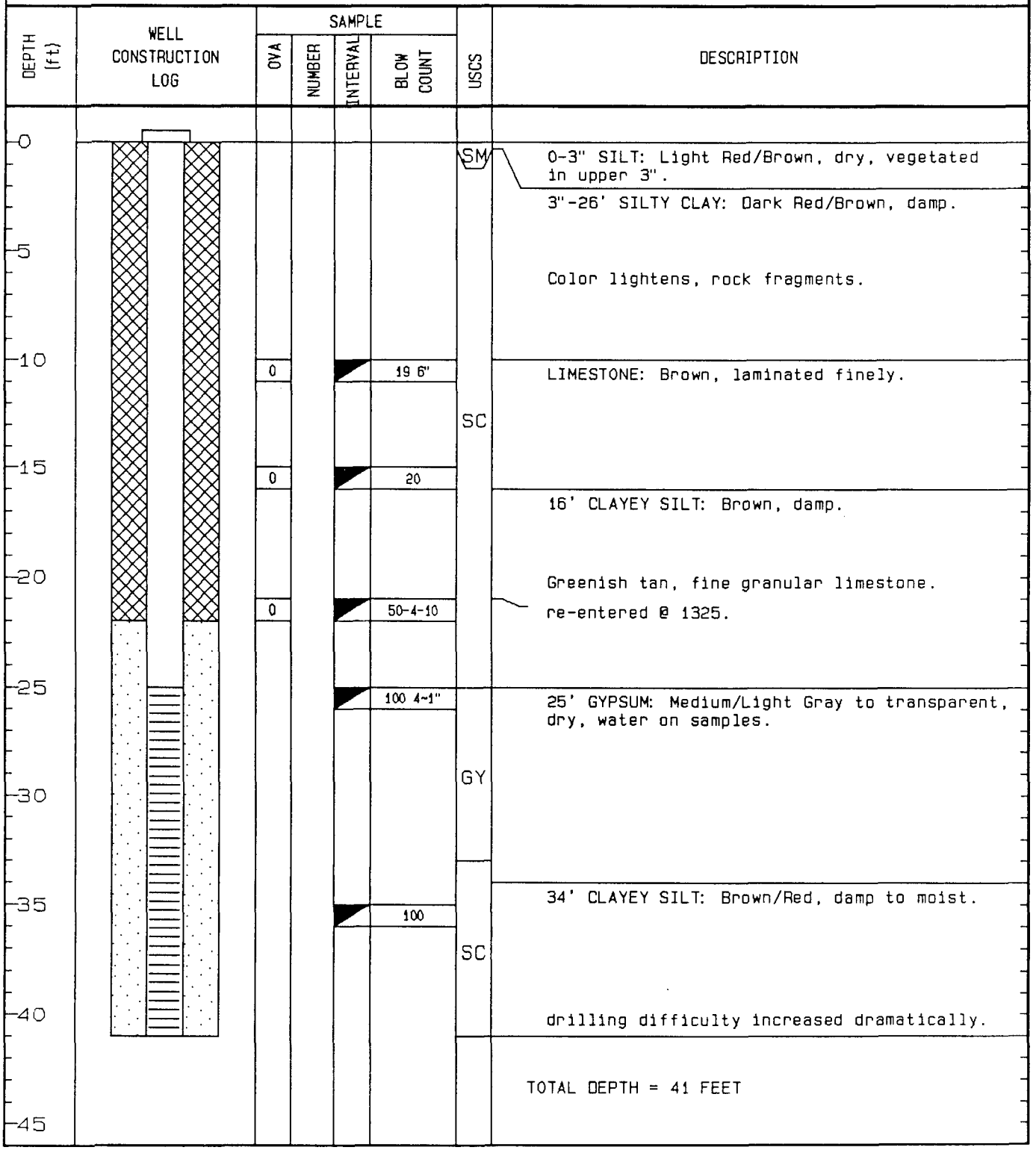


DEPTH (ft)	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0					SM	0-3" SILT: Red/Brown, dry, vegetated in upper 2-3". 3"-16' CLAYEY SILT: Red/Brown, slightly damp.
5						- drilling difficultly increases, color lightens due to inclusion of gypsum powder.
10	0			50 for 10"		Light Red/Brown, moist, with gravel ranging up to 1.25" in max. dimensions, gypsum fragments ranging to 0.5" in max. dim.
						- cuttings are moist, with hydrocarbon odor.
15	0			50 for 10"		
					SC	SILTY CLAY: Medium Brown grading to Light Yellow/Brown gypsiferous silty clay with orange staining, very moist to wet.
20	495					gypsum content increasing.
	0			110 for 6"	GY	GYPSUM ROCK: Light Gray, matrix wet, 1" recovery.
25						- gypsum, no sample at this depth.
30						TOTAL DEPTH = 30 FEET
35						

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method:
Logged By : JDB
Checked By :

Boring No. : B-27
Location : 600'S. of B-26
Grade Elev. : Not Available
Total Depth : 41
First Water : Not Encountered
Bedrock Depth: Not Encountered
Started : 3-22-94 1035
Finished : 3-22-94 1510



MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method: Hollow Stem Auger
Logged By : JDB
Checked By :

Boring No. : B-28
Location : 60' from B-26 @ S65E
Grade Elev. : Not Available
Total Depth : 25
First Water : 15
Bedrock Depth: 15
Started : 3-22-94 1650/3-23 1327
Finished : 3-22-94 1727/3-23 1500

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0							0-3" SILT: Light Red/Brown, dry, vegetated in upper 3".
							- Red/Brown, slightly damp.
5							CLAYEY SILT:
						SM	
10		0			54		
							- increasingly gypsiferous.
15	▽	0			100 for 6"		GYPSUM: Light Gray, saturated, slight hydrocarbon odor.
20						GY	
25							TOTAL DEPTH = 25 FEET
30							

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method: Hollow Stem Auger
Logged By : JDB
Checked By :

Boring No. : B-29
Location : 60' from B-26 @ N65W
Grade Elev. : Not Available
Total Depth : 41
First Water : 15
Bedrock Depth: 13
Started : 3-22-94 1795/3-23 1635
Finished : 3-22-94 1841/3-23 1810

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0						SM	0-3" SILT: Light Red/Brown, dry, vegetated in upper 3".
							3"-15' SILTY CLAY: Light Brown, damp.
5						SC	
10		0			50		Light Gray/Brown, slightly damp, gypsiferous.
15	▽	0			50 for 1"		GYPSUM: hydrocarbon odor, wet.
20		0			90		- strong hydrocarbon odor.
25						GY	
30							
35							
40		0			100	SC	SILT: Brown/Red, saturated, with some clay.
							TOTAL DEPTH = 41 FEET
45							

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method: Hollow Stem Auger
Logged By : JDB
Checked By :

Boring No. : B-30
Location : 150' from B-26 @ N65W
Grade Elev. : Not Available
Total Depth : 35
First Water : 25
Bedrock Depth: 11
Started : 3-23-94 0730
Finished : 3-23-94 1102

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0							
						SM	0-3" SILT: Light Red/Brown, dry, vegetated in upper 3". 3"-30' slightly damp, with some clay.
5							
10		0			100 for 4"		- gypsum cement.
						GY	GYPSUM ROCK: Light Gray, dry.
15		0			100 for 4"		
20		0			100 for 4"		- moist.
						SM	SILT: Light Gray gypsum cemented silt grading to Dark Gray silt with some clay, very moist.
25	▽	0			50 for 14"		Dark Gray silt with Light Gray gypsum, moist.
30		0			50 for 1"	GY	GYPSUM ROCK: White grading to Light Gray, dry, but sampler wet.
						SS	SILTSTONE: Brown/Red grading to Brown/Red silt with some clay, wet.
35		0			100 for 9"		
							TOTAL DEPTH = 35 FEET
40							

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method: Hollow Stem Auger
Logged By : JDB
Checked By :

Boring No. : B-31
Location : 150' from B-26 @ S65E
Grade Elev. : Not Available
Total Depth : 25
First Water : 15
Bedrock Depth: 22
Started : 3-23-94 1130
Finished : 3-23-94

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0							
							0-3" SILT: Light Red/Brown, dry, vegetated to 3".
							- damp.
5							
10		0			50		CLAYEY SILT: Red/Brown, moist, gypsiferous.
						SM	
15	▽	0			50		- wet, cementing is variable, water is most prevalent in zones with less cementing.
20							- gypsum content increases with depth.
						GY	GYPSUM ROCK: White to transparent, wet.
25							TOTAL DEPTH = 25 FEET
30							
35							

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method:
Logged By : JDB
Checked By :

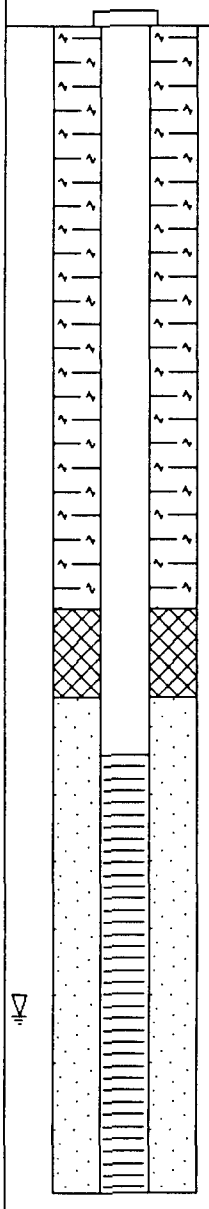
Boring No. : B-32
Location : 340' N of MW-9
Grade Elev. : Not Available
Total Depth : 47
First Water : None Encountered
Bedrock Depth: 15
Started : 3-24-94 1015
Finished : 3-24-94 1544

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0						SM	0-3" SILT: Light Red/Brown, dry, vegetated to 3".
						SC	3"-10' SILTY SAND: Red/Brown, slightly damp, fine grained sand.
5							
						GY	Light Red/Brown, damp, gypsum fragments.
10		0			50-4-16		
						SC	CLAYEY SILT: Red/Brown, coarse grained gypsum, gypsifeous sediment.
15		0			50-4-8		Light Red/Brown, coarse grained.
20		0			50-4-1		White/Gray gypsum.
25		0			50-4-0		no recovery, powdered gypsum on shoe.
30		0			50-4-0		no recovery, powdered gypsum on shoe.
35		0			50-4-6		GYPSUM ROCK: saturated.
40		0			50-4-0	GY	dry.
45		0			50-4-0		dry.
50							TOTAL DEPTH = 47 FEET

MITTELHAUSER corporation

Project Name: AMOCO Artesia
Project No. : 2436
Drilling Co.: Harrison
Driller : Don Reza
Drill Rig : Mobile B-61
Drill Method:
Logged By : JDB
Checked By :

Boring No. : B-33
Location : 1500' S of MW-5
Grade Elev. : Not Available
Total Depth : 40
First Water : 34
Bedrock Depth: 9
Started : 3-24-94 1700
Finished : 3-24-94 1915

DEPTH (ft)	WELL CONSTRUCTION LOG	SAMPLE OVA	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE BLOW COUNT	USCS	DESCRIPTION
0						SM	0-3" SILT: Light Red/Brown, dry, vegetated in upper 3".
						SC	3"-7' SILTY CLAY: Red/Brown, damp.
5							
							Light Red/Brown, gypsiferous.
10							GYPSUM: White.
							Light Gray/Brown.
15							White.
20						GY	
25							
30							
35						SC	SILTY CLAY: Brown/Red, saturated, fine grained sand.
40							TOTAL DEPTH = 40 FEET
45							

APPENDIX C

WELL CONSTRUCTION LOGS AND

DEVELOP/SAMPLING SHEETS

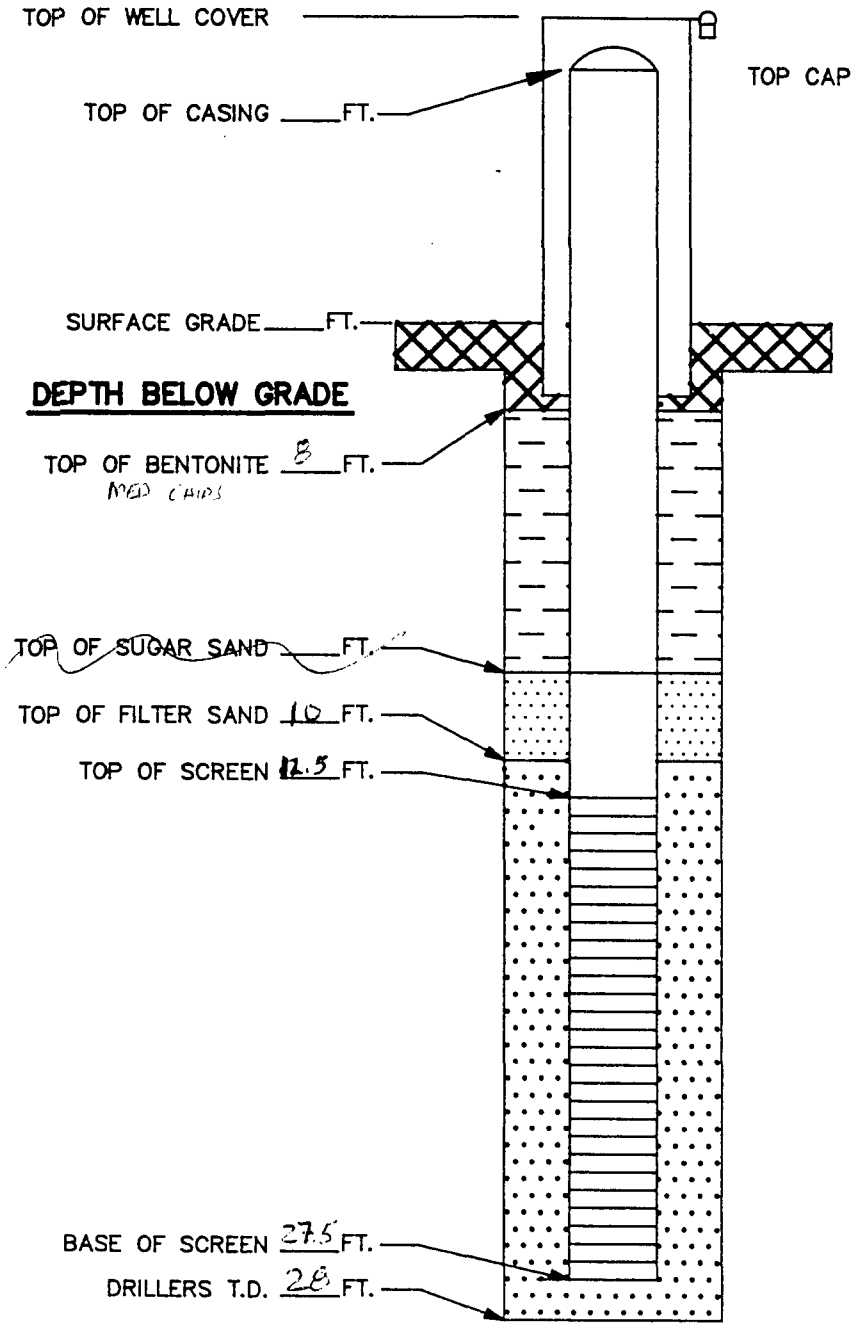
CAD NO. MONWELL1

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: 4M1000 ARTESIA
PROJECT NO.: 2436
DATE: 3-21-94
RIG-UP TIME: 0830
RIG-DOWN TIME: 1015

WELL NO.: MW-6
GEOLOGIST: JDB
AUGER O.D.: 10"
DRILLING CO.: HARRISON
DRILLER: D. REZA



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): ____

BLANK CASING

TYPE: SCH 40 PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 1 X 10 FT.
____ X 6 FT.
1 X 5 FT.
____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: ____
CEMENT TYPE: ____
CEMENT (SACKS): ____
BENTONITE (SACKS): ____
WATER (GALS): ____
TREMIE PIPE (Y/N): ____

SUGAR SAND

BRAND NAME: ____
TYPE: ____
SIZE: ____
NO. OF BAGS: ____
TREMIE PIPE (Y/N): ____

SAND FILTER PACK

BRAND NAME: TEXAS MINING CO.
TYPE: SILICA
SIZE: 12/20
NO. OF BAGS: 9
TREMIE PIPE (Y/N): AUGERS

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020
CENTRALIZERS (Y/N): NO
CASING SECTION: ____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
____ X ____ FT.

BARRELS OF CUTTINGS: 1.5
END CAP (SLIP/FLUSH): FLUSH

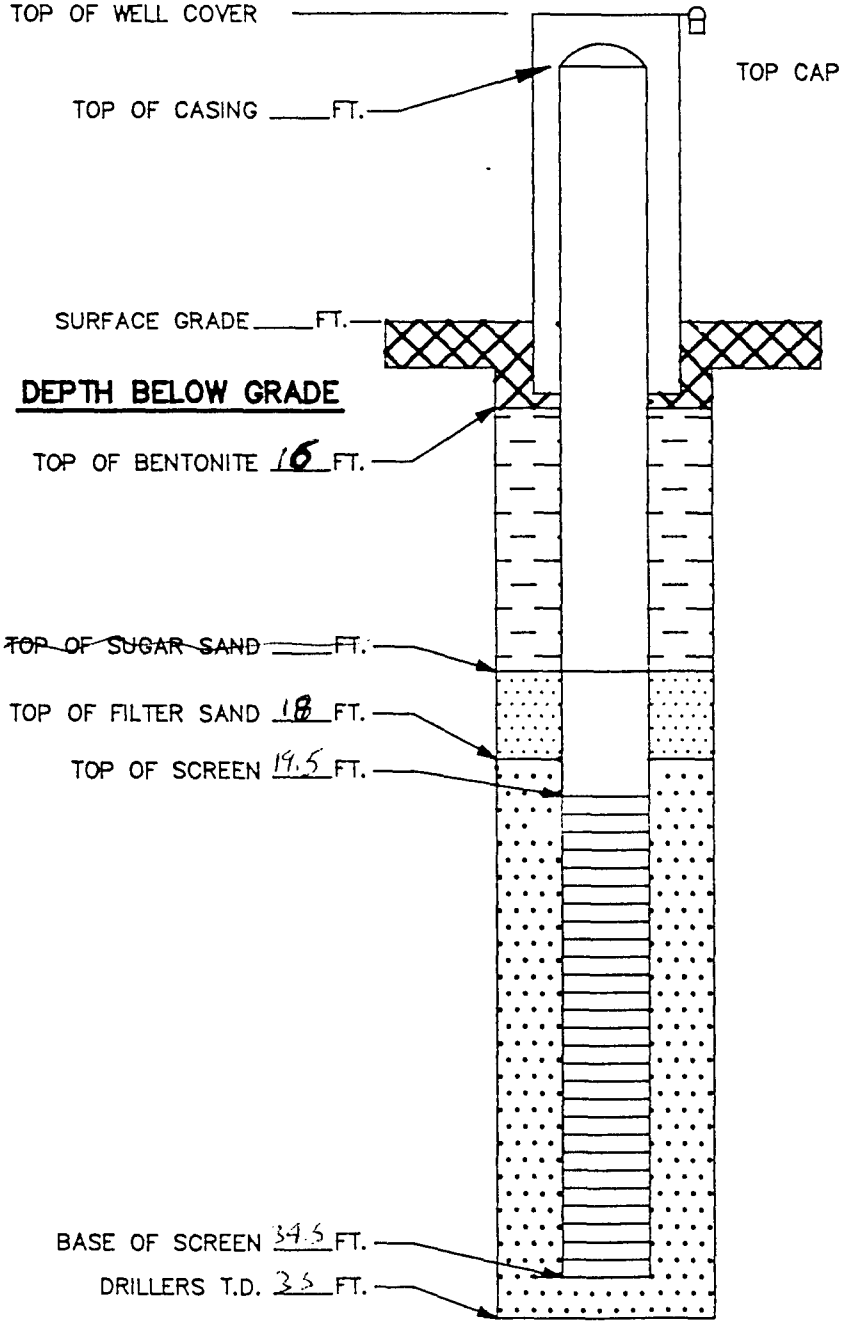
CAD NO. MONWELL1

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: AMOCO ARTESIA STATION
PROJECT NO.: 2436
DATE: 3-21-94
RIG-UP TIME: 1500
RIG-DOWN TIME: 1926

WELL NO.: B-25 / MW-4
GEOLOGIST: JDB
AUGER O.D.: 10.25"
DRILLING CO.: HARRISON
DRILLER: DON REZA



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): _____

BLANK CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 2 X 10 FT.
_____ X 6 FT.
_____ X 5 FT.
_____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: _____
CEMENT TYPE: _____
CEMENT (SACKS): _____
BENTONITE (SACKS): _____
WATER (GALS): _____
TREMIE PIPE (Y/N): _____

SUGAR SAND

BRAND NAME: _____
TYPE: _____
SIZE: _____
NO. OF BAGS: _____
TREMIE PIPE (Y/N): _____

SAND FILTER PACK

BRAND NAME: TEXAS MINING CO
TYPE: SILICA
SIZE: 12/20
NO. OF BAGS: 9
TREMIE PIPE (Y/N): AUGER

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020"
CENTRALIZERS (Y/N): _____
CASING SECTION: _____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
_____ X ____ FT.

BARRELS OF CUTTINGS: _____
END CAP (SLIP/FLUSH): _____

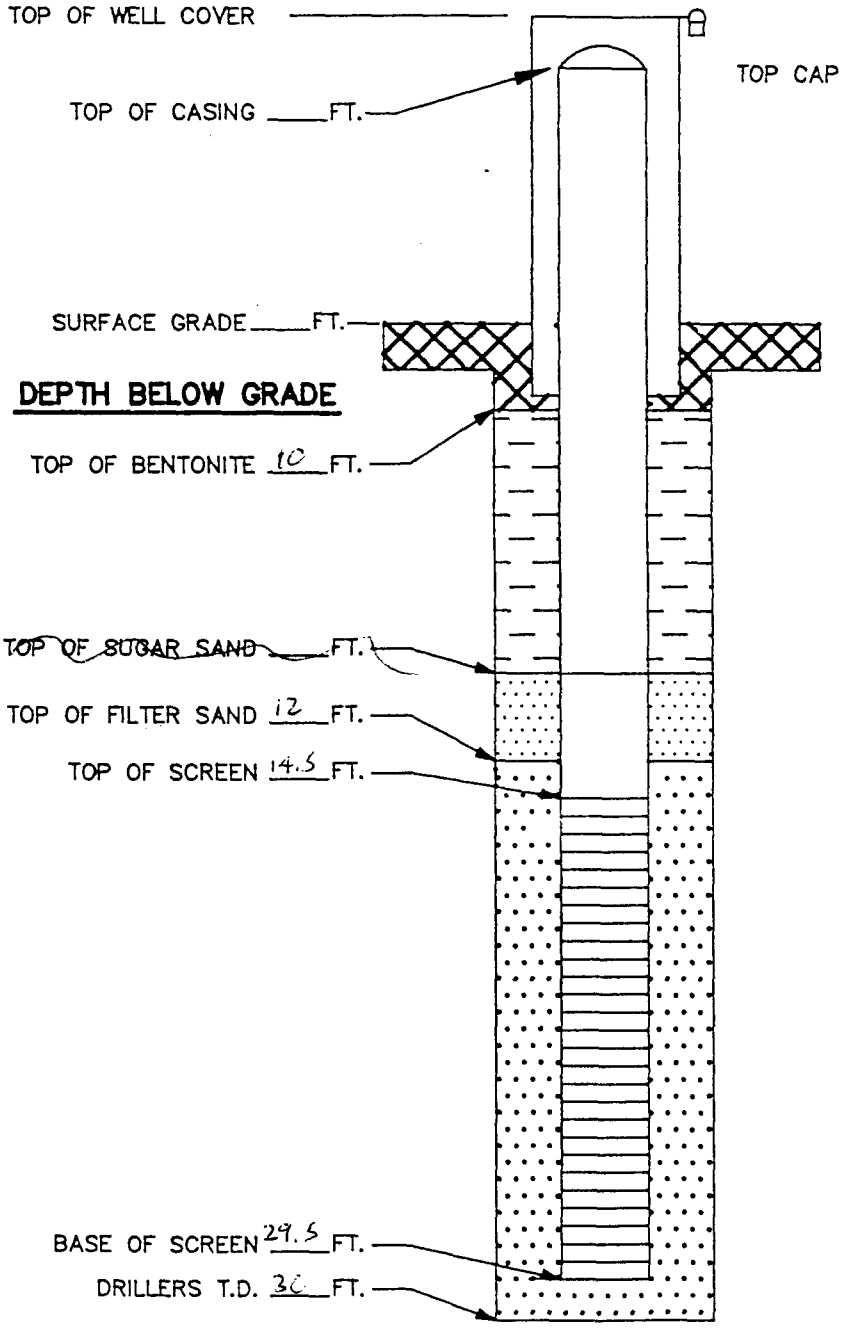
MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

CAD NO. MONWELL1

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: AMOCO ARTESIA STATION
PROJECT NO.: 2436
DATE: 3-22-94
RIG-UP TIME: 0910
RIG-DOWN TIME: 0950

WELL NO.: MW-10
GEOLOGIST: JDB
AUGER O.D.: 10.25"
DRILLING CO.: HARRISON
DRILLER: DONNIE RED



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): _____

BLANK CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 2 X 10 FT.
_____ X 6 FT.
_____ X 5 FT.
_____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: _____
CEMENT TYPE: _____
CEMENT (SACKS): _____
BENTONITE (SACKS): _____
WATER (GALS): _____
TREMIE PIPE (Y/N): _____

SUGAR SAND

BRAND NAME: _____
TYPE: _____
SIZE: _____
NO. OF BAGS: _____
TREMIE PIPE (Y/N): _____

SAND FILTER PACK

BRAND NAME: TEXAS MINING CO.
TYPE: SILICA
SIZE: 12/20
NO. OF BAGS: 9
TREMIE PIPE (Y/N): AUGERS

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020"
CENTRALIZERS (Y/N): _____
CASING SECTION: _____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
_____ X ____ FT.

BARRELS OF CUTTINGS: _____
END CAP (SLIP/FLUSH): _____

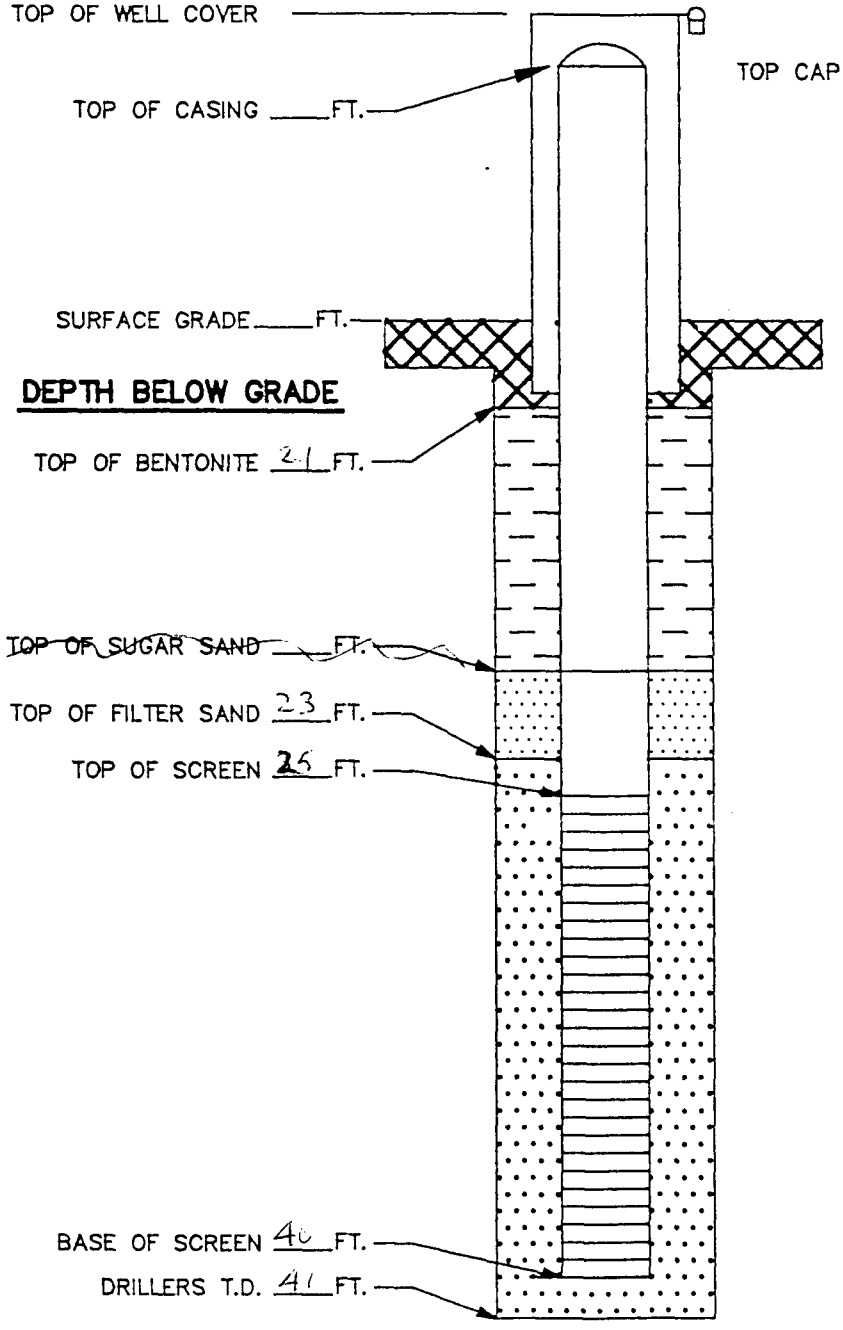
CAD NO. MONWELL1

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: AMOCO ARIZONA STATION
PROJECT NO.: 2436
DATE: 3-22-94
RIG-UP TIME: 1035
RIG-DOWN TIME: 1510 TD

WELL NO.: MW-11
GEOLOGIST: JDB
AUGER O.D.: 10.25"
DRILLING CO.: HARRISON
DRILLER: DONNY REZA



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): ____

BLANK CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 3 X 10 FT.
____ X 6 FT.
____ X 5 FT.
____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: ____
CEMENT TYPE: ____
CEMENT (SACKS): ____
BENTONITE (SACKS): ____
WATER (GALS): ____
TREMIE PIPE (Y/N): ____

SUGAR SAND

BRAND NAME: ____
TYPE: ____
SIZE: ____
NO. OF BAGS: ____
TREMIE PIPE (Y/N): ____

SAND FILTER PACK

BRAND NAME: TEXAS MINING CO
TYPE: SILICA
SIZE: 12-20
NO. OF BAGS: 9
TREMIE PIPE (Y/N): AUGER

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020 (.42-.45mm)
CENTRALIZERS (Y/N): ____
CASING SECTION: ____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
____ X ____ FT.

BARRELS OF CUTTINGS: 0
END CAP (SLIP/FLUSH): ____

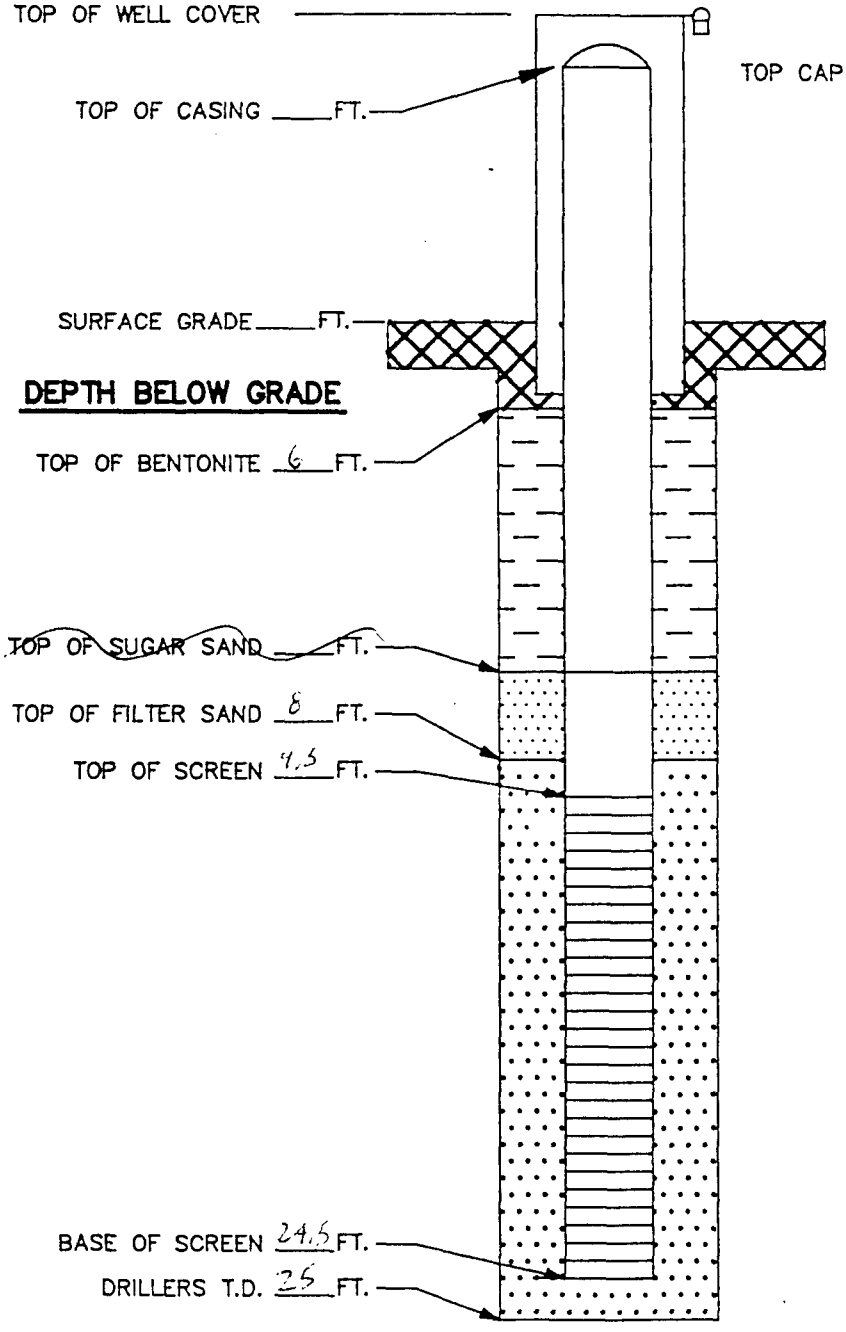
CAD NO. MONWELL1

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: AMOCO ARTESIA STATION
PROJECT NO.: 2436
DATE: 3-23-94
RIG-UP TIME: 1650 on 3-22-94
RIG-DOWN TIME: 1500 on 3-23-94

WELL NO.: MW-12
GEOLOGIST: JDB
AUGER O.D.: 10.25
DRILLING CO.: HARRISON
DRILLER: GENNY REZA



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): _____

BLANK CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 1 X 10 FT.
_____ X 6 FT.
_____ X 5 FT.
_____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: _____
CEMENT TYPE: _____
CEMENT (SACKS): _____
BENTONITE (SACKS): _____
WATER (GALS): _____
TREMIE PIPE (Y/N): _____

SUGAR SAND

BRAND NAME: _____
TYPE: _____
SIZE: _____
NO. OF BAGS: _____
TREMIE PIPE (Y/N): _____

SAND FILTER PACK

BRAND NAME: TEXAS MINING CO
TYPE: SILICA
SIZE: 12/20
NO. OF BAGS: 9
TREMIE PIPE (Y/N): AUGER

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020"
CENTRALIZERS (Y/N): _____
CASING SECTION: _____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
_____ X ____ FT.

BARRELS OF CUTTINGS: Ø
END CAP (SLIP/FLUSH): _____

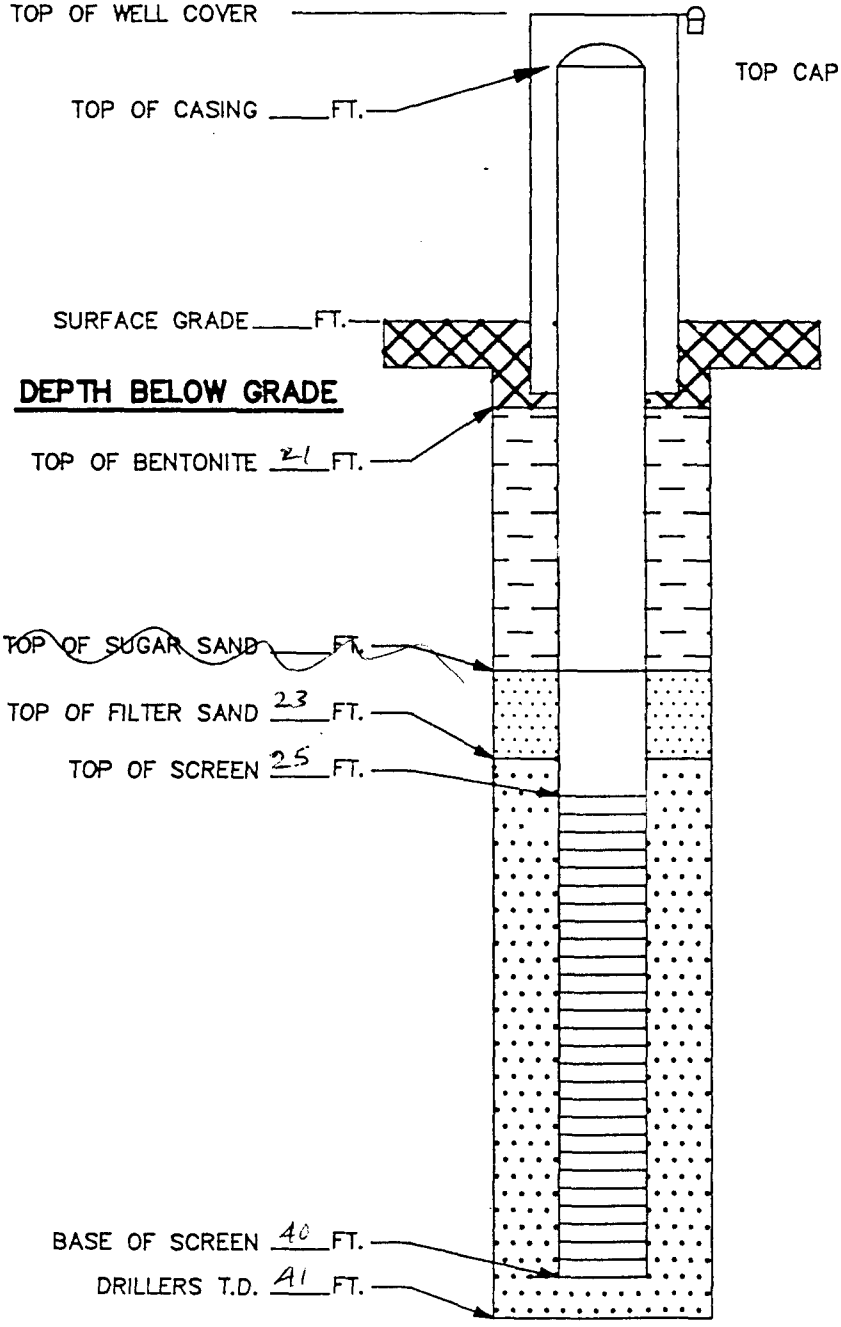
CAD NO. MONWELL1

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: AMOCO ARTESIA STATION
PROJECT NO.: 3436
DATE: 3-24-94
RIG-UP TIME: 1745 on 3-22-94
RIG-DOWN TIME: 0930 on 3-24-94

WELL NO.: MW-13
GEOLOGIST: JDB
AUGER O.D.: 10-25"
DRILLING CO.: HARRISON
DRILLER: DONNY REZA



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): ____

BLANK CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 3 X 10 FT.
____ X 6 FT.
____ X 5 FT.
____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: ____
CEMENT TYPE: ____
CEMENT (SACKS): ____
BENTONITE (SACKS): ____
WATER (GALS): ____
TREMIE PIPE (Y/N): ____

SUGAR SAND

BRAND NAME: ____
TYPE: ____
SIZE: ____
NO. OF BAGS: ____
TREMIE PIPE (Y/N): ____

SAND FILTER PACK

BRAND NAME: TEXAS MINERALS CO
TYPE: SILICA
SIZE: 12/20
NO. OF BAGS: 9
TREMIE PIPE (Y/N): AUGER

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020"
CENTRALIZERS (Y/N): ____
CASING SECTION: ____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
____ X ____ FT.

BARRELS OF CUTTINGS: 6
END CAP (SLIP/FLUSH): ____

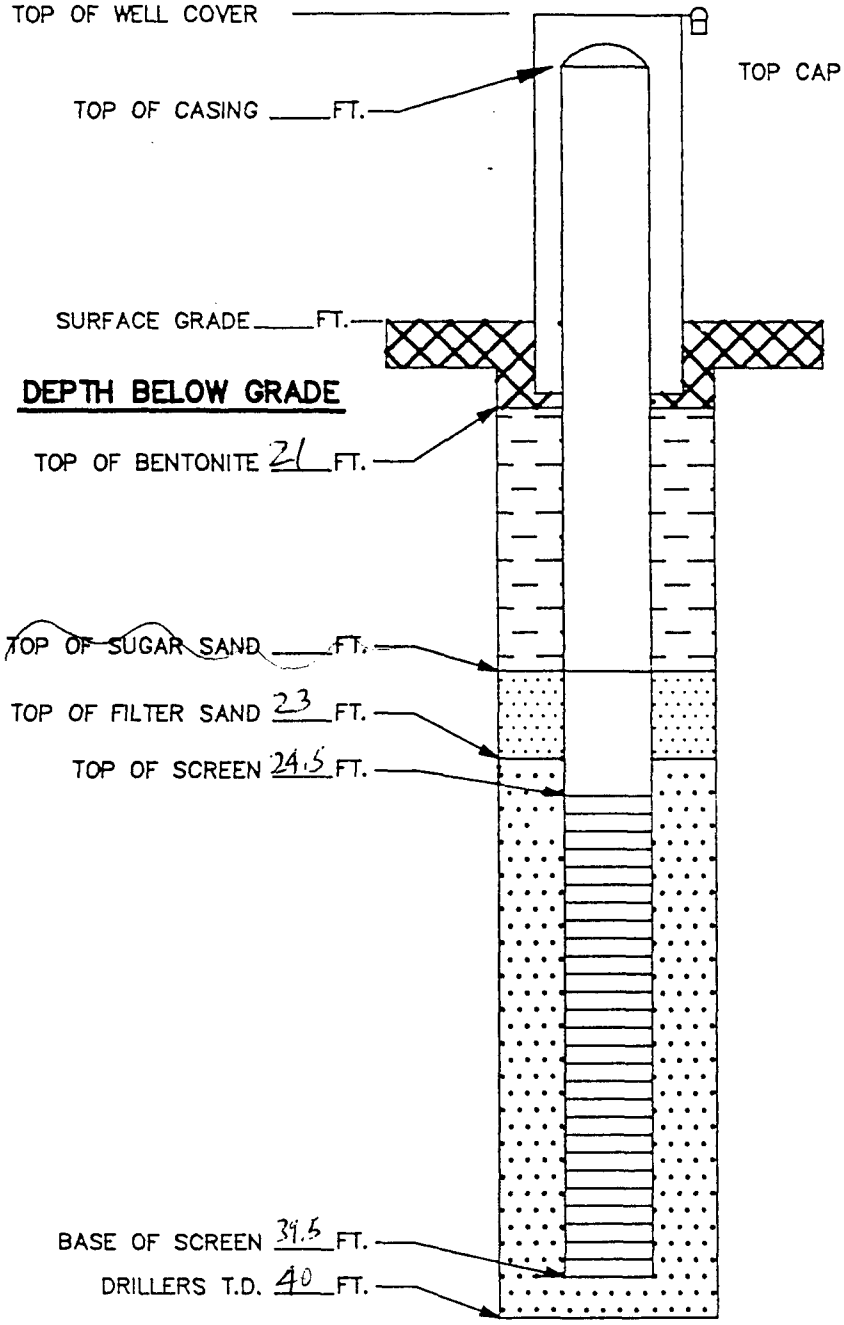
CAD NO. MONWELL1

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

MONITORING WELL INSTALLATION REPORT

PROJECT NAME: AMOCO ARCO STATION
PROJECT NO.: 2436
DATE: 3-24-94
RIG-UP TIME: 1700
RIG-DOWN TIME: 1915

WELL NO.: MW-14
GEOLOGIST: JDB
AUGER O.D.: 10.25"
DRILLING CO.: HARRISON
DRILLER: DENNY REZA



WELL COVER

TOP CAP (SLIP/FLUSH/LOCKING): _____

BLANK CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
CASING SECTION: 3 X 10 FT.
_____ X 6 FT.
_____ X 5 FT.
_____ X 2.5 FT.

GROUT MIXTURE

VOLCLAY: _____
CEMENT TYPE: _____
CEMENT (SACKS): _____
BENTONITE (SACKS): _____
WATER (GALS): _____
TREMIE PIPE (Y/N): _____

SUGAR SAND

BRAND NAME: _____
TYPE: _____
SIZE: _____
NO. OF BAGS: _____
TREMIE PIPE (Y/N): _____

SAND FILTER PACK

BRAND NAME: TEXAS MINING CO.
TYPE: SILICA
SIZE: 12/20
NO. OF BAGS: 8
TREMIE PIPE (Y/N): AUGERS

SCREEN CASING

TYPE: PVC
SCHEDULE: 40
I.D.: 4"
THREADS: FLUSH
SLOT SIZE: 0.020"
CENTRALIZERS (Y/N): _____
CASING SECTION: _____ X 20 FT.
1 X 10 FT.
1 X 5 FT.
_____ X ____ FT.

BARRELS OF CUTTINGS: 0
END CAP (SLIP/FLUSH): _____

MITTELHAUSER corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

CAD NO. 15810701
SHEET 1 OF 1

WELL DEVELOPMENT AND/OR GROUNDWATER SAMPLING DATA

PROJECT NAME: AMOCO ARTESIA STATION
PROJECT NO.: 2436
DATE: 3-26-94
PID/FID READING:
WELL NO.: MW-11

GEOLOGIST: JDB
CONTRACTOR: N/A
DEVELOPMENT:
SAMPLING: ✓
TYPE OF RIG:

PURGING METHOD

METHOD (PUMP/BAIL): BAIL
PUMP SIZE AND TYPE: MANUFACTURE/MODEL:
PUMP RATE: PUMPING ELAPSED TIME:
METHOD USED TO OBTAIN PUMP RATE:

VOLUME PRODUCED WATER

DEPTH TO GROUNDWATER:
START DEPTH: 19.61 → 43.22 TIME: 1653 FINISH DEPTH: DRY TIME: 1741
CASING ID (INCH): 4" LINEAR FEET OF WATER: 23.61
WELL VOLUME (GAL): 15.6
VOLUME WATER PRODUCED: 33 WELL VOLUMES PRODUCED:

PHYSICOCHEMICAL PARAMETERS

TIME (24 HOUR)	DATE	TOTAL VOLUME WATER (gal.)	PUMP INTAKE DEPTH (ft.)	SURGE EVENT	TEMP. (°C) F	TDS (g/l)	CONDUCTIVITY (mS/cm) x 1000	pH	WATER CLARITY (NTU)
1707	3-26-94	Ø	N/A	N/A	63.6	30	3.18	8.08	
1714		5			63.7	570	2.89	7.84	
1718		10			63.1	870	2.85	7.74	
1722		15			63.5	780	2.67	7.70	
1727		20			62.0	800	2.21	7.70	
1732		25			61.3	850	2.18	7.72	
1737		30			61.3	950	2.26	7.67	
1741		BAILED	DRY						
	↓		↓	↓					

STARTING TIME: 1703
STOPPING TIME: 1741

NOTES:

MITTELHAUSER Corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

CAD NO. 15810701
SHEET 1 OF 1

WELL DEVELOPMENT AND/OR GROUNDWATER SAMPLING DATA

PROJECT NAME: ARCO ARTESIA STATION
PROJECT NO.: 2436
DATE: 3-26-94
PID/FID READING: N/A
WELL NO.: MW-12

GEOLOGIST: SDB
CONTRACTOR: N/A
DEVELOPMENT: —
SAMPLING: ✓
TYPE OF RIG: —

PURGING METHOD

METHOD (PUMP/BAIL): BAIL
PUMP SIZE AND TYPE: _____ MANUFACTURE/MODEL: _____
PUMP RATE: _____ PUMPING ELAPSED TIME: _____
METHOD USED TO OBTAIN PUMP RATE: _____

VOLUME PRODUCED WATER

DEPTH TO GROUNDWATER:
START DEPTH: 17.27 TIME: 1838 FINISH DEPTH: DRY TIME: 1849
CASING ID (INCH): 4" LINEAR FEET OF WATER: 10.91
WELL VOLUME (GAL): 7.13
VOLUME WATER PRODUCED: 15.5 WELL VOLUMES PRODUCED: _____

PHYSICOCHEMICAL PARAMETERS

TIME (24 HOUR)	DATE	TOTAL VOLUME WATER (gal.)	PUMP INTAKE DEPTH (ft.)	SURGE EVENT	TEMP. (°C) °F	TDS (g/l)	CONDUCTIVITY (mS/cm) x1000	pH	WATER CLARITY (NTU)
1839	3-26-94	0	N/A	N/A	97.9?	0	9.96	7.39	
1843		5			80.3?	20	9.39	7.29	
1845		10			80.1?	250	9.31	7.29	
1848		15			99.1?	400	9.12	7.25	
1849	—	BAILED DRY			—	—	—	—	
	↓		↓	↓					

STARTING TIME: 1839
STOPPING TIME: 1922

NOTES: WELL FLUIDS HAVE PRODUCT ODOR
WATER IS WHITE (GYP)

MITTELHAUSER Corporation
23272 MILL CREEK RD. SUITE 100
LAGUNA HILLS, CA. 92653

CAD NO. 15810701
SHEET 1 OF 1

WELL DEVELOPMENT AND/OR GROUNDWATER SAMPLING DATA

PROJECT NAME: AMOCO ARTESIA STATION
PROJECT NO.: 2436
DATE: 3-26-94
PID/FID READING: N/A
WELL NO.: MW-14

GEOLOGIST: JDB
CONTRACTOR: N/A
DEVELOPMENT: —
SAMPLING: ✓
TYPE OF RIG: —

PURGING METHOD

METHOD (PUMP/BAIL):
PUMP SIZE AND TYPE: MANUFACTURE/MODEL:
PUMP RATE: PUMPING ELAPSED TIME:
METHOD USED TO OBTAIN PUMP RATE:

VOLUME PRODUCED WATER

DEPTH TO GROUNDWATER:
START DEPTH: 19.36 TIME: 1754 FINISH DEPTH: DRY TIME: 1824
CASING ID (INCH): 4" LINEAR FEET OF WATER: 24.69
WELL VOLUME (GAL): 16.30
VOLUME WATER PRODUCED: 34 WELL VOLUMES PRODUCED:

PHYSICOCHEMICAL PARAMETERS

TIME (24 HOUR)	DATE	TOTAL VOLUME WATER (gal.)	PUMP INTAKE DEPTH (ft.)	SURGE EVENT	TEMP. (°C) °F	TDS (g/l)	CONDUCTIVITY (mS/cm) x (000)	pH	WATER CLARITY (NTU)
1756	3-26-94	0	N/A	N/A	62.7	2.5	2.98	7.89	
1758		5			62.6	1.7	2.80	7.79	
1802		10			61.0	450	2.84	7.78	
1806		12			60.7	500	2.75	7.75	
1812		17			58.8	700	2.64	7.85	
1816		22			60.6	700	2.57	7.78	
1819		27			60.6	800	2.36	7.77	
1822		32			60.2	900	2.44	7.74	
1824		— BAILED DRY —							
	✓		✓	✓					

STARTING TIME: 1756
STOPPING TIME: 1824

NOTES:

APPENDIX D

LABORATORY ANALYTICAL RESULTS

AND CHAIN OF CUSTODY

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

ANALYTICAL REPORT

LOG NO: A94-03-207

Received: 28 MAR 94

Mailed: 4/4/94

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Project: 2436-02/AMOCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
03-207-1	MW-11	27 MAR 94
03-207-2	MW-14	27 MAR 94
03-207-3	MW-12	27 MAR 94

PARAMETER	03-207-1	03-207-2	03-207-3
Extractable Organics (8270)			
Date Analyzed	03/30/94	03/30/94	03/30/94
Date Extracted	03/29/94	03/29/94	03/29/94
Dilution Factor, Times	1	1	1
1,2,4-Trichlorobenzene, ug/L	<5	<5	<5
1,2-Dichlorobenzene, ug/L	<5	<5	<5
1,2-Diphenylhydrazine, ug/L	<5	<5	<5
1,3-Dichlorobenzene, ug/L	<5	<5	<5
1,4-Dichlorobenzene, ug/L	<5	<5	<5
2,4,5-Trichlorophenol, ug/L	<10	<10	<10
2,4,6-Trichlorophenol, ug/L	<5	<5	<5
2,4-Dichlorophenol, ug/L	<5	<5	<5
2,4-Dimethylphenol, ug/L	<10	<10	<10
2,4-Dinitrophenol, ug/L	<20	<20	<20
2,4-Dinitrotoluene, ug/L	<5	<5	<5
2,6-Dinitrotoluene, ug/L	<5	<5	<5
2-Chloronaphthalene, ug/L	<5	<5	<5
2-Chlorophenol, ug/L	<5	<5	<5
2-Methyl-4,6-dinitrophenol, ug/L	<5	<5	<5
2-Methylnaphthalene, ug/L	<10	<10	<10
2-Methylphenol (o-Cresol), ug/L	<5	<5	<5
2-Nitroaniline, ug/L	<10	<10	<10
2-Nitrophenol, ug/L	<10	<10	<10
3,3'-Dichlorobenzidine, ug/L	<5	<5	<5
3-Nitroaniline, ug/L	<10	<10	<10
4-Bromophenylphenylether, ug/L	<5	<5	<5

BCA

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

LOG NO: A94-03-207

Received: 28 MAR 94

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Project: 2436-02/AMOCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
03-207-1	MW-11	27 MAR 94
03-207-2	MW-14	27 MAR 94
03-207-3	MW-12	27 MAR 94

PARAMETER	03-207-1	03-207-2	03-207-3
4-Chloro-3-methylphenol, ug/L	<5	<5	<5
4-Chloroaniline, ug/L	<5	<5	<5
4-Chlorophenylphenylether, ug/L	<10	<10	<10
4-Methylphenol (p-Cresol), ug/L	<5	<5	<5
4-Nitroaniline, ug/L	<20	<20	<20
4-Nitrophenol, ug/L	<10	<10	<10
Acenaphthene, ug/L	<5	<5	<5
Acenaphthylene, ug/L	<5	<5	<5
Aniline, ug/L	<5	<5	<5
Anthracene, ug/L	<5	<5	<5
Benzidine, ug/L	<1000	<1000	<1000
Benzo(a)anthracene, ug/L	<5	<5	<5
Benzo(a)pyrene, ug/L	<5	<5	<5
Benzo(b)fluoranthene, ug/L	<10	<10	<10
Benzo(g,h,i)perylene, ug/L	<10	<10	<10
Benzo(k)fluoranthene, ug/L	<10	<10	<10
Benzyl Alcohol, ug/L	<10	<10	<10
Benzoic acid, ug/L	<100	<100	<100
Butylbenzylphthalate, ug/L	<10	<10	<10
Chrysene, ug/L	<5	<5	<5
Di-n-octylphthalate, ug/L	<10	<10	<10
Dibenzo(a,h)anthracene, ug/L	<5	<5	<5
Dibenzofuran, ug/L	<5	<5	<5
Dibutylphthalate, ug/L	<10	<10	<10
Diethylphthalate, ug/L	<10	<10	<10

BCA

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

LOG NO: A94-03-207

Received: 28 MAR 94

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Project: 2436-02/AMOCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
03-207-1	MW-11	27 MAR 94
03-207-2	MW-14	27 MAR 94
03-207-3	MW-12	27 MAR 94

PARAMETER	03-207-1	03-207-2	03-207-3
Dimethylphthalate, ug/L	<5	<5	<5
Fluoranthene, ug/L	<5	<5	<5
Fluorene, ug/L	<5	<5	<5
Hexachlorobenzene, ug/L	<5	<5	<5
Hexachlorobutadiene, ug/L	<10	<10	<10
Hexachlorocyclopentadiene, ug/L	<10	<10	<10
Hexachloroethane, ug/L	<10	<10	<10
Indeno(1,2,3-c,d)pyrene, ug/L	<10	<10	<10
Isophorone, ug/L	<5	<5	<5
N-Nitrosodimethylamine, ug/L	<5	<5	<5
N-Nitrosodiphenylamine, ug/L	<10	<10	<10
N-Nitrosodi-n-propylamine, ug/L	<5	<5	<5
Nitrobenzene, ug/L	<5	<5	<5
Naphthalene, ug/L	<5	<5	<5
Phenanthrene, ug/L	<5	<5	<5
Phenol, ug/L	<5	<5	<5
Pentachlorophenol, ug/L	<5	<5	<5
Pyrene, ug/L	<10	<10	<10
Bis(2-chloroethoxy)methane, ug/L	<5	<5	<5
Bis(2-chloroethyl)ether, ug/L	<5	<5	<5
Bis(2-chloroisopropyl)ether, ug/L	<5	<5	<5
Bis(2-ethylhexyl)phthalate, ug/L	<10	<10	<10

BCA

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

LOG NO: A94-03-207

Received: 28 MAR 94

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Project: 2436-02/AMOCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
03-207-1	MW-11	27 MAR 94
03-207-2	MW-14	27 MAR 94
03-207-3	MW-12	27 MAR 94

PARAMETER	03-207-1	03-207-2	03-207-3
EPA Method 8020			
Date Analyzed	04/01/94	04/01/94	04/01/94
Date Confirmed	04/01/94	04/01/94	04/01/94
Dilution Factor, Times	1	1	1
1,2-Dichlorobenzene, ug/L	<0.5	<0.5	<0.5
1,3-Dichlorobenzene, ug/L	<0.5	<0.5	<0.5
1,4-Dichlorobenzene, ug/L	<0.5	<0.5	<0.5
Benzene, ug/L	<0.5	<0.5	<0.5
Chlorobenzene, ug/L	<0.5	<0.5	<0.5
Ethylbenzene, ug/L	<0.5	<0.5	<0.5
Toluene, ug/L	<0.5	<0.5	<0.5
Total Xylene Isomers, ug/L	<0.5	<0.5	<0.5

BCA

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

LOG NO: A94-03-207

Received: 28 MAR 94

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Project: 2436-02/AMOCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
03-207-4	Trip Blank	27 MAR 94

PARAMETER	03-207-4
EPA Method 8020	
Date Analyzed	04/01/94
Date Confirmed	04/01/94
Dilution Factor, Times	1
1,2-Dichlorobenzene, ug/L	<0.5
1,3-Dichlorobenzene, ug/L	<0.5
1,4-Dichlorobenzene, ug/L	<0.5
Benzene, ug/L	<0.5
Chlorobenzene, ug/L	<0.5
Ethylbenzene, ug/L	<0.5
Toluene, ug/L	<0.5
Total Xylene Isomers, ug/L	<0.5

BCA

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

LOG NO: A94-03-207

Received: 28 MAR 94

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Project: 2436-02/AMOCO

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
03-207-5	MW-15	27 MAR 94

PARAMETER	03-207-5				
Sample Held, Not Analyzed	HOLD				

Frederick W. Haley, Laboratory Manager

BCA

B C Analytical

1200 Gene Autry Way
Anaheim, CA 92805
714/978-0113
Fax: 714/978-9284

April 4, 1994

Mr. Jeff Bennett
Mittelhauser Corporation
23272 Mill Creek Dr. Suite 300
Laguna Hills, CA 92653

Dear Mr. Bennett:

B C Analytical is pleased to provide you with an enhancement for laboratory reporting. Along with your analytical report, we have enclosed our Batch QC report for this order (laboratory ID number 9403207). This report presents the data for the quality control samples analyzed with your samples as described in our Quality Assurance Manual. The report consists of five parts.

Definitions and Terms - a glossary for your use when interpreting the Batch QC reports.

Laboratory Control Standards - a report of LCS results for each analysis, at a minimum of one LCS per batch.

Matrix QC Precision - a report of duplicate and/or duplicate spike results, with the calculated relative percent difference.

Matrix QC Accuracy - a summary of spike or average spike results, with the calculated percent recovery.

Method Blanks - a summary of blank results for each analysis, reported at a minimum of one per batch, along with the corresponding reporting detection limit (RDL).

We trust you will find this information useful. We recognize that this explanation is brief and that you may need more detailed assistance in order to use the Batch QC reports. Please call your client services representative, the local QA coordinator, or me if you would like to discuss this report further or want to receive Batch QC information regularly with your analytical report.

Very truly yours,

Frederick W. Haley

Frederick W. Haley
Laboratory Manager

BCA

B C ANALYTICAL

ORDER QC REPORT
Definitions and Terms

Accuracy:	The ability of a procedure to determine the "true" concentration of an analyte.
Precision:	The reproducibility of a procedure demonstrated by the agreement between analyses performed on either duplicates of the same sample or a pair of duplicate spikes.
Batch:	A group of twenty samples or less, of similar matrix type, prepped together or analyzed together if no sample preparation is required, under the same conditions and with the same reagents. The batch must include a method blank, LCS and matrix QC.
Laboratory Control Standard (LCS):	A blank that is spiked with a known amount of analyte and subjected to the same procedures as the samples. The LCS indicates the accuracy of the analytical method. It also serves to double-check the calibration because it is prepared from a different source than the standard used to calibrate the instrument.
Matrix QC:	Quality control performed on actual client samples. The matrix spike is a client's sample spiked with a known amount of analyte. For most analyses, the laboratory performs matrix spikes in duplicate (duplicate spikes).
Method Blank:	A sample that contains no analyte. For water analysis, organic-free or deionized water is used. For solids analysis, analyte-free solvent is used. The method blank serves to measure contamination associated with laboratory storage, preparation or instrumentation.
Batch Number:	Numeric designation for a batch of samples and the associated QC. The batch number sequence is unique for each determination.
LC Result:	Laboratory result of an LCS analysis.
LT Result:	Expected result, or true value, of the LCS analysis.
Percent Recovery:	The percentage of analyte recovered. For LCS, the percent recovery calculation is: LC/LT x 100.

LC1, LC2

Results of analyzing duplicate LCS's, used to determine precision.

R1, R2 Result:

Results of analyzing duplicate aliquots of a sample, with R1 indicating the first replicate and R2 the second replicate; used to determine precision.

MS, MSD Result:

Results of analyzing a matrix spike and a matrix spike duplicate, used to determine precision.

Relative % Diff (RPD):

Calculated using one of the following:

$$\frac{|LC1 - LC2| \times 100}{([LC1 + LC2]/2)} \qquad \frac{|R1 - R2| \times 100}{([R1 + R2]/2)}$$

$$\frac{|MS - MSD| \times 100}{([MS + MSD]/2)}$$

MS, MSD %:

The percentage of analyte recovered in the matrix spikes. The percent recovery calculation is:

$$\text{MS \%:} \ \frac{(MS - X)}{(T - X)} \times 100 \qquad \text{MSD \%:} \ \frac{(MSD - X)}{(T - X)} \times 100$$

where X is the sample result, listed on the analytical report, and T is the true value, defined below.

True value:

The theoretical, or expected, result of a spiked sample analysis.

NC Flag

Indicates that the spike recovery was not calculated due to high sample concentration relative to the amount of spike added.

Q Flag

Indicates that the quality control measurement is outside the specified control limits.

Blank Result:

Laboratory result of analysis of the method blank.

RDL (Reporting Detection Limit):

BCA-assigned limit, set at a level higher than the method detection limit (MDL) determined using EPA guidelines. Sample RDLs may differ from the blank RDL if the samples were diluted.

: ORDER PLACED FOR CLIENT: Mittelhauser Corporation 9403207 :
: BC ANALYTICAL : ANHM LAB : 13:55:51 04 APR 1994 - P. 1 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.... ANALYZED	METHOD.....	EQUIP.	BATCH..	ID.NO
9403207*1	MW-11	BNA.8270.HSL	03.30.94	8270	557-04	9416	6950
		VA.8020	04.01.94	8020	556-04	94028	8307
9403207*2	MW-14	BNA.8270.HSL	03.30.94	8270	557-04	9416	6950
		VA.8020	04.01.94	8020	556-04	94028	8307
9403207*3	MW-12	BNA.8270.HSL	03.30.94	8270	557-04	9416	6950
		VA.8020	04.01.94	8020	556-04	94028	8307
9403207*4	Trip Blank	VA.8020	04.01.94	8020	556-04	94028	8307
9403207*5	MW-15	HOLD	04.04.94				7522

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Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

BC ANALYTICAL

ORDER QC REPORT FOR A9403207

DATE REPORTED : 04/04/94

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
1. Extractable Organics (						
Date Analyzed	03.30.94	9416	03/30/94	03/30/94	Date	N/A
Date Extracted	03.30.94	9416	03/29/94	03/29/94	Date	N/A
1,2,4-Trichlorobenzene	03.30.94	9416	76.1	100	ug/L	76
1,2-Dichlorobenzene	03.30.94	9416	62.5	100	ug/L	62
1,2-Diphenylhydrazine	03.30.94	9416	77.8	100	ug/L	78
1,3-Dichlorobenzene	03.30.94	9416	58.5	100	ug/L	58
1,4-Dichlorobenzene	03.30.94	9416	57.5	100	ug/L	57
2,4,5-Trichlorophenol	03.30.94	9416	94.7	100	ug/L	95
2,4,6-Trichlorophenol	03.30.94	9416	110	100	ug/L	110
2,4-Dichlorophenol	03.30.94	9416	82.7	100	ug/L	83
2,4-Dimethylphenol	03.30.94	9416	86.4	100	ug/L	86
2,4-Dinitrophenol	03.30.94	9416	196	100	ug/L	196 Q
2,4-Dinitrotoluene	03.30.94	9416	143	100	ug/L	143 Q
2,6-Dinitrotoluene	03.30.94	9416	120	100	ug/L	120
2-Chloronaphthalene	03.30.94	9416	71.0	100	ug/L	71
2-Chlorophenol	03.30.94	9416	69.5	100	ug/L	69
2-Methyl-4,6-dinitrophenol	03.30.94	9416	147	100	ug/L	147
2-Methylnaphthalene	03.30.94	9416	68.4	100	ug/L	68
2-Methylphenol (o-Cresol)	03.30.94	9416	63.6	100	ug/L	64
2-Nitroaniline	03.30.94	9416	86.7	100	ug/L	87
2-Nitrophenol	03.30.94	9416	97.3	100	ug/L	97
3,3'-Dichlorobenzidine	03.30.94	9416	517	800	ug/L	65
3-Nitroaniline	03.30.94	9416	50.3	100	ug/L	50 Q
4-Bromophenylphenylether	03.30.94	9416	87.9	100	ug/L	88
4-Chloro-3-methylphenol	03.30.94	9416	98.9	100	ug/L	99
4-Chloroaniline	03.30.94	9416	93.3	100	ug/L	93
4-Chlorophenylphenylether	03.30.94	9416	88.3	100	ug/L	88
4-Methylphenol (p-Cresol)	03.30.94	9416	22.5	100	ug/L	22 Q
4-Nitroaniline	03.30.94	9416	88.0	100	ug/L	88
4-Nitrophenol	03.30.94	9416	16.5	100	ug/L	16
Acenaphthene	03.30.94	9416	62.9	100	ug/L	63
Acenaphthylene	03.30.94	9416	72.1	100	ug/L	72
Aniline	03.30.94	9416	68.7	100	ug/L	69
Anthracene	03.30.94	9416	69.6	100	ug/L	70
Benzidine	03.30.94	9416	812	800	ug/L	101
Benzo(a)anthracene	03.30.94	9416	155	100	ug/L	155 Q
Benzo(a)pyrene	03.30.94	9416	77.0	100	ug/L	77
Benzo(b)fluoranthene	03.30.94	9416	100	100	ug/L	100
Benzo(g,h,i)perylene	03.30.94	9416	81.6	100	ug/L	82
Benzo(k)fluoranthene	03.30.94	9416	49.2	100	ug/L	49
Benzyl Alcohol	03.30.94	9416	69.7	100	ug/L	70
Benzoic acid	03.30.94	9416	83.8	100	ug/L	84
Butylbenzylphthalate	03.30.94	9416	220	100	ug/L	220 Q
Chrysene	03.30.94	9416	62.5	100	ug/L	62

LABORATORY CONTROL STANDARDS
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	LC RESULT	LT RESULT	UNIT	PERCENT RECOVERY
Di-n-octylphthalate	03.30.94	9416	83.9	100	ug/L	84
Dibenzo(a,h)anthracene	03.30.94	9416	81.2	100	ug/L	81
Dibenzofuran	03.30.94	9416	76.0	100	ug/L	76
Dibutylphthalate	03.30.94	9416	68.7	100	ug/L	69
Diethylphthalate	03.30.94	9416	84.0	100	ug/L	84
Dimethylphthalate	03.30.94	9416	92.6	100	ug/L	93
Fluoranthene	03.30.94	9416	73.7	100	ug/L	74
Fluorene	03.30.94	9416	65.9	100	ug/L	66
Hexachlorobenzene	03.30.94	9416	95.0	100	ug/L	95
Hexachlorobutadiene	03.30.94	9416	75.3	100	ug/L	75
Hexachlorocyclopentadiene	03.30.94	9416	77.0	100	ug/L	77
Hexachloroethane	03.30.94	9416	46.4	100	ug/L	46
Indeno(1,2,3-c,d)pyrene	03.30.94	9416	86.4	100	ug/L	86
Isophorone	03.30.94	9416	89.6	100	ug/L	90
N-Nitrosodimethylamine	03.30.94	9416	42.2	100	ug/L	42
N-Nitrosodiphenylamine	03.30.94	9416	39.5	100	ug/L	39
N-Nitrosodi-n-propylamine	03.30.94	9416	84.5	100	ug/L	84
Nitrobenzene	03.30.94	9416	75.6	100	ug/L	76
Naphthalene	03.30.94	9416	58.3	100	ug/L	58
Phenanthrene	03.30.94	9416	76.1	100	ug/L	76
Phenol	03.30.94	9416	35.4	100	ug/L	35
Pentachlorophenol	03.30.94	9416	140	100	ug/L	140 Q
Pyrene	03.30.94	9416	141	100	ug/L	141 Q
Bis(2-chloroethoxy)methane	03.30.94	9416	73.7	100	ug/L	74
Bis(2-chloroethyl)ether	03.30.94	9416	64.8	100	ug/L	65
Bis(2-chloroisopropyl)ether	03.30.94	9416	60.7	100	ug/L	61
Bis(2-ethylhexyl)phthalate	03.30.94	9416	194	100	ug/L	194 Q
2. EPA Method 8020						
Date Analyzed	04.02.94	94028	04/02/94	04/02/94	Date	N/A
Date Confirmed	04.02.94	94028	04/02/94	04/02/94	Date	N/A
1,2-Dichlorobenzene	04.02.94	94028	21.0	20.0	ug/L	105
1,3-Dichlorobenzene	04.02.94	94028	18.2	20.0	ug/L	91
1,4-Dichlorobenzene	04.02.94	94028	19.5	20.0	ug/L	97
Benzene	04.02.94	94028	21.3	20.0	ug/L	106
Chlorobenzene	04.02.94	94028	24.6	20.0	ug/L	123
Ethylbenzene	04.02.94	94028	20.5	20.0	ug/L	102
Toluene	04.02.94	94028	21.6	20.0	ug/L	108
Total Xylene Isomers	04.02.94	94028	37.6	40.0	ug/L	94

BC ANALYTICAL

ORDER QC REPORT FOR A9403207

DATE REPORTED : 04/04/94

MATRIX QC ACCURACY (SPIKES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS %	MSD %	TRUE RESULT	UNIT
1. EPA Method 8020							
Benzene		04.01.94	94028	110	108	20.0	ug/L
Ethylbenzene		04.01.94	94028	111	109	20.0	ug/L
Toluene		04.01.94	94028	111	110	20.0	ug/L

BC ANALYTICAL

ORDER QC REPORT FOR A9403207

DATE REPORTED : 04/04/94

MATRIX QC PRECISION (DUPLICATE SPIKES)
BATCH QC REPORT

PARAMETER	SAMPLE NUMBER	DATE ANALYZED	BATCH NUMBER	MS RESULT	MSD RESULT	UNIT	RELATIVE % DIFF
1. EPA Method 8020							
Date Analyzed		04.01.94	94028	04/01/94	04/01/94	Date	N/A
Date Confirmed		04.01.94	94028	04/01/94	04/01/94	Date	N/A
Benzene		04.01.94	94028	22.0	21.7	ug/L	1
Ethylbenzene		04.01.94	94028	22.2	21.9	ug/L	1
Toluene		04.01.94	94028	22.2	22.0	ug/L	1

BC ANALYTICAL

ORDER QC REPORT FOR A9403207

DATE REPORTED : 04/04/94

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
1. Extractable Organics (						
Date Analyzed	03.30.94	9416	03/30/94	NA	Date	8270
Date Extracted	03.30.94	9416	03/29/94	NA	Date	8270
1,2,4-Trichlorobenzene	03.30.94	9416	0	5	ug/L	8270
1,2-Dichlorobenzene	03.30.94	9416	0	5	ug/L	8270
1,2-Diphenylhydrazine	03.30.94	9416	0	5	ug/L	8270
1,3-Dichlorobenzene	03.30.94	9416	0	5	ug/L	8270
1,4-Dichlorobenzene	03.30.94	9416	0	5	ug/L	8270
2,4,5-Trichlorophenol	03.30.94	9416	0	10	ug/L	8270
2,4,6-Trichlorophenol	03.30.94	9416	0	5	ug/L	8270
2,4-Dichlorophenol	03.30.94	9416	0	5	ug/L	8270
2,4-Dimethylphenol	03.30.94	9416	0	10	ug/L	8270
2,4-Dinitrophenol	03.30.94	9416	0	20	ug/L	8270
2,4-Dinitrotoluene	03.30.94	9416	0	5	ug/L	8270
2,6-Dinitrotoluene	03.30.94	9416	0	5	ug/L	8270
2-Chloronaphthalene	03.30.94	9416	0	5	ug/L	8270
2-Chlorophenol	03.30.94	9416	0	5	ug/L	8270
2-Methyl-4,6-dinitrophenol	03.30.94	9416	0	5	ug/L	8270
2-Methylnaphthalene	03.30.94	9416	0	10	ug/L	8270
2-Methylphenol (o-Cresol)	03.30.94	9416	0	5	ug/L	8270
2-Nitroaniline	03.30.94	9416	0	10	ug/L	8270
2-Nitrophenol	03.30.94	9416	0	10	ug/L	8270
3,3'-Dichlorobenzidine	03.30.94	9416	0	5	ug/L	8270
3-Nitroaniline	03.30.94	9416	0	10	ug/L	8270
4-Bromophenylphenylether	03.30.94	9416	0	5	ug/L	8270
4-Chloro-3-methylphenol	03.30.94	9416	0	5	ug/L	8270
4-Chloroaniline	03.30.94	9416	0	5	ug/L	8270
4-Chlorophenylphenylether	03.30.94	9416	0	10	ug/L	8270
4-Methylphenol (p-Cresol)	03.30.94	9416	0	5	ug/L	8270
4-Nitroaniline	03.30.94	9416	0	20	ug/L	8270
4-Nitrophenol	03.30.94	9416	0	10	ug/L	8270
Acenaphthene	03.30.94	9416	0	5	ug/L	8270
Acenaphthylene	03.30.94	9416	0	5	ug/L	8270
Aniline	03.30.94	9416	0	5	ug/L	8270
Anthracene	03.30.94	9416	0	5	ug/L	8270
Benzidine	03.30.94	9416	0	1000	ug/L	8270
Benzo(a)anthracene	03.30.94	9416	0	5	ug/L	8270
Benzo(a)pyrene	03.30.94	9416	0	5	ug/L	8270
Benzo(b)fluoranthene	03.30.94	9416	0	10	ug/L	8270
Benzo(g,h,i)perylene	03.30.94	9416	0	10	ug/L	8270
Benzo(k)fluoranthene	03.30.94	9416	0	10	ug/L	8270
Benzyl Alcohol	03.30.94	9416	0	10	ug/L	8270
Benzoic acid	03.30.94	9416	0	100	ug/L	8270
Butylbenzylphthalate	03.30.94	9416	2.0	10	ug/L	8270
Chrysene	03.30.94	9416	0	5	ug/L	8270

METHOD BLANKS AND REPORTING DETECTION LIMIT (RDL)
FOR BATCHES WHICH INCLUDE THIS ORDER

PARAMETER	DATE ANALYZED	BATCH NUMBER	BLANK RESULT	RDL	UNIT	METHOD
Di-n-octylphthalate	03.30.94	9416	0	10	ug/L	8270
Dibenzo(a,h)anthracene	03.30.94	9416	0	5	ug/L	8270
Dibenzofuran	03.30.94	9416	0	5	ug/L	8270
Dibutylphthalate	03.30.94	9416	3.7	10	ug/L	8270
Diethylphthalate	03.30.94	9416	0	10	ug/L	8270
Dimethylphthalate	03.30.94	9416	0	5	ug/L	8270
Fluoranthene	03.30.94	9416	0	5	ug/L	8270
Fluorene	03.30.94	9416	0	5	ug/L	8270
Hexachlorobenzene	03.30.94	9416	0	5	ug/L	8270
Hexachlorobutadiene	03.30.94	9416	0	10	ug/L	8270
Hexachlorocyclopentadiene	03.30.94	9416	0	10	ug/L	8270
Hexachloroethane	03.30.94	9416	0	10	ug/L	8270
Indeno(1,2,3-c,d)pyrene	03.30.94	9416	0	10	ug/L	8270
Isophorone	03.30.94	9416	0	5	ug/L	8270
N-Nitrosodimethylamine	03.30.94	9416	0	5	ug/L	8270
N-Nitrosodiphenylamine	03.30.94	9416	0	10	ug/L	8270
N-Nitrosodi-n-propylamine	03.30.94	9416	0	5	ug/L	8270
Nitrobenzene	03.30.94	9416	0	5	ug/L	8270
Naphthalene	03.30.94	9416	0	5	ug/L	8270
Phenanthrene	03.30.94	9416	0	5	ug/L	8270
Phenol	03.30.94	9416	0	5	ug/L	8270
Pentachlorophenol	03.30.94	9416	0	5	ug/L	8270
Pyrene	03.30.94	9416	0	10	ug/L	8270
Bis(2-chloroethoxy)methane	03.30.94	9416	0	5	ug/L	8270
Bis(2-chloroethyl)ether	03.30.94	9416	0	5	ug/L	8270
Bis(2-chloroisopropyl)ether	03.30.94	9416	0	5	ug/L	8270
Bis(2-ethylhexyl)phthalate	03.30.94	9416	17	10	ug/L	8270
2. EPA Method 8020						
Date Analyzed	04.01.94	94028	04/01/94	NA	Date	8020
1,2-Dichlorobenzene	04.01.94	94028	0	0.5	ug/L	8020
1,3-Dichlorobenzene	04.01.94	94028	0	0.5	ug/L	8020
1,4-Dichlorobenzene	04.01.94	94028	0	0.5	ug/L	8020
Benzene	04.01.94	94028	0	0.5	ug/L	8020
Chlorobenzene	04.01.94	94028	0	0.5	ug/L	8020
Ethylbenzene	04.01.94	94028	0	0.5	ug/L	8020
Toluene	04.01.94	94028	0.11	0.5	ug/L	8020
Total Xylene Isomers	04.01.94	94028	0	0.5	ug/L	8020

MITTELHAUSER corporation

23272 MILL CREEK DRIVE, SUITE 300
LAGUNA HILLS, CALIFORNIA 92653
(714) 472-2444

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NUMBER:	PROJECT NAME:
2436-02	AMOCO

SAMPLED BY: (PRINTED AND SIGNATURE)
Tim Eyses

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	ANALYSIS(ES): 8020 (EPA)	8270 (EPA)	PRESERVATIVE	REMARKS
MW-11	3-27-94	0742	H2O	MW-11	3	X	X	ICE	NORMAL T.A.T
MW-14		0806		MW-14	3	X	X		
MW-12		0823		MW-12	2	X	X		
MW-15		0835		MW-15	3	X	X		"HOLD SAMPLE"
TRIP BLANK		0846		TRIP BLANK	2	X			

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	TOTAL NO. OF SAMPLES (THIS SHIPMENT)	4	LABORATORY:
	3/28/94	1135		TOTAL NO. OF CONTAINERS (THIS SHIPMENT)	13	BCA
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT:		LABORATORY PHONE NUMBER:
				ERIC STRAHAN		(714) 978-0113
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( )YES (X)NO		

DISTRIBUTION: WHITE, MITTELHAUSER CORPORATION
CANARY, LABORATORY
PINK, CLIENT
GOLD, PROJECT FILE

REMARKS: CONTACT JEFF BINNETT W/ RESULTS @ 714-587-2158
FAX 714-472-2418