GW - 32

6/85

PERMITS, RENEWALS, & MODS

Application

ATTACHMENT B-5

INVENTORY OF SOLID WASTE MANAGEMENT UNITS

June 14, 1985

NMD000333211

Prepared for:

Giant Refinery Company
A Division of Giant Industries, Inc.
Ciniza Refinery
Gallup, New Mexico 87301

Prepared by:

Geoscience Consultants, Ltd.
500 Copper Avenue, NW
Albuquerque, New Mexico 87102

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 EXECUTIVE SUMMARY

Pursuant to Section 3004(u) and 3004 (v) of the Resource Conservation and Recovery Act, as amended by Hazardous and Solid Waste Amendments of 1984, P.L. 98-616, and the transmittal of April 1985 from the U.S. Environmental Protection Agency, Giant Industries, Inc. (Giant) is submitting the following information on continuing releases and corrective actions. This document describes and details all active and inactive solid waste management units (including regulated hazardous waste units) which have been utilized since the Ciniza Refinery began its operations in 1958. Giant's Ciniza Facility is an active refinery and generates typical refinery wastes as well as a variety of domestic and residential types of solid waste.

A variety of solid waste management units have been utilized since refinery operations began in 1958 and have included: 5 landfill areas; 25 surface impoundments; 2 land treatment areas; 2 container storage areas; and 2 wastewater treatment units.

High volume refinery wastes produced at Ciniza, have been managed in a manner which favors their degradation and immobilization. Environmental releases of these types of wastes or constituents are considered highly unlikely or minimal.

Low volume refinery wastes and other solid wastes were generated intermittently and generally in small quantities. Because of their low aggregate concentrations and the fact that many were often comingled with other wastes or reduced in volume, it is doubtful that these will have had any significant impact on the environment.

Additionally, the hydrogeologic environment, soil and climatological conditions at the Ciniza Refinery further minimizes the potential for any releases of wastes or waste constituents to ground water, surface water or the atmosphere.

The information provided in this document has been compiled from a review of existing available data and a detailed records search and interviews of current and past refinery employees. In many instances, written historical documentation concerning past management practices does not exist and estimates are formulated using current operation and management practices. The locations and unit dimensions of inactive solid waste management areas provided in the Facility Site Map were located as accurately as possible. In many instances, physical boundaries can no longer be distinguished for inactive units. A significant effort has been made to furnish EPA with complete, useful and accurate data.

2.0 LANDFILL SITES

2.1 LANDFILL AREAS

Several landfill areas have been operated by the Ciniza Refinery since 1958. The exact dates of operation and closure are not recorded. Landfill Areas 1, 2, 3 and 4 are inactive. Landfill Area 5 is currently used for disposal scrap metal, pipe, office and residential waste.

Waste Description

The inactive landfill areas (1, 2, 3 and 4) received solid wastes consisting primarily of demolition and construction wastes (asphalt paving, concrete, scrap metal) and a variety of office, residential and shop wastes. It is estimated that some defluorinator bauxite and hydrotreating catalyst (Co/Mo/Ni) may also have been landfilled before Giant Refinery Company assumed operations from Shell in 1982. Small quantities of outdated laboratory chemicals may also have been disposed of by landfilling according to then existing governmental regulations.

Landfill Area 1 served mainly as a scrap metal disposal area and may have received quantities of alky scrap metal from the alkylation unit.

Landfill Areas 3 and 4 have received asbestos wastes which have been disposed of according to Federal regulations. Landfill Area 4 still has an active asbestos waste disposal cell.

Landfill Area 5 is currently active and receives various types of solid wastes including scrap metal, office and residential trash, etc. Combustible wastes are usually burned at Landfill Area 5.

Quantity/Volume

No records exist for the quantities of municipal type wastes which may have been placed in the landfill areas. Estimates for refinery wastes are based on total annual quantities. It is not known whether all wastes listed in Table 2-1 were actually landfilled and/or in what quantities.

TABLE 2-1

WASTES POTENTIALLY LANDFILLED

Waste Type	Estimated Amount	Years Produced
Asbestos Insulation	0.5 ton/yr	1958-current
Defluorinator Bauxite	2.0 tons/yr	1958-current
Co/Mo/Ni Catalyst	4.5 tons/yr	1970-current
Alky Scrap Metal	5.0 tons/yr	1958-current
Laboratory Chemicals	200 lbs/yr	1958-current

Unit Description

The approximate dimensions of the landfill areas are listed below. It is estimated that nominal depths were 6-8 feet. Individual landfills may also have consisted of small discreet cells instead of entire trenches. The dimensions and estimated capacities of each of these units is shown below:

Landfill Area	Dimensions	Depth	Estimated Maximum Capacity (cu. yds.)
1	20' X 20'	6' - 8'	89-118
2	85' X 80' X 100'	6' - 8'	151,111 - 201,481
3	50' X 100'	6' - 8'	1,111 - 1,481
4	50' X 100'	6' - 8'	1,111 - 1,481
5	50' X 100'	active	active

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data, or information which indicate any releases to ground water, surface water, soil or the atmosphere from the landfill areas.

2.2 TANK FARM

The Ciniza Refinery currently operates six product storage tanks containing leaded gasoline. In the past it was common industry practice to dispose of tank bottoms within the tank berms. This practice took place only once every five years and the practice was discontinued after November 19, 1980. These wastes are now applied to the land treatment area according to RCRA Part B requirements.

Waste Description

Wastes disposed within the tank berms would have consisted of leaded tank bottoms.

Quantity/Volume

Inspection records indicate that for the years 1965-1980 approximately one ton/year of leaded tank bottoms were generated.

Unit Description

Typical dimensions within the containment berms for larger storage tanks are approximately 150' X 150' square with a berm height of 3-4 feet. Total product storage capacity is approximately 79,701 barrels.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to ground water, surface water, or the atmosphere from wastes disposed of in product storage areas.

2.3 BURN PIT

Up until 1976 a burn pit was utilized to dispose of various waste oils.

Waste Description

Wastes incinerated in the burn pit would have included acid soluble oils (ASO) from the HF alkylation unit. Spent silicon oxide catalysts may also have been disposed of in the burn pit.

Quantity/Volume

Annual amounts of ASO is estimated to have been approximately 500 bbl/year.

Unit Description

Approximate dimensions of the burn pit were 20' x 40' x 20' with a nominal depth of ten to twelve feet. The pit was used from approximately 1958 to 1976. The pit was unlined and was excavated into the native soils.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to ground water, surface water or the atmosphere from the burn pit area.

3.0 PITS, PONDS, LAGOONS

3.1 EVAPORATION PONDS

The Ciniza Refinery currently maintains an active group of evaporation ponds consisting of 16 total cells (Appendix 1). Cells 1-7, 8 and 9A,B,C and D probably date from 1958 when refinery operations commenced. Cells 11,12A and 12B are post-1970. Cell #10 was originally a wastewater treatment pond for boiler house and water softener regeneration waste waters. This was replaced in 1980 with an in-line neutralization tank which is discussed in Section 6.0.

Waste Description

Cells 1,2,6,7,8,11,12A and 12B receive treated refinery process wastewaters originating from the API separator unit. API separator effluent is not a listed hazardous waste, and although profiles of hazardous constituents are not fully documented, limited data dating from 1976 is being provided in Appendix 4.

Cells 3,4,5 and 9A,B,C and D receive wastewaters originating from boiler house blowdown and from brine and hydrochloric acid regeneration of the zeolite waste softeners. Limited analyses of discharges to Cells 3,4,5 and 9A,B,C and D are provided found in Appendix 4.

Quantities/Volumes

Based on current operations and reviews of purchase records it is estimated that the refinery process wastewater ponds receive an API effluent discharge of 80 gpm/24 hours and may be applicable for the years 1958 - present.

Record searches and current operations indicate that approximately 40 tons/year of untreated water softener regeneration wastewaters were discharged to Cells 3,4,5 and 9A,B,C and D during the years 1970 through 1980. After 1980, this discharge has been neutralized with crushed limestone in an in-line neutralization tank.

Unit Description

The eight refinery process water ponds are unlined and have an approximate total surface area of 81.9 acres. Each pond is approximately 3 feet deep except for Cell 2 which has a depth of 9-10 feet. Water levels in individual ponds usually never exceed 1 1/2 to 2 feet in depth except for Cell 2. Based on 2 feet of freeboard in Cell 2 and average water depth of 1.5 feet in all other cells, the total capacity is approximately 150-155 acre-feet.

The boiler house/water softener-backwash (clean water sewer system) evaporation ponds are unlined and have an approximate total area of 32.8 acres. Again, each cell is approximately 3 feet deep with a maximum water depth of 1 1/2 - 2 feet. Assuming a maximum water depth of 1.5 feet for each pond, total capacity is approximately 49.20 acre-feet.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to ground water, surface water or the atmosphere from the evaporation ponds other than evaporation which clearly takes place.

3.2 SEWAGE LAGOONS

The Ciniza Refinery currently maintains four sewage lagoons. Lagoons #1,2 and 3 (Appendix 1) date from 1958. Lagoon #4 was installed in 1972.

Waste Description

Lagoon #1 receives sanitary wastes from the seven company residences located on the southern boundary of the refinery property.

Lagoon #2 receives sanitary wastes from the laboratory, warehouse and maintenance buildings and the service shops.

Lagoon #3 services the warehouse and offices on the eastern edge of the refinery property and receives sanitary wastewaters.

Lagoon #4 receives sanitary wastewaters from the administrative office building.

Quantities/Volume

Based on a rough estimate of 50 gal/day/person, the sewage lagoons would have received the following volumes of sanitary wastes:

Lagoon	Peopled Served	Approximate Volume
1	21	1050 gallons
2	60-75	3,000 - 3,750 gallons
3	1	50 gallons
4	15	750 gallons

Unit Description

All the lagoons are unlined and their locations can be found in the Facility Site Map in Appendix I-1. The approximate dimension and capacities for each lagoon are listed below.

Dimensions:

Sewage Lagoon #1	175' X 175' X 4'
Sewage Lagoon #2	445' X 127' X 4'
Sewage Lagoon #3	100' X 100' X 4'
Sewage Lagoon #4	63' X 50' X 4'

Capacity:

Sewage Lagoon #1	913,850 gallons
Sewage Lagoon #2	1,686,407 gallons
Sewage Lagoon #3	298,400 gallons
Sewage Lagoon #4	93,996 gallons

3.3 RAILROAD RACK LAGOON

The Railroad Rack lagoon is adjacent to sewage Lagoon #3 and receives product spills collected in spill pans which may occur during loading of tank cars. This material is removed three or four times a year by vacuum truck and transferred to the API separator.

Waste Description:
Diesel fuel is the main product which is loaded in bulk at the rail loading area.

Quantities/Volumes
No records are available on the amounts of diesel fuel which may have been discharged to the railroad rack lagoon.

Unit Description
The railroad rack lagoon is approximately 175' X 50' X 4' with a total capacity of 261,100 gallons.

3.4 SLUDGE PITS

Prior to November 19, 1980 API separator sludges and slop oils were disposed of in two unlined sludge pits just west of the API unit. The contents of the sludge pits were removed and the sludge pits closed prior to November 19, 1980. The wastes from the pits were placed in the new land treatment area.

Waste Description
Wastes consisted of API separator sludge and slop oil emulsion solids.

Quantity/Volume
Estimated volumes for API separator sludges and slop oil emulsion solids for the years 1958-1980 are 100 tons/year and 2 tons/year respectively.

Unit Description
The sludge pits had dimensions of approximately 70' X 80' X 120' X 130' and 70' X 50' X 50'. Berms were approximately three feet high and considering a free board of one foot total capacity for both units was approximately 250,000 gallons.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information indicating any releases to ground water, surface water or the atmosphere from the sludge pits.

3.5 ASPHALT PIT

A small asphalt pit was created near the perimeter of the old asphalt storage tank farm when an unplanned spill occurred. The asphalt has been left in place due to its solid nature and immobility. close it!

Waste Description

Asphalt

Quantity/Volume

Based on the dimensions of this pit approximately 1000-2000 feet^3 of asphalt remain in the pit.

Unit Description

Dimensions of the unlined asphalt pit are approximately 50' X 20'. Existing berms indicate a depth of approximately two feet giving a total capacity of roughly 2,000 cubic feet.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information that indicate any releases to ground water, surface water or the atmosphere from the asphalt pit. The material is very solid and quite immobile.

4.0 LAND TREATMENT

The Ciniza Refinery has utilized two land treatment areas since operations began in 1958. One has been inactive since before November 19, 1980 and the other is currently operating under Interim Status (Part B permit pending).

4.1 LAND TREATMENT AREA #1 (INACTIVE)

Land Treatment Area #1 was closed prior to November 19, 1980 and received no waste applications after 1975.

Waste Description

The old land treatment area received typical refinery wastes. Among those wastes applied would be API separator sludge, tank bottoms, waste oil, slop oils, etc.

Quantities/Volumes

No exact records are available on the quantities of waste which were applied to the old land treatment area. Prior to November 1980 API separator sludge was placed in unlined sludge pits at an estimated annual volume of 100 tons/year. These sludge pits were removed from service before November 19, 1980 (see Section 3.4). The residual wastes were applied to the new land treatment area in 1981.

Waste oil was probably applied to the same area during the years 1958-1980 at an estimated annual volume of 10 tons/year.

Unit Description

The old land treatment unit had dimensions of approximately 300' X 80' and was located on the northern side of the refinery process area (Appendix I-1). Current operating practices at the Interim Status land treatment area limit incorporation of wastes into the upper twelve inches of the treatment zone and similar practices were followed during application of wastes at the old unit.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to groundwater, surface water or the atmosphere from the old land treatment unit.

4.2 LAND TREATMENT AREA #2 (ACTIVE)

The Ciniza Refinery currently maintains an active land treatment unit that has operated under Interim Status since November 19, 1980.

Waste Description

The current land treatment unit receives typical refinery wastes which historically have been land treated. These wastes are listed or characteristic hazardous wastes and contain a number of Appendix VIII constituents.

Quantities/Volumes

Those wastes periodically received, the amounts and their frequency of application are presented in Table 4-1. These wastes are applied intermittently and their availability will depend on storage unit capacities and clean out events. Application logs from November 1980 to September 1983 document an average annual loading rate of 68 barrels/acre.

Unit Description

The Interim Status land treatment unit consists of six individual cells totalling 13.8 acres. Three cells have received waste application since November 19, 1980. Each cell is approximately 462' X 222' with a total area of 2.35 acres each. Depth of waste incorporation is limited to the upper twelve inches of soil. The land treatment area is located along the northeastern perimeter of Evaporation Pond 12A (Appendix I-1). Giant has submitted a land treatment demonstration plan to New Mexico Environmental Improvement Division (NMEID) and is awaiting the approval or modification of that plan to begin their land treatment demonstration pursuant to New Mexico Hazardous Waste Act (NMHWA) and RCRA. This facility has a RCRA ground water monitoring system which is in full compliance with interim status regulations.

TABLE 4-1

WASTE APPLICATION FREQUENCY

Waste	Estimated Amount (lbs.)	Frequency
Cooling Tower Sludge	6,300	Twice/year
Slop Oil Emulsion	800	Once/5 years
Heat Exchanger Cleaning Sludge	400	Once/1.5 years
API Separator Sludge	250,000	Twice/year
Leaded Tank Bottoms	1,600	Once/5 years

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to ground water, surface water or the atmosphere from the Interim Status land treatment unit. No releases have been indicated pursuant to the careful monitoring that has been performed using the RCRA ground water monitoring system at the land treatment area.

5.0 CONTAINER STORAGE

The Ciniza Refinery currently maintains and operates a small container storage area for temporary (less than 90 days) storage of spent solvents. An old storage area was operated adjacent to Landfill Area #4 and contained empty drums which once held various chemical products. It was closed prior to November 19, 1980 and all drums were removed. The current storage area has been in operation since November 19, 1980, and is located in the warehouse yard (Appendix I-1).

5.1 CONTAINER STORAGE AREA (ACTIVE)

Waste Description

Spent 1,1,1-trichloroethane is the only solvent waste currently stored in 55 gallon drums within the container area.

Quantity/Volume

Approximately ten 55-gallon drums per year are handled at the container storage area.

Unit Description

The drums of spent solvent are stored in a fenced area adjacent to the maintenance warehouse building. The area has an asphalted surface and the drums are stored on pallets.

Documentation of Prior and/or Continuing Releases

No releases of solvent wastes have ever occurred at the container storage area.

5.2 CONTAINER STORAGE AREA (INACTIVE)

Waste Description

Empty drums from various chemical products.

Quantity/Volume

No data is available on the number of drums which may have been in storage in the past.

Unit Description

Drum storage area was approximately 80' X 50'. Drums were stored on bare earth. This area is now used for the storage of surplus and salvageable materials.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any release to soil, ground water, surface water or the atmosphere from any of the drum storage areas.

6.0 WASTEWATER TREATMENT UNITS

The Ciniza Refinery operates two wastewater treatment units. The API separator unit became operational in 1958 and receives influent from the refinery process area. The acid neutralization tank was installed in 1980 to replace Cell #10 of the evaporation ponds and receives influent from the clean water sewer system which services the water softener units and boiler house area.

6.1 API SEPARATOR

The API separator consists of two parallel units which receive oily water discharge from the refinery process area. The aqueous effluent from the separator discharges to the refinery evaporation ponds. The sludge is removed from the separator and applied to the interim status land treatment area (active).

Waste Description

Wastes entering the API separator consist of oily wastewaters generated in the refinery process area including the cooling tower area and tank farm. It is also estimated that approximately 25 tons/year of spent caustic and two tons/year of KOH enter the API separator for treatment. Contaminants found in this process stream intering the API separator may include chromium, lead, spent caustics and KOH. In addition, the API unit may have also received small quantities of chemical wastes from the laboratory drains.

Quantities/Volumes

Based on current operations, inflow/outflow is approximately 80 gpm/24 hours and past volumes should be approximately the same. Laboratory wastes disposed are estimated to be 200 lbs/year, although no figures are avialable as to what percentage of that total may have entered the API unit.

Unit Description

The API separator is an above-grade concrete tank with two parallel compartments and has approximate dimensions of 80' X 22' X 5'. Considering one foot of freeboard approximate capacity is 66,000 gallons.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to soil, ground water, surface water or the atmosphere from the API separator unit.

6.2 ACID WASTEWATER NEUTRALIZATION TANK

In 1980 the Ciniza Refinery installed an in-line acid wastewater neutralization tank. The tank receives wastewater from the clean water sewer systems which services the water softening units and boiler house area. Crushed limestone is used to raise the pH of the wastewaters to approximately 3.65 which are then discharged directly to the refinery wastewater evaporation ponds.

Waste Description

Acidic wastewater entering the neutralization tank is produced as a result of water softener unit regeneration. The Ciniza Refinery uses a zeolite type water softening system and back-washes the units with brine and HCl during the regeneration cycles. The resultant wastewater ranges over a pH of 1.3 to 2.5 during the regeneration cycle.

Quantities/Volumes

An examination of purchase records indicate that the neutralization tank may receive 40 tons/year of water softener chemicals (i.e. spent brine and HCl). Estimated average inflow is 58 gpm/24 hours including continuous and batch blowdown.

Unit Description

The neutralization tank is a cylindrical, converted acid storage tank. It is constructed of carbon steel and originally had a butyl rubber

liner. The wall thickness of the tank is unknown. Approximate dimensions are 20 feet in length with a five foot diameter.

Total capacity is approximately 3,000 gallons although fluid level seldom exceeds two feet as it passes through the tank.

Documentation of Prior and/or Continuing Releases

Giant Refining Company has no records, data or information which indicate any releases to soils, ground water, surface water or the atmosphere from the neutralization tank.

7.0 GROUND WATER MONITORING

7.1 RCRA GROUND WATER MONITORING

Giant instituted an Interim Status Ground Water Monitoring Program in December 1981. Three down-gradient and one up-gradient wells were installed at the land treatment facility to monitor potential releases to groundwater. The tabulated analytical results for the time period of December 1981 to April 1984 can be found in Appendix F of Giant's Part B permit application that was submitted to the U.S. EPA on December 1, 1984. Additional analyses for post-April 1984 can be found in Appendix I-2 of this document.

7.2 GENERAL GROUND WATER CHEMISTRY

A number of analyses have also been performed to determine general ground water quality in the refinery area during the operational life of the facility. Analytical results can be found in Appendix I-3.

8.0 WASTE ANALYSES

A number of waste streams at the Ciniza Refinery have been analyzed over a period of years. Available analytical results are found in Appendix I-4.

APPENDIX 1
FACILITY SITE MAP

APPENDIX 2

RCRA GROUND WATER MONITORING DATA

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refinery
Attn: Bob Anderson
Route 3 Box 7
Gallup, NM 87301

DATE: 10 January 1985
1183

ANALYTE	SAMPLE ID/ANALYTICAL RESULTS			
	MW-1B (Cubitainer)	MW-2 52	MW-3 52	MW-4 52
pH	8.3	8.95	8.85	8.60
EC	10 umhos/cm	1100 umhos/cm	1100 umhos/cm	1200 umhos/cm
	OW-2	OW-7	OW24 52	#1 Pond Outlet
pH	8.1	8.7	8.0	9.1
EC	1300 umhos/cm	1200 umhos/cm	1100 umhos/cm	5600 umhos/cm
	Blank	MW-1 52	NOMINAL DETECTION LIMIT	
pH	7.4	8.7	0.01	
EC	1100 umhos/cm	1180 umhos/cm	0.1 umhos/cm	

	MW-1 52 Vial	MW-2 52	MW-3 52	MW-4 52
TOC	8.0 mg/l	7.0 mg/l	5.0 mg/l	6.0 mg/l
TOX	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l

	OW-2	OW-7	OW-24 52	# 1 Pond
TOC	11.0 mg/l	5.0 mg/l	12.0 mg/l	1560.0 mg/l
TOX	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l

	Blank	MW 1B	NOMINAL DETECTION LIMIT:
TOC	4.0 mg/l	4.0 mg/l	0.1 mg/l
TOX	<0.01 mg/l	<0.01 mg/l	0.01 mg/l

REFERENCES: 1."Standard Methods for the Examination of Water and Wastewater", 15th Edition, APHA, N.Y., 1980.

2. EPA-SW 846

7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964

TO: Giant Refinery

1183

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerly,

Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES

TO: GeoScience
Attn: Randy Hicks
500 Copper Ave. N.W.
Suite 501
Albuquerque, NM 87102

DATE: 22 February 1985
0160

ANALYTE	SAMPLE ID/ ANALYTICAL RESULTS		
		MW-1	Blank, Pb/Hg Spike
	#1 MW-3	#2	#3
pH	8.7	8.8	8.9
EC	1100.0 umhos/cm	1100.0 umhos/cm	5 umhos/cm
TOC	8.2 mg/l	7.4 mg/l	4.0 mg/l
TOX	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l
Cl	57.0 mg/l	47.0 mg/l	1.0 mg/l
Fe	0.020 mg/l	0.077 mg/l	<0.05 mg/l
Mn	0.029 mg/l	0.024 mg/l	<0.005 mg/l
Pb	0.010 mg/l	0.009 mg/l	0.039 mg/l
			0.037 mg/l (duplicate)
Hg	<0.002 mg/l	<0.002 mg/l	0.002 mg/l
Phenols	<1.0 mg/l	<1.0 mg/l	<1.0 mg/l
SO_4	120.0 mg/l	150.0 mg/l	<1.0 mg/l
	130.0 mg/l (duplicate)		
Na	140.0 mg/l	234.0 mg/l	<1.0 mg/l
	#4 MW-2	#5 MW-4	#6 OW-11
pH	8.8	8.6	8.2
EC	1180.0 umhos/cm	1200.0 umhos/cm	1600.0 umhos/cm
TOC	5.8 mg/l	10.8 mg/l	9.9 mg/l
TOX	<0.01 mg/l	<0.01 mg/l	<0.01 mg/l
Cl	56.0 mg/l	16.0 mg/l	105.0 mg/l
			102.0 mg/l (Duplicate)
Fe	0.037 mg/l	0.086 mg/l	0.078 mg/l
Mn	0.017 mg/l	0.038 mg/l	0.012 mg/l
	0.0169 mg/l (duplicate)		
Pb	0.010 mg/l	0.006 mg/l	0.004 mg/l
Hg	<0.002 mg/l	<0.002 mg/l	<0.002 mg/l
Phenols	<1.0 mg/l		1.8 mg/l
SO_4	157.0 mg/l	120.0 mg/l	167.0 mg/l
Na	195.0 mg/l	277.0 mg/l	359.0 mg/l

	Spike
Pb	0.042 mg/l
Hg	0.002 mg/l

TO: GeoScience

NOMINAL DETECTION LIMITS

pH	0.01
EC	0.1 umhos/cm
TOC	0.1 mg/l
TOX	0.01 mg/l
Cl	0.1 mg/l
Fe	0.05 mg/l
Mn	0.005 mg/l
Pb	0.001 mg/l
Hg	0.002 mg/l
Phenols	1.0 mg/l
SO_4	1.0 mg/l
Na	1.0 mg/l

REFERENCE: "Standard Methods for the Examination of Water and Wastewater", 15th Edition, APHA, N.Y., 1980.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer W. Smith

Jennifer W. Smith, Ph.D.
Laboratory Director

SAMPLE DESCRIPTION INFORMATION

for

Giant Refining Co.

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
4511-01	1S1	Water	12/5/84	12/7/84
4511-02	2S1	Water	12/5/84	12/7/84
4511-03	3S1	Water	12/5/84	12/7/84
4511-04	4S1	Water	12/5/84	12/7/84

January 8, 1985

ANALYTICAL RESULTS

for

Giant Refining Co.

RCRA INDICATORS

Parameter	Units	Detection Limit	4511-01	4511-02	4511-03	4511-04
pH Value 1	units	0.01	8.76	8.85	8.80	8.57
pH ue 2	units	0.01	8.77	8.84	8.78	8.57
pH alue 3	units	0.01	8.80	8.94	8.81	8.58
pH Value 4	units	0.01	8.84	8.87	8.81	8.59
Specific Conductance at 25°C	umhos/cm	1	1170	1160	1170	1200
Specific Conductance at 25°C	umhos/cm	1	1160	1160	1160	1190
Specific Conductance at 25°C	umhos/cm	1	1140	1160	1170	1190
Specific Conductance at 25°C	umhos/cm	1	1140	1160	1160	1190
Total Organic Carbon Value 1	mg/l	0.1	1.2	1.6	4.2	4.1
Total Organic Carbon Value 2	mg/l	0.1	1.2	1.6	4.3	4.1
Total Organic Carbon Value 3	mg/l	0.1	1.3	1.5	4.2	3.8
Total Organic Carbon Value 4	mg/l	0.1	1.2	1.5	4.2	3.8
Total Organic Halogen Value 1	ugCl^-/l	5	ND[1]	ND[1]	ND[2]	ND[1]
Total Organic Halogen Value 2	ugCl^-/l	5	ND[1]	ND[1]	ND[2]	ND[1]
Total Organic Halogen Value 3	ugCl^-/l	5	ND[1]	ND[1]	ND[2]	ND[1]
Total Organic Halogen Value 4	ugCl^-/l	5	ND[1]	ND[1]	ND[2]	ND[1]

Notes

1. Detection limit 25 ugCl^-/l because of low sample volume.
2. Detection limit 50 ugCl^-/l because of low sample volume.
3. ND = Not detected.

APPENDIX 3

GENERAL GROUND WATER CHEMISTRY

EL PASO NATURAL GAS PRODUCTS COMPANY

Water Analysis

Water Well No. 2 — Ciniza Refinery

Sampled: November 15, 1956 by Jim Druley

Total Hardness as $CaCO_3$	625
Calcium as $CaCO_3$	460
Magnesium as $CaCO_3$	155
P - Alkalinity	0
Total Alkalinity as $CaCO_3$	168
Chlorides as Cl	16
Sulfate as SO_4	440
Silica as SiO_2	6
Total Iron as Fe	0.9
Color No.	N.L.
pH	7.2

All results expressed as parts per million.

J.E.D.
1/14/57

CUSTOMER Shell Oil Co.
ATTENTION Mr. Diester
ADDRESS Rt. 3 Box 7
CITY Gallup, NM 87301
INVOICE NO. 612101

#1 = API SEPARATOR OVERFLOW
#2 = POND 3 OVERFLOW
#3 = RAW WATER TANK

REPORT OF ANALYSIS

SAMPLES RECEIVED	12/16/76	CUSTOMER ORDER NUMBER	

TYPE OF ANALYSIS Water Analysis -

Analysis	Water Sample #1 mg/	Water Sample #2 mg/l	Water Sample #3 mg/l
Arsenic	0.05	0.07	0.03
Barium	0.5	2.3	0.3
Cadmium	< 0.001	< 0.001	< 0.001
Chloride	93.6	3970	39.8
Fluoride	35.9	13.2	0.27
Iron	1.77	3.40	0.143
Lead	0.005	0.012	< 0.001
Manganese	0.06	3.1	0.006
Mercury	0.0009	< 0.0004	< 0.0004
Selenium	0.06	< 0.01	< 0.01
Copper	0.001	0.019	0.002
Sulfite	214	0.90	0.70
Sulfate	970	869	408
Total Dissolved Solids	1575	15258	944
Cyanide	38.4	1.06	0.07
Zinc	0.106	0.306	0.005
Phenols	< 0.001	< 0.001	< 0.001
Total Kjeldahl Nitrogen	610	134	3.47
Chromium	0.7	0.18	0.002
Dissolved Oxygen	< 1	7.8	6.2
Boron	0.3	0.2	0.2
Molybdenum	0.003	0.001	0.001
Nickel	0.02	0.07	< 0.01
Aluminum	1.0	10.4	< 0.1
Cobalt	0.008	< 0.001	< 0.001
Lithium	0.035	0.070	0.020
Vanadium	0.02	0.08	0.01
Calcium	31.8	1090	199
Ammonia Nitrogen as N	292	64.2	0.49
Nitrate as N	< 0.1	< 0.1	< 0.1
Nitrite as N	< 0.1	< 0.1	< 0.1
pH	9.19	2.23	7.90
Chlorine	< 0.01	< 0.01	< 0.01

APPROVED BY

James J. Mueller, President
12/14/77

Controls for Environmental Pollution, Inc.
1925 Rosina • P.O. Box 5351 • Santa Fe, New Mexico 87501 • Telephone 505/982-9841

CUSTOMER Shell Oil Co.
ATTENTION Mr. Diester
ADDRESS Rt. 3 Box 7
CITY Gallup, NM 87301
INVOICE NO. 612101

#4 = POND 2 OVERFLOW
#5 = REFINERY DRINKING WATER
#6 = TEST WELL No. 11

REPORT OF ANALYSIS

SAMPLES RECEIVED 12/16/76 | CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Water Analysis -

Analysis	Water Sample #4 mg/l	Water Sample #5 mg/l	Water Sample #6 mg/l
Arsenic	0.03	0.02	0.07
Barium	< 0.1	< 0.1	< 0.1
Cadmium	< 0.001	< 0.001	0.011
Chloride	1010	41.8	38800
Fluoride	155	0.30	0.22
Iron	0.177	0.924	3.43
Lead	0.004	< 0.001	0.027
Manganese	0.5	0.024	27
Mercury	< 0.0004	< 0.0004	< 0.0004
Selenium	0.06	0.02	< 0.01
Copper	0.002	0.6	0.009
Sulfite	15.9	0.70	1.70
Sulfate	1394	1020	2023
Total Dissolved Solids	3377	1020	65,526
Cyanide	3.58	0.06	0.17
Zinc	0.028	0.069	4.52
Phenols	< 0.001	< 0.001	< 0.001
Total Kjeldahl Nitrogen	597	8.53	4.46
Chromium	0.35	0.001	0.077
Dissolved Oxygen	5.2	7.3	64
Boron	0.2	< 0.1	0.5
Molybdenum	< 0.001	< 0.001	0.008
Nickel	0.03	0.04	1.40
Aluminum	0.1	< 0.1	1.2
Cobalt	0.009	< 0.001	< 0.001
Lithium	0.060	0.015	0.372
Vanadium	0.07	< 0.01	< 0.01
Calcium	17.5	2.93	5350
Ammonia Nitrogen as N	265	0.73	2.93
Nitrate as N	< 0.1	< 0.1	28.4
Nitrite as N	0.1	< 0.1	< 0.1
pH	7.99	8.46	7.12
Chlorine	< 0.01	< 0.01	< 0.01

APPROVED BY

James J. Mueller, President
1/14/77

Controls for Environmental Pollution, Inc.
1935 Rosina • P.O. Box 5351 • Santa Fe, New Mexico 87501 • Telephone 505/982-

CUSTOMER Shell Oil Co.
ATTENTION Mr. Diester
ADDRESS Rt. 3 Box 7
CITY Gallup, NM 87301
INVOICE NO. 612101

#7 = TEST WELLS No. 32/33
#8 = TRADING POST WATER

REPORT OF ANALYSIS

SAMPLES RECEIVED	12/16/76	CUSTOMER ORDER NUMBER	

TYPE OF ANALYSIS: Water Analysis -

Analysis	Water Sample #7 mg/l	Water Sample #8 mg/l
Arsenic	0.05	0.02
Barium	0.1	< 0.1
Cadmium	0.012	< 0.001
Chloride	36,600	51.8
Fluoride	0.54	0.22
Iron	2.73	2.49
Lead	< 0.001	< 0.001
Manganese	4	2
Mercury	< 0.0004	< 0.0004
Selenium	< 0.01	< 0.01
Copper	0.007	0.005
Sulfite	0.70	0.70
Sulfate	2648	365
Total Dissolved Solids	64,362	969
Cyanide	0.26	0.03
Zinc	1.02	0.055
Phenols	< 0.001	< 0.001
Total Kjeldahl Nitrogen	31.8	0.64
Chromium	0.002	0.002
Dissolved Oxygen	7.0	6.6
Boron	0.7	0.2
Molybdenum	0.005	< 0.001
Nickel	0.23	< 0.01
Aluminum	1.2	< 0.1
Cobalt	< 0.001	< 0.001
Lithium	0.297	0.015
Vanadium	< 0.01	< 0.01
Calcium	3540	171
Ammonia Nitrogen as N	15.7	0.30
Nitrate as N	52.0	< 0.1
Nitrite as N	< 0.1	< 0.1
pH	7.22	8.03
Chlorine	< 0.01	< 0.01

APPROVED BY

James J. Mueller, President
1/14/77

Controls for Environmental Pollution, Inc.

CINIZA GROUNDWATER - Comparisons are shown for five wells that have been sampled three times, the wells are:

OW-2: located at the extreme downstream edge of the property
OW-4: located in the middle of the land treatment area
OW-11: background well between I-40 and plant
OW-12: midway between the tank farm and airstrip
OW-20: just east of the cooling water tower

The results shown are in mg/l. The standards for drinking water or groundwater are in parentheses following each parameter name,

Parameter	Well	12/80	6/81	9/81
	OW-2	-	.53	.025
	OW-4	-	.045	.028
Lead (.05)	OW-11	.002	.004	.021
	OW-12	.03	.046	.08
	OW-20	.04	.055	.015
	OW-2	.003	-	.005
	OW-4	.005	-	.002
Chromium (.05)	OW-11	.003	.003	.003
	OW-12	.004	-	.15
	OW-20	.1	.044	.038
	OW-2	1.6	.6	.45
	OW-4	1.0	.6	.55
Fluoride (~2.0)	OW-11	.2	.086	.09
	OW-12	.52	-	-
	OW-20	.4	-	.34

Parameters analyzed for the first time 9/81 are as follows:

	Barium (1.0)	Cadmium (.01)	Mercury (.002)	Silver (.05)
OW-2	3.0	< .001	.0077	< .01
OW-4	.3	< .001	.0042	< .01
OW-11	.3	< .001	< .0004	< .01
OW-12	1.0	< .001	< .0004	< .01
OW-20	1.0	< .001	< .0004	< .01

	Phenols (.005)	Fecal Coliform	Total Organic Halogens
OW-2	< .001	< 1 col/100 ml	< .4 ppm
OW-4	< .001	< 1 col/100 ml	< .4 ppm
OW-11	< .001	< 1 col/100 ml	< .4 ppm
OW-12	< .001	-	< .4 ppm
OW-20	< .001	< 1 col/100 ml	< .4 ppm

Raw Water

NALCO

ANALYTICAL LABORATORY REPORT

From:
Giant Refining
Gallup, NM.

Sample Marked:
Well #3 Raw Water

Analysis No. W 72420
Date Sampled 1/10/85
Date Received 2/ 6/85
Date Printed 2/25/85
Page 1

<<< WATER ANALYSIS >>>

	PPM	
CATIONS:		
Calcium (CaCO3) - Soluble	490.	196
Magnesium (CaCO3) - Soluble	170.	41
Sodium (CaCO3)	37.	17
Potassium (K)	2.6	
Ammonia (CaCO3)	< 0.6	
Barium (Ba) - Soluble	0.2	
Cobalt (Co) - Soluble	0.01	
Chromium (Cr) - Soluble	0.03	
Copper (Cu) - Soluble	0.01	
Iron (Fe) - Soluble	0.05	
Lead (Pb) - Soluble	0.06	
Strontium (Sr) - Soluble	2.4	
Thallium (Tl) - Soluble	0.7	
Vanadium (V) - Soluble	0.02	
Zirconium (Zr) - Soluble	0.01	
		259
ANIONS:	PPM	
Bicarbonate Alkalinity (CaCO3)	174.	212
Boron (B)	0.5	
Total Filterable Phosphorus (P)	0.8	
? Total Filterable Sulfur (S)	170.	
Fluoride (F) - Free	0.31	
Chloride (CaCO3)	13.	9.2
Sulfate (CaCO3)	480.	461
Nitrate (CaCO3)	< 1.	
Nitrite (NO2)	< 0.1	682.2
Silica (SiO2) - Molybdate Reactive	19.	
OTHERS:	PPM	TDS 941

RAW WATER

NALCO

ANALYTICAL LABORATORY REPORT

From:
Giant Refining
Gallup, NM.

Sample Marked:
Well #3

Analysis No.	W 72420
Date Sampled	1/10/85
Date Received	2/ 6/85
Date Printed	2/25/85
Page	2 Last

Ph (Ph Units)	6.9
Alkalinity (CaCO3) - Total	174.
Conductivity (Micromhos/cm)	1100.
Aluminum (Al) - Soluble	0.4

The soluble elements (XX2) were not detected:
CD2 MN2 MO2 NI2 SB2 SN2 TI2 ZN2

Lab Comments:
Sample arrived partially frozen.

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refinery
Attn: Bob Anderson
Route 3 Box 7
Gallup, NM 87301

DATE: 10 January 1985
1183

ANALYTE	SAMPLE ID/ANALYTICAL RESULTS		
	Pint Bottle OW-2	Pint Bottle OW-24	#1 Pond Outlet
As	0.030 mg/l	0.024 mg/l	0.30 mg/l
Ba	1.3 mg/l	1.5 mg/l	1.0 mg/l
Cd	<0.01 mg/l	0.01 mg/l	0.02 mg/l
Cr	0.016 mg/l	0.007 mg/l	3.40 mg/l
Pb	0.081 mg/l	0.087 mg/l	0.137 mg/l
Hg	<0.002 mg/l	<0.002 mg/l	<0.002 mg/l
Se	0.042 mg/l	0.048 mg/l	0.84 mg/l
Ag	<0.03 mg/l	<0.03 mg/l	<0.03 mg/l
Mn	1.170 mg/l	1.589 mg/l	0.066 mg/l

NOMINAL DETECTION LIMIT:

As	0.002 mg/l
Ba	0.005 mg/l
Cd	0.01 mg/l
Cr	0.005 mg/l
Pb	0.001 mg/l
Hg	0.002 mg/l
Se	0.002 mg/l
Ag	0.03 mg/l
Mn	0.005 mg/l

REFERENCE: "Standard Methods for the Examination of Water and Wastewater", 15th Edition, APHA, N.Y., 1980.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerly,

Jennifer V. Smith, Ph.D.
Laboratory Director

7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964

APPENDIX 4

WASTE STREAM ANALYSES

TABLE III
WATER ANALYSIS RESULTS
WELLS AND PONDS
FILE-OPERATIONS 1426

ATE	SAMPLE	WELL CONDITION *	ALLUVIUM WELL WATER DEPTH	PH	TDS	CHLORIDE	HARDNESS	P ALKALINITY	M ALKALINITY	SULFITE	CHROMAT
/5/2	Alluvium Well #1	1	0								
/5/70	Alluvium Well #2	1	0								
/4/70	Alluvium Well #3	1	0								
/4/	Alluvium Well #4	1	0								
/5/7	Cathodic Protection Well	3		7.1	1500	40	38	0	444	4	
/4/7	API Separator			10.2	4,200	50	28	500	624	28	0
/9/7	Pond #1			10.7	5,000	0	10	464	674	30	0
/4/7	Pond #2			2.8	15,000	1000+	2000	0	0	8	—
/4/70	Pond #3			2.7	18,000	1000+	2000	0	0	8	—
/9/7	Pond #4			2.5	19,000	1000+	2400	0	0	8	—
/9/7	Pond #5			2.8	22,500	1000+	2700	0	0	8	—
/7/	Pond #6			2.8	32,000	1000+	3100	0	0	7	—
/7/70	Pond #7			5.0	41,000	1000+	—	0	0	3	—
/5/7	Pond #8			6.1	72,000	1000+	500	0	0	3	—
/4/7	Pond #9			5.4	15,000	1000+	4200	0	0	2	—
/9/70	~~Pond #10~~ Well, South of Pond #9	3		8.6	4,800	84	18	64	362	2	—

* 1. No Water in Well
2. Water in Well, But Not Flowing
3. Well Flowing

SHELL OIL COMPANY

DATE August 20, 1971

TO GROUP LEADER - CINIZA REFINERY

FROM PROCESS ENGINEER - UTILITIES
CINIZA REFINERY

SUBJECT EFFULENT WATER TEST RESULTS

The following is a tabulation of the results of testing the Ciniza pond water for the month of August, 1971.

NAME	DATE	CHLORIDE ppm	HARDNESS ppm $CaCO_3$	CHROMINE ppm	PH	TDS	SULFIDE ppm
Pond #1	8/18	50.0	130	0	8.2		13.5
Pond #2	8/18	9200	3400	83.2	3.6		12.2
API Pit	8/18	260	140	0	8.5		16.5
Cat. Prot. Well	8/18	68	56	66.6	6.8		0
Pond #1	8/4	400	56	0	8.9	2960	23.5
Pond #2	8/4	26,800	700	0	3.4	9520	2.0
Pond #3	8/4		POND	DRY			
Pond #4	8/4		POND	DRY			
Pond #5	8/4		POND	DRY			
Pond #6 (2nd HALF)	8/4	107,000	5700	0	4.2	17,420	4.5
Pond #7	8/4	96,000	6600	0	3.6	17,850	3.0
Pond #8	8/4	POND		DRY			
Pond #9 (LAST SEC.)	8/4	100,000+	12,500	0	5.1	24,650	4.0
Pond #10	8/4		POND	DRY			
API Pit	8/4	700	36	0	9.6	2735	32.0
Cat. Prot. Well	8/4	900	40	50	7.5	1555	2.0

J. N. Anderson

cc: Refinery Superintendent
Manager Operations
Tech File 12.09.3

SM 32 (Rev. 9-51)

SHELL OIL COMPANY

REFERENCE LP-File

DATE

TO REFINERY SUPERINTENDENT

FROM GROUP LEADER
CINIZA REFINERY

SUBJECT EFFULENT WATER TEST RESULTS

The following is a tabulation of the results of testing the Cinlza pond water for the month of SEPTEMBER. 1971

NAME	DATE	CHLORIDE ppm	HARDNESS ppm $CaCO_3$	CHROMINE ppm	PH	TDS % WT	SULFIDE ppm
Pond #1	9/3/71	—	—		9.8	.3644	
Pond #2		—	—		4.7	1.0434	
API Pit		400	517		12.0	.4389	
Cat. Prot. Well							
Pond #1							
Pond #2							
Pond #3		—	—		4.8	3.0511	
Fond #4		—	—		7.1	—	
Pond #5		—	—		5.7	—	
Pond #6		10,000	N.L		4.9	3.3090	
Pond #7		21,300	N.L		4.7	6.6811	
Pond #8		92,300	N.L		7.3	24.363	
Pond #9		177,500	N.L		5.8	37.987	
Pond #10		17.4	364		8.1	.1655	
~~API Pit~~ ALUM WELL NO.1		36	84		8.2	.4387	— ?
Cat. Prot. Well							

cc - Managor Operations

14.a

LABORATORY REPORT

SHELL OIL COMPANY

DATE 11/29/71

The following results were obtained on effluent and water samples during the month of October.

Samples	ph	Cl ppm	TDS ppm
#1 Pond	5.6	40	3155
#2 Pond	4.2	5325	16278
#3 Pond	4.2	5325	17189
#6 Pond	3.7	10650	40077
#7 Pond	5.6	28400	34544
#8 Pond	4.3	28400	76811
#9 Pond	4.8	17750	31400
#10 Pond	6.9	74	611
#11 Pond	6.3	5325	9477
Cath. Pt. Well	6.9	62	4278
API Well	7.5	18	2211
allow. #1	4.2	58	700
allow. #2	4.3	224	767

REMARKS:

SIGNATURE: K J Wagoner
OP

LABORATORY REPORT

LP-File
Process Water Analysis

SHELL OIL COMPANY

12-1

DATE 12-1-71

Attached are tabulated results of process water analysis for the month of November.

REMARKS:

SIGNATURE: K. F. Wilson

DATE ENDING	SAMPLE	pH	Wt% TDS	P ALKY	M ALKY	Cl^- ppm	$S^=$ ppm
11/2/71	Pri. Col OH Rec H_2O	5.6	.0111				
	Sec. Col OH Rec H_2O	9.0	.0233				
	Cat HP Sep H_2O	7.9	.0066				
	Va Col OH H_2O	5.0	.0100				
11/3/71	Steam Gen.	10.7	.3989				
	CO Boiler H_2O	10.8	.3745				
	H_2O Before Dealt	8.7	.0200				
	H_2O after Dealt	9.4	.0445				
11/5/71	Condo. Return	6.8	.0044	NIL	NIL		
	#1 Boiler H_2O	10.4	.4155	150	200		
	#2 Boiler H_2O	—	—	190	250		
	#3 Boiler H_2O	10.4	.5394	144	180		
11/9/71	#2 Pond	7.3					
11/10/71	Steam Gen	10.4	.4277				
	CO Boiler H_2O	11.2	.3611				
	H_2O Before Dealt	8.8	.0077				
	H_2O after Dealt	9.1	.0655				
11/6/71	NHT Strip OH Rec H_2O	5.5	.0389				
	NHT H.P. Sep H_2O	8.2	.0022				
	Plt Waste Heat Boiler	10.6	.2077				
	Prim Col OH Rec H_2O	9.6	.0267				
	Sec Col OH Rec H_2O	6.2	.0055				
	Va Col H_2O	5.9	.0078				
11/12/71	#2 Pond	7.2					
11/15/71	Plt Waste Heat Boiler	10.9	.3589				
	Va Col H_2O	8.5	.0020				
	NHT Strip OH H_2O	8.4	.0088				
	Cat H.P. Sep H_2O	8.2	.0067				
	Pri Col OH H_2O	9.6	.0200				
	Sec Col OH H_2O	7.8	.0095				
	NHT HP Sep H_2O	8.6	.0055				
	#2 Pond	7.3					
11/17/71	H_2O Before Dealt	7.8	.0100			88	
	H_2O after Dealt	8.3	.0322			124	
	Steam Gen.	10.5	.2356			86	
	CO Boiler H_2O	11.1	.5722			140	
11/18/71	CO Boiler H_2O		.5340				
	Pri Col OH Rec H_2O						1734

ATE ENDING	SAMPLE	pH	Wtr TDS	P Alky	M Alky	Cl⁻ ppm	S⁼ ppm
11/19/71	#2 Boiler	10.2	.3889	180	204		
	#3 Boiler	9.9	.1422	80	100		
11/23/71	Plt Waste Ht Boiler	10.6	.3778				
	Cat HP Rec H2O	6.3	.0011				
	Lee Col OH Rec H2O	6.2	.0044				
	Pri Col OH Rec H2O	7.2	.0223				
	NHT HP Lop H2O	8.3	.0068				
	Vac Col H2O	3.9	.0111				
	NHT Strip OH H2O	5.7	.0014				
11/24/71	H2O before Desalt	8.6	.0133				
	H2O after Desalt	9.2	.0600				
	Col Boiler H2O	10.5	.5711				
	Steam Gen.	10.4	.3911				
11/25/71	#2 Pond	8.0					
	NHT Strip OH H2O					12	141
	NHT H.P. Lop H2O					6	229
	Vac Col H2O					4	NIL
	Pri Col OH Rec H2O					18	1822
	Lee Col OH Rec H2O					22	NIL
	Cat HP Lop H2O					12	1257
	Plant Waste HT Boiler					8	NIL
11/30/71	Plant Waste Ht Boiler	6.9	.4156			54	
	NHT Strip OH Rec H2O	8.0	.0111			70	180
	Cat H.P. Rec H2O	7.6	.0303			50	1440
	Vac Col H2O	4.7	.0134			4	NIL
	NHT HP Lop H2O	8.0	.0111			20	90
	Lee Col OH H2O	5.6	.0244			2	NIL
	Pri Col OH H2O	9.6	.0744			100	1250

LF. F. 1P

DATE	SAMPLE	CHLORIDE	PH	TDS	HARDNESS	COD	+6 CHROMATE	Waste
1/28/92	POND #1	178	8.9	3000	158		70.8	
	POND #2	1556	5.9	10000	1918		126.8	
	POND #3	6140	6.8	9000	2312		60.3	
	4	6460	7.0	9100	1944		246.4	
	5	13840	6.8	11000	2700		190.3	
	6	12100	6.6	10900	3000		141.4	
	7	15480	6.9	13000	4618		96.7	
	8	28700	6.8	17000	4698		72.8	
	9	42700	6.8	13000	4726		64.4	
	10	92	7.4	1000	132		73.8	
	11	82	6.7	14000	4660		116.4	

LAB ANALYSIS of WATER

DATE: 9/29/72

SAMPLE POND	SAMPLE TEST WELL	"M" ALKALINITY	pH	TDS	Cl^-	HARDNESS
1		130	0	0	150	70
2		320	8.7	2968	5,280	1,372
3			3.5	10,600	10.300	3,526
4			4.2	11,660	13,900	10,520
5		6	5.2	11,600	12,850	3,149
6		38	6.3	13,780	20,000	5,346
7		0	4.0	13,780	16,490	5,600
9		14	5.9	14,840	10,300	8,900
10		0	1.8	13,780	29,300	2,700
(CATHODIC PROTECTION WELL)		520	6.5	2014	70	54
		COD				
1		1560				
2		5234				
3		3465				

LAB ANALYSIS of WATER

DATE: 9/22/72

SAMPLE						
POND	TEST WELL	~~COD~~ M ALKALINITY	pH	TDS	Cl⁻	HARDNESS
	21	580	7.0	68,781	73,000	[illegible]
	23	50	5.6	60,268	42,000	[illegible]

CUSTOMER Shell Oil Co.
ATTENTION Mr. Diester
ADDRESS Rt. 3 Box 7
CITY Gallup, NM 87301
INVOICE NO. 612101

#1 = API SEPARATOR OVERFLOW
#2 = POND 3 OVERFLOW
#3 = RAW WATER TANK

REPORT OF ANALYSIS

SAMPLES RECEIVED	12/16/76	CUSTOMER ORDER NUMBER	

TYPE OF ANALYSIS Water Analysis -

Analysis	Water Sample #1 mg/	Water Sample #2 mg/l	Water Sample #3 mg/l
Arsenic	0.05	0.07	0.03
Barium	0.5	2.3	0.3
Cadmium	< 0.001	< 0.001	< 0.001
Chloride	93.6	3970	39.8
Fluoride	35.9	13.2	0.27
Iron	1.77	3.40	0.143
Lead	0.005	0.012	< 0.001
Manganese	0.06	3.1	0.006
Mercury	0.0009	< 0.0004	< 0.0004
Selenium	0.06	< 0.01	< 0.01
Copper	0.001	0.019	0.002
Sulfite	214	0.90	0.70
Sulfate	970	869	408
Total Dissolved Solids	1575	15258	944
Cyanide	38.4	1.06	0.07
Zinc	0.106	0.306	0.005
Phenols	< 0.001	< 0.001	< 0.001
Total Kjeldahl Nitrogen	610	134	3.47
Chromium	0.7	0.18	0.002
Dissolved Oxygen	< 1	7.8	6.2
Boron	0.3	0.2	0.2
Molybdenum	0.003	0.001	0.001
Nickel	0.02	0.07	< 0.01
Aluminum	1.0	10.4	< 0.1
Cobalt	0.008	< 0.001	< 0.001
Lithium	0.035	0.070	0.020
Vanadium	0.02	0.08	0.01
Calcium	31.8	1090	199
Ammonia Nitrogen as N	292	64.2	0.49
Nitrate as N	< 0.1	< 0.1	< 0.1
Nitrite as N	< 0.1	< 0.1	< 0.1
pH	9.19	2.23	7.90
Chlorine	< 0.01	< 0.01	< 0.01

APPROVED BY

James J. Mueller, President
12/14/77

CEC

Controls for Environmental Pollution, Inc.

CUSTOMER Shell Oil Co.
ATTENTION Mr. Diester
ADDRESS Rt. 3 Box 7
CITY Gallup, NM 87301
INVOICE NO. 612101

#4 = POND 2 OVERFLOW
#5 = REFINERY DRINKING WATER
#6 = TEST WELL No. 11

REPORT OF ANALYSIS

SAMPLES RECEIVED 12/16/76

CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Water Analysis -

Analysis	Water Sample #4 mg/l	Water Sample #5 mg/l	Water Sample #6 mg/l
Arsenic	0.03	0.02	0.07
Barium	<0.1	< 0.1	< 0.1
Cadmium	<0.001	< 0.001	0.011
Chloride	1010	41.8	38800
Fluoride	155	0.30	0.22
Iron	0.177	0.924	3.43
Lead	0.004	< 0.001	0.027
Manganese	0.5	0.024	27
Mercury	<0.0004	< 0.0004	< 0.0004
Selenium	0.06	0.02	< 0.01
Copper	0.002	0.6	0.009
Sulfite	15.9	0.70	1.70
Sulfate	1394	1020	2023
Total Dissolved Solids	3377	1020	65,526
Cyanide	3.58	0.06	0.17
Zinc	0.028	0.069	4.52
Phenols	<0.001	< 0.001	< 0.001
Total Kjeldahl Nitrogen	597	8.53	4.46
Chromium	0.35	0.001	0.077
Dissolved Oxygen	5.2	7.3	64
Boron	0.2	< 0.1	0.5
Molybdenum	<0.001	< 0.001	0.008
Nickel	0.03	0.04	1.40
Aluminum	0.1	< 0.1	1.2
Cobalt	0.009	< 0.001	< 0.001
Lithium	0.060	0.015	0.372
Vanadium	0.07	< 0.01	< 0.01
Calcium	17.5	2.93	5350
Ammonia Nitrogen as N	265	0.73	2.93
Nitrate as N	<0.1	< 0.1	28.4
Nitrite as N	0.1	< 0.1	< 0.1
pH	7.99	8.46	7.12
Chlorine	<0.01	< 0.01	< 0.01

APPROVED BY

James J. Mueller, President
1/14/77

CEP

Controls for Environmental Pollution, Inc.

CUSTOMER Shell Oil Co.
ATTENTION Mr. Diester
ADDRESS Rt. 3 Box 7
CITY Gallup, NM 87301
INVOICE NO. 612101

#7 = TEST WELLS No. 32/33
#8 = TRADING POST WATER

REPORT OF ANALYSIS

SAMPLES RECEIVED	12/16/76	CUSTOMER ORDER NUMBER	
TYPE OF ANALYSIS	Water Analysis -		

Analysis	Water Sample #7 mg/l	Water Sample #8 mg/l
Arsenic	0.05	0.02
Barium	0.1	< 0.1
Cadmium	0.012	< 0.001
Chloride	36,600	51.8
Fluoride	0.54	0.22
Iron	2.73	2.49
Lead	< 0.001	< 0.001
Manganese	4	2
Mercury	< 0.0004	< 0.0004
Selenium	< 0.01	< 0.01
Copper	0.007	0.005
Sulfite	0.70	0.70
Sulfate	2648	365
Total Dissolved Solids	64,362	969
Cyanide	0.26	0.03
Zinc	1.02	0.055
Phenols	< 0.001	< 0.001
Total Kjeldahl Nitrogen	31.8	0.64
Chromium	0.002	0.002
Dissolved Oxygen	7.0	6.6
Boron	0.7	0.2
Molybdenum	0.005	< 0.001
Nickel	0.23	< 0.01
Aluminum	1.2	< 0.1
Cobalt	< 0.001	< 0.001
Lithium	0.297	0.015
Vanadium	< 0.01	< 0.01
Calcium	3540	171
Ammonia Nitrogen as N	15.7	0.30
Nitrate as N	52.0	< 0.1
Nitrite as N	< 0.1	< 0.1
pH	7.22	8.03
Chlorine	< 0.01	< 0.01

APPROVED BY

James J. Mueller, President
1/14/77

CUSTOMER
ADDRESS
CITY
ATTENTION
INVOICE NO.

Shell Oil Company
P. O. Box 3, Route 7
Gallup, NM 87301

803030

REPORT OF ANALYSIS

SAMPLES RECEIVED 1/30/78	CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Total Sulfur as Sulfate

Sample Identification	mg/l
Drinking Water # 1	547
Cathodic Protection Well #2	490
API Overflow #3	2470
Desalter Water # 4	362
NHT #5	22.2
Raw Water #6	469
Boiler Blowdown #7	1930
CWT Blowdown #8	3840

Controls for Environmental Pollution, Inc.
P.O. Box 5351 • 1925 Rosina • Santa Fe, New Mexico 87502

APPROVED BY

Bud Summers, Environmental Sciences Mgr.

2/9/78 PAGE 1 OF 1 PAGE

TABLE 2

Ciniza Refinery Metals Results for Wastewater samples Taken During July and August,1980.

Metal	New Well Raw Water 7/23/80 0830 hrs.	Pond 3 Inlet /Softener Waste 8/11/80 1000 hrs.	Cooling Water Tower Blowdown 7/23/80 0830 hrs.	API Separator Overflow 7/17/80 1330 hrs.	API Sepatrator Overflow 7/19/80 1300 hrs.	API Separator Overflow 7/23/80 0830 hrs.
Arsenic	0.003	0.031	0.013	0.004	0.005	0.015
Barium	0.014	0.068	0.022	0.22	0.094	0.105
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	<0.001	0.026	13.	0.91	0.64	1.2
Lead	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Selenium	<0.001	0.097	0.025	0.015	0.018	0.024
Silver	<0.001	0.002	0.010	0.006	0.012	0.005

CUSTOMER Dames & Moore
ADDRESS Suite 398W, City Center
CITY 6400 Uptown Blvd., N.E.
ATTENTION Albuquerque, NM 87110
OICE NO Bill Mead
012179

REPORT OF ANALYSIS

SAMPLES RECEIVED 11/10/80 | CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Sludge (Date Collected 11/6/80)

Sample Identification	Type of Analysis	mg/liter
API Seperator Emulsion	Arsenic	< 0.01
EPA ID - K051	Barium	< 10
	Cadmium	< 0.001
	Chromium	0.006
	Chromium 6+	< 0.01
	Lead (Total)	6.1
	Mercury	< 0.004
	Selenium	< 0.01
	Silver	< 0.01
	Total Chrome	200 ug/gm
		percent by weight
	Total Organic Carbon	17.8

APPROVED BY
Elmer D. Martinez, Operations Division, Mgr.
12/24/80 PAGE 1 OF 1 PAGE

CUSTOMER Dames and Moore
ADDRESS Suite 398W, City Center
CITY 6400 Uptown Blvd., N.E.
ATTENTION: Albuquerque, NM 87110
INVOICE NO Bill Mead
012050

REPORT OF ANALYSIS

SAMPLES RECEIVED 11/10/80 | CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Sludge

EPA ID	Sample Identification	Type of Analysis	
K052	Leaded Tank Sludge;	Lead (Total)	690 ug/g
	Tank 59	EP Lead	0.08 mg/liter
	Date Collected 11/4/80	Total Organic Lead	2.4 ug/gm

APPROVED BY
Elmer D. Martinez, Operations Division, Mgr.
12/11/80

	Neutralization TANK	R.R. CATCH BASIN A	R.R. CATCH BASIN B	POND # 3 A	POND # 3 B	POND #1 A	POND #1 B	API SEP. EFFLUENT	API SEP. SLUDGE	MW-4	MW-1	MW-2	MW-3
PARAMETERS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Molybdenum	<0.10	<0.10	4.4	<0.10	18.	<0.10	12.	<0.10	14.	<0.10	<0.10	<0.10	<0.10
Nickel	<0.10	<0.10	2.3	<0.10	11.	<0.10	25.	<0.10	75.	<0.10	<0.10	<0.10	<0.10
Silicon	5.1	3.5	<2.0	35.	32.	76.	7.1	62.	19.	7.2	5.0	5.8	5.5
Silver	<0.10	<0.10	<2.0	<0.10	<2.0	<0.10	<2.0	<0.10	1.7	<0.10	<0.10	<0.10	<0.10
Strontium	6.2	0.58	84.	0.90	360.	0.84	396.	0.77	280.	0.24	<0.10	0.21	<0.10
Tin	0.10	<0.10	6.0	<0.10	27.	0.4	17.	0.11	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium	<0.10	<0.10	3.2	<0.10	21.	<0.10	10.	<0.10	11.	<0.10	<0.10	<0.10	<0.10
Yttrium	<0.10	<0.10	<2.0	<0.10	3.6	<0.10	<2.0	<0.10	<2.0	<0.10	<0.10	<0.10	<0.10
Zinc	<0.10	<0.10	6.7	0.74	340.	0.76	2080.	0.68	4,700.	<0.10	<0.10	<0.10	<0.10
TOTAL METALS AA													
Arsenic	0.030	<0.005	16.7	0.012	11.6	0.24	22.5	0.26	24.0	<0.0005	0.0005	<0.0005	<0.005
Mercury	<0.0005	<0.0005	<0.01	<0.0005	<0.01	<0.0005	<0.20	<0.0005	<0.10	0.0006	<0.0005	<0.005	<0.0005
Selenium	0.032	<0.005	1.91	0.032	3.2	0.041	10.6	0.020	1.4	<0.0005	0.013	0.005	0.012
EP TOX METALS													
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.0005	0.0005	<0.0005	<0.005
Barium	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.10
Cadmium	ND	ND	<0.10	ND	<0.10	ND	<0.10	ND	<0.1	<0.10	<0.10	<0.10	<0.10
Lead	ND	ND	<0.50	ND	<0.5	ND	<0.5	ND	<0.5	<0.10	<0.10	<0.10	<0.10
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0006	0.0005	<0.0005	<0.005

	Neutralization Tank	R.R. Catch Basin A	R.R. Catch Basin B	Pond #3 A	Pond #3 B	Pond #1 A	Pond #1 B	API Sep. Effluent	API Sep. Sludge	MW-4	MW-1	MW-2	MW-3
PARAMETERS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Chromium	ND	ND	<0.25	ND	<0.25	ND	<0.25	ND	<0.25	<0.10	<0.10	<0.10	<0.10
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.0005	0.013	0.005	
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	0.012D <0.10
REACTIVE WASTES													
Sulfides	ND	NR	NR	35.6	NR	180.0	NR	402.0	15,200	NR	NR	NR	NR
Cyanides	ND	NR	NR	ND	NR	ND	NR	ND	NS	NR	NR	NR	NR
LISTED WASTES													
F001 WASTES													
Tetrachloroethylene	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
Trichloroethylene	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
1,1,1-trichloroethane	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
Carbon tetrachloride	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
Chlorinated flouro-carbons	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
F002 WASTES													
Methylene chloride	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
1,1,2-trichloro-1,2, 2-triflouroethane	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
Tetrachloro-ethylene	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND

	Neutralization Tank	RR. Catch Basin A	RR. Catch Basin B	Pond #2 A	Pond #2 B	Pond #1 A	Pond #1 B	API Sep. Effluent	API Sep. Sludge	MW-4	MW-1	MW-2	MW-3
PARAMETERS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Trichloroethylene	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
1,1,1-trichloroethane	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
Chlorobenzene	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
0, dichlorobenzene	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
Trichloroflouro-methane	NR	ND	NR	ND	NR	ND	NR	ND	NR	ND	ND	ND	ND
F003 FWASTES													
Xylene (total o,p,m)	NR	ND	NR	0.38	NR	0.75	NR	1.9	NR	ND	ND	ND	ND
Ethyl benzene	NR	ND	NR	0.07	NR	0.11	NR	0.17	NR	ND	ND	ND	ND
F005 WASTES													
Toluene	NR	ND	NR	0.93	NR	0.94	NR	8.9	NR	ND	ND	ND	ND
OTHER WASTES													
Benzene	NR	0.003	NR	0.34	NR	0.54	NR	3.3	NR	ND	ND	ND	ND
TOX	NR	NR	NR	NR	NR	NR	NR	NR	NR	LNA	LNA	LNA	LNA
TOC	NR	NR	NR	NR	NR	NR	NR	NR	NR	47	1.7	24	34.5

NR ANALYSIS NOT REQUESTED
ND NOT DETECTED
LNA LAB NOT ABLE TO RUN ANALYSIS
NS SAMPLE NOT SUITABLE FOR ANALYSIS

When tested?
EID 2/84
SEE ATT. B-6

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2180

4

REPORT OF ANALYSIS

LAB # 84-03-404

LE IDENTIFICATION	DATE COLLECTED	TYPE OF ANALYSIS	mg/liter	
Seperator Sludge	03/13/84	Silver	<0.01	
		Arsenic	<0.01	
		Barium	0.4	
		Cadmium	<0.001	
		Chromium	0.036	
		Chromium, Hexavalent	<0.01	
		Chromium	10	(ug/gram)
		Mercury	<0.0004	
		Oil and Grease	26,000	(ug/gram)
		Lead	<0.001	
		Lead	340	(ug/gram)
		pH	9.30	(units)
		Selenium	<0.01	
		Total Organic Carbon	>400,000	

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2180

2

REPORT OF ANALYSIS

LAB # 84-03-404

LE IDENTIFICATION	DATE COLLECTED	TYPE OF ANALYSIS	mg/liter	
ing Tower Sludge	03/29/84	Silver	<0.01	
		Arsenic	<0.01	
		Barium	0.4	
		Cadmium	<0.001	
		Chromium	0.063	
		Chromium, Hexavalent	<0.01	
		Chromium	170	(ug/gram)
		Mercury	<0.0004	
		Oil and Grease	29,000	(ug/gram)
		Lead	0.001	
		Lead	140	(ug/gram)
		pH	9.15	(units)
		Selenium	<0.01	
		Total Organic Carbon	>400,000	

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN-STATE 505/982-9811
OUT OF STATE 800/545-2100

E 3

REPORT OF ANALYSIS

LAB # 84-03-404

PLE IDENTIFICATION	DATE COLLECTED	TYPE OF ANALYSIS	mg/liter	
t Exchanger Sludge	03/29/84	Silver	<0.01	
		Arsenic	<0.01	
		Barium	0.1	
		Cadmium	0.001	
		Chromium	<0.001	
		Chromium, Hexavalent	<0.01	
		Chromium	15	(ug/gram)
		Mercury	<0.0004	
		Oil and Grease	22,500	(ug/gram)
		Lead	0.003	
		Lead	330	(ug/gram)
		pH	11.2	(units)
		Selenium	<0.01	
		Total Organic Carbon	>400,000	

EDA Instruments Inc.
[X] 5451 Ward Road
Wheat Ridge CO 80033
Telephone (303) 422 9112

[ ] ...iver Avenue SE
Albuquerque NM 87108
Telephone (505) 266 9106

EDA

Report of Analysis

To

Giant Refining
Route 3
Box 7
Gallup, NM 87301

OIL

ATTN: Louise Campbell

Client No.	Log. NO.	Client P.O. NO.	Date Collected	Date Received	Date Reported
	4145	76198	9/26/84	10/9/84	11/12/84

Sample Identification	pH Units	Oil %	Water %	Solid %
LTA - 2 - OIL	9.00	92.6	4.2	2.3

Approved by Russell McCallister

EDA Instruments Inc.
XXXX151 Ward Road
Wheat Ridge CO 80033
Telephone (303) 422 9112

4 ver Avenue SE
Albuquerque NM 87108
Telephone (505) 266 9106

EDA

Report of Analysis

To

Giant Refining
Route 3
Box 7
Gallup, NM 87301

ATTN: Louise Campbell

Client No.	Log. No.	Client P.O. No.	Date Collected	Date Received	Date Reported
	4145	76198	9/26/84	10/9/84	12/5/84

Sample Identification	As mg/l	* Maximum Allowable Concentration, mg/l	Ba mg/l	* Maximum Allowable Concentration, mg/l
LTA - 2	0.004	5.0	0.310	100.0

API SEP SLUDGE
COMPOSITE FROM CLEANING 7-17-84

Sample Identification	Cd mg/l	* Maximum Allowable Concentration, mg/l	Cr mg/l	* Maximum Allowable Concentration, mg/l
LTA - 2	0.003	1.0	1.74	5.0

Sample Identification	Pb mg/l	* Maximum Allowable Concentration, mg/l	Hg mg/l	* Maximum Allowable Concentration, mg/l
LTA - 2	0.138	5.0	<0.0002	0.2

Sample Identification	Se mg/l	* Maximum Allowable Concentration, mg/l	Ag mg/l	* Maximum Allowable Concentration, mg/l
LTA - 2	0.039	1.0	<0.001	5.0

* Federal Register, Vol. 45, No. 98.

Approved by [signature]

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-01-1 (A-F)

LOCATION DESCRIPTION: Giant Refinery

Raw Water from pump in boiler house DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analytical Laboratories DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT) Satisfactory- not broken or leaking

COMMENTS: Standard Methods - 15th edition

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	1.2	mg/l			1.0	mg/l	
COD	<3.0	mg/l			3.0	mg/l	
TOC	649.5	mg/l	540.5	mg/l	0.1	mg/l	
TSS	<4.0	mg/l			4.0	mg/l	
TDS	828.0	mg/l			10.0	mg/l	
Oil & Grease	0.28	mg/l			0.2	mg/l	
Hardness	837.5	*			10.0	mg/l	
Chromium	<0.01	mg/l			0.01	mg/l	
Iron	0.07	mg/l			0.03	mg/l	
Calcium	248.0	mg/l			0.01	mg/l	
Magnesium	53.0	mg/l			0.01	mg/l	
Sodium	2.80	mg/l	2.40	mg/l	0.01	mg/l	
Potassium	7.0	mg/l	6.30	mg/l	0.01	mg/l	
Ammonium	<0.1	mg/l			0.1	mg/l	
Chloride	8.0	mg/l			0.1	mg/l	
Sulfate	285.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION - ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-01-1 (A-E) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: ~~11/9/84~~

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: Standard Methods - 15th edition

ND - No data

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	530.0	mg/l			1.0	mg/l	
Fluoride	0.31	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	4.14	mg/l	3.69	mg/l	0.10	mg/l	
*mg $(CaCO_3)$ l							
Specific Conductance	1120	umhos/cm @ 25°C					field test by Grant
Temp.	71.6	°F					"
pH	6.85	pH units					"
M Alk	ND						"
P Alk.	ND						"

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-02-1 (A-F)

LOCATION DESCRIPTION: Giant Refinery

Water Softener Regeneration Wastewater @beginning of cycle DATE SAMPLED: 11/8/84

(Combined wastewaters from Na^+ cycle and H^+ cycle exchangers)

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): ~~Satisfactory-not broken or leaking~~

COMMENTS: Standard Methods - 15th edition

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	< 1.0	mg/l			1.0	mg/l	
COD	2766.0	mg/l			3.0	mg/l	
TOC	1307.4	mg/l			0.1	mg/l	
TSS	908.0	mg/l			4.0	mg/l	
TDS	54660.0	mg/l			10.0	mg/l	
Oil & Grease	2.50	mg/l			0.2	mg/l	
Hardness	54258.2	*			10.0	mg/l	
Chromium	<0.01	mg/l	<0.01	mg/l	0.01	mg/l	
Iron	0.92	mg/l			0.03	mg/l	
Calcium	14440.0	mg/l			0.01	mg/l	
Magnesium	4420.0	mg/l			0.01	mg/l	
Sodium	7460.0	mg/l			0.01	mg/l	
Potassium	84.0	mg/l			0.01	mg/l	
Ammonium	0.1	mg/l	< 0.1	mg/l	0.1	mg/l	
Chloride	21291.0	mg/l			0.1	mg/l	
Sulfate	275.0	mg/l	270.0	mg/l	0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-02-1 (A-F)cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff _____. CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	343.0	mg/l			1.0	mg/l	
Fluoride	0.217	mg/l	0.222	mg/l	0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	3.20	mg/l			0.10	mg/l	
*mg($CaCO_3$)l							
Specific Conductance	79,800	umhos/cm @25°C					Field test by Grant
Temp.	71.6	°F					"
pH	1.3	pH units					"

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-02-2 (A-F)

LOCATION DESCRIPTION: Giant Refinery

Water Softener Regeneration Wastewater DATE SAMPLED: 11/9/84

@middle of cycle

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: _____

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	<1.0	mg/l			1.0	mg/l	
COD	4742.0	mg/l			3.0	mg/l	
TOC	1840.1	mg/l			0.1	mg/l	
TSS	856.0	mg/l	904.0	mg/l	4.0	mg/l	
TDS	68144.0	mg/l	69698.0	mg/l	10.0	mg/l	
Oil & Grease	3.70	mg/l	3.40	mg/l	0.2	mg/l	
Hardness	43407.8	*	43807.4	*	10.0	mg/l	
Chromium	<0.01	mg/l			0.01	mg/l	
Iron	1.06	mg/l			0.03	mg/l	
Calcium	15560.0	mg/l	15720.0	mg/l	0.01	mg/l	
Magnesium	1106.0	mg/l			0.01	mg/l	
Sodium	19520.0	mg/l			0.01	mg/l	
Potassium	137.0	mg/l			0.01	mg/l	
Ammonium	< 0.1	mg/l			0.1	mg/l	
Chloride	27374.0	mg/l			0.1	mg/l	
Sulfate	335.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION: ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-02-2 (A-F) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laborator DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	402.0	mg/l			1.0	mg/l	
Fluoride	0.23	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l	<0.10	mg/l	0.10	mg/l	
Silica	0.30	mg/l			0.10	mg/l	
*mg ($CaCO_3$) l							
Spec. Cond.	99,000	umhos/cm @25°C					field test by Giant
Temp.	71.6	°F					"
pH	2.1	pH units					"

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-02-3(A-F)

LOCATION DESCRIPTION: Giant Refinery

Water Softener Regeneration Wastewater @ end of cycle DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	< 1.0	mg/l	< 1.0	mg/l	1.0	mg/l	
COD	1482.0	mg/l			3.0	mg/l	
TOC	1660.6	mg/l	1749.5	mg/l	0.1	mg/l	
TSS	384.0	mg/l			4.0	mg/l	
TDS	34088.0	mg/l			10.0	mg/l	
Oil & Grease	21.6	mg/l			0.2	mg/l	
Hardness	5516.1	*			10.0	mg/l	
Chromium	< 0.01	mg/l			0.01	mg/l	
Iron	0.87	mg/l			0.03	mg/l	
Calcium	1622.0	mg/l			0.01	mg/l	
Magnesium	356.0	mg/l			0.01	mg/l	
Sodium	16940.0	mg/l			0.01	mg/l	
Potassium	53.0	mg/l			0.01	mg/l	
Ammonium	< 0.1	mg/l			0.1	mg/l	
Chloride	14194.0	mg/l			0.1	mg/l	
Sulfate	280.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-02-3 (A-F) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	269.0	mg/l			1.0	mg/l	
Fluoride	0.32	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	3.67	mg/l			0.10	mg/l	
*mg($CaCO_3$)l							
Spec. Cond.	58,300	umhos/cm @25°C					Field test by Giant
Temp.	71.6	°F					"
pH	2.5	pH units					"

JE JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION - ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 1

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-03-1 (A-F)

LOCATION DESCRIPTION: Giant Refinery

Cooling Tower Blowdown - Near top of cooling tower on return DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	9.0	mg/l			1.0	mg/l	
COD	277.0	mg/l			3.0	mg/l	
TOC	767.1	mg/l			0.1	mg/l	
TSS	< 4.0	mg/l			4.0	mg/l	
TDS	6580.0	mg/l			10.0	mg/l	
Oil & Grease	25.0	mg/l	19.0	mg/l	0.2	mg/l	
Hardness	3346.4	*			10.0	mg/l	
Chromium	17.81	mg/l	18.88	mg/l	0.01	mg/l	
Iron	0.79	mg/l			0.03	mg/l	
Calcium	1200.0	mg/l			0.01	mg/l	
Magnesium	85.0	mg/l			0.01	mg/l	
Sodium	1948.0	mg/l			0.01	mg/l	
Potassium	17.0	mg/l			0.01	mg/l	
Ammonium	0.1	mg/l			0.1	mg/l	
Chloride	384.0	mg/l	384.0	mg/l	0.1	mg/l	
Sulfate	2500.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION AND DEVELOPMENT OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-03-1 (A-F) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	300.0	mg/l	340.0	mg/l	1.0	mg/l	
Fluoride	1.98	mg/l			0.10	mg/l	
Phosphate	0.20	mg/l			0.10	mg/l	
Silica	37.51	mg/l			0.10	mg/l	
*mg ($CaCO_3$) l							
Spec. Cond.	8070	micromhos/cm @25°C					Field test by Giant
Temp.	71.6	°F					"
pH	6.1	pH units					"

JE JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-04-1 (A-F)

LOCATION DESCRIPTION: Giant Refinery

Desalter Effluent — downstream of exchanger near desalter

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	1117.0	mg/l			1.0	mg/l	
COD	1936.0	mg/l	2137.0	mg/l	3.0	mg/l	
TOC	3690.0	mg/l			0.1	mg/l	
TSS	116.0	mg/l			4.0	mg/l	
TDS	6972.0	mg/l			10.0	mg/l	
Oil & Grease	568.0	mg/l			0.2	mg/l	
Hardness	3523.3	*			10.0	mg/l	
Chromium	<0.01	mg/l			0.01	mg/l	
Iron	90.0	mg/l	85.5	mg/l	0.03	mg/l	
Calcium	1268.0	mg/l			0.01	mg/l	
Magnesium	94.0	mg/l			0.01	mg/l	
Sodium	1862.0	mg/l			0.01	mg/l	
Potassium	73.0	mg/l			0.01	mg/l	
Ammonium	3.75	mg/l			0.1	mg/l	
Chloride	3447.0	mg/l	3345.0	mg/l	0.1	mg/l	
Sulfate	300.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: ~~G-04-1 (A-F)~~ cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laborator" DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	< 1.0	mg/l			1.0	mg/l	
Fluoride	0.74	mg/l	0.73	mg/l	0.10	mg/l	
Phosphate	0.50	mg/l	0.55	mg/l	0.10	mg/l	
Silica	8.63	mg/l			0.10	mg/l	
*mg ($CaCO_3$) l							
Spec. Cond.	12,500	umhos/cm @25°C					Field test by Giant
Temp.	71.6	°F					"
pH	6.6	pH units					"

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-1 (A-F)

LOCATION DESCRIPTION: Giant Refinery

APT Separator Effluent – outlet pipe downstream of weir before No. 1 evap. pond. DATE SAMPLED: 11/8/84 9:00AM

LAB NAME: Assdigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	615.0	mg/l			1.0	mg/l	
COD	790.0	mg/l			3.0	mg/l	
TOC	1889.0	mg/l			0.1	mg/l	
TSS	< 4.0	mg/l	< 4.0	mg/l	4.0	mg/l	
TDS	3112.0	mg/l	3116.0	mg/l	10.0	mg/l	
Oil & Grease	29.3	mg/l			0.2	mg/l	
Hardness	2753.4	*			10.0	mg/l	
Chromium	2.71	mg/l			0.01	mg/l	
Iron	9.30	mg/l			0.03	mg/l	
Calcium	1040.0	mg/l			0.01	mg/l	
Magnesium	38.0	mg/l			0.01	mg/l	
Sodium	1012.0	mg/l			0.01	mg/l	
Potassium	8.0	mg/l			0.01	mg/l	
Ammonium	195.0	mg/l			0.1	mg/l	
Chloride	735.0	mg/l			0.1	mg/l	
Sulfate	1010.0	mg/l	1000.0	mg/l	0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION - ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-1 (A-F) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtvical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	<1.0	mg/l			1.0	mg/l	
Fluoride	39.2	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	13.52	mg/l			0.10	mg/l	
*mg ($CaCO_3$) l							

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-2 (A-F)

LOCATION DESCRIPTION: Giant Refinery

API Separator Effluent - outlet pipe DATE SAMPLED: 11/8/84 10:00 AM
downstream of weir before No. 1 evap. pond.

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	607.0	mg/l			1.0	mg/l	
COD	948.0	mg/l			3.0	mg/l	
TOC	2103.2	mg/l			0.1	mg/l	
TSS	<4.0	mg/l			4.0	mg/l	
TDS	2392.0	mg/l			10.0	mg/l	
Oil & Grease	9.10	mg/l			0.2	mg/l	
Hardness	2797.6	*			10.0	mg/l	
Chromium	0.89	mg/l			0.01	mg/l	
Iron	1.13	mg/l			0.03	mg/l	
Calcium	1094.0	mg/l			0.01	mg/l	
Magnesium	16.0	mg/l			0.01	mg/l	
Sodium	478.0	mg/l	508.1	mg/l	0.01	mg/l	
Potassium	4.0	mg/l	3.90	mg/l	0.01	mg/l	
Ammonium	390.0	mg/l			0.1	mg/l	
Chloride	689.0	mg/l			0.1	mg/l	
Sulfate	420.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-2(A-F) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	<1.0	mg/l	<1.0	mg/l	1.0	mg/l	
Fluoride	52.8	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	7.95	mg/l	7.90	mg/l	0.10	mg/l	
*mg ($CaCO_3$) l							

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-4 (A-F)

LOCATION DESCRIPTION: Giant Refinery

API Separator Effluent - outlet pipe DATE SAMPLED: 11/8/84 12:00 Noon
downstream of weir before No. 1 evap pond.

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	990.0	mg/l			1.0	mg/l	
COD	2094.0	mg/l	2213.0	mg/l	3.0	mg/l	
TOC	2007.1	mg/l			0.1	mg/l	
TSS	<4.0	mg/l			4.0	mg/l	
TDS	2380.0	mg/l			10.0	mg/l	
Oil & Grease	19.3	mg/l			0.2	mg/l	
Hardness	2444.5	*	2440.3	*	10.0	mg/l	
Chromium	1.27	mg/l			0.01	mg/l	
Iron	2.37	mg/l			0.03	mg/l	
Calcium	996.0	mg/l			0.01	mg/l	
Magnesium	20.0	mg/l	19.0	mg/l	0.01	mg/l	
Sodium	1174.0	mg/l			0.01	mg/l	
Potassium	10.0	mg/l			0.01	mg/l	
Ammonium	275.0	mg/l			0.1	mg/l	
Chloride	750.0	mg/l			0.1	mg/l	
Sulfate	500.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-4(A-F)cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above'

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	<1.0	mg/l			1.0	mg/l	
Fluoride	35.8	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	8.72	mg/l			0.10	mg/l	
*mg $(CaCO_3)$ l							

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-5 (A-F)

LOCATION DESCRIPTION: Giant Refinery

API Separator Effluent – outlet pipe DATE SAMPLED: 11/8/84 2:00PM
downstream of weir before No. 1 evap pond.

LAB NAME: Assaigai Analytical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): Satisfactory-not broken or leaking

COMMENTS:

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	1170.0	mg/l			1.0	mg/l	
COD	2332.0	mg/l			3.0	mg/l	
TOC	2362.4	mg/l			0.1	mg/l	
TSS	<4.0	mg/l			4.0	mg/l	
TDS	2404.0	mg/l			10.0	mg/l	
Oil & Grease	12.0	mg/l			0.2	mg/l	
Hardness	2734.8	*			10.0	mg/l	
Chromium	1.0	mg/l			0.01	mg/l	
Iron	1.09	mg/l	0.99	mg/l	0.03	mg/l	
Calcium	1054.0	mg/l	990.0	mg/l	0.01	mg/l	
Magnesium	25.0	mg/l	23.0	mg/l	0.01	mg/l	
Sodium	993.0	mg/l			0.01	mg/l	
Potassium	11.0	mg/l			0.01	mg/l	
Ammonium	185.0	mg/l	200.0	mg/l	0.1	mg/l	
Chloride	628.0	mg/l			0.1	mg/l	
Sulfate	660.0	mg/l			0.1	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: G-05-5 (A-F) cont

LOCATION DESCRIPTION: Giant Refinery

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: 11/9/84

LAB SAMPLE ID Same as above

DATE ANALYZED: ~~11/9/84 ff~~ CHECKED BY: ~~JVS~~

SAMPLE CONDITION (ON RECEIPT): ~~Saitsfactory not broken or leaking~~

COMMENTS:

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	< 1.0	mg/l			1.0	mg/l	
Fluoride	44.3	mg/l			0.10	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	8.80	mg/l			0.10	mg/l	
*mg ($CaCO_3$) l							

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION: ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 1 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: QC-Standard

LOCATION DESCRIPTION: Assaigai Analytical Laboratory

DATE SAMPLED: 11/9/84

LAB NAME: ~~Assaigai Analytical Laboratory~~ DATE REC'D: ~~NA~~

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): NA

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
BOD	1.1	mg/l			1.0	mg/l	
COD	0.8	mg/l			0.01	mg/l	
TOC	205.1	mg/l			0.1	mg/l	
TSS	1.0	mg/l			1.0	mg/l	
TDS	225.0	mg/l			1.0	mg/l	
Oil & Grease	0.8	mg/l			0.5	mg/l	
Hardness	371.6	*			5	mg/l	
Chromium	<0.01	mg/l			0.01	mg/l	
Iron	<0.05	mg/l			0.05	mg/l	
Calcium	114.0	mg/l			0.1	mg/l	
Magnesium	8.0	mg/l			0.01	mg/l	
Sodium	5.6	mg/l			0.1	mg/l	
Potassium	8.0	mg/l			0.1	mg/l	
Ammonium	<0.1	mg/l			0.1	mg/l	
Chloride	12.0	mg/l			0.1	mg/l	
Sulfate	39.0	mg/l			1.0	mg/l	

JACOBS ENGINEERING GROUP INC
ADVANCED SYSTEMS DIVISION ALBUQUERQUE OPERATIONS

WATER QUALITY ANALYTICAL RESULTS

Sheet 2 of 2

SITE ID: _____ LOCATION ID: _____ SAMPLE ID: ~~QC-Standard cont~~

LOCATION DESCRIPTION: Assaigai Analytical Laboratory

DATE SAMPLED: 11/8/84

LAB NAME: Assaigai Analtyical Laboratory DATE REC'D: NA

LAB SAMPLE ID: Same as above

DATE ANALYZED: 11/9/84 ff CHECKED BY: JVS

SAMPLE CONDITION (ON RECEIPT): NA

COMMENTS: _____

PARAMETER	RESULTS				DETECTION LIMIT		COMMENTS
	PRIMARY	UNITS	DUPLICATE	UNITS	VALUE	UNIT	
Nitrate	<1.0	mg/l			1.0	mg/l	
Fluoride	0.58	mg/l			0.01	mg/l	
Phosphate	<0.10	mg/l			0.10	mg/l	
Silica	12.95	mg/l			0.01	mg/l	
*mg $(CaCO_3)$/l							

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

SAMPLE ID: 3/7/85, Leaded tank 571-Sludge taken while repairing suction line composited from tank bottom. Sample # 85-5

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMI
Sb	6.8 ug/g	0.002 ug/g
As	40.0 ug/g	0.002 ug/g
Ba	934.0 ug/g	0.005 ug/g
Be	0.10 ug/g	0.001 ug/g
Cd	80.0 ug/g	0.002 ug/g
Cr	250.0 ug/g	0.005 ug/g
Cu	600.0 ug/g	0.002 ug/g
Pb	17800.0 ug/g	0.001 ug/g
Ni	800.0 ug/g	0.01 ug/g
Se	2.0 ug/g	0.002 ug/g
Ag	23.0 ug/g	0.003 ug/g
Tl	<0.1 ug/g	0.1 ug/g
Zn	180.0 ug/g	0.004 ug/g
EC	970 umhos/cm	0.1 umhos/cm
pH	7.1	0.01
Bulk Density	1.47	
Solids weight fraction	97.2 %	
Oil weight fraction	<0.1 %	
Water weight fraction	2.8 %	
Ignitability	>60 °C	
Benzylchloride	<0.01 ug/g	0.01 ug/g
bis (2-chloroethyl) ether	<0.01 ug/g	0.01 ug/g
bis (2-chloroisopropyl) ether	<0.01 ug/g	0.01 ug/g
bis (chloroethyl) ether	<0.01 ug/g	0.01 ug/g
dichloromethane	<0.01 ug/g	0.01 ug/g
dichloropropanol	<0.01 ug/g	0.01 ug/g
trichlorobenzenes	<0.01 ug/g	0.01 ug/g
1,2 dibromoethane	<0.01 ug/g	0.01 ug/g
2-chlorophenol	<0.01 ug/g	0.01 ug/g
2,4-dichlorophenol	<0.01 ug/g	0.01 ug/g
2,4,6-trichlorophenols	<0.01 ug/g	0.01 ug/g
tetrachloropnenol	<0.01 ug/g	0.01 ug/g
pentachlorophenol	<0.01 ug/g	0.01 ug/g
benzo(b)fluoranthene	<0.01 ug/g	0.01 ug/g
benzo(j)fluoranthene	<0.01 ug/g	0.01 ug/g
chloronaphnalene	<0.01 ug/g	0.01 ug/g
fluoranthene	<0.01 ug/g	0.01 ug/g
chloromethane	<0.01 ug/g	0.01 ug/g
bromomethane	<0.01 ug/g	0.01 ug/g
vinylchloride	<0.01 ug/g	0.01 ug/g

TO:Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
chloroethane	<0.01 ug/g	0.01 ug/g
methylene chloride	<0.01 ug/g	0.01 ug/g
trichlorofluoromethane	<0.01 ug/g	0.01 ug/g
1,1-dichloroethene	<0.01 ug/g	0.01 ug/g
1,1-dichloroethane	<0.01 ug/g	0.01 ug/g
trans-1,2-dichloroethene	<0.01 ug/g	0.01 ug/g
chloroform	<0.01 ug/g	0.01 ug/g
1,2-dichloroethane	<0.01 ug/g	0.01 ug/g
1,1,1-trichloroethane	<0.01 ug/g	0.01 ug/g
carbon tetrachloride	<0.01 ug/g	0.01 ug/g
bromodichloromethane	<0.01 ug/g	0.01 ug/g
1,2-dichloropropane	<0.01 ug/g	0.01 ug/g
trans 1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
trichloroethene	<0.01 ug/g	0.01 ug/g
benzene	<0.01 ug/g	0.01 ug/g
dibromochloromethane	<0.01 ug/g	0.01 ug/g
1,1,2-trichloroethane	<0.01 ug/g	0.01 ug/g
cis-1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
2-chloroethylvinyl ether	<0.01 ug/g	0.01 ug/g
bromoform	<0.01 ug/g	0.01 ug/g
1,1,2,2-tetrachloroethane	<0.01 ug/g	0.01 ug/g
tetrachloroethene	<0.01 ug/g	0.01 ug/g
toluene	<0.01 ug/g	0.01 ug/g
chlorobenzene	<0.01 ug/g	0.01 ug/g
ethyl benzene	<0.01 ug/g	0.01 ug/g
1,3-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,2-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,4-dichlorobenzene	<0.01 ug/g	0.01 ug/g

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW 846, EMSL- Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

SAMPLE ID: 3/7/85, HT. EX. Cleaning sludge from 2 FCC OVHD Bundles & from 2 gas con ovhd bundles. Sample # 85-6.

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMI
Sb	9.8 ug/g	0.002 ug/g
As	140.0 ug/g	0.002 ug/g
Ba	355.0 ug/g	0.005 ug/g
Be	0.10 ug/g	0.001 ug/g
Cd	170.0 ug/g	0.002 ug/g
Cr	19700.0 ug/g	0.005 ug/g
Cu	6200.0 ug/g	0.002 ug/g
Pb	250.0 ug/g	0.001 ug/g
Ni	1500.0 ug/g	0.01 ug/g
Se	256.0 ug/g	0.002 ug/g
Ag	24.0 ug/g	0.003 ug/g
Tl	<0.1 ug/g	0.1 ug/g
Zn	2600.0 ug/g	0.004 ug/g
EC	2250 umhos/cm	0.1 umhos/cm
pH	6.3	0.01
Bulk Density	1.46	
Solids weight fraction	74.9 %	
Oil weight fraction	1.3 %	
Water weight fraction	23.8 %	
Ignitability	>60 °C	
Benzylchloride	<0.01 ug/g	0.01 ug/g
bis (2-chloroethyl) ether	<0.01 ug/g	0.01 ug/g
bis (2-chloroisopropyl) ether	<0.01 ug/g	0.01 ug/g
bis (chloroethyl) ether	<0.01 ug/g	0.01 ug/g
dichloromethane	<0.01 ug/g	0.01 ug/g
dichloropropanol	<0.01 ug/g	0.01 ug/g
trichlorobenzenes	<0.01 ug/g	0.01 ug/g
1,2 dibromoethane	<0.01 ug/g	0.01 ug/g
2-chlorophenol	<0.01 ug/g	0.01 ug/g
2,4-dichlorophenol	<0.01 ug/g	0.01 ug/g
2,4,6-trichlorophenols	<0.01 ug/g	0.01 ug/g
tetrachlorophenol	<0.01 ug/g	0.01 ug/g
pentachlorophenol	<0.01 ug/g	0.01 ug/g
benzo(b)fluoranthene	<0.01 ug/g	0.01 ug/g
benzo(j)fluoranthene	<0.01 ug/g	0.01 ug/g
chloronapthalene	<0.01 ug/g	0.01 ug/g
fluoranthene	<0.01 ug/g	0.01 ug/g
chloromethane	<0.01 ug/g	0.01 ug/g
bromomethane	<0.01 ug/g	0.01 ug/g
vinylchloride	<0.01 ug/g	0.01 ug/g

TO:Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
chloroethane	<0.01 ug/g	0.01 ug/g
methylene chloride	<0.01 ug/g	0.01 ug/g
trichlorofluoromethane	<0.01 ug/g	0.01 ug/g
1,1-dichloroethene	<0.01 ug/g	0.01 ug/g
1,1-dichloroethane	<0.01 ug/g	0.01 ug/g
trans-1,2-dichloroethene	<0.01 ug/g	0.01 ug/g
chloroform	<0.01 ug/g	0.01 ug/g
1,2-dichloroethane	<0.01 ug/g	0.01 ug/g
1,1,1-trichloroethane	29.4 ug/g	0.01 ug/g
carbon tetrachloride	<0.01 ug/g	0.01 ug/g
bromodichloromethane	<0.01 ug/g	0.01 ug/g
1,2-dichloropropane	<0.01 ug/g	0.01 ug/g
trans 1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
trichloroethene	<0.01 ug/g	0.01 ug/g
benzene	<0.01 ug/g	0.01 ug/g
dibromochloromethane	<0.01 ug/g	0.01 ug/g
1,1,2-trichloroethane	<0.01 ug/g	0.01 ug/g
cis-1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
2-chloroethylvinyl ether	<0.01 ug/g	0.01 ug/g
bromoform	<0.01 ug/g	0.01 ug/g
1,1,2,2-tetrachloroethane	<0.01 ug/g	0.01 ug/g
tetrachloroethene	<0.01 ug/g	0.01 ug/g
toluene	<0.01 ug/g	0.01 ug/g
chlorobenzene	<0.01 ug/g	0.01 ug/g
ethyl benzene	<0.01 ug/g	0.01 ug/g
1,3-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,2-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,4-dichlorobenzene	<0.01 ug/g	0.01 ug/g

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW 846, EMSL- Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

SAMPLE ID: 3/8/85, Cooling Tower sludge taken from No. Basin 2P
Sample # 85-7

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMI
Sb	12.0 ug/g	0.002 ug/g
As	19.0 ug/g	0.002 ug/g
Ba	495.0 ug/g	0.005 ug/g
Be	0.20 ug/g	0.001 ug/g
Cd	15.0 ug/g	0.002 ug/g
Cr	8050.0 ug/g	0.005 ug/g
Cu	390.0 ug/g	0.002 ug/g
Pb	160.0 ug/g	0.001 ug/g
Ni	39.0 ug/g	0.01 ug/g
Se	5.0 ug/g	0.002 ug/g
Ag	38.0 ug/g	0.003 ug/g
Tl	<0.1 ug/g	0.1 ug/g
Zn	5000.0 ug/g	0.004 ug/g
EC	6500 umhos/cm	0.1 umhos/cm
pH	7.9	0.01
Bulk Density	1.45	
Solids weight fraction	40.2 %	
Oil weight fraction	4.0 %	
Water weight fraction	55.8 %	
Ignitability	>60 °C	
Benzylchloride	<0.01 ug/g	0.01 ug/g
bis (2-chloroethyl) ether	<0.01 ug/g	0.01 ug/g
bis (2-chloroisopropyl) ether	<0.01 ug/g	0.01 ug/g
bis (chloroethyl) ether	<0.01 ug/g	0.01 ug/g
dichloromethane	<0.01 ug/g	0.01 ug/g
dichloropropanol	<0.01 ug/g	0.01 ug/g
trichlorobenzenes	<0.01 ug/g	0.01 ug/g
1,2 dibromoethane	<0.01 ug/g	0.01 ug/g
2-chlorophenol	<0.01 ug/g	0.01 ug/g
2,4-dichlorophenol	<0.01 ug/g	0.01 ug/g
2,4,6-trichlorophenols	<0.01 ug/g	0.01 ug/g
tetrachlorophenol	<0.01 ug/g	0.01 ug/g
pentachlorophenol	<0.01 ug/g	0.01 ug/g
benzo(b)fluoranthene	<0.1 ug/g	0.1 ug/g
benzo(j)fluoranthene	<0.1 ug/g	0.1 ug/g
chloronaphthalene	<0.1 ug/g	0.1 ug/g
fluoranthene	<0.1 ug/g	0.1 ug/g
chloromethane	<0.01 ug/g	0.01 ug/g
bromomethane	<0.01 ug/g	0.01 ug/g
vinylchloride	<0.01 ug/g	0.01 ug/g

TO:Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
chloroethane	<0.01 ug/g	0.01 ug/g
methylene chloride	<0.01 ug/g	0.01 ug/g
trichlorofluoromethane	<0.01 ug/g	0.01 ug/g
1,1-dichloroethene	<0.01 ug/g	0.01 ug/g
1,1-dichloroethane	<0.01 ug/g	0.01 ug/g
trans-1,2-dichloroethene	<0.01 ug/g	0.01 ug/g
chloroform	<0.01 ug/g	0.01 ug/g
1,2-dichloroethane	<0.01 ug/g	0.01 ug/g
1,1,1-trichloroethane	<0.01 ug/g	0.01 ug/g
carbon tetrachloride	<0.01 ug/g	0.01 ug/g
bromodichloromethane	<0.01 ug/g	0.01 ug/g
1,2-dichloropropane	<0.01 ug/g	0.01 ug/g
trans 1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
trichloroethene	<0.01 ug/g	0.01 ug/g
benzene	<0.01 ug/g	0.01 ug/g
dibromochloromethane	<0.01 ug/g	0.01 ug/g
1,1,2-trichloroethane	<0.01 ug/g	0.01 ug/g
cis-1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
2-chloroethylvinyl ether	<0.01 ug/g	0.01 ug/g
bromoform	<0.01 ug/g	0.01 ug/g
1,1,2,2-tetrachloroethane	<0.01 ug/g	0.01 ug/g
tetrachloroethene	<0.01 ug/g	0.01 ug/g
toluene	<0.01 ug/g	0.01 ug/g
chlorobenzene	<0.01 ug/g	0.01 ug/g
ethyl benzene	<0.01 ug/g	0.01 ug/g
1,3-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,2-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,4-dichlorobenzene	<0.01 ug/g	0.01 ug/g

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW 846, EMSL- Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

SAMPLE ID: 3/13/85, API Seperator sludge taken from bottom w/scoop
Sample # 85-8

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
Sb	16.0 ug/g	0.002 ug/g
As	90.0 ug/g	0.002 ug/g
Ba	720.0 ug/g	0.005 ug/g
Be	0.20 ug/g	0.001 ug/g
Cd	30.0 ug/g	0.002 ug/g
Cr	6100.0 ug/g	0.005 ug/g
Cu	830.0 ug/g	0.002 ug/g
Pb	530.0 ug/g	0.001 ug/g
Ni	358.0 ug/g	0.01 ug/g
Se	11.0 ug/g	0.002 ug/g
Ag	53.0 ug/g	0.003 ug/g
Tl	<0.1 ug/g	0.1 ug/g
Zn	13900.0 ug/g	0.004 ug/g
EC	NA	
pH	8.0	0.01
Bulk Density	1.34	
Solids weight fraction	95.3 %	
Oil weight fraction	4.7 %	
Water weight fraction	<1 %	
Ignitability	20 °C	
Benzylchloride	<0.01 ug/g	0.01 ug/g
bis (2-chloroethyl) ether	<0.01 ug/g	0.01 ug/g
bis (2-chloroisopropyl) ether	<0.01 ug/g	0.01 ug/g
bis (chloroethyl) ether	<0.01 ug/g	0.01 ug/g
dichloromethane	<0.01 ug/g	0.01 ug/g
dichloropropanol	<0.01 ug/g	0.01 ug/g
trichlorobenzenes	<0.01 ug/g	0.01 ug/g
1,2 dibromoethane	<0.01 ug/g	0.01 ug/g
2-chlorophenol	946.0 ug/g	0.01 ug/g
2,4-dichlorophenol	<0.1 ug/g	0.1 ug/g
2,4,6-trichlorophenols	<0.1 ug/g	0.1 ug/g
tetrachlorophenol	<0.1 ug/g	0.1 ug/g
pentachlorophenol	<0.1 ug/g	0.1 ug/g
benzo(b)fluoranthene	59.0 ug/g	0.1 ug/g
benzo(j)fluoranthene	60.1 ug/g	0.1 ug/g
chloronapthalene	<0.1 ug/g	0.1 ug/g
fluoranthene	10.2 ug/g	0.1 ug/g
chloromethane	0.015 ug/g	0.01 ug/g
bromomethane	<0.01 ug/g	0.01 ug/g
vinylchloride	<0.01 ug/g	0.01 ug/g

TO:Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
chloroethane	<0.01 ug/g	0.01 ug/g
methylene chloride	0.022 ug/g	0.01 ug/g
trichlorofluoromethane	<0.01 ug/g	0.01 ug/g
1,1-dichloroethene	8.5 ug/g	0.01 ug/g
1,1-dichloroethane	0.2 ug/g	0.01 ug/g
trans-1,2-dichloroethene	0.1 ug/g	0.01 ug/g
chloroform	0.5 ug/g	0.01 ug/g
1,2-dichloroethane	0.7 ug/g	0.01 ug/g
1,1,1-trichloroethane	56.2 ug/g	0.01 ug/g
carbon tetrachloride	<0.1 ug/g	0.1 ug/g
bromodichloromethane	<0.1 ug/g	0.1 ug/g
1,2-dichloropropane	<0.1 ug/g	0.1 ug/g
trans 1,3-dichloropropene	<0.1 ug/g	0.1 ug/g
trichloroethene	0.4 ug/g	0.1 ug/g
benzene	100.2 ug/g	0.1 ug/g
dibromochloromethane	<0.1 ug/g	0.1 ug/g
1,1,2-trichloroethane	<0.1 ug/g	0.1 ug/g
cis-1,3-dichloropropene	<0.1 ug/g	0.1 ug/g
2-chloroethylvinyl ether	<0.1 ug/g	0.1 ug/g
bromoform	<0.1 ug/g	0.1 ug/g
1,1,2,2-tetrachloroethane	0.3 ug/g	0.1 ug/g
tetrachloroethene	10.2 ug/g	0.1 ug/g
toluene	76.0 ug/g	0.1 ug/g
chlorobenzene	3.1 ug/g	0.1 ug/g
ethyl benzene	47.0 ug/g	0.1 ug/g
1,3-dichlorobenzene	0.1 ug/g	0.1 ug/g
1,2-dichlorobenzene	0.1 ug/g	0.1 ug/g
1,4-dichlorobenzene	0.1 ug/g	0.1 ug/g

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW 846, EMSL- Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES

TO:Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

SAMPLE ID: 3/14/85 Slop oil emulsion from BTM of tank 107
Sample # 85-9

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
Sb	2.3 ug/g	0.002 ug/g
As	44.0 ug/g	0.002 ug/g
Ba	681.0 ug/g	0.005 ug/g
Be	0.10 ug/g	0.001 ug/g
Cd	20.0 ug/g	0.002 ug/g
Cr	260.0 ug/g	0.005 ug/g
Cu	320.0 ug/g	0.002 ug/g
Pb	725.0 ug/g	0.001 ug/g
Ni	138.0 ug/g	0.01 ug/g
Se	3.0 ug/g	0.002 ug/g
Ag	40.0 ug/g	0.003 ug/g
Tl	<0.1 ug/g	0.1 ug/g
Zn	5600.0 ug/g	0.004 ug/g
EC	NA	
pH	6.0	0.01
Bulk Density	0.94	
Solids weight fraction	66.6 %	
Oil weight fraction	33.4 %	
Water weight fraction	<1 %	
Ignitability	20 °C	
Benzylchloride	<0.01 ug/g	0.01 ug/g
bis (2-chloroethyl) ether	<0.01 ug/g	0.01 ug/g
bis (2-chloroisopropyl) ether	<0.01 ug/g	0.01 ug/g
bis (chloroethyl) ether	<0.01 ug/g	0.01 ug/g
dichloromethane	<0.01 ug/g	0.01 ug/g
dichloropropanol	<0.01 ug/g	0.01 ug/g
trichlorobenzenes	<0.01 ug/g	0.01 ug/g
1,2 dibromoethane	<0.01 ug/g	0.01 ug/g
2-chlorophenol	1743.0 ug/g	0.1 ug/g
2,4-dichlorophenol	<0.1 ug/g	0.1 ug/g
2,4,6-trichlorophenols	1376.0 ug/g	0.1 ug/g
tetrachlorophenol	<0.1 ug/g	0.1 ug/g
pentachlorophenol	<0.1 ug/g	0.1 ug/g
benzo(b)fluoranthene	<1.0 ug/g	1.0 ug/g
benzo(j)fluoranthene	<1.0 ug/g	1.0 ug/g
chloronapthalene	<1.0 ug/g	1.0 ug/g
fluoranthene	520.8 ug/g	1.0 ug/g
chloromethane	<0.01 ug/g	0.01 ug/g
bromomethane	<0.01 ug/g	0.01 ug/g
vinylchloride	<0.01 ug/g	0.01 ug/g

TO:Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

0300

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMIT
chloroethane	<0.01 ug/g	0.01 ug/g
methylene chloride	<0.01 ug/g	0.01 ug/g
trichlorofluoromethane	<0.01 ug/g	0.01 ug/g
1,1-dichloroethene	<0.01 ug/g	0.01 ug/g
1,1-dichloroethane	<0.01 ug/g	0.01 ug/g
trans-1,2-dichloroethene	<0.01 ug/g	0.01 ug/g
chloroform	<0.01 ug/g	0.01 ug/g
1,2-dichloroethane	<0.01 ug/g	0.01 ug/g
1,1,1-trichloroethane	<0.01 ug/g	0.01 ug/g
carbon tetrachloride	<0.01 ug/g	0.01 ug/g
bromodichloromethane	<0.01 ug/g	0.01 ug/g
1,2-dichloropropane	<0.01 ug/g	0.01 ug/g
trans 1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
trichloroethene	<0.01 ug/g	0.01 ug/g
benzene	0.54 ug/g	0.01 ug/g
dibromochloromethane	<0.01 ug/g	0.01 ug/g
1,1,2-trichloroethane	<0.01 ug/g	0.01 ug/g
cis-1,3-dichloropropene	<0.01 ug/g	0.01 ug/g
2-chloroethylvinyl ether	<0.01 ug/g	0.01 ug/g
bromoform	<0.01 ug/g	0.01 ug/g
1,1,2,2-tetrachloroethane	<0.01 ug/g	0.01 ug/g
tetrachlordethene	<0.01 ug/g	0.01 ug/g
toluene	0.35 ug/g	0.01 ug/g
chlorobenzene	<0.01 ug/g	0.01 ug/g
ethyl benzene	0.32 ug/g	0.01 ug/g
1,3-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,2-dichlorobenzene	<0.01 ug/g	0.01 ug/g
1,4-dichlorobenzene	<0.01 ug/g	0.01 ug/g

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW 846, EMSL- Cincinnati, 1982.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES

TO: Giant Refining
St. Rt. 3 Box 7
Gallup, NM 87301

DATE: 15 May 1985

SAMPLE ID: 3/7/85, Leaded tank 571-Sludge taken while repairing suction line composited from tank bottom. Sample # 85-5

ANALYTE	ANALYTICAL RESULTS	NOMINAL DETECTION LIMI
Benz(a)anthracene	ND *	0.01 ug/g
Benzo(a)pyrene	ND *	0.01 ug/g
Dibenzanthracene	ND *	0.01 ug/g
Indeno(1,2,3,c,d)pyrene	ND *	0.01 ug/g
Napthalene	ND *	0.01 ug/g

SAMPLE ID: 3/7/85, HT. EX. Cleaning sludge from 2 FCC OVHD bundles & from 2 gas con ovhd bundles. Sample # 85-6

Benz(a)anthracen	ND *	0.01 ug/g
Benzo(a)pyrene	ND *	0.01 ug/g
Dibenzanthracene	ND *	0.01 ug/g
Indeno(1,2,3,c,d)pyrene	ND *	0.01 ug/g
Napthalene	32.2 ug/g	0.01 ug/g

SAMPLE ID: 3/8/85, Cooling Tower sludge taken from No. Basin 2P Sample # 85-7

Benz(a)anthracene	ND *	0.01 ug/g
Benzo(a)pyrene	ND *	0.01 ug/g
Dibenzanthracene	ND *	0.01 ug/g
Indeno(1,2,3,c,d)pyrene	ND *	0.01 ug/g
Napthalene	ND *	0.01 ug/g

SAMPLE ID: 3/13/85, API Seperator sludge taken from bottom w/scoop Sample # 85-8:

Benz(a)anthracene	ND *	0.01 ug/g
Benzo(a)pyrene	ND *	0.01 ug/g
Dibenzanthracene	ND *	0.01 ug/g
Indeno(1,2,3,c,d)pyrene	ND *	0.01 ug/g
Napthalene	ND *	0.01 ug/g

* ND = None detected

REFERENCE: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW 846, EMSL- Cincinnati, 1982.

Sincerely,

Jennifer V. Smith

Jennifer V. Smith, Ph.D.
Laboratory Director

7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964

APPENDIX 5

CERTIFICATION

CERTIFICATION

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Earl J. Blanchard