

CORRESPONDENCE

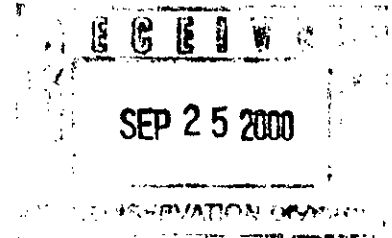
MISC.

RICE Operating Company

122 West Taylor • Hobbs, New Mexico 88240
Phone: (505)393-9174 • Fax: (505) 397-1471

CERTIFIED MAIL

RETURN RECEIPT NO. 7099 3220 0002 3946 8004



September 21, 2000

Mr. William C. Olson
NM Energy, Minerals, and Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
2040 S. Pacheco
Santa Fe, NM 87505

**RE: GROUND WATER CONTAMINATION
ARCO SOUTH JUSTIS UNIT F-230
JUSTIS SALT WATER DISPOSAL SYSTEM
UNIT LETTER C, SEC 25, T25S, R37E
LEA COUNTY, NEW MEXICO**

Dear Mr. Olson:

Rice Operating Company (ROC) is in receipt of your letter informing of groundwater contamination at the above-described site. ROC confirms that a Justis SWD System 4" PVC pipeline is active at this site, and to the southwest of the site, a pipeline vent is installed.

ROC was informed about this environmental project in August of 1998 by Bob Allen of Safety and Environmental Solutions, Inc., (SESI) a Hobbs NM consulting firm working for ARCO Permian. A meeting was conducted with ARCO Permian at the SESI office in Hobbs on August 24 to share information. A site investigation, visual and historic record review was conducted at that time (letter describing results is enclosed) and because of a clean boring near the pipeline and no record or evidence of accidental discharge from this pipeline or pressure vent device, it was determined that the Justis pipeline and nearby vent were not likely to have contributed to the groundwater impact at this site.

After receipt of NMOCD's August 9, 2000 request for a site investigation, ROC discussed this site impact with BP (formerly ARCO Permian), Margaret Lowe, and made plans to include BP in a near-pipeline investigative dig. ROC representatives again went to this site on August 18th and reviewed the topographical nature of the surrounding area. It was decided that on a date

suitable to ROC and BP, ROC would arrange for a backhoe, work crew, and environmental technician to be at this site and conduct the following work plan:

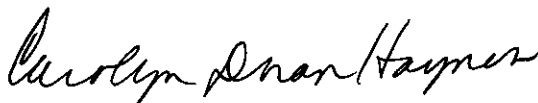
1. The vadose zone on both sides and beneath the 4" PVC pipeline will be exposed in several strategic places for sample procurement.
2. Samples will be collected from several depths at each sampling site.
3. Samples will be field analyzed for volatile hydrocarbons with a PID meter, and for chlorides by silver nitrate titration.
4. Selected samples will have field results confirmed at Cardinal Laboratory in Hobbs, NM.
5. Sample results of this work plan will be compiled and reviewed.
6. Results, interpretation, conclusion, future work plan, etc. will be submitted to NMOCD with copies to BP and any other interested parties.

An estimated timeline for this site investigation to be conducted is the first week of October, probably either the 5th or 6th. NMOCD will be notified 48 hours in advance of the event. All sampling and analysis will be conducted pursuant to NMOCD guidelines.

ROC is the service provider (operator) for the Justis Salt Water Disposal System and has no ownership of any portion of pipeline, well or facility. The Justis SWD System is owned by a consortium of oil producers, System Partners, who provide all operating capital on a percentage ownership/usage basis.

If you have any questions or if I can be of any service, please don't hesitate to call.

RICE OPERATING COMPANY



Carolyn Doran Haynes
Operations Engineer

Enclosure: Letter to SESI dated 9/24/98

Cc: file, Ms. Donna Williams,
NMOCD, District I Office
1625 N. French Drive
Hobbs, NM 88240

RICE *Operating Company*

122 West Taylor
HOBBS, NEW MEXICO 88240
(505) 393-9174

September 24, 1998

Safety & Environmental Solutions, Inc.
703 East Clinton, Suite 103
Hobbs, New Mexico 88240

ATTN: Mr. Bob Allen, President

RE: Pit Closure
NW/4, 25-T25S-R37E
Lea County, New Mexico

Mr. Allen:

Rice Operating Company (ROC) has completed an initial assessment of the potential for Vent C-25 and the associated pipeline to be a source of groundwater contamination at the above-referenced site. This assessment was performed in response to the concerns expressed by Safety & Environmental Solutions, Inc. (SES) and Arco Permian during our meeting on August 24, 1998. The assessment included a review of ROC files for historical evidence of a release, a review of investigation results supplied by SES, and a visual inspection of the site.

The subject pipeline is a 4-inch PVC line that was buried approximately 2.5 feet below ground surface. Both the file review and the visual inspection of the pipeline by ROC personnel identified no evidence of an active leak or record of a historical release/spill having occurred at the site.

Based on information obtained during the ground water monitoring event conducted by SES on August 25, 1998, the depth to groundwater beneath the site ranges from approximately 60 feet to 63 feet below ground surface and the apparent direction of groundwater flow is towards the southeast. A base map depicting the top of the water table and direction of groundwater flow is enclosed.

The analytical results from the monitoring event indicate that dissolved chloride (Cl) and total dissolved solid (TDS) concentrations in the groundwater progressively increase in a downgradient direction. The two upgradient monitor wells MW-1 and MW-5 contained the lowest levels of Cl and TDS as compared to the five downgradient wells. Cl and TDS levels ranged from 1,839 mg/l Cl and 4,380 mg/l TDS in MW-1 to 24,186 mg/l Cl and 58,260 mg/l TDS in MW-6.

The analytical results indicate a significant increase in CL and TDS levels between the wells located upgradient relative to the former pit area (MW-1 and MW-5) and the wells located downgradient from the former pit (MW-2, MW-3, MW-4, MW-6, and MW-7).

As shown on the enclosed map, all seven monitor wells are located upgradient to Vent C-25. Therefore Vent C-25 is not a potential source of the groundwater contamination.

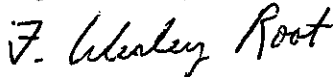
The portion of our pipeline that could be a potential source (located upgradient relative to the contamination identified in MW-6 and MW-7) is approximately 2.5 feet below ground surface. Any release from the line would have had to migrate downward through 60 feet of soil before impacting groundwater. The analytical results from soil samples collected when MW-2 was drilled recorded TPH (total petroleum hydrocarbon) and BTEX (benzene, toluene, ethylbenzene, and total xylenes) levels below method detection limits for all sampled intervals. While soil samples apparently were not collected when MW-6 and MW-7 were installed, no staining or other evidence of soil contamination was noted on the boring logs from these wells

Based on these findings, Vent C-25 and the associated pipeline are not a potential source of the groundwater contamination identified at this site.

If you have any questions, please feel free to call me at the phone number listed above.

Sincerely,

F. Wesley Root
Projects Manager



Enclosure: Base Map

cc: KH
JM
File

MW-5

3,002.85'

CL - 2,396
TDS - 5,430



MW-1

3,002.72'

CL - 1,839
TDS - 4,380

3,002.70'

FORMER PIT AREA

Direction of
Ground Water Flow

3,002.60'

3,002.50'

3,002.45'

MW-4

CL - 6,910
TDS - 13,960

MW-3

3,002.47'

CL - 4,124
TDS - 8,840

MW-2

3,002.41'

CL - 2,731
TDS - 12,240

3,002.33' MW-6

CL - 24,186
TDS - 58,260

3,002.31' MW-7

CL - 3,288
TDS - 8,170

VENT C-25

RICE OPERATING CO.
4-INCH PVC PIPELINE

CL = Chloride Concentration (mg/l)

TDS = Total Dissolved Solids Concentration (mg/l)

Contour Interval = 0.10 feet

Groundwater samples and gauging data obtained by SES on 8-25-98

Rice Operating Company

122 W. Taylor
Hobbs, NM 88240

Ph: (505) 393-9174 FAX 397-1471

Map Legend

⊕ - Monitor Well Location

□ - Junction Box

Scale: 1 inch = 50 feet

BASE MAP

Vent C-25, Justis SWD System
Ltr C, Sec 25-T25S-R37E
Lea Co. NM



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

December 30, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z-559-572-890

Ms. Margaret Lowe
Arco Permian
P.O. Box 1610
Midland, Texas 79702

**RE: GROUND WATER/SOIL INVESTIGATION AND REMEDIATION
SOUTH JUSTIS UNIT F-230**

Dear Ms. Lowe:

The New Mexico Oil Conservation Division (OCD) has reviewed Arco Permian's (Arco) November 15, 1999 "WORK PLAN, VADOSE ZONE GROUND WATER REMEDIATION PLAN, IDA WIMBERLY PIT, ARCO PERMIAN" and accompanying September 28, 1999 "ARCO PERMIAN, IDA WIMBERLY, SOUTH JUSTIS UNIT F-230, MONITOR WELL REPORT, LEA COUNTY, NEW MEXICO". These documents, which were submitted on behalf of Arco by their consultant Safety & Environmental Solutions, Inc, contain the results of Arco's investigation of soil and ground water contamination related to the former use of an unlined pit at Arco's South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico.. The documents also contain a work plan for installation of a new monitor well in the former pit, ground water quality monitoring and remediation of soil contamination.

The above referenced work plan is approved with the following conditions:

1. Arco shall sample soils from the new monitor well at 10 foot intervals from the surface. The samples shall be analyzed for concentrations of chloride, total petroleum hydrocarbons, benzene, toluene, ethylbenzene and xylene.
2. Arco shall complete the new monitor well as follows:
 - a. At least 15 feet of well screen shall be placed across the water table interface with 5 feet of the well screen above the water table and 10 feet of the well screen below the water table.
 - b. An appropriately sized gravel pack shall be set in the annulus around the well screen from the bottom of the hole to 2-3 feet above the top of the well screen.

- c. A 2-3 foot bentonite plug shall be placed in the annulus above the gravel pack.
 - d. The remainder of the annulus shall be grouted to the surface with cement containing 3-5% bentonite.
 - e. A concrete pad and locking well cover shall be placed at the surface.
 - e. The well shall be developed after construction using EPA approved procedures.
- 3. Arco shall wait a minimum of 24 hours after the new monitor well has been developed to purge and sample ground water from the monitor well.
 - 4. All soil and ground water samples shall be sampled and analyzed using EPA approved methods and quality assurance/quality control (QA/QC) procedures.
 - 5. Quarterly ground water sampling shall continue until the site receives approval for final closure of the soil and ground water remedial actions.
 - 6. All wastes generated during the investigation and remediation activities shall be disposed of at an OCD approved facility.
 - 7. Arco shall submit an annual report which contains the results of all investigation, remediation and monitoring activities. The report shall be submitted to the OCD Santa Fe Office by April 1 of each year with a copy provided to the OCD Hobbs District Office and shall include the following information:
 - a. A description of all investigation, remediation and monitoring activities which occurred during the past year including conclusions and recommendations.
 - b. A geologic/lithologic log and well completion diagram for each new monitor well, vapor venting well and soil boring.
 - c. A quarterly water table potentiometric map showing the location of the pit and any spills, excavated areas, monitor wells, soil borings, vapor venting wells and any other pertinent site features as well as the direction and magnitude of the hydraulic gradient.
 - d. Quarterly isopleth maps for contaminants of concern which were observed during the investigations.

Ms. Margaret Lowe

December 30, 1999

Page 3

- e. Summary tables of all new soil sampling results obtained during the investigation and copies of all laboratory analytical data sheets and associated QA/QC data.
- f. Summary tables of all ground water sampling results obtained over time since initiation of ground water sampling and copies of all laboratory analytical data sheets and associated QA/QC data.
- g. The disposition of all wastes generated.

Please be advised that OCD approval does not relieve Arco of liability should the work plan fail to adequately remediate or monitor contamination related to Arco's activities, or if contamination exists which is outside the scope of the work plan. In addition, OCD approval does not relieve Arco of responsibility for compliance with any other federal, state or local laws and regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,



William C. Olson
Hydrologist
Environmental Bureau

xc: OCD Hobbs District Office
Beth Aldrich, Safety & Environmental Solutions, Inc.

**Work Plan
Vadose Zone Ground Water Remediation Plan
Ida Wimberly Pit
ARCO Permian**

RECEIVED

NOV 17 1999

ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Purpose

The purpose of this Work Plan is to cause the closure of the abandoned pit located at the Ida Wimberly lease in a manner that will protect the population, environment and groundwater of the area surrounding the subject location. The Ida Wimberly lease is located at the ARCO Permian (ARCO) South Justis Unit F-230 in Unit C, Section 25, T25S, R37E, Lea County, New Mexico.

Background

In October 1997, ARCO secured the services of Safety and Environmental Solutions, Inc. to complete all necessary sampling and testing of the area covered by the abandoned pit located at the Ida Wimberly lease. ARCO owns the surface rights to Section 25 as well as part of the adjacent sections. ARCO owns the mineral rights in the NW 1/4 and the SW 1/4 NE 1/4. The remaining portion of the NE 1/4 are state mineral rights. The mineral rights of the south half of Section 25 are federal. ARCO controls the traffic on the surface of the property and also controls the disposition of the ground water under this property. (See Exhibit A- South Justis Unit Plat)

In the initial investigation, a borehole was drilled at the bottom of the pit area. The field analytical results indicated an elevated level of Total Petroleum Hydrocarbons (TPH). Knowledge of process indicates that the material in this area would be exempt oil field waste. Based upon this information, a work plan for installation of monitor wells to delineate contamination was developed. This information was reported to the New Mexico Oil Conservation Division in the report dated November 6, 1997, *ARCO Permian Work Plan Investigation of Possible Groundwater Impact, Section 25 Township 25S Range 37 E, Lea County, New Mexico*.

Upon approval of the work plan, three monitor wells were installed. The results revealed elevated levels of Chlorides and Total Dissolved Solids (TDS). This information was submitted to the New Mexico Oil Conservation Division in a report dated December 1997, *ARCO Permian Installation of Monitor Wells and Investigative Results, Section 25 Township 25S Range 37 E, Lea County, New Mexico*.

After review of these results, further delineation was deemed necessary. The installation of additional monitor wells was proposed and submitted to the New Mexico Oil Conservation Division in a report dated April 28, 1998, *ARCO Permian Amended Work Plan Investigation of Possible Groundwater Impact, Section 25 Township 25S Range 37 E, Lea County, New Mexico*. The results from this phase of the investigation were submitted under separate cover on September 28, 1999.

Shallow protectable groundwater in the area is scarce. There are two water wells within a one-mile radius of the pit. The water from these wells is currently used for livestock. This pit has not been used since before 1991 when ARCO acquired the lease. During this time, the hydrocarbons have not migrated beyond the pit boundaries. The lack of migration is confirmed by the latest sampling of the monitor wells conducted on September 24, 1999. A summary of the analysis follows:

| Contaminant | MW #1 | MW #2 | MW #3 | MW #4 | MW #5 | MW #6 | MW #7 |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sodium | 1157 ppm | 3611 ppm | 2892 ppm | 8521 ppm | 1355 ppm | 22692ppm | 3553 ppm |
| Calcium | 296 ppm | 544 ppm | 448 ppm | 736 ppm | 312 ppm | 2480 ppm | 600 ppm |
| Magnesium | 126 ppm | 258 ppm | 214 ppm | 272 ppm | 112 ppm | 1458 ppm | 97 ppm |
| Potassium | 24 ppm | 62 ppm | 55 ppm | 76 ppm | 20 ppm | 98 ppm | 66 ppm |
| Conductivity | 1978 ppm | 1715 ppm | 1679 ppm | 1603 ppm | 1657 ppm | 1482 ppm | 1523 ppm |
| T-Alkalinity | 188 ppm | 376 ppm | 376 ppm | 508 ppm | 196 ppm | 192 ppm | 136 ppm |
| Chlorides | 2231 ppm | 6590 ppm | 5374 ppm | 14600ppm | 2535 ppm | 42583ppm | 6387 ppm |
| Sulfate (SO ₄) | 455 ppm | 666 ppm | 397 ppm | 488 ppm | 429 ppm | 1428 ppm | 553 ppm |
| Carbonate | 0 ppm | 0 ppm | 0 ppm | 0 ppm | 0 ppm | 0 ppm | 0 ppm |
| HCO ₃ | 229 ppm | 459 ppm | 459 ppm | 620 ppm | 239 ppm | 234 ppm | 166 ppm |
| TDS | 4520 ppm | 14270ppm | 10330ppm | 20020ppm | 5100 ppm | 71000ppm | 12140ppm |
| pH | 7.19 | 6.88 | 6.91 | 7.04 | 7.28 | 6.74 | 7.59 |
| TPH | 2.76 ppm | 4.27 ppm | 1.52 ppm | 3.27 ppm | 1.26 ppm | 1.88 ppm | 1.32 ppm |
| Benzene | <.002 ppm | 0.003 ppm | 0.005 ppm | 0.033 ppm | <.002 ppm | 0.003 ppm | 0.008 ppm |
| Toluene | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| E. Benzene | <.002 ppm | <.002 ppm | <.002 ppm | 0.006 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| T. Xylenes | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm |

A cumulative summary of laboratory analytical results for each monitor well can be found attached as Appendix A. These results show elevated levels of Chlorides and TDS (Total Dissolved Solids) in all monitor wells from initial testing. Sulfate levels fluctuate in all wells from initial testing. Benzene has been observed in Monitor Well #4 only in all testing.

The Site Plan in Appendix B shows the location of the monitoring wells.

Method

Vadose Zone

ARCO proposes to begin remediation of the vadose zone by placing two soil-venting wells along the south edge of the existing pit area in order to allow oxygenation of the soils below surface. The wells will consist of 2" PVC screen contacting the vadose zone from a depth of 5' to just above the capillary fringe at an approximate depth of 50'. These wells will also allow light-end hydrocarbons to be vented to the surface. The process of introducing air to the vadose zone will enhance the process of natural attenuation.

Monitoring of the natural attenuation process will be achieved through the monitoring of the groundwater in the existing monitor wells.

Groundwater Program

ARCO agrees to sample existing groundwater in all monitor wells quarterly for a period of 18 months that began in June 1999. The quarterly samples will be analyzed for Chlorides, Sulfate, TDS, pH, TPH, Benzene, Toluene, Ethyl-benzene, and Total Xylenes as identified in the initial sampling. The initial samples were analyzed for TPH, BTEX, Chlorides, major Cations and Anions, and Total Dissolved Solids with results filed with the NMOCD Santa Fe and Hobbs District offices.

In addition to the monitoring program, Arco will install an exploratory well in the pit area in order to assess any impact contaminants from the pits area may have had upon the ground water underlying the pit.

ARCO proposes to begin drilling the three additional wells by December 3, 1999.

Appendix A

Cumulative Well Data

Ida Wimberly Cumulative Well Data

Monitor Well #1

| Contaminant | WQCC Standard | Initial Test 12/17/97 | Test Date 8/25/98 | Test Date 6/17/99 | Test Date 9/24/99 |
|---------------|------------------|-----------------------------|----------------------|----------------------|----------------------|
| Aluminum | 5.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Arsenic | 0.1 ppm | <0.1 ppm | n/a | n/a | n/a |
| Barium | 1.0 ppm | <1.0 ppm | n/a | n/a | n/a |
| Boron | 0.75 ppm | <0.75 ppm | n/a | n/a | n/a |
| Cadmium | 0.01 ppm | <0.01 ppm | n/a | n/a | n/a |
| Chloride | 250.0 ppm | 1580 ppm | 1839 ppm | 1610 ppm | 2231 ppm |
| Chromium | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Cobalt | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Copper | 1.0 ppm | <0.1 ppm | n/a | n/a | n/a |
| Iron | 1.0 ppm | .388 ppm | n/a | n/a | n/a |
| Lead | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Manganese | 0.2 ppm | 0.345 ppm | n/a | n/a | n/a |
| Mercury | 0.002 ppm | <0.02 ppm | n/a | n/a | n/a |
| Molybdenum | 1.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Nickel | 0.2 ppm | <0.2 ppm | n/a | n/a | n/a |
| Selenium | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Silver | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Sulfate | 600 ppm | 1050 ppm | 305 ppm | n/a | 455 ppm |
| Zinc | 10.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| TDS | 1000 ppm | 3480 ppm | 4380 ppm | 4560 ppm | 4520 ppm |
| pH | > 6 & <9 | 5.58 | 6.384 | n/a | 7.19 ppm |
| TPH | N/A | n/a | 42.9 ppm | n/a | 2.76 ppm |
| Benzene | 0.01 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| Toluene | 0.75 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| E. Benzene | 0.75 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| Total Xylenes | 0.62 ppm | <.006 ppm | <.006 ppm | n/a | <.006 ppm |

Monitor Well #2

| Contaminant | WQCC Standard | Initial Test 12/17/97 | Test Date 8/25/98 | Test Date 6/17/99 | Test Date 9/24/99 |
|---------------|------------------|--------------------------|----------------------|----------------------|----------------------|
| Aluminum | 5.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Arsenic | 0.1 ppm | <0.1 ppm | n/a | n/a | n/a |
| Barium | 1.0 ppm | <1.0 ppm | n/a | n/a | n/a |
| Boron | 0.75 ppm | <0.75 ppm | n/a | n/a | n/a |
| Cadmium | 0.01 ppm | <0.01 ppm | n/a | n/a | n/a |
| Chloride | 250.0 ppm | 6200 ppm | 2731 ppm | 3890 ppm | 6590 ppm |
| Chromium | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Cobalt | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Copper | 1.0 ppm | <0.1 ppm | n/a | n/a | n/a |
| Iron | 1.0 ppm | <2 ppm | n/a | n/a | n/a |
| Lead | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Manganese | 0.2 ppm | 0.343 ppm | n/a | n/a | n/a |
| Mercury | 0.002 ppm | <0.02 ppm | n/a | n/a | n/a |
| Molybdenum | 1.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Nickel | 0.2 ppm | <0.2 ppm | n/a | n/a | n/a |
| Selenium | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Silver | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Sulfate | 600 ppm | 1160 ppm | 426 ppm | n/a | 666 ppm |
| Zinc | 10.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| TDS | 1000 ppm | 10490 ppm | 12240 ppm | 7490 ppm | 14270 ppm |
| pH | > 6 & <9 | 7.84 | 6.303 | n/a | 6.88 |
| TPH | N/A | n/a | 14.0 ppm | 10.3 ppm | 4.27 ppm |
| Benzene | 0.01 ppm | <.002 ppm | <.002 ppm | <.002 ppm | .003 ppm |
| Toluene | 0.75 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| E. Benzene | 0.75 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| Total Xylenes | 0.62 ppm | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm |

Monitor Well #3

| Contaminant | WQCC Standard | Initial Test 12/17/97 | Test Date 8/25/98 | Test Date 6/17/99 | Test Date 9/24/99 |
|---------------|------------------|--------------------------|----------------------|----------------------|----------------------|
| Aluminum | 5.0 ppm | <0.3 ppm | n/a | n/a | n/a |
| Arsenic | 0.1 ppm | <0.1 ppm | n/a | n/a | n/a |
| Barium | 1.0 ppm | <1.0 ppm | n/a | n/a | n/a |
| Boron | 0.75 ppm | <0.75 ppm | n/a | n/a | n/a |
| Cadmium | 0.01 ppm | <0.01 ppm | n/a | n/a | n/a |
| Chloride | 250.0 ppm | 8500 ppm | 4124 ppm | 7570 ppm | 5374 ppm |
| Chromium | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Cobalt | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Copper | 1.0 ppm | <0.1 ppm | n/a | n/a | n/a |
| Iron | 1.0 ppm | <.2 ppm | n/a | n/a | n/a |
| Lead | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Manganese | 0.2 ppm | 0.440 ppm | n/a | n/a | n/a |
| Mercury | 0.002 ppm | <0.02 ppm | n/a | n/a | n/a |
| Molybdenum | 1.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Nickel | 0.2 ppm | <0.2 ppm | n/a | n/a | n/a |
| Selenium | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Silver | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Sulfate | 600 ppm | 1280 ppm | 279 ppm | n/a | 397 ppm |
| Zinc | 10.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| TDS | 1000 ppm | 15300 ppm | 8840 ppm | 15180 ppm | 10330 ppm |
| pH | > 6 & <9 | 7.77 | 6.64 | n/a | 6.91 |
| TPH | N/A | n/a | 24.6 ppm | n/a | n/a |
| Benzene | 0.01 ppm | <.002 ppm | <.002 ppm | <.002 ppm | .005 ppm |
| Toluene | 0.75 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| E. Benzene | 0.75 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| Total Xylenes | 0.62 ppm | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm |

Monitor Well #4

| Contaminant | WQCC Standard | Initial Test 8/10/98 | Test Date 8/25/98 | Test Date 6/17/99 | Test Date 9/24/99 |
|---------------|------------------|-------------------------|----------------------|----------------------|----------------------|
| Aluminum | 5.0 ppm | <0.3 ppm | n/a | n/a | n/a |
| Arsenic | 0.1 ppm | <0.1 ppm | n/a | n/a | n/a |
| Barium | 1.0 ppm | <1.0 ppm | n/a | n/a | n/a |
| Boron | 0.75 ppm | <0.75 ppm | n/a | n/a | n/a |
| Cadmium | 0.01 ppm | <0.01 ppm | n/a | n/a | n/a |
| Chloride | 250.0 ppm | 9641 ppm | 6910 ppm | 4680 ppm | 14600 ppm |
| Chromium | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Cobalt | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Copper | 1.0 ppm | <0.1 ppm | n/a | n/a | n/a |
| Iron | 1.0 ppm | <.2 ppm | n/a | n/a | n/a |
| Lead | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Manganese | 0.2 ppm | 0.440 ppm | n/a | n/a | n/a |
| Mercury | 0.002 ppm | <0.02 ppm | n/a | n/a | n/a |
| Molybdenum | 1.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Nickel | 0.2 ppm | <0.2 ppm | n/a | n/a | n/a |
| Selenium | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Silver | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Sulfate | 600 ppm | 159 ppm | 335 ppm | n/a | 488 ppm |
| Zinc | 10.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| TDS | 1000 ppm | 13580 ppm | 13960 ppm | 9460 ppm | 20020 ppm |
| pH | > 6 & <9 | 6.69 | 6.64 | n/a | 7.04 |
| TPH | N/A | <1.0 ppm | 11.8 ppm | n/a | 3.27 ppm |
| Benzene | 0.01 ppm | 0.033 ppm | 0.046 ppm | 0.003 ppm | 0.033 ppm |
| Toluene | 0.75 ppm | <.002 ppm | <.002 ppm | <.002 ppm | <.002 ppm |
| E. Benzene | 0.75 ppm | <.007 ppm | .012 ppm | <.002 ppm | 0.006 ppm |
| Total Xylenes | 0.62 ppm | <.006 ppm | <.006 ppm | <.006 ppm | <.006 ppm |

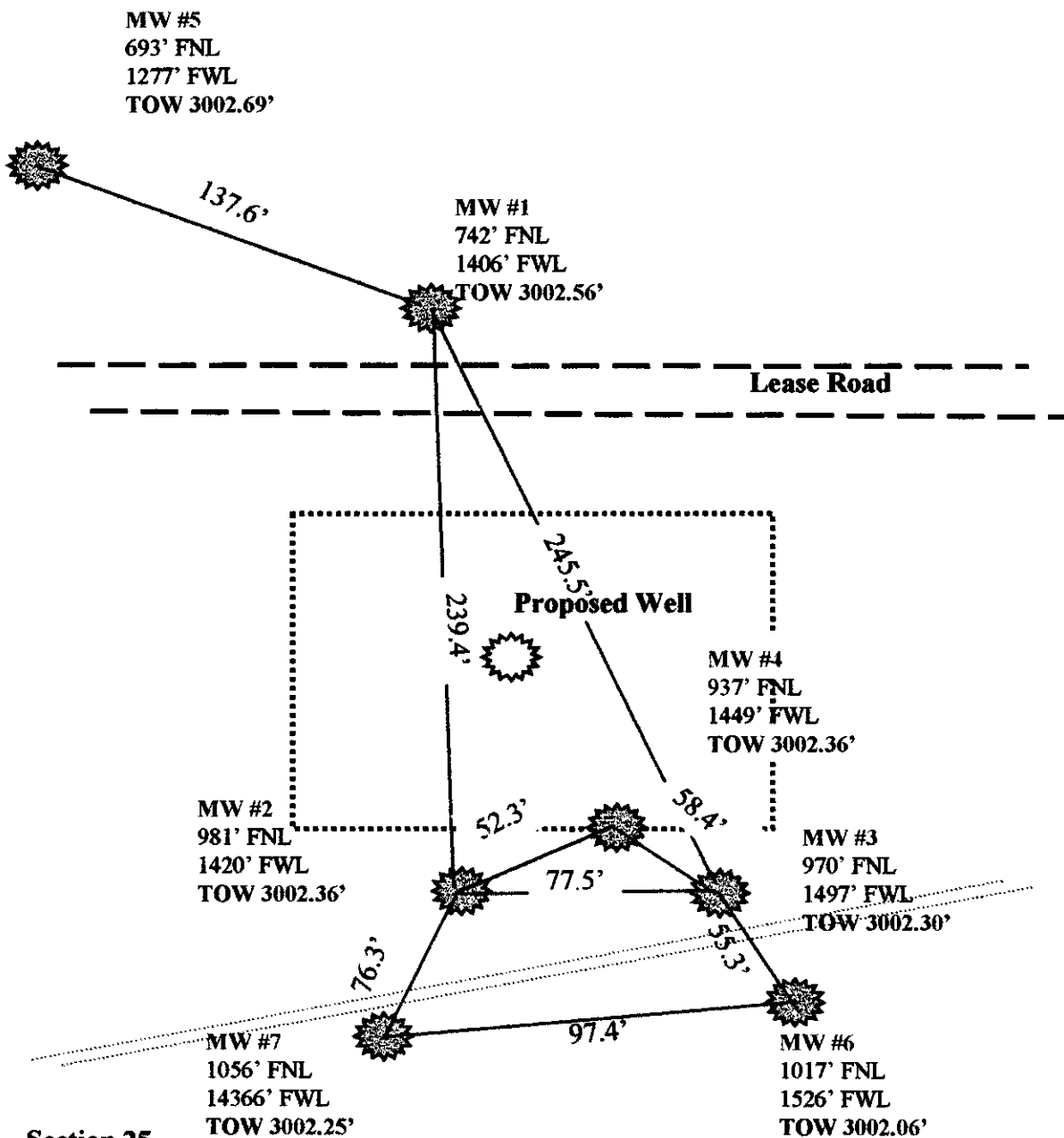
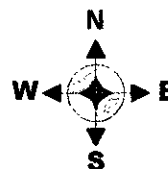
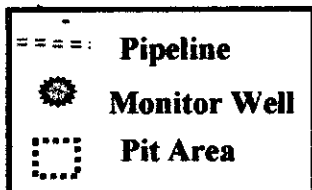
Monitor Well #5

| Contaminant | WQCC Standard | Initial Test 8/10/98 | Test Date 8/25/98 | Test Date 6/17/99 | Test Date 9/24/99 |
|---------------|------------------|-------------------------|----------------------|----------------------|----------------------|
| Aluminum | 5.0 ppm | <0.3 ppm | n/a | n/a | n/a |
| Arsenic | 0.1 ppm | <0.1 ppm | n/a | n/a | n/a |
| Barium | 1.0 ppm | <1.0 ppm | n/a | n/a | n/a |
| Boron | 0.75 ppm | <0.75 ppm | n/a | n/a | n/a |
| Cadmium | 0.01 ppm | <0.01 ppm | n/a | n/a | n/a |
| Chloride | 250.0 ppm | 1950 ppm | 2396 ppm | 2090 ppm | 2535 ppm |
| Chromium | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Cobalt | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Copper | 1.0 ppm | <0.1 ppm | n/a | n/a | n/a |
| Iron | 1.0 ppm | <.2 ppm | n/a | n/a | n/a |
| Lead | 0.05 ppm | <0.05 ppm | n/a | n/a | n/a |
| Manganese | 0.2 ppm | 0.440 ppm | n/a | n/a | n/a |
| Mercury | 0.002 ppm | <0.02 ppm | n/a | n/a | n/a |
| Molybdenum | 1.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| Nickel | 0.2 ppm | <0.2 ppm | n/a | n/a | n/a |
| Selenium | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Silver | 0.05 ppm | <0.1 ppm | n/a | n/a | n/a |
| Sulfate | 600 ppm | 138 ppm | 274 ppm | n/a | 429 ppm |
| Zinc | 10.0 ppm | <0.2 ppm | n/a | n/a | n/a |
| TDS | 1000 ppm | 3790 ppm | 5430 ppm | 5300 ppm | 5100 ppm |
| pH | > 6 & <9 | 7.14 | 7.216 | n/a | 7.28 |
| TPH | N/A | <1.0 ppm | 11.0 ppm | n/a | 1.26 ppm |
| Benzene | 0.01 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| Toluene | 0.75 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| E. Benzene | 0.75 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| Total Xylenes | 0.62 ppm | <.006 ppm | <.006 ppm | n/a | <.006 ppm |

Monitor Well #6

| Contaminant | WQCC Standard | Initial Test 8/11/98 | Test Date 8/25/98 | Test Date 6/17/99 | Test Date 9/24/99 |
|---------------|---------------|----------------------|-------------------|-------------------|-------------------|
| Aluminum | 5.0 ppm | n/a | n/a | n/a | n/a |
| Arsenic | 0.1 ppm | n/a | n/a | n/a | n/a |
| Barium | 1.0 ppm | n/a | n/a | n/a | n/a |
| Boron | 0.75 ppm | n/a | n/a | n/a | n/a |
| Cadmium | 0.01 ppm | n/a | n/a | n/a | n/a |
| Chloride | 250.0 ppm | 29600 ppm | 24186 ppm | 25500 ppm | 42583 ppm |
| Chromium | 0.05 ppm | n/a | n/a | n/a | n/a |
| Cobalt | 0.05 ppm | n/a | n/a | n/a | n/a |
| Copper | 1.0 ppm | n/a | n/a | n/a | n/a |
| Iron | 1.0 ppm | n/a | n/a | n/a | n/a |
| Lead | 0.05 ppm | n/a | n/a | n/a | n/a |
| Manganese | 0.2 ppm | n/a | n/a | n/a | n/a |
| Mercury | 0.002 ppm | n/a | n/a | n/a | n/a |
| Molybdenum | 1.0 ppm | n/a | n/a | n/a | n/a |
| Nickel | 0.2 ppm | n/a | n/a | n/a | n/a |
| Selenium | 0.05 ppm | n/a | n/a | n/a | n/a |
| Silver | 0.05 ppm | n/a | n/a | n/a | n/a |
| Sulfate | 600 ppm | n/a | 750 ppm | 1200 ppm | 1428 ppm |
| Zinc | 10.0 ppm | n/a | n/a | n/a | n/a |
| TDS | 1000 ppm | 58260 ppm | 58260 ppm | 53980 ppm | 71000 ppm |
| pH | > 6 & <9 | n/a | 6.829 | n/a | 6.74 |
| TPH | N/A | <1.0 ppm | 6.8 ppm | n/a | 1.88 ppm |
| Benzene | 0.01 ppm | 0.044 ppm | 0.007 ppm | n/a | 0.003 ppm |
| Toluene | 0.75 ppm | 0.004 ppm | <.002 ppm | n/a | <.002 ppm |
| E. Benzene | 0.75 ppm | <.002 ppm | <.002 ppm | n/a | <.002 ppm |
| Total Xylenes | 0.62 ppm | 0.009ppm | <.006 ppm | n/a | <.006 ppm |

Appendix B Site Plan



Section 25,
 Township 25 South
 Range 37 East N.M.P.M.

ARCO Permian

Site Plan
South Justis F-230
Monitor Wells

Safety & Environmental
Solutions, Inc.
Hobbs, New Mexico



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

March 22, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. P-274-520-636

Ms. Margaret Lowe
Arco Permian
P.O. Box 1610
Midland, Texas 79702

**RE: GROUND WATER/SOIL INVESTIGATION
SOUTH JUSTIS UNIT F-230**

Dear Ms. Lowe:

The New Mexico Oil Conservation Division (OCD) has reviewed Arco Permian's (Arco) February 10, 1999 correspondence and 2 accompanying undated documents titled "ARCO PERMIAN SOUTH JUSTIS UNIT F-230, INSTALLATION OF ADDITIONAL MONITOR WELLS AND INVESTIGATION RESULTS, LEA COUNTY, NEW MEXICO" and "ARCO PERMIAN SOUTH JUSTIS UNIT F-230, IDA WIMBERLY LEASE, WORK PLAN, VADOSE ZONE REMEDIATION, LEA COUNTY, NEW MEXICO". These documents, which were submitted on behalf of Arco by their consultant Safety & Environmental Solutions, Inc, contain the results of Arco's investigation of soil and ground water contamination related to the former use of an unlined pit at Arco's South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico.. The documents also contain a work plan for capping and leaving existing soil contamination in place on the assumption that hydrocarbons will not migrate from the pit.

A review of the above referenced documents and prior reports on the site shows that hydrocarbons have already migrated from the pit into ground water and contaminated ground water in excess of New Mexico Water Quality Control Commission (WQCC) ground water standards. Ground water contamination at the site will not be abated as long as a source of contaminants still exists in the soils overlying the ground water. Therefore, the above referenced work plan to not remediate the source of the contamination and cap the pit is denied. The OCD requires that Arco submit an alternate work plan to the OCD Santa Fe Office by April 30, 1999 with a copy provided to the OCD Hobbs District Office. The work plan shall include a soil and ground water remediation plan as well as a plan for monitoring ground water quality in all site monitor wells.

In addition, the investigations have shown that salts exist in the pit soils and have migrated from the pit to the ground water. Arco concludes that the source of these salts is an adjacent produced water

Ms. Margaret Lowe
March 22, 1999
Page 2

pipeline. In order to assess whether the pit or the pipeline is the source of this contamination please provide the OCD with information on the types of wastes which were placed in the pit, the name of the operator of the pipeline and any evidence of releases from the pipeline. Please provide this information along with the above required work plan.

If you have any questions, please call me at (505) 827-7154.

Sincerely,



William C. Olson
Hydrologist
Environmental Bureau

xc: OCD Hobbs District Office
Beth Aldrich, Safety & Environmental Solutions, Inc.

Z 274 520 636

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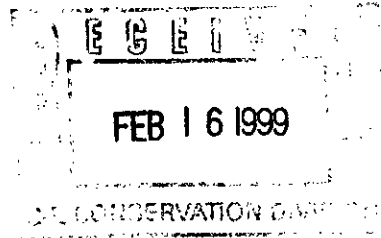
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PS Form 3800, April 1995

Safety & Environmental Solutions, Inc.

February 10, 1999

Mr. Bill Olsen
New Mexico Oil Conservation Division
2040 S. Pacheco Street
Santa Fe, New Mexico 87505



Dear Mr. Olsen:

Please find enclosed the corrected reports for the Arco Permian South Justis Monitor well installation in Lea County, New Mexico. Also enclosed in the proposed Work Plan for Vadose Zone Remediation at the pit. This work plan will be implemented upon your approval.

If you have any questions or comments, please call. Thank you.

Sincerely,

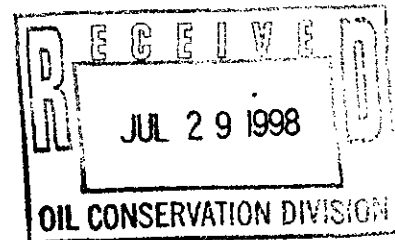
Beth Aldrich

BA/nh
enclosure

Safety & Environmental Solutions, Inc.

July 23, 1998

Mr. Bill Olsen
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505



Dear Mr. Olsen:

As agreed to in our conversation on July 23, 1998, your office will receive the Additional Monitor Well Investigation Results report for the Arco Permian South Justis Unit F-230 by September 4, 1998. This extension is due to the problems encountered with obtaining a drilling unit. We are tentatively scheduled to drill these monitor wells the week of August 10, 1998.

If you have any questions please don't hesitate to call. Thank you.

Sincerely,

A handwritten signature in cursive script, appearing to read "Beth Aldrich".

Beth A. Aldrich for
Bob Allen, President
SES, Inc.

Cc: Margaret Lowe
Larry Henson

BA/baa



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 10, 1998

CERTIFIED MAIL
RETURN RECEIPT NO. P-235-437-285

Ms. Margaret Lowe
Arco Permian
P.O. Box 1610
Midland, Texas 79702

**RE: GROUND WATER INVESTIGATIONS
SOUTH JUSTIS UNIT F-230**

Dear Ms. Lowe:

The New Mexico Oil Conservation Division (OCD) has reviewed the following Arco Permian (Arco) documents which were submitted on behalf of Arco by their consultant Safety & Environmental Solutions, Inc.:

- December 1997 "ARCO PERMIAN SOUTH JUSTIS UNIT F-230, INSTALLATION OF MONITOR WELLS AND INVESTIGATION RESULTS, LEA COUNTY, NEW MEXICO" which was received by the OCD on March 2, 1998.
- April 28, 1998 "ARCO PERMIAN SOUTH JUSTIS UNIT F-230, AMENDED WORK PLAN, INVESTIGATION OF POSSIBLE GROUNDWATER IMPACT, LEA COUNTY, NEW MEXICO".

These documents contain the results of Arco's investigation of the soil and ground water contamination and an amended work plan for additional investigations of the extent of ground water contamination related to Arco's activities at the South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico.

The above referenced work plan is approved with the following conditions:

1. Ground water from all of the monitor wells will be sampled and analyzed for benzene, toluene, ethylbenzene, xylene (BTEX), cations and anions and total dissolved solids (TDS) using EPA approved methods and quality assurance/quality control procedures.

Ms. Margaret Lowe
June 10, 1998
Page 2

2. Arco will submit a report on the investigation actions to the OCD by August 10, 1998. The report will contain:
 - a. A description of all activities conducted including conclusions and recommendations.
 - b. A site map showing the monitor well locations and other pertinent site features.
 - c. A ground water potentiometric map created using the water table elevations from all site monitor wells. The map will show the direction and magnitude of the hydraulic gradient at the site.
 - d. Geologic logs and well completion diagrams for all site monitor wells.
 - e. A summary of the water quality sampling analyses including copies of the laboratory analytical results and the associated quality assurance/quality control data.
 - f. The disposition of all wastes generated.
3. Arco will notify the OCD at least 48 hours prior to all scheduled activities such that the OCD has the opportunity to witness the activities and split samples.

Pleased be advised that OCD approval does not relieve Arco of liability if the work plan fails to adequately define the extent of contamination related to Arco's activities. In addition, OCD approval does not relieve Arco of responsibility for compliance with any other federal, state or local laws and regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,



William C. Olson
Hydrogeologist
Environmental Bureau

xc: Wayne Price, OCD Hobbs District Office
Bob Allen, Safety & Environmental Solutions, Inc.

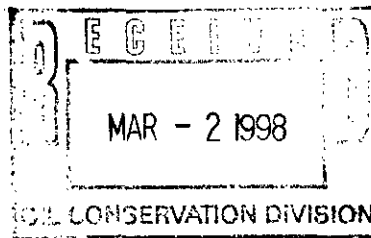
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PS Form 3800, April 1995

Safety & Environmental Solutions, Inc.

February 25, 1998

Mr. Bill Olsen
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505



Dear Mr. Olsen:

Please find enclosed an Installation of Monitor Wells and Investigation Results report for your file for Arco South Justis Unit F-23. Mr. Allen would appreciate your perusal and response as quickly as possible to discuss further exploration methods on this project.

If you have any questions please don't hesitate to call. Thank you.

Sincerely,

Beth A. Aldrich for
Bob Allen, President
SES, Inc.

Enclosures

BA/baa



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

November 25, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-410-431-232

Ms. Margaret Lowe
Arco Permian
P.O. Box 1610
Midland, Texas 79702

**RE: GROUND WATER INVESTIGATION
SOUTH JUSTIS UNIT F-230**

Dear Ms. Lowe:

The New Mexico Oil Conservation Division (OCD) has reviewed Arco Permian's (Arco) November 11, 1997 "ARCO PERMIAN SOUTH JUSTIS UNIT F-230, WORK PLAN, INVESTIGATION OF POSSIBLE GROUNDWATER IMPACT, LEA COUNTY, NEW MEXICO" which was submitted on behalf of Arco by their consultant Safety & Environmental Solutions, Inc. This document contains Arco's work plan to determine the extent of ground water contamination related to Arco's activities at the South Justis Unit F-230 located in Unit C, Section 25, T25S, R37E, Lea County, New Mexico.

The above referenced work plan is approved with the following conditions:

1. Ground water from all of the monitor wells will be sampled and analyzed for benzene, toluene, ethylbenzene, xylene (BTEX), polynuclear aromatic hydrocarbons, Water Quality Control Commission (WQCC) metals and cations and anions using EPA approved methods and quality assurance/quality control procedures.
2. Arco will submit a report on the investigation actions to the OCD by January 23, 1997. The report will contain:
 - a. A description of all activities conducted including conclusions and recommendations.
 - b. A map showing the monitor well locations and the direction and magnitude of the hydraulic gradient and other pertinent site features.
 - c. Geologic logs and well completion diagrams for each monitor well.

Ms. Margaret Lowe
November 25, 1997
Page 2

- d. The laboratory analytical results of all soil and water quality sampling including the quality assurance/quality control data.
 - e. The disposition of all wastes generated.
3. Arco will notify the OCD at least 48 hours prior to all scheduled activities such that the OCD has the opportunity to witness the activities and split samples.

Pleased be advised that OCD approval does not relieve Arco of liability if the work plan fails to adequately define the extent of contamination related to Arco's activities. In addition, OCD approval does not relieve Arco of responsibility for compliance with any other federal, state or local laws and regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,



William C. Olson
Hydrogeologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Supervisor
Bob Allen, Safety & Environmental Solutions, Inc.

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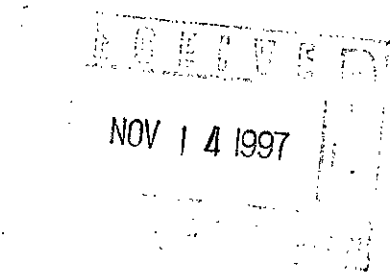
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PS Form 3800, April 1995

Safety & Environmental Solutions, Inc.

November 11, 1997

Mr. Roger Anderson
New Mexico Oil Conservation Division
2040 S. Pacheco Street
Santa Fe, New Mexico 87505



Dear Mr. Anderson:

Please consider this letter as your formal notification of a possible groundwater impact by hydrocarbons in Unit C of Section 25 Township 25S Range 37E in Lea County, New Mexico. This location is an abandoned pit operated by Arco Permian.

I have enclosed a work plan for the initial investigation of this contamination and will pursue the full delineation of contamination after analysis of the results of the initial investigation.

Please consider the work plan as the first phase of the work to be done on this project. If the plan meets with your approval, kindly contact me by phone as the scheduling of equipment in this area has become a problem. This work plan will be implemented immediately upon your approval and successful scheduling of the necessary equipment.

Thank you for your consideration in this matter.

Sincerely,

Bob Allen REM
President

BA/nh
enclosure

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone

☐ Personal

Time

9:19 AM

Date

10/29/97

Originating Party

Other Parties

Bob Allen - SAFETY & ENVIRONMENT

R. ANDERSON

Subject

GW CONTAMINATION

Discussion

While operating a pit for Arco Permian at UL C Sec 25 25S 37E free oil was encountered at 55 feet. GW is estimated at 65 feet. TPH at 50 feet was 10000 ppm. S&ES will submit a workplan.

Conclusions or Agreements

Distribution

Bill Olson

Signed

R. Anderson