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STAGE 1 WORKPLAN

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ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

STAGE 1 ABATEMENT PLAN

FOR THE

SOUTH LANGLIE JAL UNIT

CONSISTING OF PORTIONS OF SECTIONS 7, 8, 17 & 18 TOWNSHIP 25 SOUTH – RANGE 37 EAST LEA COUNTY, NEW MEXICO

2 February 2002

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Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM

1.0 INTRODUCTION

1.1 EXECUTIVE SUMMARY

Chaparral Energy, Inc. (hereinafter referred to as Chaparral) purchased the New Mexico assets of Bristol Resources Corporation (hereinafter referred to as Bristol) in late October 2000 and began operating the unit in early November. Part of this purchase is the South Langlie Jal Unit (hereinafter referred to as SLJU) located along the northern edge of Jal, New Mexico. Mr. and Mrs. Clay Osborn (hereinafter referred to as Osborn or the surface owner) the surface owners upon whom this unit rests has reported their water wells have "salted out" in the aquifer located just below 45 feet from surface. Tests of their water wells over the years reportedly show a steadily increasing presence of chlorides to the point the water is no longer fit for human or livestock use. A USGS states that the once potable ground water in this area started to become nonpotable as early as 1953, and probably earlier (Ground-Water Report 6, Geology and Ground-Water Conditions in Southern Lea County, New Mexico, United State Geological Survey, 1961, pages 95, 105 and 106). A chloride content of 610 ppm had been found in well 25.37.15.223 on 26 February 1953, one of several shallow water wells in the Jal, New Mexico area at this time. A chloride content of 525 ppm had been found in well 22.37.1.440 in October 1953, another one of several shallow water wells in the Jal, New Mexico area at this time. Since the injection of saltwater in the SLJU did not begin until early 1971, it is highly improbable whether this unit was the cause, or even a major contributor to the groundwater contamination of Mr. Osborn's wells. This document represents Chaparral's compliance with the New Mexico Energy, Minerals and Natural Resources Department who has ordered Chaparral submit an abatement plan to investigate and abate ground water pollution underneath this unit.

As part of this plan, Chaparral searched the data readily available in the Hobbs, New Mexico office of the NMOCD, reviewed available literature and environmental assessment reports, examined aerial photos and physically investigated the unit and adjoining properties. The sites herein were selected based on these investigations tempered by the fact it is prohibitively expensive to thoroughly test and evaluate each and every site that appears to have distressed vegetation, no matter the cause. Chaparral was aware parts of the SLJU were in need of clean up when the unit was purchased from Bristol. Accordingly, it was committed to removing the abandon equipment and affecting repairs to flowlines and storage batteries as was necessary to improve the environmental stance of the unit. Since taking over operations and ownership of the SLJU two very small but reportable releases were experienced and both were immediately reported to the NMOCD and cleaned up to state standards. These sites have been included in this plan for the purposes of ensuring they are and remain clean. Chaparral has also upgraded its storage facilities and several flowlines within the unit to prevent potential releases. Some existing wells are scheduled to be properly plugged and abandoned in that they are no longer needed for waterflood operations and it is the prudent thing to do if the wells are no longer needed or necessary for the economic recovery of oil and gas. After reviewing the work of past evaluators it appears many of the sites presented by them revealed no contamination, or, in several cases, only limited contamination. These sites may only required removing the top few inches of soil and replacing it with cleaner soil. The removed soil can be dealt with off-site at a location

agreeable to the NMOCD. In that they do not appear to be a source of chloride problems they are not listed here, but they will be dealt with as Chaparral continues its lease cleanup program. Off site are at least two potential sources of groundwater pollution. To the west, on going oil and gas production operations have resulted in numerous saltwater releases readily evidenced by distressed and dead vegetation, cleared areas that have been worked to remediate spill-affected sites. This is a probable source of chlorides in the aquifer. To the south, the daily watering of the golf course allegedly uses high chloride ground water mixed with water from the sanitary lagoons to the east. This would pull contaminated groundwater towards the golf course wells at a much faster rate than the Osborn's wells, thus "salting out" the Osborn's wells. Applying the high chloride water to the fairways would result in high evaporation rates, leaving salt deposits behind. These evaporates would eventually work their way down into the aquifer further adding to the chlorides in the first aquifer. Further contamination from oil and gas production north of the SLJU is another potential source of chloride contamination.

1.2 SITE DESCRIPTION

The SLJU consists of parts of Sections 7, 8, 17 & 18 of Township 25 South, Range 37 East, Lea County, New Mexico, more precisely described as the E/2 SW/4, SE/4 and the SW/4 NE/4 of Section 7, the SW/4 of Section 8, the W/2 of Section 17 and the E/2 of Section 18, all lying in Township 25 South, Range 37 East, Lea County, New Mexico. (See Appendix A.1 and A.2)

1.3 SITE MAPS AND DIAGRAMS

1.3.1 7.5 Minute Series (1:24,000 Scale) Topographic Map (Composite using parts of the Jal NW Quadrangle and the Jal Quadrangle Maps, both dated 1969 and Photorevised in 1979.). See Appendix A.1.

1.3.2 Field Lease Map with the SLJU boundaries marked. Producing oil wells, saltwater injection wells and known monitoring wells are spotted on this map. See Appendix A.2.

1.3.3. Map indicating the projected location for drilling new monitoring wells. See Appendix A.3.

1.3.4. Map showing known water wells within the confines of the unit. Where known, the chloride content of the water is given. See Appendix A.4.

1.3.5. Copy of a portion of the Geologic Map of Southern Lea County, New Mexico showing type of material on the surface as well as the age of that material. See Appendix A.5.

1.3.6 Copy of a portion of the Ground-Water Map of Southern Lea County, New Mexico showing water-table contours, type of rock from which the water is found, depth to water, depth of well and whether the well is flowing or being pumped. See Appendix A.6.

1.3.7 Well spot map showing the location of all known oil and gas wells, injection wells, saltwater disposal wells, tank batteries (existing and abandoned), storage and disposal pits, flare pits, pipelines, flowlines, injection lines, water injection plants and other such oilfield related facilities. See Appendix A.7.

1.3.8 Pipeline map showing all known pipelines, flowlines and injection lines. See Appendix A-8.

1.3.9 Map showing all documented release sites. See Appendix A-9.

1.3.10 Diagrams showing the location of soil and water sampling sites as reported by Cornerstone Environmental Services, Inc. See Appendix A-10.

1.4 SITE HISTORY

The SLJU sits in undeveloped rangeland just north of Jal, New Mexico. This area has been producing oil and natural gas since the 1920's. Prior to the discovery of oil and gas in this area the property had been used as rangeland. Few improvements have been made to the area other than various homes, barns, corrals, and other outbuildings needed for ranching and the facilities necessary for oil and gas exploration and production. Adjoining properties, surface and subsurface, to the north, east and west have been used in a like manner since this area was settled. South of the Osborn ranch house is the City of Jal Municipal Golf Course and Country Club followed by the northern edge of the City of Jal proper. From the information provided Chaparral there is at a minimum nine waterwells with in the boundaries of the SLJU that are, or recently have been, in use. Other water wells and groundwater monitoring wells are located within one mile of the SLJU. The Jal Country Club has drilled and developed several water wells to support the vegetation on the country club grounds. These wells produce water from the first aquifer and apply a mixture of high chloride groundwater with water from the sewage lagoons to the east to the golf course. These wells lie south of Osborn's home in the southeast corner of Section 18-T25S-R37E, Lea County, New Mexico (see Appendix A.4.). To date, accurate and reliable well data on these wells as to their exact location and depth has not been seen by Chaparral personnel. The injection of saltwater in the SLJU did not begin until early 1971. It is doubtful this unit was the cause, or even a major contributor to the groundwater contamination of Mr. Osborn's wells. Bristol, Apache Corporation, Texaco Exploration and Production, Inc., Penroc Oil Corporation and possibly others have operated the SLJU or individual producing wells within the unit prior to Chaparral acquiring the SLJU in October 2000, according to the information at hand. Oil and gas production operations by other parties are underway up-gradient and down-gradient from the SLJU.

According to the United States Geological Survey, Ground-Water Report 6, (Geology and Ground-Water Conditions in Southern Lea County, New Mexico, 1961, by Alexander Nicholson, Jr. and Alfred Clebsch, Jr.) groundwater in this area became nonpotable as early as 1953, if not before. Chloride has been found as high as 610 ppm in at least one water well in the Jal, New Mexico area at that time (well 25.37.15.223 on 26 February 1953).

According to telephone conversations with the NMOCD, at least thirty other Stage 1 Abatement Plans are being pursued in the Lea and Eddy County area of the State.

1.5 SUMMARY OF PREVIOUS INVESTIGATIONS

Starting on 18 January 1999, Cornerstone Environmental Resources, Inc. (hereinafter referred to as CERI), on behalf of Bristol, conducted a Phase II Environmental Assessment of the property. Trenches were dug along the path of the 10 January 1999 saltwater release between the SLJU #9 and the SLJU #13 WIW to the top of the first hard barrier (caliche) where liquids were thought to not be able to pass. Soil samples were taken in an attempt to ascertain the depth of damage due to brine from pipeline leaks or other sources. Sampling and testing showed some high chloride levels, however CERI stated it also indicated the damage done was either from earlier releases (prior to Bristol taking over operations of the unit), releases from off-site, or the presence of high chlorides could be naturally occurring. Talks were held with the NMOCD to determine the appropriate actions to be taken concerning these discoveries. The NMOCD directed Bristol to determine the source of the brine water and to perform vertical and horizontal delineation of the contamination by sampling for BTEX, TPH and Chlorides. (PHASE II ENVIRONMENTAL ASSESSMENT, South Langlie Jal Unit, Lea County, New Mexico, Not Dated, Cornerstone Environmental Resources, Inc.)

On 15 and 16 June 1999, CERI conducted a second Phase II Environmental Assessment of the property. Six soil borings using a 7" hollow stem auger were made to depths of 20 to 25 feet to further delineate chloride concentrations at or near the site of the 10 January 1999 release just north of the SLJU Well #13 WIW. These borings were to ascertain the presence and concentration of chlorides, BTEX and TPH, if any existed. BTEX above the detection limit of 20µg/kg was not found in any of the samples analyzed. TPH was found in several places above the detection range of 1 mg/kg. (See Appendix B.) TPH in the diesel range was found only near the surface of Soil Sampling Well #3 and TPH in the gasoline range was found near the surface of Soil Sampling Well #6. Chlorides in the soil were found at varying and unconnected intervals from the surface to total depth. Concentrations ranged from 1 to 3,710 ppm. Ground water was reportedly not encountered in any soil sampling well. (PHASE II ENVIRONMENTAL ASSESSMENT, South Langlie Jal Unit, Lea County, New Mexico, Not Dated, Cornerstone Environmental Resources, Inc.)

On 20 and 21 July 2000, CERI conducted a third Phase II Environmental Assessment of the property. This time three sites were evaluated for the deeper presence of hydrocarbon and chloride contamination. Site 1 was an abandoned oil and gas lease tank battery. A sign at the facility identified the site as the Winters "E" Lease Tank Battery located near the center of the W/2 NE/4 of Section 18-T25S-R37E. Two oil storage tanks remained, but have since been removed by Bristol. Bristol left the battery fence, concrete blocks and some junk iron in place. Site 2 was another tank battery site without production vessels. No lease sign was present to properly identify the lease, but according to the topographic map the location is near the S/2 S/2 NE/4 of Section 18-T25S-R37E. This would be the Winters "C" tank battery site. Site number 3 was a former flare pit located west of an abandoned tank battery located near the W/2 SW/4 SE/4 of Section 18-T25S-R37E. This would be the abandon tank

battery that served the plugged Gutman #2-18. No production vessels remain at this site. Soil material was found on top of a plastic tarp just west of the pit, indicating contaminated soil had been removed by parties unknown and allowed to bio-remediate in place.

Samples at Site 1 were analyzed and found to have TPH GRO of 23.1 mg/kg and TPH DRO of 13,900 mg/kg. No BTEX was detected. The positive test came from heavy, dried hydrocarbon contaminated soils that had been picked up and piled in the northeast corner of the tank battery pad. This soil reportedly can be dug up and hauled to a proper disposal facility in that it is not mobile hydrocarbon and does not appear to extend below ground level more than a few inches. Similar hydrocarbon deposits were found at Site 2 and again no BTEX was detected. Testing in 1999 (using EPA Method 8015 Modified) had detected TPH GRO of 1.55 mg/kg and TPH DRO of 4,160 mg/kg from this soil at the surface. Additional testing in June 2000, using EPA Method 418.1, detected TPH in the 8,000 to 8,800 mg/kg range at the surface. A surface sample at Site 3 showed TPH DRO of 24,300 mg/kg, but no BTEX or TPH GRO. Tests were also conducted on the soil that had been placed on the plastic tarp. BTEX, TPH DRO and TPH GRO were not detected. (See Appendix B.) However, TPH using EPA Method 418.1 did detect TPH of 8,700 mg/kg from this source. CERI recommended the top six inches of soil at each site be removed for off-site disposal and the pit backfilled with clean soil. Bristol and CERI felt that was all that would be necessary to bring these sites into full compliance with NMOCD regulations. (PHASE II ENVIRONMENTAL ASSESSMENT, South Langlie Jal Unit, Lea County, New Mexico, Not Dated, Cornerstone Environmental Resources, Inc.)

According to Safety & Environmental Solutions, Inc.'s, (hereinafter referred to as SESI) report of 27 January 2000, a Phase II Environmental Site Assessment on behalf of Osborn was conducted. SESI reportedly made eight test borings around the Winters "E" Lease Tank Battery (SESI and CERI Site #1); four test borings at the Winters "C" Lease Tank Battery located at SE/4 SW/4 NE/4 of Section 18-T25S-R37E (SESI and CERI Site #2); and, three test borings near the Gutman Lease Tank Battery (SESI and CERI Site #3) in an attempt to determine the vertical extent of BTEX, TPH and Chloride contamination. Chlorides in soil were stated to be in excess of 250 ppm to a depth of 45 feet from surface at all locations. The next set of test borings was reportedly made north of the SLJU #13 WIW. Here SESI put in 6 boreholes to a depth of 25 feet. Results were similar to those found earlier. Several other sites were mentioned as being visually identified but not yet tested. The exact location of these sites has not been made clear to Chaparral. A final site, which appears to be just south of Osborn's home, was identified by SESI as a place to install three test borings. The surface owner and SESI personnel have told Chaparral that SESI sampled and tested the known water wells in the immediate vicinity of Osborn's home for the presence and concentration of chlorides. Reportedly, chloride concentrations ranged from 121 mg/l to 857 mg/l, but data was not provided on a specific well to well basis. (See Appendix Safety and Environmental Solutions, Inc. report dated 27 January 2000 as prepared for Mr. Clay Osborn.) Also, a sample of the water used by the City of Jal for watering the country club was analyzed by SESI and found to have a chloride concentration of 610 mg/l. Again, exactly which well was tested was not reported. SESI provided several years worth of laboratory analysis conducted on wells operated by the City of Jal, New Mexico. These wells are listed by number or name, but their exact location is not given. The City of Jal will be asked to more properly

designate the location and current use of each well during the course of this first investigation by Chaparral.

2.0 WORKPLAN – SUBSURFACE

2.1 SITE GEOLOGY AND HYDROLOGY

The surface of the unit is comprised of sediments of Quaternary age that are in the form of either alluvial deposits or dune sands of Recent age. The alluvium was deposited in topographically low areas where the Triassic Ogallala formation has been eroded away. The dune sands normally cover both the alluvium and the Ogallala formation. In several areas the older alluvium is exposed in small duneless patches or in pits, natural or man made. The alluvium varies in thickness from just a few inches to several hundreds of feet, with an average depth of approximately 100 feet. The surface it is generally calcareous silt. Surface sands are usually very porous and permeable, as are alluvial deposits, with fractured caliche at or just below the surface. The sand encountered in this area is generally a fine- to medium-grained, uniformly reddish-brown or white and poorly cemented. The dunes are stable to semistable over most of the area with some active dune migration. Average thickness of the sand runs between 5 to 10 feet with some areas as much as 30 feet in thickness.

Structurally, this portion of Lea County, New Mexico sits in the Delaware Basin. Triassic rocks in the area have a regional dip of less than 1 degree to the southeast. There are reverse dips in the area generally around depressions. Groundwater flow tends to follow this regional dip within the area of the SLJU. The only other structural features are major unconformities due to subsidence or differential compaction of the sediments to the west. These structural features have some effect on the direction of groundwater flow, usually directing it to the south.

2.2 VERTICAL & HORIZONTAL EXTENT OF THE PLAN

Several test borings have already been made throughout the unit area. However, the exact extent of any possible contamination, both horizontally and vertically, has not been established. The limited information received from Bristol's representatives helped determine the location of the six sites to be investigated on the SLJU. Chaparral will continue to solicit this data from the NMOCD wherever it can be found. In order to ascertain the existence and concentration of off-site contamination migrating in from the west and northwest, Chaparral proposes to install three monitoring wells down to the base of the first aquifer (approximately 60 feet from surface) at the following locations along the western edge of the SLJU (more monitoring wells may be drilled as is deemed necessary):

MW #	Location	Section
1	300' west of the SW/4 NW/4 SE/4 (next to pipeline ROW and in the middle of a NW to SE running gully)	18-T25S-R37E
2	300' west of the SW/4 SE/4 SW/4 (south of gravel pit and in the middle of a NW to SE running gully)	7-T25S-R37E
3	100' south of the center of the Section (in the middle of a NW to SE running gully)	7-T25S-R37E

Other monitoring wells will also be installed down-gradient of sites tested and found contaminated with excess chlorides, BTEX or TPH. A monitoring well already exists north of the SLJU #13WIW. It will be used to monitor contamination as a result of releases that have occurred in this area over a period of years.

Six sites within the SLJU have been identified as having the potential to have had oil and/or saltwater releases. (See Appendix F) They will be inspected for signs of surface damage and, if found to be a source of contamination, test holes drilled on a square grid pattern to ascertain the vertical and horizontal extent of contamination, if any, that exists. The Hobbs office of the New Mexico Oil Conservation Division has identified these sites.

Soil samples shall be taken every ten feet and field-tested for the presence of total petroleum hydrocarbons (TPH – Gasoline and TPH - Diesel), benzene, toluene, ethylbenzene, xylene (BTEX) and chlorides (Cl). Samples with positive field tests shall be sent to a laboratory for analysis. In an attempt to determine the presence of natural waters (if any can be found in the area) as opposed to waters from oil and gas production operations, water samples shall also be taken where possible from each test well and analyzed for benzene, toluene, ethylbenzene, xylene (BTEX), total dissolved solids (TDS), major cations and anions and New Mexico Water Quality Control Commission (WQCC) metals. All sampling and testing shall use EPA approved methods and quality assurance/quality control (QA/QC) procedures. The results of these tests shall be compiled with the results from previous testing and an attempt shall be made to ascertain if the soil contamination exists.

2.3 MAGNITUDE OF VADOSE-ZONE & GROUNDWATER CONTAMINATION

Vadose-zone contamination has not been determined. No report made available to Chaparral to date mentions by name or reference a vadose-zone being encountered, although a vadose zone should have been encountered in every test boring that went to the first aquifer. Should data be missing or otherwise unavailable this area shall be addressed in this investigation and report when Chaparral drills test and monitoring wells.

2.4 SUBSURFACE HYDRAULIC PARAMETERS

2.4.1 HYDRAULIC CONDUCTIVITY

Hydraulic conductivity has yet to be determined. When the proposed test and monitoring wells are drilled and completed, hydraulic conductivity calculations shall be made. Existing

water wells completed in this zone, if useable, shall also be tested so long as the well's owner allows the work to be completed.

2.4.2 HYDRAULIC TRANSMISSIBILITY

Hydraulic transmissibility has yet to be determined. When the proposed test and monitoring wells are drilled and completed, hydraulic transmissibility calculations shall be made. Existing water wells completed in this zone, if useable, shall also be tested so long as the well's owner allows the work to be completed.

2.4.3 HYDRAULIC STORATIVITY

Hydraulic storativity has yet to be determined. When the proposed test and monitoring wells are drilled and completed, hydraulic storativity calculations shall be made. Existing water wells completed in this zone, if useable, shall also be tested so long as the well's owner allows the work to be completed.

2.4.4 RATE OF CONTAMINATE MIGRATION

Rate of contaminate migration has yet to be determined. When the proposed test and monitoring wells are drilled and completed, rate of contamination migration calculations shall be made. Existing water wells completed in this zone, if useable, shall also be tested so long as the well's owner allows the work to be completed.

2.4.5 DIRECTION OF CONTAMINATE MIGRATION

Previous borings and measurements appear to indicate groundwater is moving to the southeast, possibly from the hills located north and west of Jal, New Mexico. This flow crosses the unit and would cause contamination from sources north and west of the unit to pass underneath the property of the surface owner and the City of Jal, New Mexico. There is a possibility regional groundwater flows will go in a different direction over a limited area due to near-surface impermeable strata, hills, etc. It appears this may be the case along the north edge of the golf course where there is indications surface and groundwater flow is to the north, towards the Osborn home. The proposed test and monitoring wells, as well as use of local water wells should help confirm the general direction of groundwater flow. In order to determine the direction of groundwater flow, all existing water wells used in this survey and all new wells put in by Chaparral shall be surveyed in, accurately spotted on a USGS Topographic Map and from this an accurate direction of groundwater flow and contaminate migration determined.

2.5 INVENTORY OF WATER WELLS

The true extent of groundwater contamination, if any, is not fully known at this time. From previous sampling it appears most of the water wells underlying Osborn's surface have chloride concentrations in excess of permissible levels (250 mg/l). The same may possibly be said of the water wells used by the City of Jal, New Mexico in their golf course watering

operations. As the full extent of any contamination of these wells is determined a more accurate water well count will be made. See the Appendix D for a list of water and monitoring wells (provided by Bristol) in the area and Appendix E (provided by SESI) for a partial listing of water wells with reported chloride contamination problems. At present, no reliable data has been seen as to the exact location and depth of any water well in the area. Water well owners in the area may need to be required by the State of New Mexico to provide well data should said data not be a part of the State of New Mexico's records. A request is being made to the State of New Mexico State Engineer's Office for all data pertaining to known water wells in the area. This data shall be incorporated into the initial report filed by Chaparral.

2.6 INVENTORY OF WATER WELLS WITHIN ONE-MILE OF THE PERIMETER OF THE THREE-DIMENSIONAL BODY WHERE THE STANDARDS OF SEC. 4103.B ARE EXCEEDED

The location of water wells within one-mile of the perimeter of the three-dimensional body where the standards of Section 4103.B are exceeded are not fully known at this time. Further examination of existing records and an actual physical investigation is required to determine this perimeter after which an inventory can be produced. A partial list of waterwells in the area is attached in Appendix D. Attempts are being made to locate all water wells within one mile of the SLJU boundaries. The list of privately owned water wells in this area as maintained by the State of New Mexico is incomplete. The City of Jal has been contacted for any information it may have in this area. City provided data will be picked up at City Hall as part of the initial field operations proposed here. As they are identified and properly located on the map they will be listed. Surface owners shall be questioned as to each well's depth, date of construction, water quality when drilled, water quality today and present use. With the permission of the well's owners, water samples may be taken to ascertain contaminates present and their concentration. Water wells that are tested and found contaminated with chloride, BTEX or TPH will be listed as per paragraphs 2.7 and 2.8 below.

2.7 LOCATION OF SUCH WELLS ACTUALLY EXCEEDING WQCC STANDARDS

A listing of presently known wells actually exceeding WQCC standards is attached to this document. See Appendix E. See paragraph 2.6 above in regards to adding to this list.

2.8 LOCATION OF SUCH WELLS POTENTIALLY EXCEEDING WQCC STANDARDS

The exact location of wells potentially exceeding WQCC standards is unknown at this time. Once this phase of the investigation is over a list will be prepared. See paragraph 2.6 above in regards to adding to this list.

3.0 WORKPLAN – SURFACE

Company crews have been working to remove surface trash, debris, abandoned equipment and materials from the unit surface. Furthermore, the existing oil storage facility has been enhanced with a new oil storage tank to replace a bad one, removal of out-of-service vessels and new lines have been installed between pieces of equipment. Steps are already underway to restore abandoned wellsites. As test wells are drilled and soil samples analyzed, a determination will be made in the field as to the extent, if any, of the chloride and/or petroleum contamination that may exist. Test wells that are not to be used as monitoring wells shall be plugged in accordance with state requirements. Where contamination is found, monitoring wells shall be drilled down gradient of the site in accordance with state requirements.

3.1 SURFACE-WATER HYDROLOGY

A preliminary assessment of the surface water hydrology on the unit proper indicates a relatively flat surface cut by several shallow northwest to southeast running gullies. No intermittent streams or creeks nor any natural ponds or lakes are shown on the topographic map for the lands comprising the unit. No lakes, creeks or streams were seen during the course of a recent physical investigation of the surface of the unit proper, only very shallow and broad areas that can conduct floodwater runoff were seen. West of the unit near the W/2 W/2 of Section 18-T25S-R37E (750' FWL & 60' FNL of the SW/4 of Section 18-T25S-R37E) is a man-made pond. This pond lies up dip from, and outside the boundaries of the SLJU, but could easily be contaminated by any release from oil and gas operations further up dip to the north and west by offset operators. The Jal Golf Course watering activities may produce surface water runoff that carries contaminates down hill towards the Osborn home.

3.2 SEASONAL STREAM FLOW CHARACTERISTICS

There are no active streams or creeks on the surface of the unit. Erosional gullies contain flowing water only after heavy rainfall events and even then only for a very short period of time.

3.3 GROUNDWATER/SURFACE WATER RELATIONSHIPS

Based on the maps seen to date, a physical inspection of the property and conversations with those who claim to know the area, surface waters in the form of rainfall tend to soak into the ground very quickly. Just beneath the topsoil (mostly sand) is a layer of fractured caliche and limestone. These rocks potentially could provide protection to the aquifer. Migrating groundwater will eventually intercept surface waters to the southeast, but the exact surface waters are unknown at this time. A map and surface study will be undertaken to ascertain what surface waters may be affected by groundwater migration.

3.4 IMPACT TO SURFACE WATER AND STREAM SEDIMENTS

Any release of produced water onto the surface will have little to no direct impact upon surface waters and stream sediments. Surface waters are seldom in the area and then only during storm events. There are no streams in the area where excess sediments would be a detriment to the stream.

3.5 IMPACTS ON SURFACE WATER

From visual inspections, no surface water exists nearby which can be directly contaminated by SLJU operations. Surface flow from the Jal Golf Course may be able to find its way north to a small pond next to Osborn's home. No information has been found to indicate this has or is happening, but water samples shall be taken from this pond and analyzed for the presence of chlorides.

3.5.1 BIOLOGICAL ASSESSMENT OF FISH

There are no known fish in this area other than those in the Osborn's Koi pond. To date it appears surface runoff has not affected them. A lack of adequate rainfall, coupled with a loss of useable groundwater to keep the pond full, does affect water quality and quantity in this pond.

3.5.2 BIOLOGICAL ASSESSMENTS OF BENTHIC MACROINVERTEBRATES

There are no known benthic macroinvertebrates in this immediate area.

3.5.3 BIOLOGICAL ASSESSMENT OF OTHER WILDLIFE POPULATIONS

Any produced water that may have been released on the unit lands does not appear to have had any affect on local wildlife. No pools or ponding of saltwater or crude oil has been seen and surface soils appear to have absorbed any produced water that may have come into contact with the surface. Evaporation in this area is at such a rapid pace that little remains for wildlife to drink or become exposed to should produced waters temporarily pond.

4.0 MONITORING PROGRAMS

At the present time Chaparral does not have any monitoring wells in place on this unit. A physical investigation of the unit revealed a monitoring well just north of the SLJU Well #13 WIW. Bristol reportedly put this in after a pipeline release in January 1999. Chaparral has no verifiable data from this well, but CERI states the well was drilled to a total depth of 52 feet with the top of the aquifer being found at 45 feet from surface. This well was abandoned by Bristol, left unplugged and has not been tampered with since Chaparral took possession of the unit. It has not had its water tested for well over a year now. Once data has been received from Bristol or CERI as to this monitoring well Chaparral may use it to help

monitor the groundwater at this location. SESI reportedly sampled water wells in the area, but the exact wells sampled were not adequately identified to allow one to use the analytical reports. Chaparral intends to install three monitoring wells along the western boundary of the unit in an attempt to monitor groundwater as it crosses over into the unit (see paragraph 2.2 above). Water from these wells shall be sampled and tested on a quarterly basis as per paragraph 4.3 below.

As part of an ongoing monitoring program, all oil and gas producing wells and all saltwater injection wells are monitored for casing leaks as per State oil and gas regulations. Any saltwater injection well that fails to pass a Mechanical Integrity Test (MIT) is taken out of service until such time as the reason for failure is ascertained and the problem corrected. Based on state records all of these wells have adequate surface casing, cemented to surface, to protect all known fresh water zones in the area. It is very unlikely a saltwater injection well would contaminate a fresh water zone due to a casing leak. Also monitored are all saltwater injection lines, flowlines from production wells to the tank battery and oil sales lines. Company personnel and the persons responsible for transporting crude oil watch for a pressure drop on any of these lines. Should a pressure drop occur in any line that line is taken out of service until the cause for the pressure loss can be found and corrected.

4.1 SAMPLING STATIONS

Chaparral has no sampling points at this time, nor does it have an accurate map showing the locations of the on-site and off-site water wells that draw water from the affected aquifer. Present plans are to identify contaminated sites, if any, within the unit boundaries and drill test borings to the first aquifer at each site. (See Appendix F for a table of documented release sites within the unit.) Furthermore, at three additional points along the up-gradient boundary of the unit, monitoring wells are planned in order to monitor the groundwater entering the aquifer underlying the unit. Soil samples shall be taken from each boring site and tested every five to ten feet into the ground. Water samples shall be taken and tested regardless of what field-testing indicates. After a site has been identified as a potentially contaminated site (evidenced by substantial differences in testing from up dip wells) both vertically and horizontally, monitoring wells shall be installed down-gradient of the site. The first well shall be drilled approximately 100 feet down-gradient of the forward edge of the identified contamination and the second well shall be installed 100 feet further down-gradient. A survey shall be made of all existing water wells on and within one-half mile of the unit boundaries. Those wells identified shall also have their water sampled and tested as per paragraph 4.3 below so long as their owners allow Chaparral access to the well.

4.2 FREQUENCIES OF SAMPLING

Each monitoring well, groundwater well and other such available water well, both public and private, within the confines of the unit as well as within one-half mile of the unit shall have their waters sampled annually thereafter unless required to be tested more often by the NMOCD. Monitoring shall continue until such time as Chaparral is satisfied that the SLJU is not the cause for any groundwater contamination.

4.3 LABORATORY TESTS TO BE RUN AND ANALYTES

The initial groundwater-sampling program shall include testing for benzene, toluene, ethylbenzene, xylene (BTEX), total dissolved solids (TDS), major cations and anions and New Mexico Water Quality Control Commission (WQCC) metals using EPA approved methods and quality assurance/quality control (QA/QC). Future testing shall be based on the results of the initial sampling test results.

The soil shall be initially tested in the field for benzene, toluene, ethylbenzene, xylene (BTEX), total petroleum hydrocarbons – gasoline range (TPH GRO), total petroleum hydrocarbons – diesel range (TPH DRO) and chlorides (Cl). Samples that respond positively to field-testing shall be sent to a certified laboratory for further testing using EPA and State of New Mexico Water Quality Control Commission (WQCC) approved methods.

4.4 QUALITY ASSURANCE PLAN

The quality assurance plan used shall be consistent with the sampling and analytical techniques listed in Section 3107.B of 20 NMAC 6.2, Ground and Surface Water Protection, as well as EPA approved methods and quality assurance/quality control (QA/QC).

4.5 SITE SAFETY AND HEALTH PLAN

A Site Safety and Health Plan is attached as Appendix H at the end of this plan. This plan may be amended should on-site circumstances require it to be changed. Appendix J contains a Material Safety Data Sheet (MSDS) for crude oil, the only expected chemical to be found on location. Should other chemicals be discovered on-site or in the groundwater an appropriate MSDS shall be procured.

5.0 ACTIVITIES SCHEDULE

A Schedule of Activities is attached as Appendix I at the end of this plan. This schedule is subject to modification, as on-site circumstances require.

5.1 SUBMISSION OF QUARTERLY PROGRESS REPORTS

A report shall be prepared by Chaparral, or its agent, for submission to the NMOCD in Santa Fe and in Hobbs, New Mexico within 30 days of the completion of the initial work and not later than 30 days after the end of each calendar quarter so long as the abatement process continues. With said report shall be a recommendation(s) as to further work deemed necessary.

5.2 SUBMISSION OF FINAL SITE INVESTIGATION REPORT

A final report submission date is unknown at this time, but Chaparral, or its agent, shall submit this report as required by the NMOCD.

6.0 ADDITIONAL INFORMATION

No additional information is provided at this time.

6.1 FIGURES AND SITE DIAGRAMS

Attached to the end of this plan are copies of the maps, lists, tables, schedules, work plans and other related data necessary to show where work is to be conducted and data already found to be pertinent to this Abatement Plan.

6.2 PHOTOGRAPHS

No photographs are provided with this document. The reports submitted after each phase of work is completed should contain photographs as is warranted in the field.

6.3 LABORATORY REPORTS AND CHAIN OF CUSTODY FORMS

This document contains no laboratory reports or chain-of-custody forms. Subsequent reports may contain this material after samples are taken and analyzed. Previous reports submitted to the NMOCD are not included. Chaparral does not have possession of the original documents and cannot vouch for the accuracy of the copies in hand.

6.4 APPENDICES

A	Site Maps and Diagrams
A.1	7.5 Minute Series (1:24,000 Scale) Topographic Map
A.2	Field Lease Map with the South Langlie Jal Unit Boundaries Marked.
A.3	Map indicating the projected location for drilling new monitoring wells.
A.4	Map showing known water wells within the confines of the unit. Where known, the chloride content of the water is given.
A.5	Copy of a portion of the Geologic Map of Southern Lea County, New Mexico showing type of material on the surface as well as the age of that material.
A.6	Copy of a portion of the Ground-Water Map of Southern Lea County, New Mexico showing water-table contours, type of rock from which the water is found, depth to water, depth of well and whether the well is flowing or being pumped.
A.7	Well Spot Map showing the location of all known oil and gas wells, water injection wells, tank batteries and pits.
A.8	Pipeline Map showing all known pipelines, flowlines and injection lines.
A.9	Map showing documented release sites.
A.10	Diagrams showing the location of soil and water sampling sites as reported by Cornerstone Environmental, Inc.
B	Water and Soil Sample Analysis Conducted by Cornerstone Environmental Resources Inc. and by Safety and Environmental Services, Inc..
C	Table of Analytical Reports from the City of Jal, New Mexico Water Wells.
D	List of Water Wells and Monitoring Wells in the Vicinity of the Osborn Ranch.

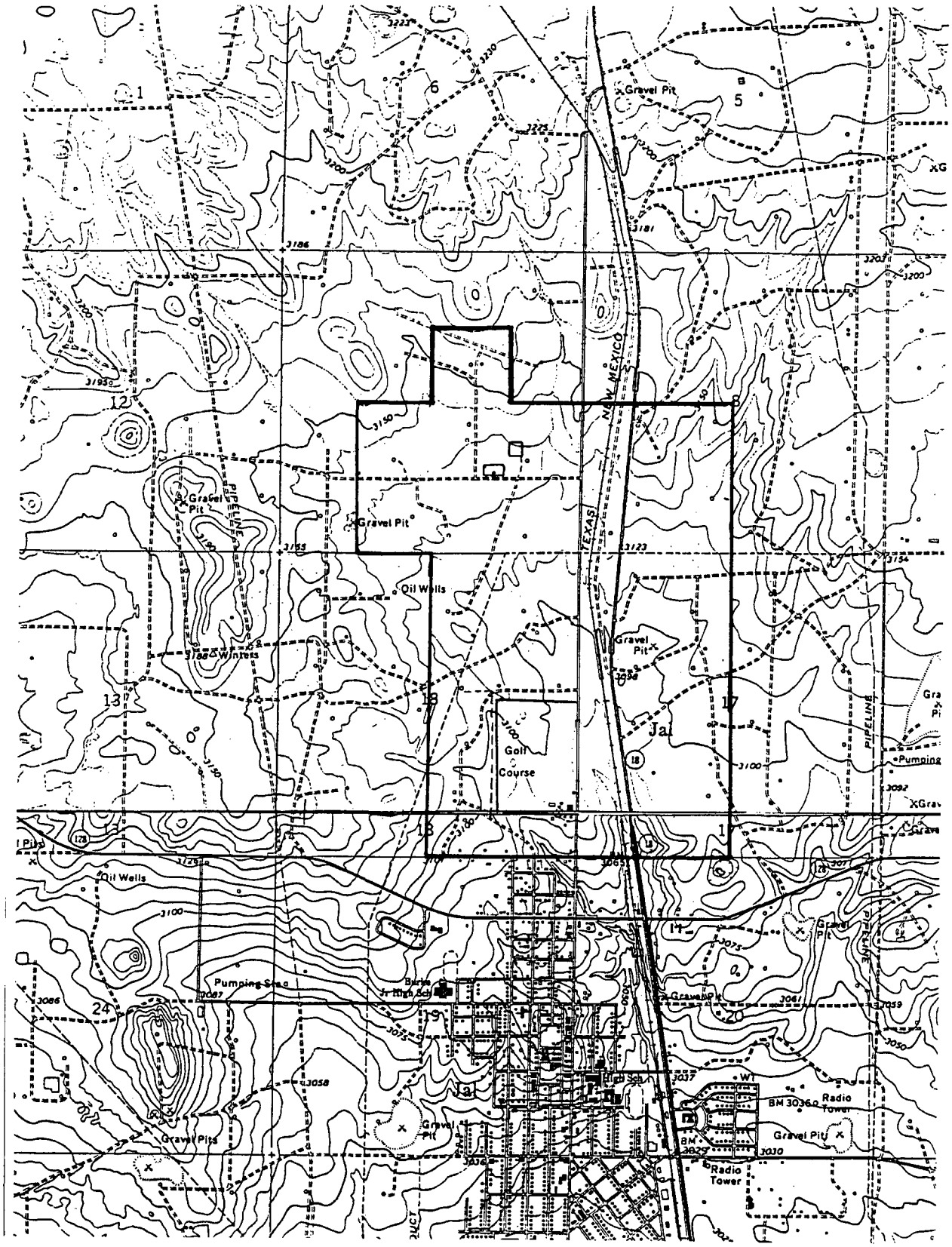
E	Waterwells Actually Affected by Pollution
F	Table of Known or Suspected Release Sites
G	List of Oil and Gas Production and Disposal Facilities
H	Site Safety and Health Plan
I	Activities Schedule
J	Material Safety Data Sheet – Crude Oil

APPENDIX A

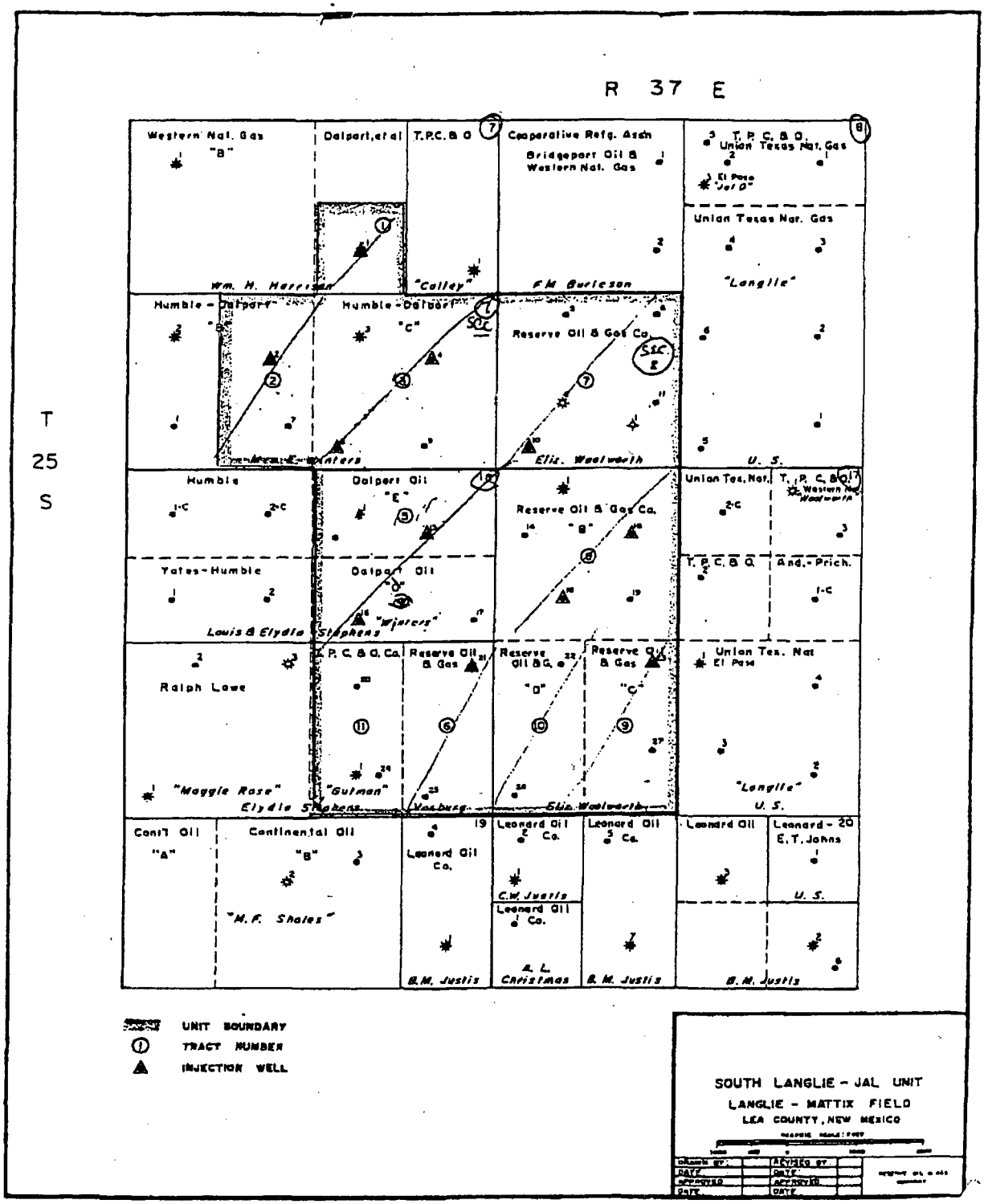
SITE MAPS

A.1 7.5 Minute Series (1:24,000 Scale) Topographic Map.

Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM

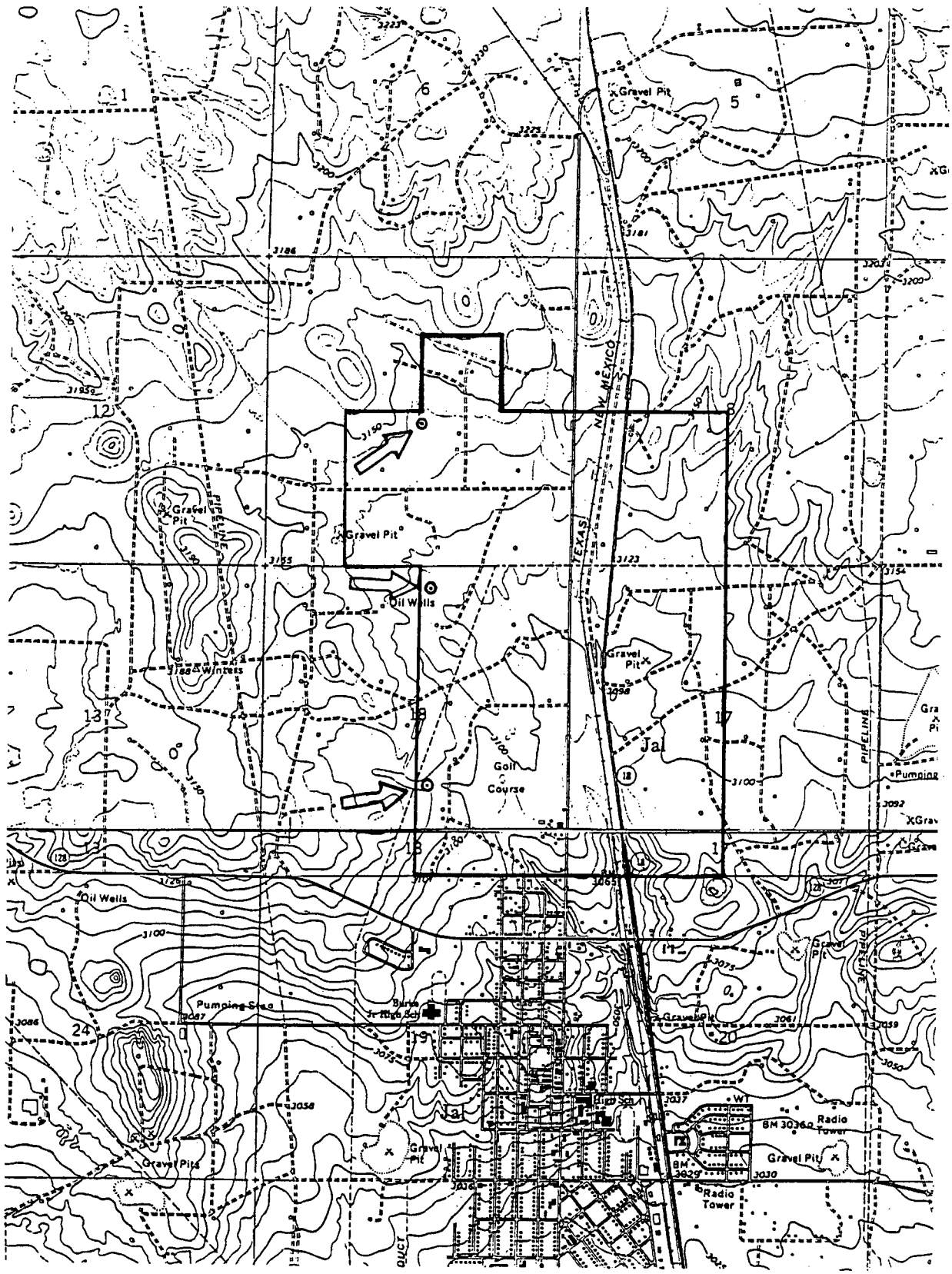


A.2 Field Lease Map with the South Langlie Jal Unit Boundaries Marked.


R 37 E
T 25 S
Western Nat. Gas "B"
Dalport, et al
T.P.C. & O
Cooperative Refg. Assn
Bridgeport Oil & Western Nat. Gas
T. P. C. & O.
Union Texas Nat. Gas
El Paso "Jal D"
Union Texas Nat. Gas
"Langlie"
Wm. H. Harrison
"Colley"
F M Burleson
Humble - Dalport "B"
Humble - Dalport "C"
Reserve Oil & Gas Co.
Sec. E
Elis. Woolworth
U. S.
Humble
Dalport Oil "E"
Reserve Oil & Gas Co. "B"
Union Tex. Nat.
T. P. C. & O.
Western Nat. Woolworth
Yates-Humble
Dalport Oil
T. P. C. & O.
And.-Prich.
Louis & Elydia Stephens
"Wiggers"
Ralph Lowe
P. C. & O. Co.
Reserve Oil & Gas
Reserve Oil & G. "D"
Reserve Oil & Gas "C"
Union Tex. Nat
El Paso
"Maggie Rose"
Elydia Stephens
"Gutman"
Vaughn
Elis. Woolworth
"Langlie"
U. S.
Conl Oil "A"
Continental Oil "B"
"M. F. Shales"
Leonard Oil Co.
Leonard Oil Co.
C.W. Justis
Leonard Oil Co.
A. L. Christmas
Leonard Oil
Leonard - 20
E. T. Johns
U. S.
B. M. Justis
B. M. Justis
B. M. Justis
UNIT BOUNDARY
TRACT NUMBER
INJECTION WELL
SOUTH LANGLIE - JAL UNIT
LANGLIE - MATTIX FIELD
LEA COUNTY, NEW MEXICO
DRAWN BY
DATE
APPROVED
DATE
REVISED BY
DATE
APPROVED
DATE

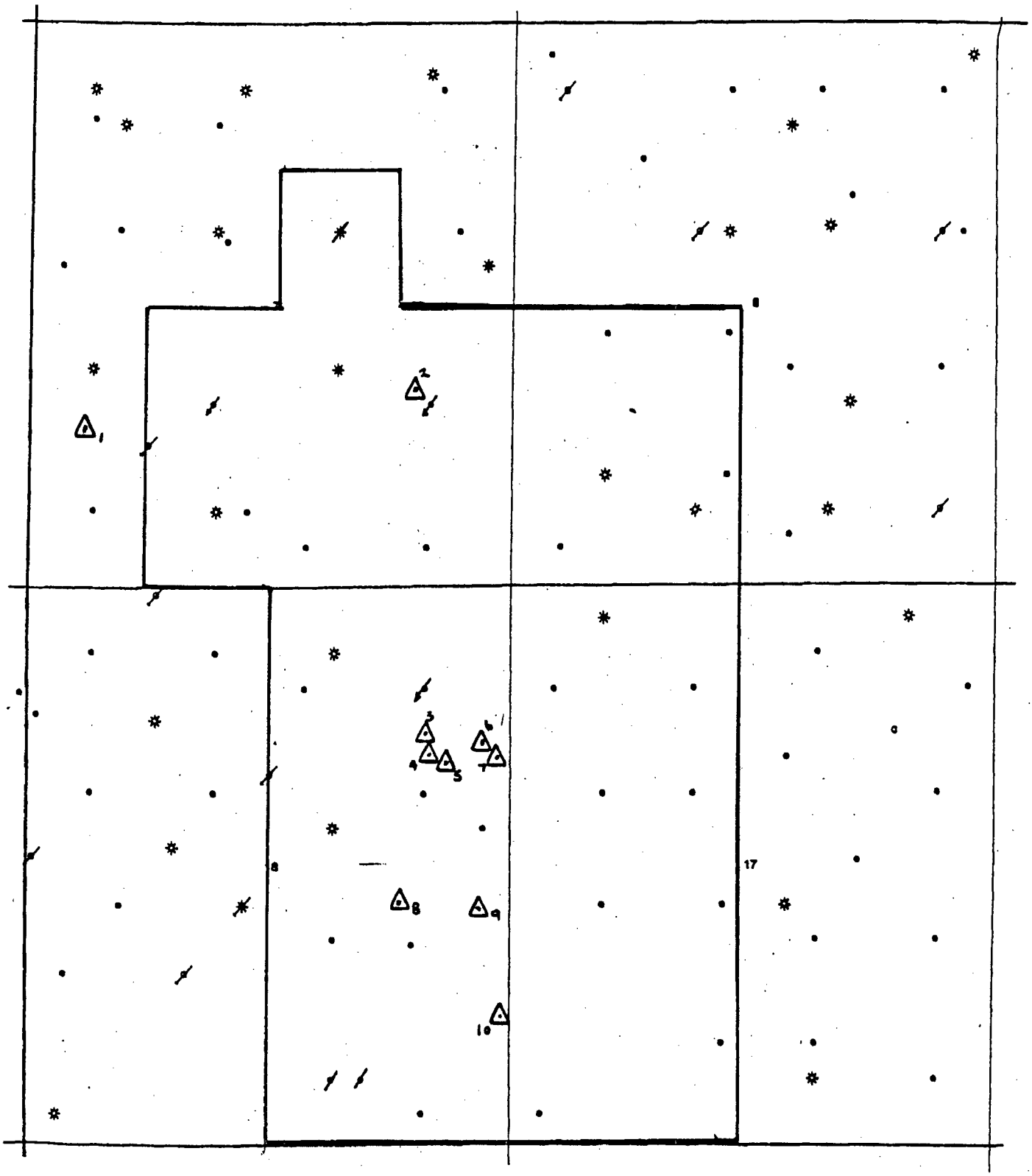
A.3 Map indicating the projected location for drilling new monitoring wells.

Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM

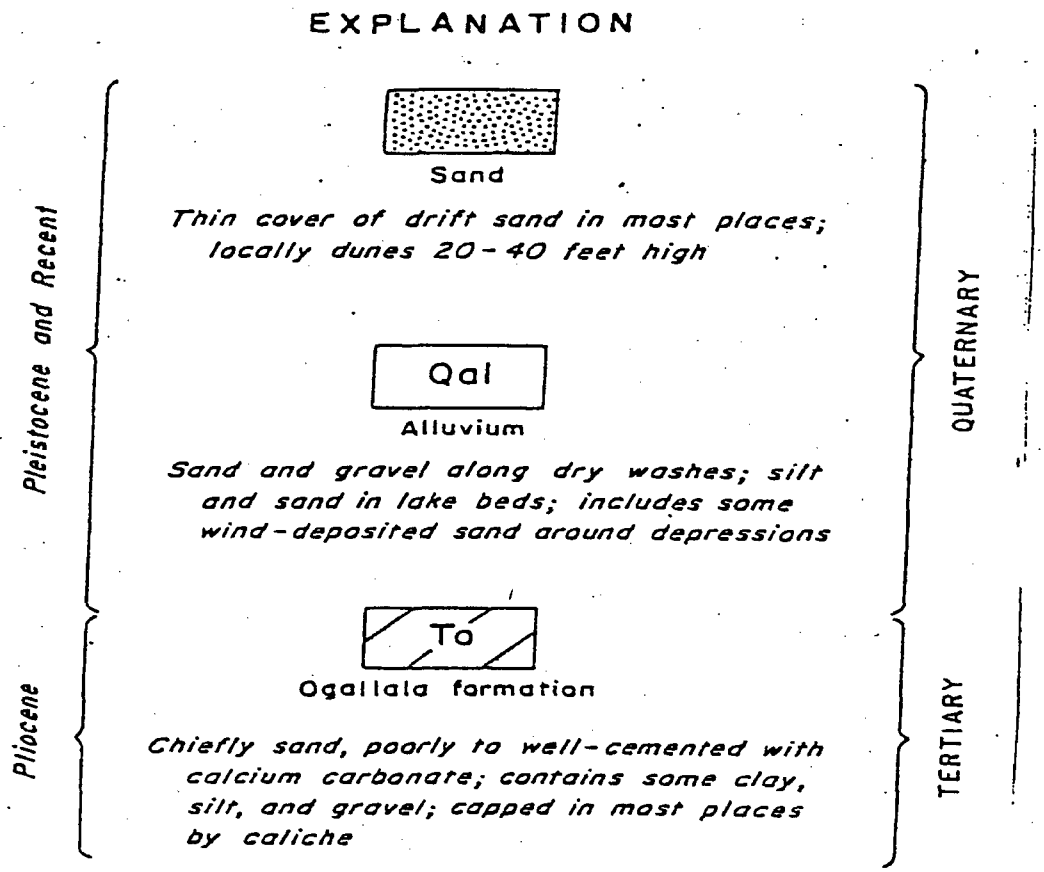


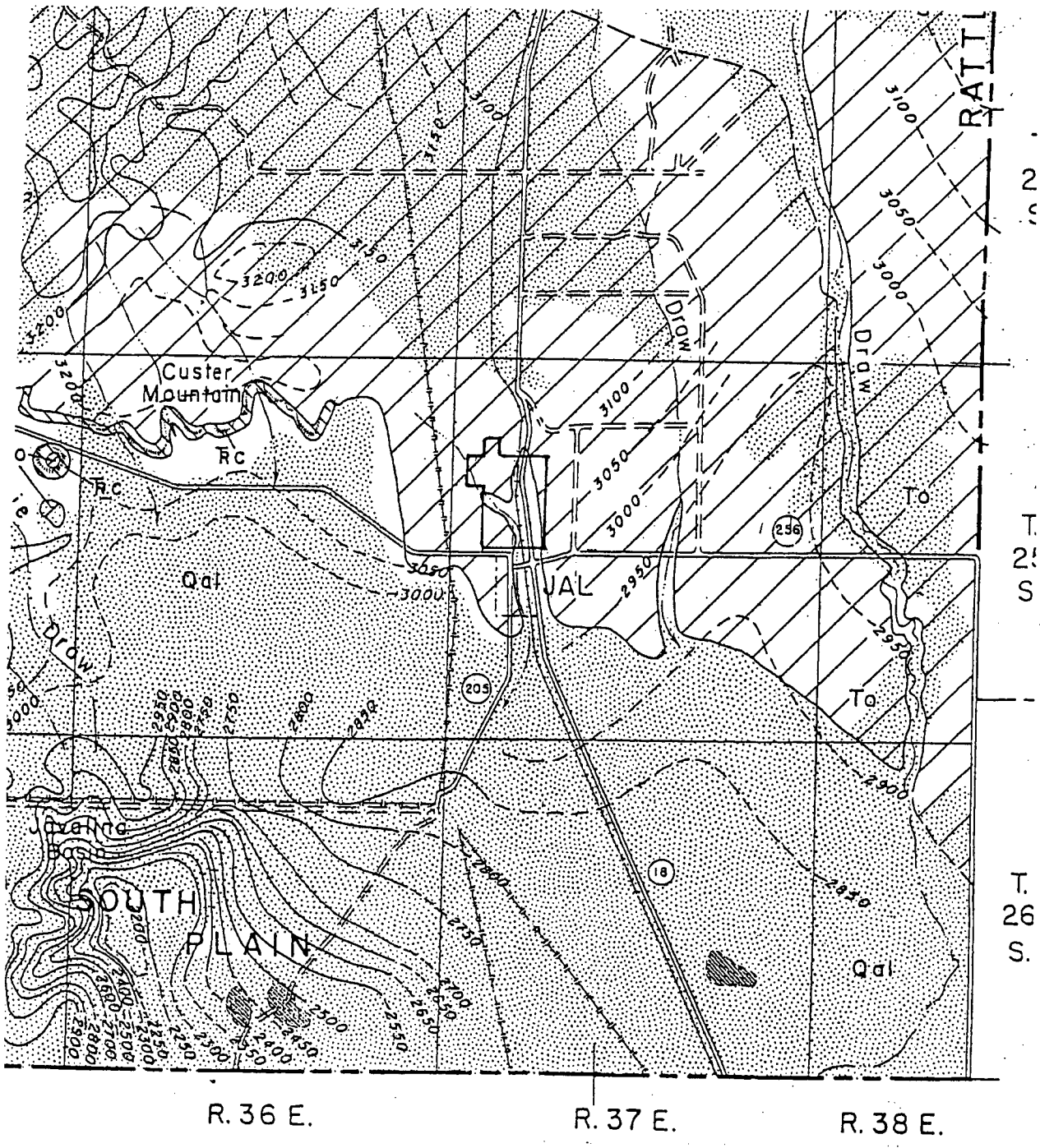
A.4 Map showing known water wells within the confines of the unit.

Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM

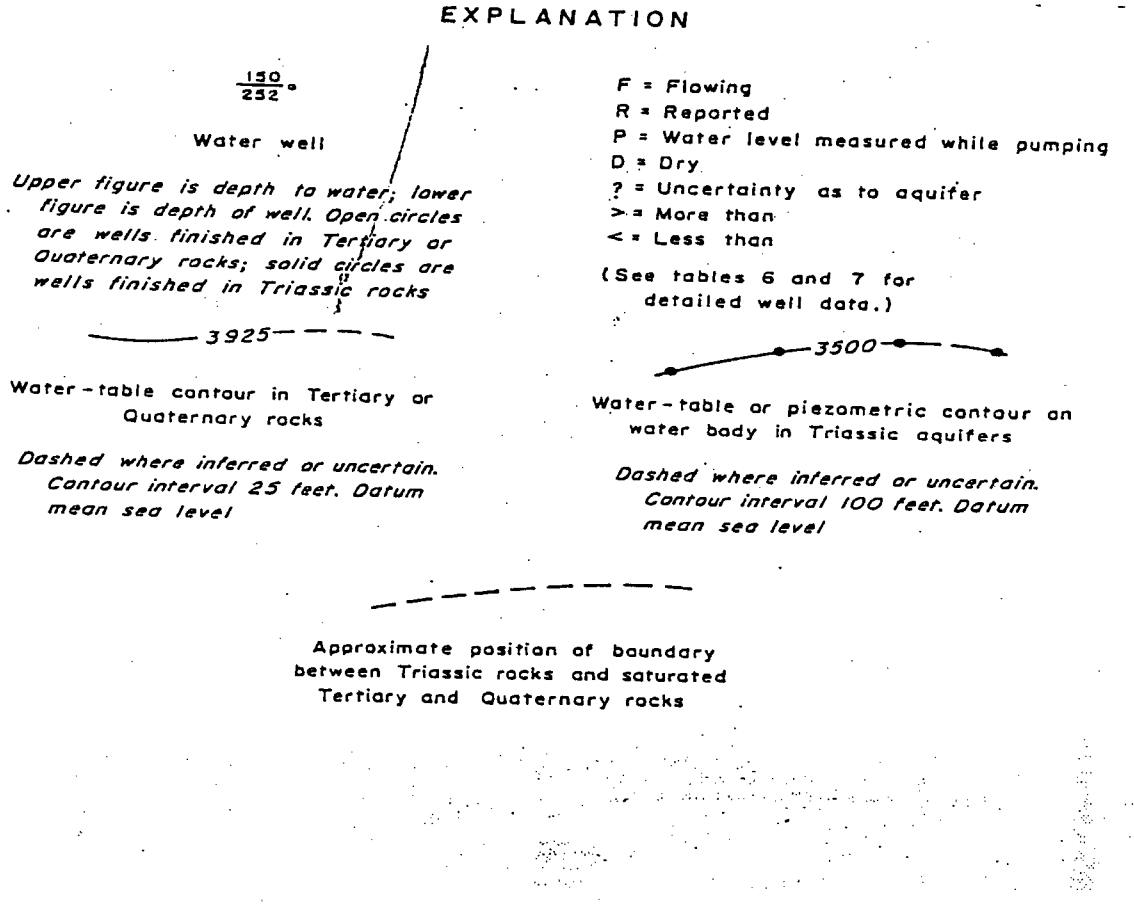


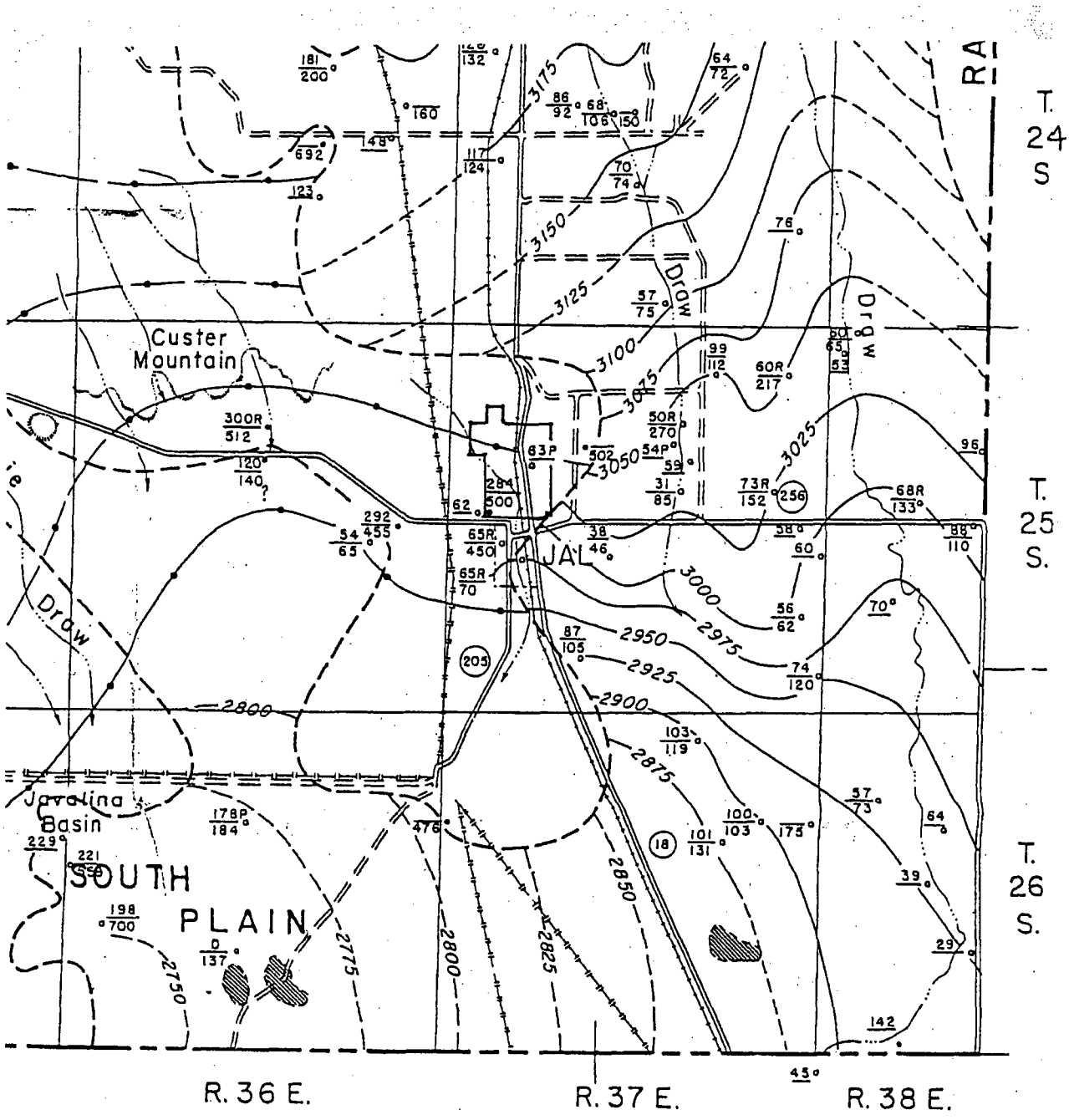
A.5 *Copy of a portion of the Geologic Map of Southern Lea County, New Mexico showing type of material on the surface as well as the age of that material.*




Custer Mountain
Rc
Rc
Qal
JAL
Draw
Draw
Draw
To
To
Qal
SOUTH PLAIN
Javelina Basin
236
205
18
3100
3050
3000
2950
2900
2850
2800
2750
2700
2650
2600
2550
2500
2450
2400
2350
2300
2250
2200
3150
3200
RATTL
R. 36 E.
R. 37 E.
R. 38 E.
T. 25 S.
T. 26 S.

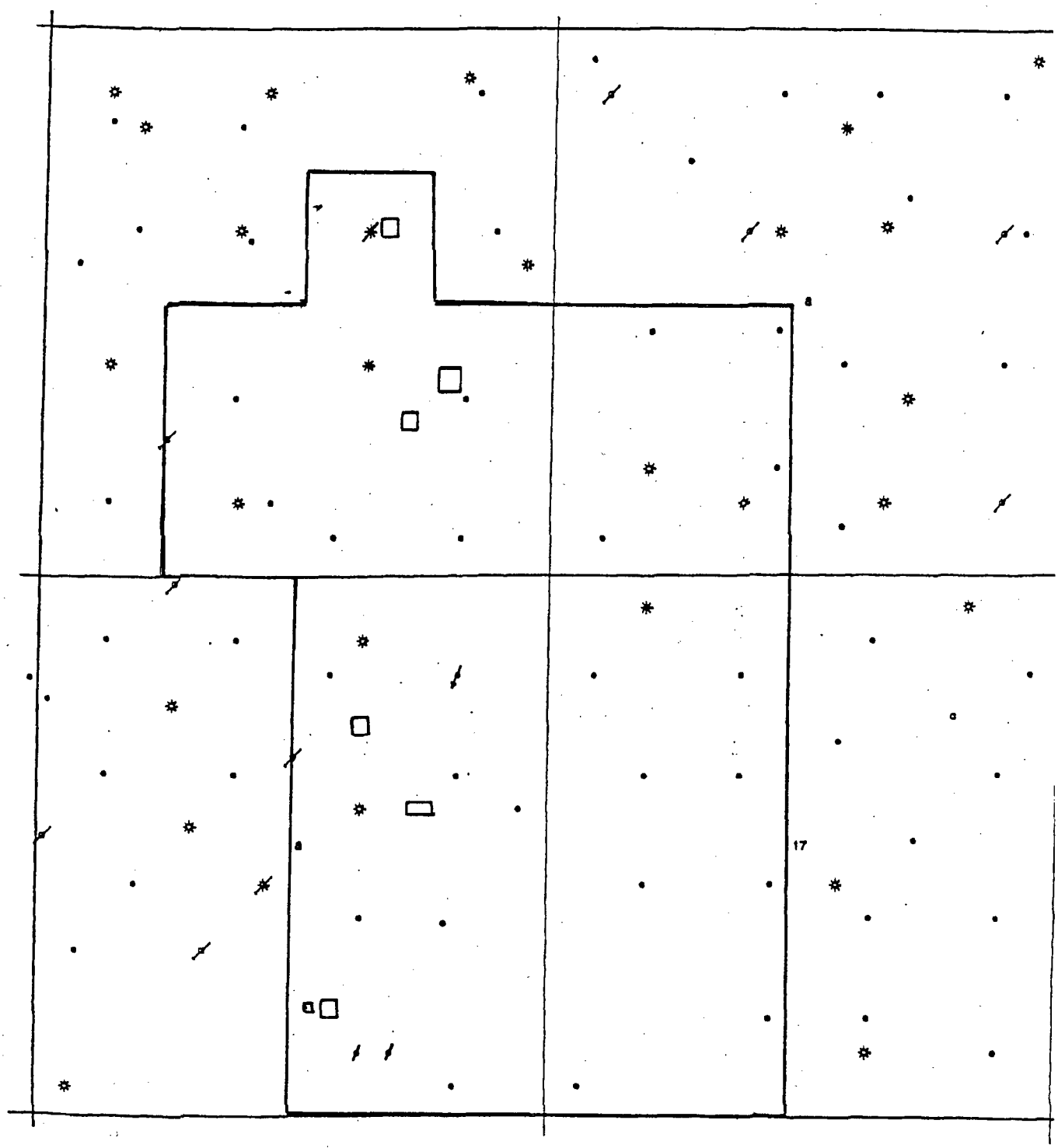
A.6 Copy of a portion of the Ground-Water Map of Southern Lea County, New Mexico showing water-table contours, type of rock from which the water is found, depth to water, depth of well and whether the well is flowing or being pumped.




Custer Mountain
Draw
Draw
Draw
JAL
Jornada Basin
SOUTH PLAIN
3175
3150
3125
3100
3075
3050
3025
3000
2975
2950
2925
2900
2875
2850
2825
2800
2775
2750
2800
T. 24 S
T. 25 S.
T. 26 S.
R. 36 E.
R. 37 E.
R. 38 E.

A.7 Well Spot Map showing the location of all known oil and gas wells, water injection wells, tank batteries and pits.

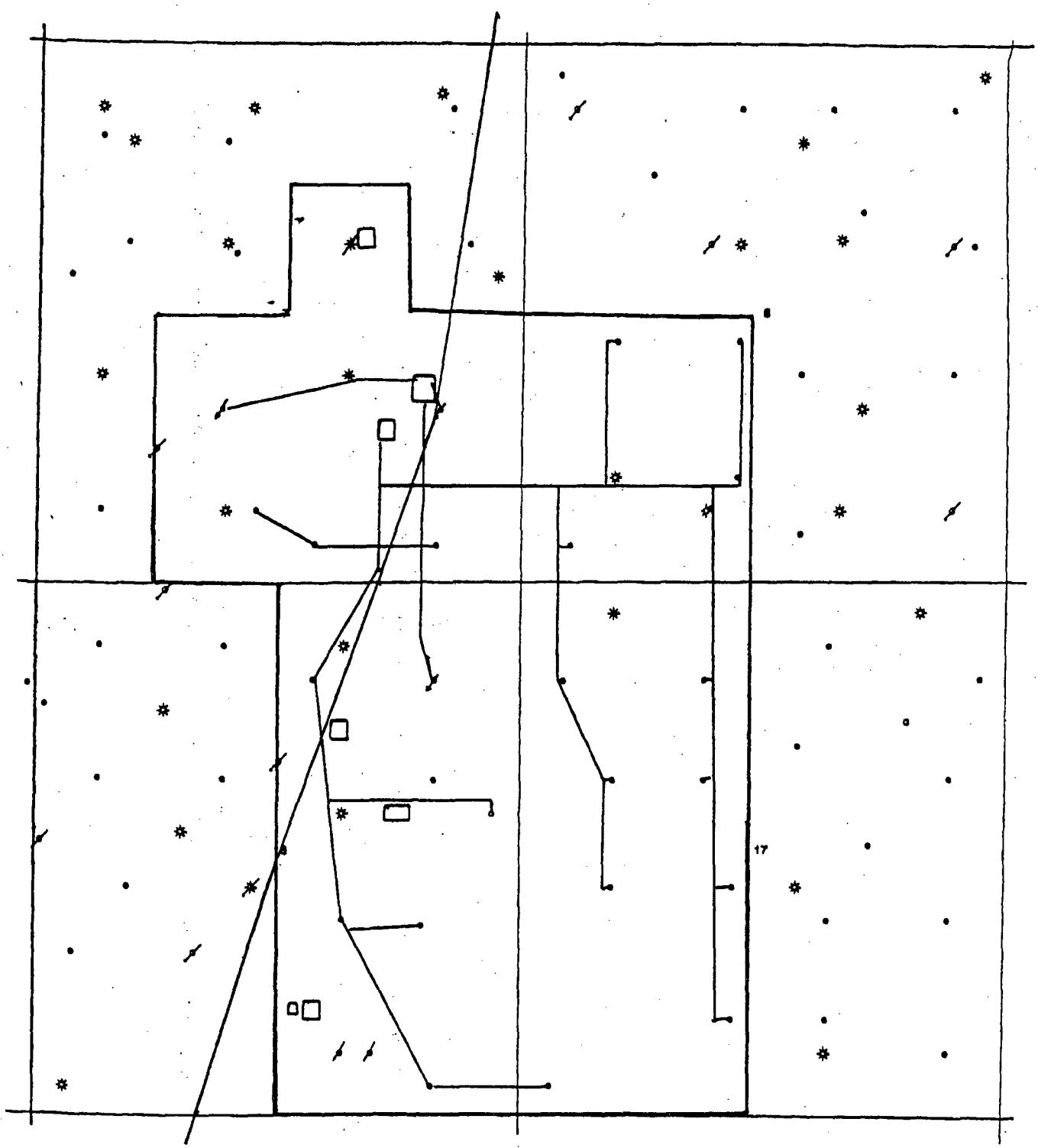
Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM



A.8 Pipeline Map showing all known pipelines, flowlines and injection lines.

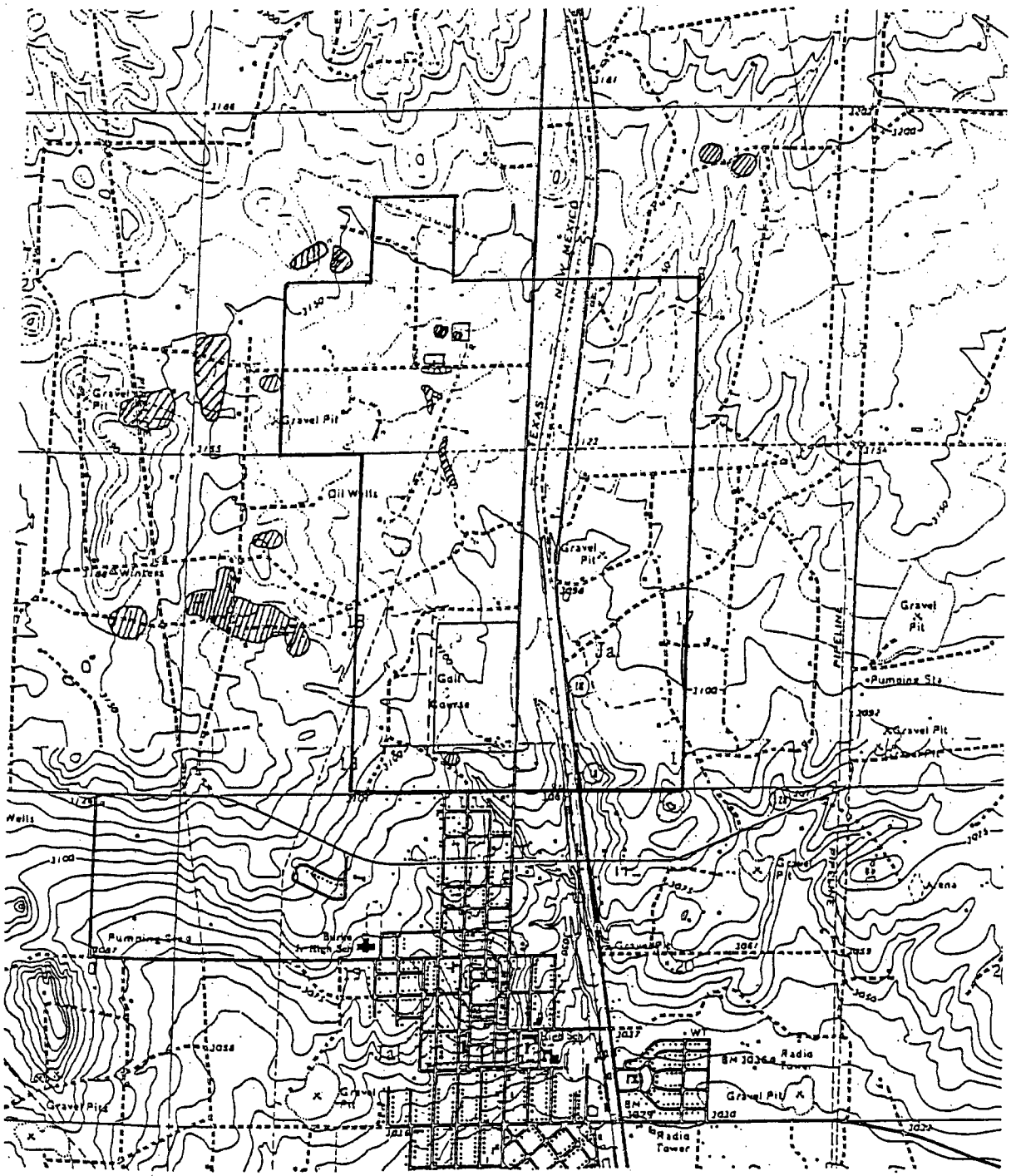
NOTE: Map is based on memory and aerial photos. May not be entirely accurate. On the ground investigation will determine actual ROW for all pipelines, flowlines and injection lines. A new map may be made as new lines or correct ROW's are found.

Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM



A.9 Map showing documented release sites.

Stage 1 Abatement Plan for the South Langlie Jal Unit
Sections 7, 8, 17 & 18-T25S-R37E, Lea County, NM

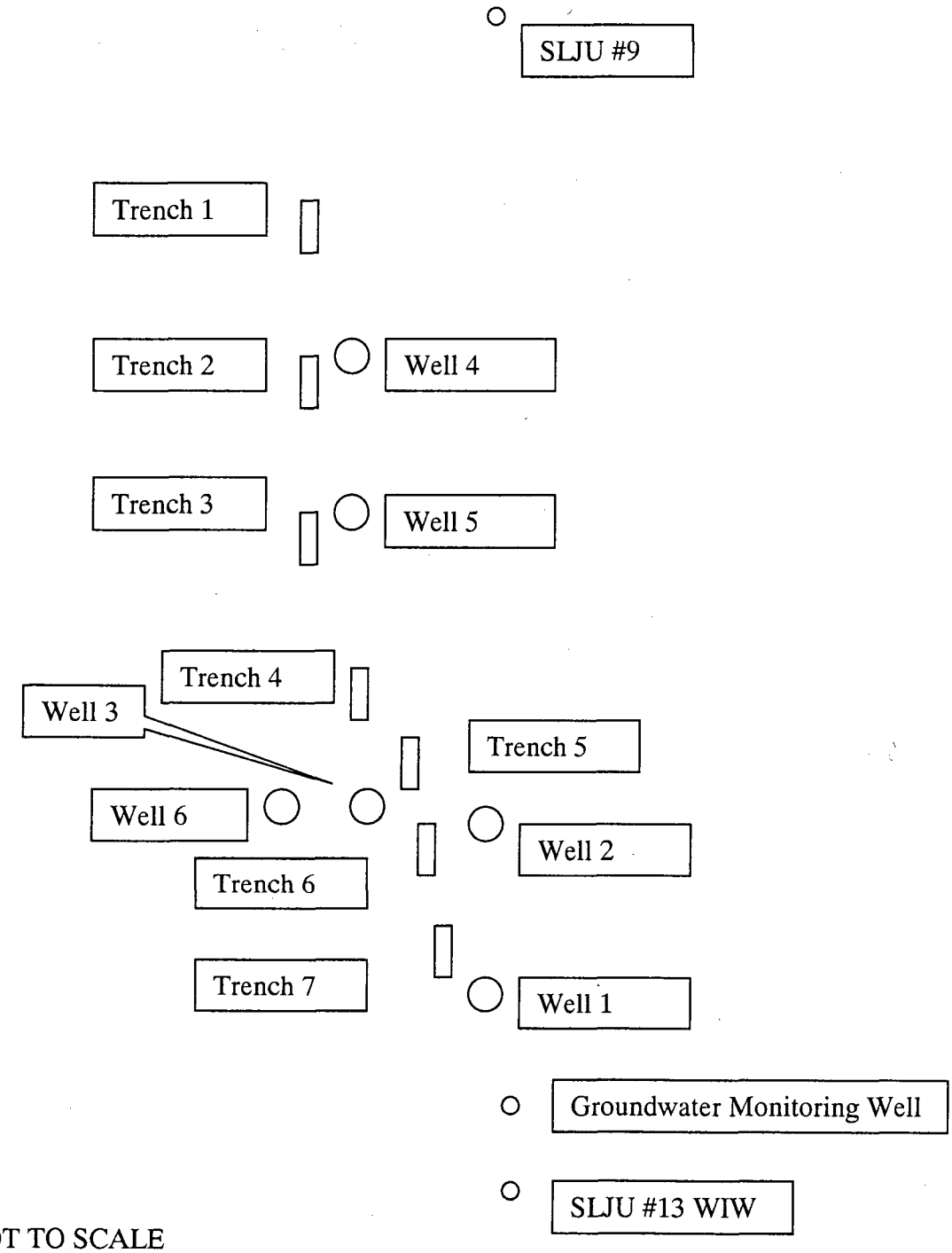


A.10 Diagrams showing the location of soil and water sampling sites as reported by Cornerstone Environmental Services, Inc. and by Safety and Environmental Solutions, Inc.

NOTE: See Appendix B for soil sample analysis of these trench and bore hole sites.

Sampling Sites Along the Release of 10 January 1999 Trenches and Bore Holes

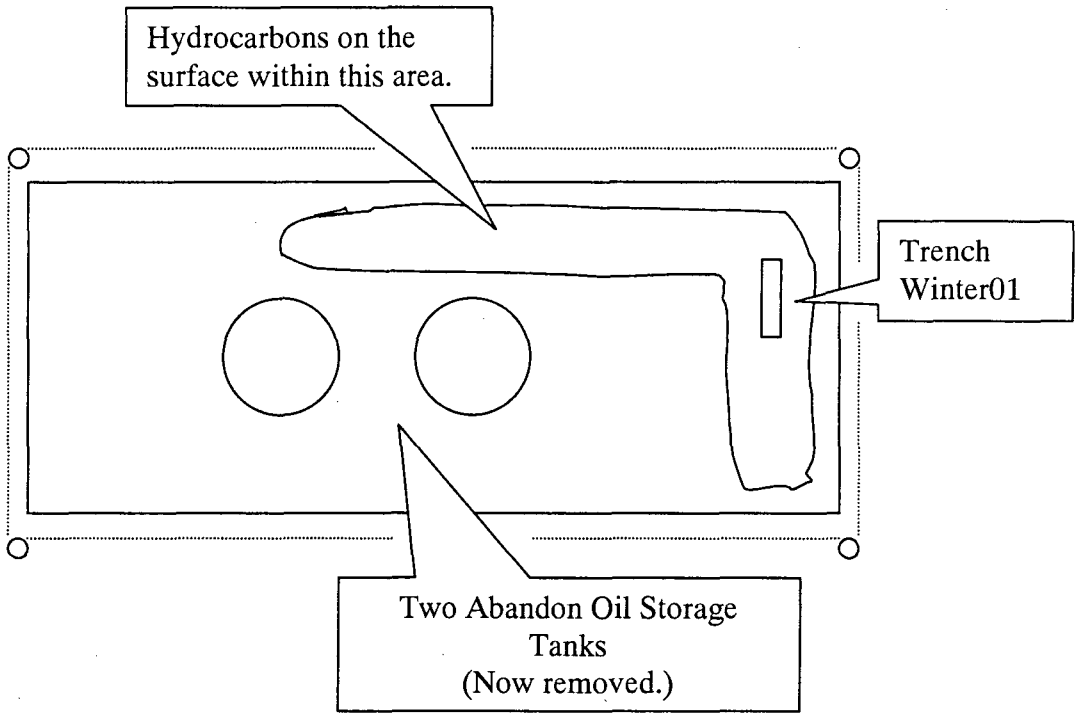
(Samples taken on 15, 16 & 18 January 1999 and 20 & 21 July 1999vby CERI.)



NOT TO SCALE

Winters "E" Abandon Tank Battery

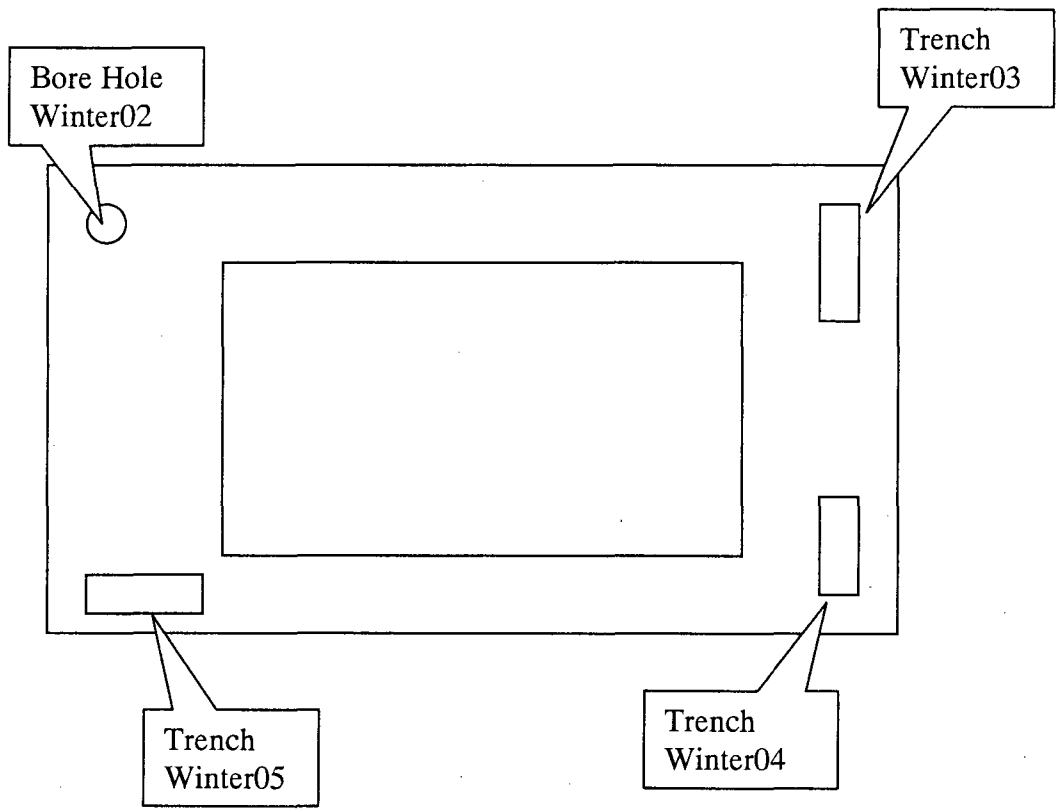
(Sampled by CERI.)



NOT TO SCALE

Winters "C" Abandon Tank Battery

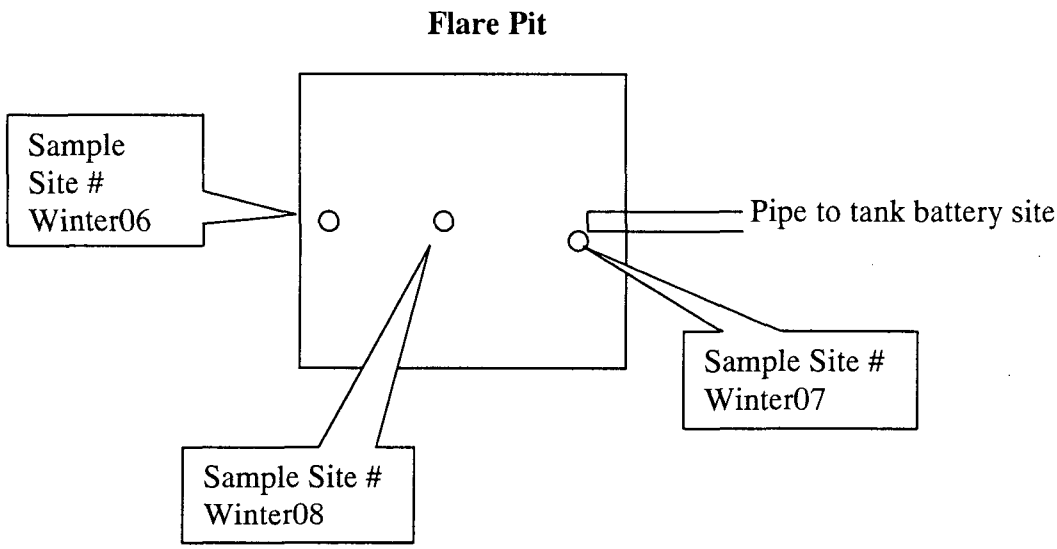
(Sampled by CERI.)



NOT TO SCALE

Gutman Lease Abandon Tank Battery Flare Pit

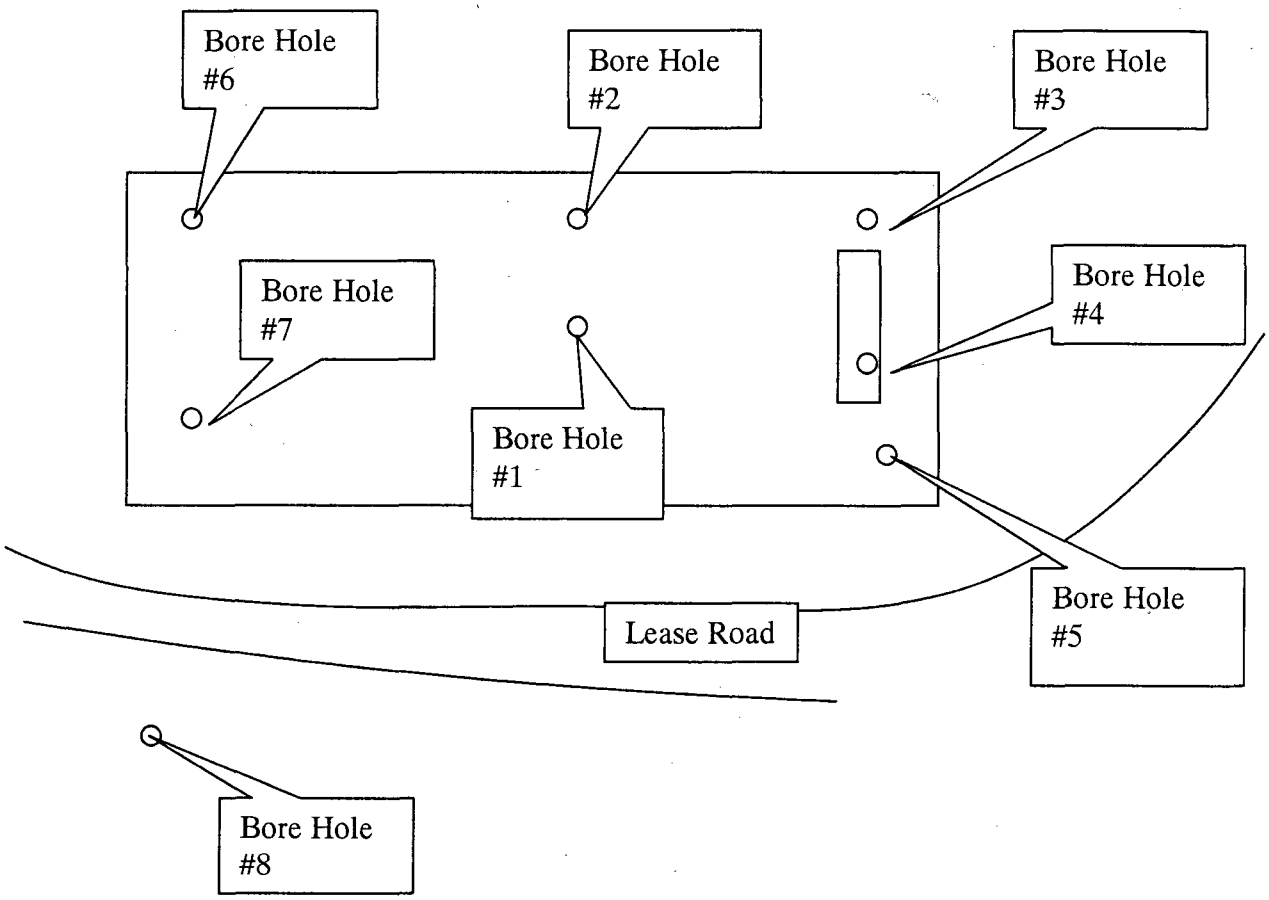
(Sampled by CERI.)



NOT TO SCALE

Winters "E" Abandon Tank Battery

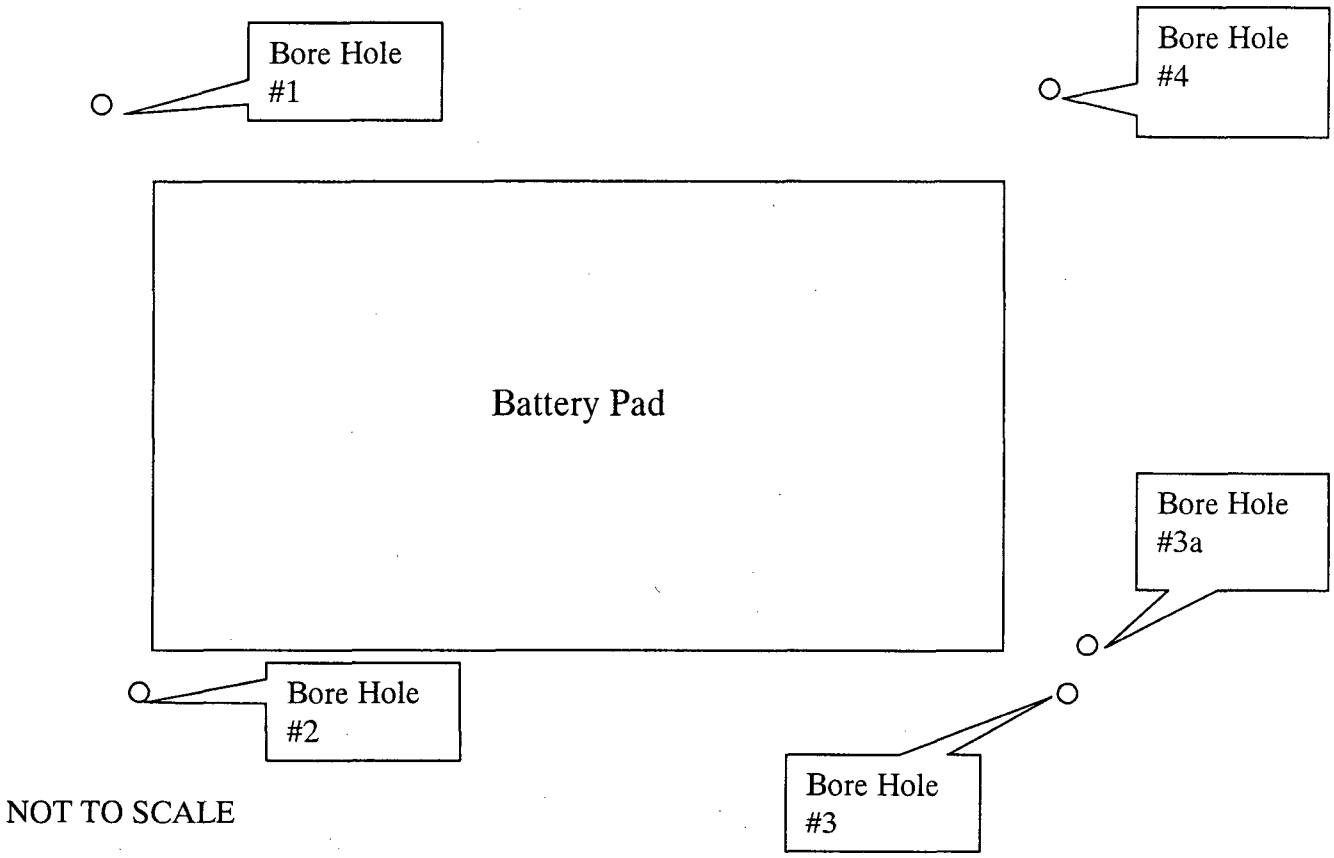
SESI Site #1



NOT TO SCALE

Winters "C" Abandon Tank Battery

SESI Site #2

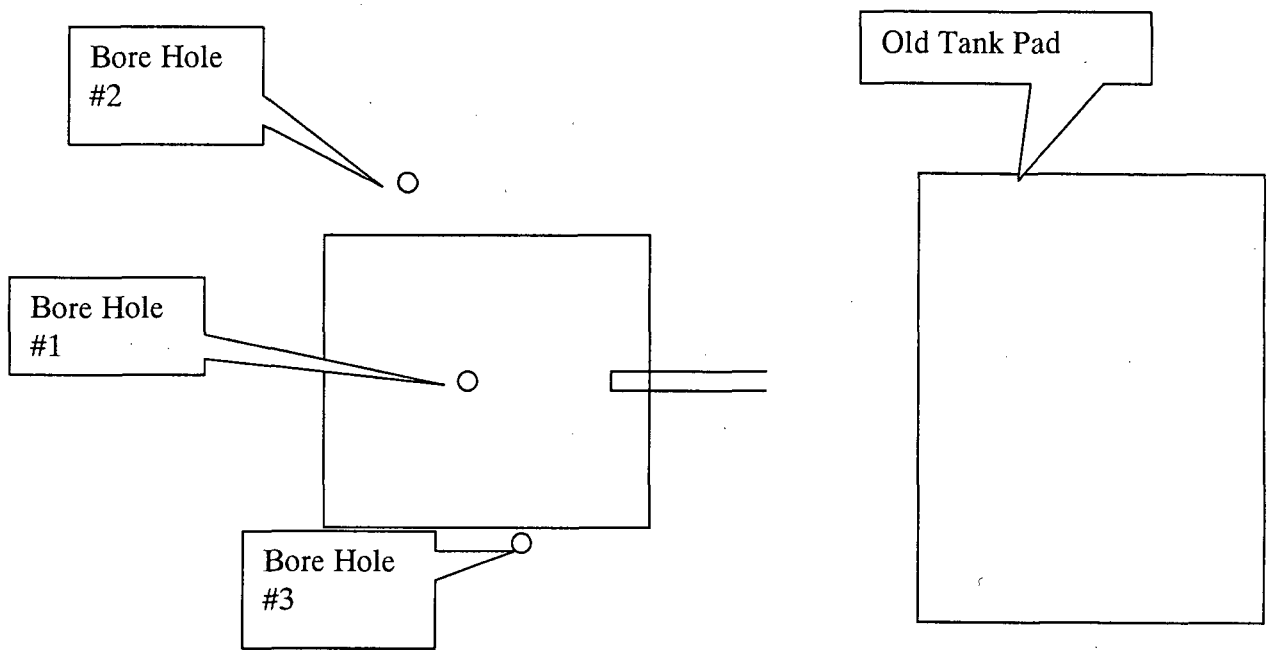


NOT TO SCALE

Gutman Lease Abandon Tank Battery Flare Pit

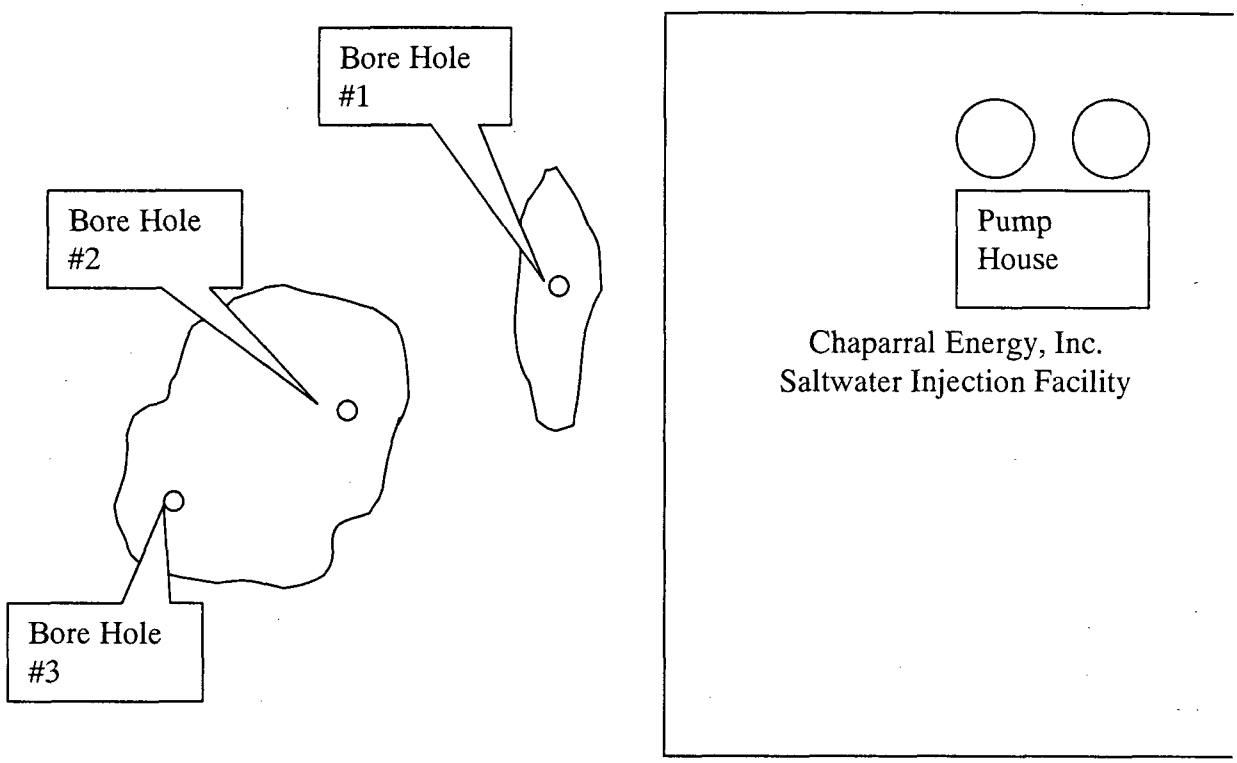
SESI Site #3

Flare Pit



NOT TO SCALE

SESI Site #9



NOT TO SCALE

APPENDIX B

CORNERSTONE ENVIRONMENTAL SERVICES INC.

And

SAFETY AND ENVIRONMENTAL SERVICES, INC.

Soil and Water Sample Analysis Results

APPENDIX B

CORNERSTONE ENVIRONMENTAL SERVICES INC.

Soil Sample Analysis – 15 and 16 June 1999

Sample #	9003001 A, B, C	9003002 A	9003003 A	9003004 A, B, C, D	9003005 A	9003006 A	Units of Measure
Well Number	1	1	1	1	2	2	
Depth	1.0	11.0	12.5	22	1.5	7.5	Feet
Mg	4,360			599			mg/kg
K	1.210			402			mg/kg
Na	ND			453			mg/kg
Cl	6	585	338	651	2	1	mg/kg
Br	ND			5			mg/kg
SO_4	12			150			mg/kg
TPH – Gasoline	ND			ND			µg/kg
Benzene	ND			ND			µg/kg
Toluene	ND			ND			µg/kg
Ethylbenzene	ND			ND			µg/kg
Xylene, Total	ND			ND			µg/kg
TPH - Diesel	ND						µg/kg

Sample #	9003007 A	9003008 A, B, C, D	9003009 A	9003010 A, B, C, D	9003011 A, B, C, D	Units of Measure
Well Number	2	3	3	3	4	
Depth	19.5	2.0	10	22	5	Feet
Mg		6,580		6,570	9,200	mg/kg
K		1,790		1,780	2,350	mg/kg
Na		782		781	ND	mg/kg
Cl	1,040	1,370	1,490	1,160	9	mg/kg
Br		7		5	ND	mg/kg
SO_4		558		625	5	mg/kg
TPH – Gasoline		ND		ND	ND	µg/kg
Benzene		ND		ND	ND	µg/kg
Toluene		ND		ND	ND	µg/kg
Ethylbenzene		ND		ND	ND	µg/kg
Xylene, Total		ND		ND	ND	µg/kg
TPH - Diesel		11,100		ND	ND	µg/kg

NOTE: See maps on page 36.

APPENDIX B (Continued)

CORNERSTONE ENVIRONMENTAL SERVICES INC.

Soil Sample Analysis – 15 and 16 June 1999

Sample #	9003012 A	9003013 A	9003014 A	900315 A, B, C, D	900316 A	9003017 A	Units of Measure
Well Number	4	4	4	5	5	5	
Depth	9	14	19.5	3.5	9.5	14.5	Feet
Mg				7,430			mg/kg
K				1,820			mg/kg
Na				217			mg/kg
Cl	1,540	2,340	1,770	273	1,690	915	mg/kg
Br				ND			mg/kg
SO_4				17			mg/kg
TPH – Gasoline				ND			µg/kg
Benzene				ND			µg/kg
Toluene				ND			µg/kg
Ethylbenzene				ND			µg/kg
Xylene, Total				ND			µg/kg
TPH - Diesel				ND			µg/kg

Sample #	9003018 A, B, C, D	9003019 A, B, C, D	9003020 A	9003021 A	9003022 A, B, C, D	Units of Measure
Well Number	5	6	6	6	6	
Depth	22	3	10	14	25	Feet
Mg	1,620	5,540			1,760	mg/kg
K	1,090	1,170			1,280	mg/kg
Na	959	ND			1,300	mg/kg
Cl	1,230	793	1,970	3,170	1,720	mg/kg
Br	6	4			8	mg/kg
SO_4	367	31			752	mg/kg
TPH – Gasoline	ND	1,120			ND	µg/kg
Benzene	ND	ND			ND	µg/kg
Toluene	ND	ND			ND	µg/kg
Ethylbenzene	ND	ND			ND	µg/kg
Xylene, Total	ND	ND			ND	µg/kg
TPH - Diesel	ND	ND			ND	µg/kg

NOTE: See maps on page 36.

APPENDIX B (Continued)

CORNERSTONE ENVIRONMENTAL SERVICES INC.

Soil Sample Analysis – 20 and 21 July 1999

Sample #	72099-1	72099-2	72099-3	72099-4	72099-5	Units of Measure
Well Number	MW#1	MW#1	MW#1	MW#1	MW#1	
Depth	5-6	10-11.4	20-21	30-31.3	40-41.1	Feet
Mg	3,320	2,460	932	969	3,810	mg/kg
K	1,300	1,480	554	616	474	mg/kg
Na	ND	ND	274	282	235	mg/kg
Cl	14	41	99	102	25	mg/kg
Br	ND	ND	ND	1	5	mg/kg
SO_4	63	69	160	159	89	mg/kg

NOTE: See maps on page36.

Water Sample Analysis – 20 and 21 July 1999

Sample Site / Analytes	New Monitoring Well	Osborn's House Well (Good Well)	Abandon House Well (Bad Well)	SLJU Produced Water	Units of Measure
Mg	41	61	135	3,170	mg/l
K	6	6	13	404	mg/l
Na	125	122	405	15,700	mg/l
Cl	348	342	687	27,000	mg/l
Br	2.24	2.52	5.6	172	mg/l
SO_4	154	304	1,440	4,590	mg/l

APPENDIX B (Continued)

CORNERSTONE ENVIRONMENTAL SERVICES INC.

Soil Sample Analysis – 20 July 1999
Winters "E" Tank Battery Site (Abandon)

Sample #	Winter 01	Winter 02	Winter 03	Winter 04	
Location	NE Corner Winters 'E" Tank Btry	NW Corner Winters 'C' Tank Btry	NE Corner Winters 'C' Tank Btry	SE Corner Winters 'C' Tank Btry	Units of Measure
TPH – Gasoline	23.1	ND	ND	1,550	mg/kg
TPH – Diesel	13,900	180	4,440	4,160	mg/kg
Benzene	ND	ND	ND	ND	µg/kg
Toluene	ND	ND	ND	ND	µg/kg
Ethylbenzene	ND	ND	ND	ND	µg/kg
Xylene – Total	ND	ND	ND	ND	µg/kg

NOTE: See maps on page 37.

Sample #	Winter 05	Winter 06	Winter 07	Winter 08	
Location	SW Corner Winters 'E" Tank Btry	West Edge of Gutman Lease Flare Pit	East Edge of Gutman Lease Flare Pit	Bottom of Gutman Lease Flare Pit	Units of Measure
TPH – Gasoline	ND	ND	ND	ND	mg/kg
TPH – Diesel	40.2	ND	380	24,300	mg/kg
Benzene	ND	ND	ND	ND	µg/kg
Toluene	ND	ND	ND	ND	µg/kg
Ethylbenzene	ND	ND	ND	ND	µg/kg
Xylene - Total	ND	ND	ND	ND	µg/kg

APPENDIX B (Continued)

SAFETY and ENVIRONMENTAL SERVICES, INC.

Soil Sample Analysis – Site 1
TPH Results - PPM

Depth	TB #1	TB #2	TB #3	TB #4	TB #5	TB #6	TB #7	TB #8
5'	1,880			544	371	1,470	<10	12,100
10'	11,600	1,710	791	48.7	136	185	<10	231
15'								
20'		182	260	<10	2,750	<10	33.6	<10
25'	2,190							
30'				48.7	<10			
35'								
40'			431	431	<10			
45'					24.<105			<10

Soil Sample Analysis – Site 1
Chlorides Results - PPM

Depth	TB #1	TB #2	TB #3	TB #4	TB #5	TB #6	TB #7	TB #8
5'	360			970	65	65	162	1,374
10'	550	81	695	792	48	178	550	1,277
15'								
20'		210	743	647	275	178	162	420
25'	302							
30'			620	711	145			1,665
35'								
40'			792	711	404			1,568
45'				792	453			1,600

Note: Blank spaces appear to represent a "Non-Detect" analytical result.

APPENDIX B (Continued)

SAFETY and ENVIRONMENTAL SERVICES, INC.

Soil Sample Analysis – Site 2

	TPH Results – PPM				Chlorides Results - PPM			
Depth	**TB #1**	**TB #2**	**TB #3**	**TB #4**	**TB #1**	**TB #2**	**TB #3**	**TB #4**
5'	104	26.3	81	295	746	1065	1775	515
10'	78	8	207				1154	560
15'			20.2				817	
20'					404	1293	817	460
25'					453		740	
30'			34.4	43.8			600	195
35'							426	
40'								
45'								

Soil Sample Analysis – Site 3

	TPH Results – PPM			Chlorides Results - PPM		
Depth	**TB #1**	**TB #2**	**TB #3**	**TB #1**	**TB #2**	**TB #3**
5'				81	65	388
10'				81	388	582
15'						
20'						
25'						
30'						
35'						
40'						
45'						

Note: Blank spaces appear to represent a "Non-Detect" analytical result.

APPENDIX B (Continued)

SAFETY and ENVIRONMENTAL SERVICES, INC.

Soil Sample Analysis – Site 9

	TPH Results – PPM			Chlorides Results - PPM		
Depth	**TB #1**	**TB #2**	**TB #3**	**TB #1**	**TB #2**	**TB #3**
5'	142	<10	<10			
10'				2797	2021	
15'				2489	1697	2465
20'						
25'						
30'						
35'						
40'						
45'						

Note: Blank spaces appear to represent a "Non-Detect" analytical result.

Appendix C

Table of Analytical Reports from the City of Jal, New Mexico Water Wells

(Chlorides)

Date	#1G	#2	#3	#4	#8	#11	#16	#18	Kemp
9 May 96		470	549	550		172	412	480	537
7 Aug 96		56	543	543	502				
7 Nov 96		470	514	523	513	176	421		536
10 Feb 97		507	528	518	517				
19 May 97		578	572	559	563	182	458		555
13 Aug 97		548	552	552	551				
5 Nov 97		557	553	549	555	241	413		557
12 Feb 98		567	553	557	539				
11 May 98		559	605	618	554	218	491		606
19 Aug 98		579	560	581	521				
30 Nov 98		557	588	587	545	292	477		585
23 Feb 99		654	650	641	593				
17 May 99	449	571	565	579	525	319			576
23 Aug 99		547	631	577	549				
22 Nov 99		588	664	594	534	419	465		560

(Total Dissolved Residue)

Date	#1G	#2	#3	#4	#8	#11	#16	#18	Kemp
9 May 96		2382	2584	2472		992	1974	2408	2490
7 Aug 96		2682	2798	2670	2733				
7 Nov 96		2370	2190	2270	2660	714	2010		2510
10 Feb 97		2600	2240	2120	2630				
19 May 97		2360	2480	2500	2920	938	2230		2700
13 Aug 97		3000	2640	2580	2980				
5 Nov 97		2730	2340	2390	2670	1250	2010		2420
12 Feb 98		2610	2580	2410	2600				
11 May 98		2410	2440	2270	2410	1100	1940		2490
19 Aug 98		2780	2720	2650	2670				
30 Nov 98		2410	2620	2340	2430	1280	2040		2400
23 Feb 99		2680	2710	2500	2480				
17 May 99	2310	2510	2610	2620	2580	1580	2310		2800
23 Aug 99		2710	3120	2780	2790				
22 Nov 99		2830	2410	2390	2390	1570	2130		2460

(Nitrate+ite as N and Kjeldahl N)

Well #	7		10	
Date	Nitrate	Kjeldahl	Nitrate	Kjeldahl
22 Aug 94			6.00	0.10
6 Feb 95	2.20	0.40		
7 Aug 95	1.90	0.10	2.00	0.10

APPENDIX D

List of Water and Monitoring Wells in the Vicinity of the Osborn Ranch, Jal, New Mexico

(As provided by Bristol representatives from work submitted by Safety & Environmental Solutions, Inc.)

Well Name	Reported Location	Comment
Front House Windmill	NE SE NE NE Sec. 18-T25S-R37E	Owner's Well #4 SESI's Front House Windmill
Main House Well & Jal Country Club MW#11	NE SW NE NE Sec. 18-T25S-R37E	Owner's Well #1 SESI's House Well
Back House Well	NE SW NE NE Sec. 18-T25S-R37E	Owner's Well #2 SESI's West Well
Bristol Resources Well	N/2 NE Sec. 18-T25S-R37E	Monitoring Well north of SLJU #13 WIW.
Front House Well	NE SE NE NE Sec. 18-T25S-R37E	Owner's Well #5 SESI's Front House Well
North Water Well	NW NE SW SW Sec. 18-T25S-R37E	Owner's Well #6 Unused SESI's Back Windmill
SW (TX-NM pipeline) Well	E/2 Sec.18-T25S-R37E	Monitoring Well
Jal Country Club MW-3	SE Sec. 18-T25S-R37E	Production & Monitoring Well
Jal Country Club MW-4	SE Sec. 18-T25S-R37E	Production & Monitoring Well
Jal Country Club NE MW	SE Sec. 18-T25S-R37E	Unused Well
Jal Country Club NW MW	SE Sec. 18-T25S-R37E	Unused Well
Jal Country Club Windmill & Jal Country Club MW#18	SE Sec. 18-T25S-R37E	Plugged
Jal Country Club MW-2	SE Sec. 18-T25S-R37E	Production & Monitoring Well
West Water Well	SE Sec. 18-T25S-R37E	Owner's Well #3 SESI's West Well
Jal Country Club Center MW	SE Sec. 18-T25S-R37E	Unused Well
Section 13 Water Well	SW SE SE SW Sec. 13-T25S-R37E	Owner's Well #7 (Unused)

Wells 8 through 15, as well as several other wells located at the Jal Country Club, are reportedly registered with the State Engineer Office as Permit CP-473.

APPENDIX E

WATERWELLS REPORTED BY SESI AS EXCEEDING WQCC STANDARDS

(As reported by Safety & Environmental Solutions, Inc. in their Environmental Site Assessment dated March 20, 2000. Chaparral Energy, Inc. has only a portion of this report.)

5.1 CERI Groundwater Analytical Data

"...In addition, two of Mr. Clay Osborn's well (sic) were sampled and found to contain concentrations of chlorides of 342 mg/l and 687 mg/l. Both concentrations are in excess of WQCC standard of 250 mg/l. (Exhibit 6)"

5.2 SESI Groundwater Analytical Data

"On December 15, 1999, SESI took samples from five (5) water wells located in the immediate vicinity of the Clay Osborn home. ...The results of the analysis (Exhibit) indicate no BTEX and chloride levels from 121 mg/l to 432 mg/l. The well servicing Mr. Osborn's home exhibited the 432 mg/l concentration. This concentration is in excess of the WQCC standards."

"On December 30, 1999, SESI sampled the north water well in the manner cited above and found no BTEX concentrations and chloride levels of 857 mg/l. The chloride concentration is in excess of the WQCC standards."

"On January 6, 2000, SESI sampled a monitor well on the west side of the property, which was installed by Texas-New Mexico Pipeline to monitor a previous leak. ...No BTEX was found in the sample and the chlorides were 210 mg/l. On the same day, the water from the commercial sales tank at the Jal Country Club was sampled and analyzed. This water comes from three wells located on the Country Club property and due south of the Osborn home. There was no BTEX found and the chloride concentration was 610 mg/l."

"Seven (7) water and monitor wells were tested on the subject property and only three (3) of the seven did not exhibit chloride levels in excess of the WQCC standards. (Exhibit 5)"

APPENDIX F

TABLE OF DOCUMENTED RELEASE SITES

Site No.	Site Name Location	Release Date, Item and Released/Volume
1-7	100' west of Saltwater Injection Facility 100' W SW SE SE Sec. 7-T25S-R37E 1810 FSL & 1200 FEL	Date and volumes unknown. Possible saltwater release.
2-7	Saltwater Injection Facility SW SE SE Sec. 7-T25S-R37E 1790 FSL & 1075 FEL	15 January 1999 10 April 1999 19 April 1999 3 July 1999 17 July 1999 Saltwater reportedly was released. Volumes not reported.
3-7	Chaparral Energy Inc. Tank Battery (Operational) S/2 S/2 N/2 SE Sec. 7-T25S-R37E 1525 FSL & 1310 FEL	19 May 2001. Lost appx'ly 60 bbls of crude oil onto roadway south of tank battery.
4-7	Pipeline leak northwest of the SLJU #9 and south of the tank battery. W/2 SE SE Sec. 7-T25S-R37E 600 FSL & 1050 FEL	2 February 2001 Approximately 7.5 barrels of oil and saltwater released.
1-18	Pipeline leak between SLJU #9 and SLJU #13 W/2 NE NE Sec. 18-T25S-R37E 600 FSL & 1050 FEL	10 January 1999. Unreported volume of saltwater released.
2-18	SLJU #25 SW SE SE Sec. 18-T25S-R37E 2310 FSL & 990 FWL	10 August 1999. Unknown volume (TSTM) of emulsion released from broken flowline.

APPENDIX G

List of Oil and Gas Production and Disposal Facilities
Section 7-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
1	Calley #1 N/2 SE SE NE	Active Oil and Gas Well
2	E. C. Winters B #1 SW SW	Oil Well
3	E. C. Winters B #2 NW SW	Gas Well
4	E. C. Winters B #3 E/2 SE SW	Oil Well now listed as the SLJU #7
5	E. C. Winters C #1 NW SE	Shut-in Oil Well now listed as the SLJU #3
6	ETZ #1 SE NW NW	Gas Well
7	ETZ#2 N/2 SW SW NW	Oil Well
8	ETZ #3 E/2 SW NW	Oil Well
9	ETZ #4 S/2 NW NW	Oil Well
10	Harrison #1 SW NE	Shut-in Saltwater Injection Well a.k.a. SLJU #1
11	Harrison #2 SE NE	Oil Well
12	Harrison #1 W/2 NE NE	Oil Well
13	W. N. Harrison #1 NW NW	Gas Well
14	Jalmat (Yates) Unit #WI-10 NE NE SW SW	Water Injection Well
15	Judy #1 N/2 S/2 NW NW	Oil Well

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 7-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
16	Judy #2 SE NW	Gas Well
17	Judy #3 NW SE SE NW	Oil Well
18	Munn-Harrison #1 W/2 SE NE NE	Gas Well
19	Munn-Harrison B #1 NW SE NE NW	Gas Well
20	NW Crosby Unit #1 SE SW	Gas Well
21	South Langlie Unit #1 SW NE	Shut-in Saltwater Injection Well a.k.a. Harrison #1.
22	South Langlie Unit #2 S/2 NW SE	Shut-in Saltwater Injection Well
23	South Langlie Unit #3 NW SE	Shut-in Oil Well
24	South Langlie Unit #4 SW NE SE	Active Saltwater Injection Well.
25	South Langlie Unit #7 E/2 SE SW	Oil Well
26	South Langlie Unit #8 SW SW SE	Oil Well
27	South Langlie Unit #9 SW SE SE	Oil Well
28	Papoose #1 NW NE	Oil Well

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 8-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
29	Burleson #2 E/2 SE NW	Oil Well a.k.a. F. M. Burleson 'WN' #2
30	F. M. Burleson 'WN' #2 E/2 SE NW	Gas Well
31	F. M. Burleson 'WN' #3 NW NW NW	Oil Well
32	W. N. Burleson #2 E/2 SE NW	Gas Well a.k.a. Burleson #2 & F. M. Burleson 'WN" #2.
33	El Paso Ruby Federal #1 E/2 SW SE	Gas Well
34	Jal D #3 SW NW NE	Oil and Gas Well
35	Langlie Jal Unit #WI-71 W/2 NW NW	Saltwater Injection Well
36	Langlie Jal Unit #72 E/2 NE NW	Oil Well
37	Langlie Jal Unit #73 NW NE	Oil Well
38	Langlie Jal Unit #74 NE NE	Oil Well
39	Langlie Jal Unit #WI-77 SE NE	Saltwater Injection Well
40	Langlie Jal Unit #78 NE SW NE	Oil Well
41	Langlie Jal Unit #WI-79 SE NW	Saltwater Injection Well
42	Langlie Jal Unit #80 W/2 E/2 SE NE	Oil Well
43	Langlie Jal Unit #81 W/2 NW SE	Oil Well
44	Langlie Jal Unit #82 NE SE	Oil Well
45	Langlie Jal Unit #WI-85 SE SE	Saltwater Injection Well

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 8-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
46	Langlie Jal Unit #86 N/2 SW SW SE	Oil Well
47	Langlie Jal Unit #112 NE NW	Oil Well
48	Langlie-Federal #1 SE SE	Same well as the Langlie Jal Unit #WI-85.
49	Langlie-Federal #3 SE NW SE	Gas Well
50	Langlie-Federal #4 NE SW NE	Gas Well
51	Langlie-Jal Federal #1 NE NE NE	Gas Well
52	Langlie-Jal Federal #2 SW NE	Gas Well
53	South Langlie Jal Unit #5 NW NE SW	Oil Well
54	South Langlie Jal Unit #6 NE NE SW	Oil Well
55	South Langlie Jal Unit #10 E/2 W/2 SW	Oil Well
56	South Langlie Jal Unit #11 NE SE SW	Oil Well
57	Woolworth #1 E/2 SE SW	Plugged and Abandoned
58	Woolworth #3 E/2 SE SW	Plugged and Abandoned
59	Woolworth #4 NW SW SW	Gas Well

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 17-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
60	Langlie Jal Unit #87 NW NE	Oil Well
61	Langlie Jal Unit #88 SE NE NE	Oil Well
62	Langlie Jal Unit #89 SE NE	Oil Well
63	Langlie Jal Unit #90 NW SW NE	Oil Well
64	Langlie Jal Unit #91 NW SE	Oil Well
65	Langlie Jal Unit #92 NE SE	Oil Well
66	Langlie Jal Unit #93 SE SE	Oil Well
67	Langlie Jal Unit #95 N/2 SW SE	Oil Well
68	Langlie Jal Unit #121 NE NW NE	Location to be drilled
69	Langlie Jal Unit #122 NW SE NE	Location to be drilled
70	Langlie Jal Unit #124 SE SW NE	Oil Well
71	Langlie 'A' Federal #2 SW SE	Gas Well
72	Woolworth #1 NE NW NW	Gas Well
73	Woolworth "B" #1 NE NW NW	Oil Well a.k.a. Woolworth #1
74	Woolworth "B" #3 S/2 NE NW	Oil Well
75	Woolworth-Federal "W" #1 NW NE NE	Gas Well
76	South Langlie Jal Unit #14 E/2 SW NW NW	Oil Well

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 17-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
77	South Langlie Jal Unit #15 S/2 NE NW	Oil Well
78	South Langlie Jal Unit #18 E/2 SW NW	Oil Well
79	South Langlie Jal Unit #19 SE NW	Oil Well
80	South Langlie Jal Unit #22 NW NE SE	Oil Well
81	South Langlie Jal Unit #23 NE NE SW	Oil Well
82	South Langlie Jal Unit #26 SW SW SW	Oil Well
83	South Langlie Jal Unit #27 NW SW SE	Oil Well

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 18-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
84	E. C. Winters #1 NW NE	Plugged and Abandoned Gas Well.
85	E. C. Winters #2 W/2 SE NE	Oil Well
86	Elydia C. Winters "C" #2 NE NW	Oil Well
87	Gutman #1-18 SW SE	Plugged and Abandoned Gas Well.
88	Gutman #2-18 NW SE	Oil Well. a.k.a. SLJU #20.
89	Humble Winter "A" #1 NW NW	Oil Well
90	Humble Winter "A" #2 NE NW	Oil Well a.k.a. Elydia C. Winters "C" #2
91	Humble Winters #1 SW NW	Oil Well
92	Humble Winters #2 SE NW	Oil Well
93	Jalmat (Yates) Unit #WI-11 NW NW NE NW	Water Injector Well
94	Jalmat (Yates) Unit #WI-18 SE NE SE NW	Water Injector Well
95	Jalmat (Yates) Unit #19 NW	Gas Well
96	Jalmat (Yates) Unit #20 SW SW NW NW	Oil Well
97	Jalmat (Yates) Unit #25 SW SE NW	Gas Well
98	Jalmat (Yates) Unit #WI-26	Water Injector Well
99	Jalmat (Yates) Unit #WI-30 NE NE SW	Water Injection Well
100	Jalmat (Yates) Unit #WI-31 S/2 NE SW	Water Injector Well
101	Maggie Rose #2 NE NW SW	Oil Well
102	Maggie Rose #3 NE NE SW	Gas Well now a saltwater disposal well. a.k.a. Jalmat (Yates) Unit #WI-30.

APPENDIX G (Continued)

List of Oil and Gas Production and Disposal Facilities
Section 18-Twp 25 South – Rge 37 East
Lea County, New Mexico

#	Well or Facility Name Legal	Facility Status
103	Vosburg #1 S/2 SE NE	Oil Well now the SLJU #16.
104	South Langlie Jal Unit #12 SE NE NE	Oil Well
105	South Langlie Jal Unit #13 SW NE NE	Saltwater injection well.
106	South Langlie Jal Unit #16 S/2 SE NE	Oil Well. Was the Vosburg #1 originally.
107	South Langlie Jal Unit #17 SW SW NW	Oil Well.
108	South Langlie Jal Unit #20 NE SW	Oil Well. Same well as the Gutman #2-18 above.
109	South Langlie Jal Unit #21 SW NE SE	Shut in oil well on the golf course.
110	South Langlie Jal Unit #24 W/2 SE SW	Plugged and Abandoned.
111	South Langlie Jal Unit #25 SE SW SW	Oil Well

APPENDIX H

SITE SAFETY and HEALTH PLAN

PREPARED BY: _____
DATE: _____
TIME: _____

FOR AREA AS FOLLOWS: Location of Facility is in Sections 7 and 18 of Township 25 South, Range 37 East, Lea County, NM. Actual sites will vary and are marked on the attached maps.

NOTE: THIS IS AN - ☑ ORIGINAL PLAN ☐ UPDATED PLAN

SAFETY MONITORING RESULTS FOR THIS PLAN:
H2S LEVEL: N/A
OXYGEN %: N/A
LEL %: N/A

WEATHER & TIDAL CONDITIONS WHEN THIS PLAN WAS PREPARED:
TEMP.: _____
HUMIDITY: _____
WIND-SPEED: _____
WIND-FROM DIRECTION: _____
WATER TEMP.: _____

TIDE: ☐ EBB ☐ FLOOD ☐ HIGH ☐ LOW ☑ N/A

SKY CONDITION: _____ PRECIPITATION?: ☐ NO ☐ YES - FORM: _____

SITE DESCRIPTION:

The site is a production and water injection facility for oil and natural gas production operations. In addition to the oil field operations, the land is used as rangeland for cattle.

OBVIOUS HAZARDS AT SITE: None

SPECIAL PRECAUTIONS TO BE TAKEN: None

HABITATIONS, BUSINESSES OR REC. AREAS AFFECTED / ENDANGERED: N/A

SITE SAFETY CONTROLS:

COORDINATOR OF SITE ACCESS/SECURITY: _____

SAFE PERIMETER DESIGNATED AS: _____

ON SITE COMMAND POST LOCATION: Field Office

SITE STAGING AREA LOCATION: N/A

SITE CONTROL BOUNDARIES: N/A

<> HOT: EXCLUSION ZONE (CONTAMINATED AREA): N/A

<> WARM: CONTAMINATION REDUCTION ZONE (DECON AREA): N/A

<> COOL: SUPPORT ZONE: N/A

BOUNDARIES DESIGNATED BY MEANS OF: Field engineer will make this determination on site as is warranted.

HAZARD EVALUATION:

SUBSTANCE INVOLVED: Substance To Be Evaluated is naturally occurring and produced water as well as oil associated with oil and gas operations that may be present in soil and ground water.

MSDS AVAILABLE?:

☐ NO		☐ NO
☑ YES	(ATTACHED TO THIS PLAN)	☑ YES

HEALTH/SAFETY HAZARDS:

- ☐ H_2S CONCENTRATION - %:_____
- ☐ TOXIC VAPOR ACCUMULATION
- ☐ FLAMMABILITY
- ☐ SKIN ABSORPTION
- ☐ INGESTION

SITE HAZARDS: Tank batteries have H_2S concentrations up to 1400 ppm. Workers are not to work On, around or inside of storage tanks without first being H_2S qualified, fit tested with the proper PPE And provided with a medical test to ensure the use of PPE is not damaging to the worker's health. This Plan does not call for any worker to be exposed to H_2S.

PERSONAL PROTECTIVE EQUIPMENT:

CHECK-OFF (x) LIST AS FOLLOWS FOR SITE WORKERS:

EYE PROTECTION:	X	
GLOVES:	X	
SPLASH SUIT:		(CHEMICAL RESISTANT, LEVEL "C")
STEEL-TOED BOOTS:	X	
HARD HAT:	X	
LIFE VESTS:		(OR OTHER CG-APPROVED PFD'S)
RESPIRATOR:		
HEARING PROTECTION:	X	

DECONTAMINATION PROCEDURES:

NOTE: THIS PLAN CONCERNS ITSELF WITH A SPILL OF CRUDE OIL, GASOLINE, AND DIESEL. DECONTAMINATION SHALL BE LIMITED TO A 4-STATION SYSTEM, WHICH INCLUDES A SAFETY/FIRST-AID STATION.

PERSON IN OVERALL CHARGE OF DECONTAMINATION: N/A

ADDITIONAL PERSONNEL:

STA. #1 - GROSS DECONTAMINATION: (SCRUB & TOOL DROP)	N/A	(WARM ZONE)
STA. #2 - LIGHT DECONTAMINATION: (RINSE)	N/A	(WARM ZONE)
STA. #3 - SITE EXIT POINT: (PROTECTIVE CLOTHING REMOVAL)	N/A	(COOL ZONE)
STA. #4 - SAFETY/FIRST AID: (* SEE BELOW: SUPPLIES)	N/A	(COOL ZONE)

EMERGENCY MEDICAL CARE:

DESIGNATION OF RESCUE ASST.: N/A (NAME)

* EQUIPMENT/SUPPLIES ON-SITE:

- ☑ 10-UNIT FIRST-AID KIT (BANDAGES, ETC.)
- ☐ BURN TREATMENT KIT
- ☐ HEAT-STRESS RELIEF ITEMS
- ☐ SKIN-CARE MEDICATIONS
- ☐ BLANKETS
- ☐ EMERGENCY EYE WASH
- ☐ OXYGEN & CPR EQUIPMENT.
- ☐ VENOM EXTRACTION DEVICES
- ☑ MSDS SHEETS (SEVERAL COPIES)

MEDICAL TRANSPORT TO BE ARRANGED BY: _____ (NAME)

NEAREST EMERGENCY MEDICAL TREATMENT FACILITY:

NAME OF HOSPITAL/CLINIC: Jal Medical Clinic

DISTANCE FROM SITE: <2 (MILES)

PHONE NUMBER OF FACILITY: (505) 395-3400

PHONE NUMBER OF AMBULANCE: 911

QUALIFIED EMT ON SITE?: ☑ NO
☐ YES - NAME: _____

SAFETY/HEALTH/HYGIENE INFORMATION:
NOTE: THE FOLLOWING ITEMS ARE TO BE ON SITE &AVAILABLE AS REQUIRED.
FOR SITE CONDITIONS (CHECK (x) AS APPROPRIATE)

CONFINED SPACE ENTRY PROGRAM: N/A
MSDS SHEETS: Attached
HEALTH & SAFETY MANUAL: N/A

ADDITIONAL INFORMATION ON MATERIAL SPILLED ✳: _____

✳ IDENTIFICATION OF INFORMATION: _____

✳ WHERE THIS INFORMATION MAY BE FOUND: _____

COMMUNICATIONS ON SITE:

EMERGENCY SIGNAL FOR RECALL FROM EXCLUSION ZONE: N/A

Communications in field are via cellular telephones. Land lines are used from nearby homes or offices.

COMMAND POST TELEPHONE NUMBER: _____

ENVIRONMENTAL MONITORING:

MONITORING TO BE PERFORMED BY: Site Engineer (NAME)

EQUIPMENT AS LISTED BELOW SHALL BE USED AS INDICATED:
CHECK (x) APPROPRIATE BOXES:

	MONITORING FREQUENCY				
MONITORING EQUIPMENT	CONTINUOUS	HOURLY	DAILY	AS NEEDED	N/A
COMBUSTIBLE GAS IND.					X
H_2S MONITOR					X
OXYGEN MONITOR					X
LEL MONITOR					X
OTHER (SPECIFY)					X
CONDUCTIVITY METER				X	
pH METER				X	
PID METER				X	

RESULTS OF MONITORING TO BE ATTACHED TO THIS PLAN, WITH COPY TO COMMAND POST.

EMERGENCY PHONE NUMBERS:
(NEAREST EMERGENCY SERVICES)

EMERGENCY SERVICES	TELEPHONE	LOCATION (TOWN)
FIRE	911 / 505-395-2221	Jal, New Mexico
POLICE	911 / 505-395-2501/2121	Jal, New Mexico
SHERIFF (Jal Police Department answers phone)	911 / 505-395-2121	Jal, New Mexico
HOSPITAL/CLINIC	911 / 505-395-3400	Jal, New Mexico
AMBULANCE	911	Jal, New Mexico
OTHERS:		
OTHERS:		
EMERGENCY MANAGEMENT COORDINATOR	505-397-9231	Hobbs, New Mexico
DPS		
ETMC HOSPITAL	N/A	
CHAPARRAL (USA) ENERGY, INC. (FIELD FOREMAN)	915-561-9462 (O) 866-561-9462 (Toll Free) 915-561-9467 (M)	Midland, Texas
CHAPARRAL ENERGY, INC. (EH&S MANAGER)	405-478-4643 Ext 1130 405-850-2732 (M)	Oklahoma City, Oklahoma
CHAPARRAL ENERGY, INC. (DISTRICT ENGINEER)	405-478-8770 Ext 1280	Oklahoma City, Oklahoma

APPENDIX I

ACTIVITIES SCHEDULE
STAGE 1 ABATEMENT PLAN
SOUTH LANGLIE JAL UNIT
LEA COUNTY, NEW MEXICO

Pre-Field Trip Preparation:

1. Obtain aerial photographs and existing well spot maps covering the unit.
2. Coordinate with legal counsel on timing of sampling the test and monitoring wells and notification of surface owners where drilling and sampling is to be done.
3. Settle surface damages for well sites, as determined by legal counsel.
4. Contact at least 48 hours in advance the Environmental Engineer Specialist(s) with the New Mexico Oil Conservation Division to schedule activities.
5. Contact the laboratory and arrange for sample containers to be either available for pick up or for delivery to the site in ample time for testing operations.
6. Make other notifications as may be necessary or required by the NMOCD or by legal council.
7. With permission of the surface owner(s) and with the concurrence of legal counsel, survey the existing water wells within the unit, those water wells within one mile of the unit boundaries, and the chosen locations of all test-wells to be drilled. Correctly spot each on a USGS Topographic Map for field and office use.
8. Survey all oil and gas wells, pipelines, production battery sites and related sites within the unit that are not already surveyed. Correctly spot each on a USGS Topographic Map for field and office use.
9. Call the City of Jal, New Mexico to arrange for picking up copies of hydrological and analytical data from all city owned and/or operated water wells within the unit area.

Day 1

1. Travel to laboratory to pick up sample containers or arrange for them to be delivered to location.
2. Go to site and verify the locations of the private water, test and monitoring wells.
3. Contact the City of Jal, NM in person to obtain chemical information on the water being applied to the golf course. Pick up well locator map if available.

Days 2, 3, 4 .....etc.

1. Rig up drilling rig over monitor and test well sites. (See attached maps with well spots.)
2. Drill each monitoring well to at least 60 feet, or to the base of the first groundwater zone below 45 feet from surface, catching soil samples every ten feet into the ground.
3. Run PVC casing to TD and develop each well for water testing.

4. Obtain water samples from test wells drilled and completed. Obtain water samples from at least two wells at the Osborn home as well as those surrounding private water wells selected for this study.
5. Start hydrological testing of all wells. Collect data needed for determining hydraulic conductivity, transmissibility, storativity, direction of contaminate flow and related parameters.
6. Prepare chain-of-custody for all water and soil samples.
7. Take iced-down samples to laboratory for testing.
8. Drill test holes at sites of possible pollution, catching soil samples every ten feet and field analyzing samples for chlorides, TPH and BTEX. Drill to the first groundwater zone below 45 feet from surface.
9. Properly plug test holes, leaving marker in place for surveyor.
10. If initial test well shows the site is polluted, start drilling test wells as required in an attempt to ascertain horizontal and vertical extent of pollution. Continue process until horizontal extent of pollution is determined.
11. Re-survey in all test wells should any well be drilled at a location other than the one originally surveyed.

Post Fieldwork

1. Secure laboratory reports made on all water and soil samples.
2. Develop accurate maps of the SLJU and adjacent properties, showing the correct location of all water wells, oil and gas wells, production facilities and other such items of interest.
3. Draw maps showing chloride levels in each well tested. Contour to indicate possible source(s) of chlorides.
4. Complete the hydraulic calculations required by the NMOCD.
5. Analyze results and evaluate the extent of chloride contamination under the South Langlie Jal Unit.
6. Prepare reports for the NMOCD, Chaparral Energy, Inc., legal counsel and other parties to the evaluation as directed by the NMOCD and legal counsel.
7. Mail reports to appropriate parties.
8. Set up a semi-annual well sampling and testing schedule for the unit if required by the NMOCD.
9. Prepare for any Stage II Abatement Plan requirements.

APPENDIX J

Material Safety Data Sheets

Section I **CORPORATION IDENTIFICATION**	
Chaparral Energy, Inc. 701 Cedar Lake Boulevard Oklahoma City, OK 73114-7806	Telephone Number for Information (450) 478-8770 Ext 1130 (EH&S) (405) 478-4162 (F)

Section II **PRODUCT/INGREDIENT**		
Trade Name: Crude Oil or Oil Petroleum Rock Oil	CAS Registry Number: 8002-05-9	NFPA Hazard Rate: (0=Low , 4=Extreme) 1 HEALTH 3 FIRE 0 REACTIVITY

HAZARDOUS COMPONENTS				
Chemical Name(s)	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (Opt)
Crude Oil, Oil, Petroleum, Hydrogen sulfide (may or may not contain), Benzene	20 ppm 1 ppm	10 ppm 10 ppm	NIOSH 10 ppm	
Common Name(s): Crude Oil, Petroleum, Oil				
Formula: Complex mixture of petroleum hydrocarbons, along with sulfur and nitrogen compounds. May contain hydrogen sulfide and may also contain a low percentage of benzene.				

Section III **PHYSICAL / CHEMICAL CHARACTERISTICS**	
Boiling Point: Variable, depending on individual crude oils.	Specific Gravity (H_2O = 1): Various
Vapor Pressure (mmHg): Varies with individual crude	Melting Point: N/A
Vapor Density (Air=1): Heavier than air to lighter than air. Varies.	Evaporation Rate: (Butyl Acetate = 1): Variable
Solubility in Water: Insoluble	Volatile, % by volume: Up to 50%
Appearance: Dark Liquid	Odor: Sulfur odor

Section IV **FIRE AND EXPLOSION HAZARD DATA**	
Stability: Stable	Conditions to Avoid: Oxidizers
Incompatibility (Materials to Avoid): Strong oxidants such as liquid chlorine, concentrated oxygen, sodium or calcium hypochlorite.	
Hazardous Decomposition of By-products: Burning may result in Hydro Sulfide, Sulfur Dioxide, and Sulfur Trioxide fumes, smoke, carbon monoxide and carbon dioxide.	
Hazardous Polymerization: Will not occur	Conditions to avoid: N/A

Section VI **HEALTH HAZARD DATA**
Routes of Entry: Inhalation? Yes Skin? Yes Eye? Yes Ingestion? Yes
Health Hazards (Acute and Chronic): Inhalation of high vapor concentrations may have results ranging from eye and respiratory irritation, dizziness and headaches to unconsciousness, depending on concentrations and length of exposure. Prolonged or repeated liquid contact with skin will dry and defat the skin, leading to skin irritation, dermatitis and an increased possibility of skin cancer. Crude oil may contain hydrogen sulfide gas. Breathing may stop after a few seconds of exposure to hydrogen sulfide concentrations greater than 700 ppm, with immediate loss of consciousness and subsequent death. Light hydrocarbons may contain low percentages of benzene. Benzene may cause leukemia and other blood diseases after prolonged or repeated exposures at high concentration.
Signs and Symptoms of Exposure: Irritation to eyes, lungs or skin after prolonged or repeated exposure. Over exposure may cause CNS depression. Hydrogen Sulfide can cause pulmonary edema and respiratory paralysis at high concentrations. Do not induce vomiting.
Medical and First Aid Procedures: Eyes: Immediately flush with water for 20 minutes and seek medical attention. Inhalation: Remove to fresh air immediately. Provide respirator support if needed. Skin: Remove contaminated clothing and wash skin thoroughly with soap and water. If irritation persists, seek medical attention. Launder contaminated clothing before reuse and discard extremely contaminated leather products. Ingestion: DO NOT induce vomiting. Seek medical attention immediately.

SECTION VII **PRECAUTIONS FOR SAFE HANDLING AND USE**
Steps to be taken in case material is released or spilled: Remove all ignition sources. Keep people away. Recover free liquid. Add absorbent (sand, earth, sawdust, etc.) to spill area. Minimize breathing vapors. Ventilate confined spaces. Open windows and doors. Keep petroleum products out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas. Federal, state and local regulations must be followed. Waste Disposal Method: Recycle as much of the recoverable product as possible. Dispose of absorbed materials at an approved disposal site or facility. Assure conformity with applicable regulations.
Precautions to be taken in handling and storing: Observe precautions for volatile, flammable vapors from absorbed materials. Toxic quantities of hydrogen sulfide may be present in storage tanks and bulk transport vessels, which contain or have contained crude petroleum. Persons opening or entering these compartments should first determine if H_2S is present. Do not attempt to rescue without wearing approved supplied air or self-contained breathing equipment.
Other precautions: Wash thoroughly with soap and water after contact. Avoid ignition sources.

Section VIII CONTROL MEASURES		
Respiratory Protection (Specific Type): Use supplied air self-contained breathing equipment in confined space or enclosed spaces.		
Ventilation	Local Exhaust Ventilate to avoid accumulation of explosive vapors.	Special: No smoking or open lights.
	Mechanical (General): Use explosion proof equipment and non-sparking tools in areas where explosive vapors may form.	Other: N/A
Protective Gloves: Use chemical resistant gloves to avoid skin contact.	Eye Protection: Goggles or face shields for spray/mist or if splashing possible.	
Other Protective Clothing or Equipment: Use chemical-resistant apron or other clothing if needed to avoid contaminating regular clothing.		
Work/Hygienic Practices: Keep containers closed when not in use. Do not handle or store near heat, sparks, flame, or strong oxidants. Ventilation must be sufficient to prevent build up of toxic or explosive concentration of vapor in air. Wash before eating, smoking or drinking. Soiled clothing should be removed and laundered.		

Date Prepared: 23 February 2001	24-Hour Emergency Number: 1-866-478-8770