

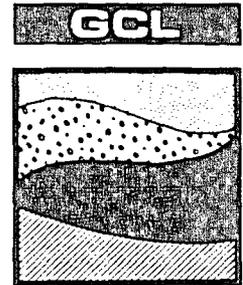
GW - 40

**GENERAL
CORRESPONDENCE**

YEAR(S):
1988-1986

Geoscience Consultants, Ltd.

500 Copper Avenue N.W. Suite 200
Albuquerque, New Mexico 87102
(505) 842-0001 FAX (505) 842-0595



December 23, 1988

Mr. Ned Kendrick, Esq.
Montgomery & Andrews, P.A.
325 Paseo de Peralta
P. O. Box 2307
Santa Fe, New Mexico 87504-2307

RE: NOVEMBER AND DECEMBER WATER ELEVATIONS

Dear Ned:

Enclosed please find water surface contour maps and water surface elevations for the months of November and December 1988.

In addition an updated copy of laboratory analysis results for the November 8, 1988 sampling at Giant's Bloomfield Refinery is enclosed. Specifically, results of polynuclear aromatic hydrocarbon and major cation/anion analysis are included in this transmittal. This data should replace the data transmitted in our December 14, 1988 letter.

If you have any questions or comments please feel free to call our office.

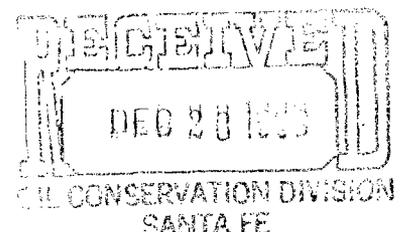
Yours very truly,
GEOSCIENCE CONSULTANTS, LTD.


Randall T. Hicks, CPG
Senior Vice President
Technical Services

Enclosure

RTH/M&A/KENDR051.LTR

cc: Mr. Robert McClenahan, Giant Bloomfield Refinery
Mr. Dave Boyer, NMOCD
Mr. Michael Wood, Groundwater Technology, Inc.



MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
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December 13, 1988

HAND-DELIVERED

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Mr. David G. Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87503

Re: Air Stripper Maintenance at Giant's Bloomfield Refinery

Dear Mr. Boyer:

In accordance with your letter of November 22, 1988 to Robert L. McClenahan, Jr. of Giant Industries, Inc. ("Giant"), I am writing to provide you with a description of air stripper cleaning performed by our consultant, Groundwater Technology, Inc. ("GTI") on October 27-28, 1988 as well as a description of Giant's upgraded control system for the collection and treatment of recovered ground water. The requested information is organized below under two headings. Items 1 through 4 of your letter are covered by our narrative description of past air stripper cleaning; item 5 is covered by our description of future collection and treatment procedures.

I. Air Stripper Cleaning on October 27-28, 1988

The cleaning program consisted of mechanically removing all possible scale and then acid washing the tower for dissolution of residual scale. The program began during the morning of October 27 when GTI mechanically removed scale by filling the air stripper tower with water and agitating the packing with air for approximately one hour. The source of the water was Tank 102, and the volume of water placed in the tower was approximately 518

Mr. David G. Boyer
December 13, 1988
Page 2

gallons. The same volume of water was placed in the tower for each subsequent cleaning operation. The agitation caused loose scale to fall from the tower walls and packing. After agitation, the water was drained through a screen to collect large pieces of scale and then diverted to the arroyo surface south of the infiltration gallery. GTI performed this procedure twice. The collected scale was later disposed of as refuse. An analysis of cations in a scale sample is appended as Attachment A.

Representatives of your office, Roger Anderson and Jami Bailey, visited the refinery during the morning of October 27. They arrived while Michael Wood of GTI was on the scaffolding next to the air stripper and involved in the mechanical washing of the stripper. Mr. Wood informs us that their conversation lasted about five minutes and that he was not aware of receiving any direction concerning cleaning procedures or disposition of cleaning fluids.

Later in the morning of October 27, following the mechanical cleaning, GTI began washing the tower using a mixture of 50 pounds of powdered sulfamic acid and 100 pounds of powdered citric acid. Material safety data sheets for these substances are appended as Attachment B. (GTI informs us that manufacturer's instructions do not exist for these substances.) The powdered acid was added to the top of the tower while filling the tower with water from Tank 102. Air was continually fed into the tower to provide agitation of water and packing. Once the tower was full, the feed water was shut off and the dilute acid wash was continually agitated with air. The dilute acid wash was to remain in the tower overnight.

To record pH readings of the dilute acid wash, GTI took samples from the base of the tower and tested them with an electronic pH meter. The initial readings indicated that the pH of the water was 3.7 at approximately 10:30 a.m. on October 27, approximately one hour after addition of the acid. No leaks or problems were noted in the system and GTI personnel left the site at approximately 4:00 p.m.

Mr. Wood checked the system at approximately 9:30 p.m. on October 27. A pH reading taken from the bottom of the tower indicated that the pH had increased to 4.3. No leaks or other abnormalities with the system were noted.

When Mr. Wood returned to the site at approximately 8:00 a.m. on October 28, he noted that the dilute acid wash had leaked out around the packing during the night. The dilute acid wash followed the land gradient with a generally southward flow from the air stripper pad. Cold temperatures during the night had apparently contracted the inflatable packer, causing the leaking

Mr. David G. Boyer
December 13, 1988
Page 3

of the dilute acid wash. The packer was still in place and partially inflated, indicating that the solution had leaked out slowly. Upon determining that the packer was intact and continued to hold air, Mr. Wood used it for the remainder of the cleaning process without incident.

After setting the packer back in place, the stripper was filled with a mixture of water from Tank 102 and 150 pounds of powdered citric acid. The dilute acid wash was agitated with air for further dissolution of inorganic scale. At approximately 10:00 a.m. on October 28, a pH level of this second wash was recorded at 4.1. At approximately 2:30 p.m. on October 28, a second pH level was recorded at 4.4.

Following this second pH reading, GTI emptied the dilute acid wash into the infiltration gallery. GTI then filled the tower twice with water from Tank 102 to rinse residual acid and scale from the tower and packing. During the filling process and for approximately ten minutes after the tower was filled, the water was continually agitated. The rinse water was then drained through a screen to remove large particulates and onto the surface near the infiltration gallery. The tower was then rinsed a final time with about 100 gallons of water, allowing the rinse water to run through the tower. The particulates were disposed of along with the scale from previous mechanical washings.

II. Upgraded Control System and Future Procedures

The upgraded control system for the collection and treatment of recovered ground water is described in the December 9, 1988 letter to me from GTI, appended as Attachment C. Giant intends to follow the operational procedures suggested in that letter.

GTI is currently developing procedures for future air stripper maintenance. They will be forwarded to you for your review and approval before any further air stripper maintenance is performed.

Once you have had an opportunity to review this letter and the enclosed materials, Giant would appreciate the opportunity to address any further questions you may have.

Sincerely,



Edmund H. Kendrick

EHK/lcj:219
Attachments
#8361-85-09

ANAYLSIS OF SCALE

SAMPLE

ATTACHMENT A



10/26/88 jp

Page 1 of 1

Western Region
 4080-C Pike Lane, Concord, CA 94520
 (415) 685-7852
 (800) 544-3422 from inside California
 (800) 423-7143 from outside California

CLIENT: James E. Goetz
 Groundwater Technology, Inc.
 3620 Wyoming NE #104
 Albuquerque, NM 87111

PROJECT#: 232-799-5009-20
 LOCATION: Bloomfield, NM

SAMPLED: 10/18/88 BY: J. Goetz
 RECEIVED: 10/20/88 BY: K. Fillingner
 ANALYZED: 10/25/88 BY: A. Mamangun
 MATRIX: Sediment C. Miller
 UNITS: mg/kg

TEST RESULTS

PARAMETER	MDL	LAB #	34000A
		I.I.D. #	AS/SCALE
Manganese	0.5		4100
Magnesium	0.5		920
Iron	0.5		90800
Calcium	1.0		211000

MDL = Method Detection Limit; compound below this level would not be detected.

METHOD: EPA 3050/6010

Emma P. Popek (S.K.)

 EMMA P. POPEK, Director

MATERIAL SAFETY DATA SHEETS

SULFAMIC ACID

CITRIC ACID

ATTACHMENT B

SULFAMIC ACID

REVISION OF: 01/80/87

VAN WATERS & ROGERS INC.
DENVER BRANCH 54800
5400 MONROE
COMMERCE CITY CO 80022

VAN WATERS & ROGERS INC. 2600 CAMPUS DRIVE SAN MATEO, CA 94403

~~EMERGENCY ASSISTANCE~~

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC
(800) 424-9300.

~~FOR PRODUCT AND SALES INFORMATION~~

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

~~PRODUCT IDENTIFICATION~~

PRODUCT NAME: SULFAMIC ACID
COMMON NAMES/SYNONYMS: AMINOSULFURIC
ACID; AMINOSULFONIC ACID

CAS NO.: 5329-14-6
VW&R CODE: T1192

FORMULA: H-SO₃ NH₂
HAZARD RATING (MANUFACTURER)
HEALTH: 3
FIRE: 0
REACTIVITY: 0
SPECIAL: NONE

DATE ISSUED: 09/86
SUPERCEDES: 03/86
HAZARD RATING SCALE:
0-MINIMAL 2-SERIOUS
1-SLIGHT 4-SEVERE
2-MODERATE

~~HAZARDOUS INGREDIENTS~~

COMPONENT	CAS NO.	%	EXPOSURE LIMITS, MG/M3			HAZARD
			OSHA PEL	ACGIH TLV	OTHER LIMIT	
SULFAMIC ACID	5329-14-6	92.2	NONE	NONE	1(DUPONT)	IRRITANT
SULFURIC ACID	7664-98-9	3.5	1	1	NONE	CORROSIVE
AMMONIUM BISULFATE	7803-62-6	3.5	NONE	NONE	NONE	NONE

~~PHYSICAL PROPERTIES~~

BOILING POINT, DEG F: 408 (DECOM) VAPOR PRESSURE, MM HG/20 DEG C: N/A
MELTING POINT, DEG F: 401 VAPOR DENSITY (AIR-1): N/A
SPECIFIC GRAVITY (WATER-1): 2.125 WATER SOLUBILITY, %: 17.7
APPEARANCE AND ODOR: EVAPORATION RATE (BUTYL ACETATE-1): NIL
WHITE TO OFF-WHITE CRYSTALS; ODORLESS

~~FIRST AID MEASURES~~

SULFAMIC ACID

REVISION OF: 01/30/87

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

IF SWALLOWED: DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LOTS OF WATER. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

HEALTH HAZARD INFORMATION

PRIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: BREATHING DUST MAY IRRITATE THE NOSE AND THROAT AND CAUSE COUGHING AND CHEST DISCOMFORT.

EYE CONTACT: DUST CAUSES EYE BURNS.

SKIN CONTACT: DUST WILL IRRITATE THE SKIN.

SWALLOWED: SWALLOWING THE DUST WILL IRRITATE THE MOUTH AND THROAT.

CHRONIC EFFECTS OF EXPOSURE: NO SPECIFIC INFORMATION AVAILABLE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE REPORTED.

TOXICITY DATA

ORAL: RAT LDLO - 1600 MG/KG

DERMAL: RABBIT: 500 MG FOR 24 HRS. PRODUCED SEVERE IRRITATION.

INHALATION: NO DATA FOUND

CARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OTHER DATA: NONE

PERSONAL PROTECTION

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MINIMIZING DUST EMISSIONS AT THE POINT OF USE.

RESPIRATORY PROTECTION: IF USE CONDITIONS GENERATE DUSTS, WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THOSE EMISSION LEVELS. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CART-

MATERIAL SAFETY DATA SHEET

PG 8

SULFAMIC ACID

REVISION OF: 01/30/87

RIDGE RESPIRATOR WITH PARTICULATE FILTERS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

EYE PROTECTION: CHEMICAL GOGGLES UNLESS A FULL FACEPIECE RESPIRATOR IS ALSO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, RUBBER GLOVES, AND RUBBER APRON.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

FIRE AND EXPLOSION INFORMATION

FLASH POINT, DEG F: NONE

FLAMMABLE LIMITS IN AIR, %

METHOD USED: N/A

LOWER: N/A UPPER: N/A

EXTINGUISHING MEDIA: THIS MATERIAL IS NOT COMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. USE WATER SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: MAY RELEASE SULFUR DIOXIDE, SULFUR TRIOXIDE, OR AMMONIA IF INVOLVED IN A FIRE. AQUEOUS SOLUTIONS OF THIS PRODUCT ARE HIGHLY ACIDIC.

HAZARDOUS REACTIVITY

STABILITY: STABLE

POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: EXCESSIVE HEAT.

MATERIALS TO AVOID: HAZARDOUS REACTION IN AQUEOUS SOLUTION MAY OCCUR WITH CHLORINE, HYPOCHLOROUS ACID, HYPOCHLORITES, CYANIDES, OR SULFIDES.

HAZARDOUS DECOMPOSITION PRODUCTS: MAY RELEASE SULFUR DIOXIDE, SULFUR TRIOXIDE, OR AMMONIA GASES.

SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE OR A SUPPLIED-AIR RESPIRATOR. IF THE SPILL OR LEAK IS SMALL, A FULL FACEPIECE AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED WITH PARTICULATE FILTERS MAY BE SATISFACTORY. IN ANY EVENT, ALWAYS WEAR EYE PROTECTION. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL. COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

MATERIAL SAFETY DATA SHEET

PG 4

SULFAMIC ACID

REVISION OF: D1/80/87

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.

NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

SPECIAL PRECAUTIONS

STORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY, WELL-VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. KEEP BAGS OR FIBER DRUMS DRY AT ALL TIMES. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: DO NOT CUT, GRIND, WELD, OR DRILL ON OR NEAR THIS CONTAINER.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

FOR ADDITIONAL INFORMATION

CONTACT DOUGLAS EISNER, TECHNICAL DIRECTOR, VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (415)573-8000

NOTICE

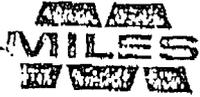
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REVISION

09/86: CORRECTED NFPA REFERENCE. ADDED COMPONENT INFORMATION. REVISED PERSONAL PROTECTION, FIRE FIGHTING INFORMATION, SPILL AND LEAK PROCEDURES, AND HANDLING ADVICE.

END OF MSDS



MANUFACTURER

Miles Laboratories, Inc.
1127 Myrtle St.
(P.O. Box 932)
Elkhart, IN 46514 (46515)

HEALTH	1
FIRE	0
REACTIVITY	0
PERS. PROT.	

SECTION 1 - IDENTITY

Common Name: (used on label) (Trade Name & Synonyms)	Citric Acid, Anhydrous, F.C.C., U.S.P.	Product Code	0701, 0702, 0705, 0704
Chemical Name	2-Hydroxy-1,2,3 Propanetricarboxylic Acid	Chemical Family	Organic Acid
Formula	C ₆ H ₈ O ₇	CAS No.	77-92-9

SECTION 2 - HAZARDOUS INGREDIENTS

Hazardous Components (chemical & common names)	Hazard	TLV (units)
Citric Acid	Skin, Eye Irritation	None Established

SECTION 3 - PHYSICAL & CHEMICAL CHARACTERISTICS (Fire & Explosion Data)

Boiling Point	N/A	Specific Gravity (H ₂ O = 1)	N/A	Vapor Pressure (mm Hg)	N/A
Percent Volatile by Volume (%)	N/A	Vapor Density (Air = 1)	N/A	Evaporation Rate (H ₂ O = 1)	N/A
Solubility in Water	162 g / 100 ml @ 25°C	Reactivity in Water/Air	Not reactive		
Appearance and Odor	Odorless, free flowing, white crystalline material, with a strong acid taste.				
Flash Point	N/A	Flammable Limits (N Air % by Volume)	Lower: N/A	Upper: N/A	Auto-ignition Temperature
Extinguisher Media	N/A				
Special Fire Fighting Procedures	None				

Unusual Fire and Explosion Hazards: None known

SECTION 4 - PHYSICAL HAZARDS

Stability	Unstable (U) Conditions to Avoid
	Stable (S) (X)
Incompatibility (Materials to Avoid)	Aqueous reaction with caustic can create heat (strong exotherm)
Hazardous Decomposition Products	None known
Hazardous Polymerization	May Occur (I) Conditions to Avoid
	Will Not Occur (N) (X)

SECTION 5 - HEALTH HAZARDS

OSHA Permissible Exposure Limit	None established	ACGIH Threshold Limit Value	None established	Other Exposure Limit Used	ACGIH and OSHA Nuisance Particulars - 5 mg/m3 respir
Signs and Symptoms of Exposure	1. Acute	(Overexposure)	Slight irritation to skin, eyes		
2. Chronic Overexposure	None determined				
Medical Conditions Generally Aggravated by Exposure	None determined				

Primary Route(s) of Exposure: Skin contact

Emergency and First Aid Procedures: Flush with water

Hygienic Practices: Normal Good Manufacturing and Housekeeping Procedures

Chemical Listed As Carcinogen or Potential Carcinogen: Not listed

SECTION 6 - SPECIAL PROTECTION INFORMATION

Respiratory Protection	Dust mask		
Ventilation	Good local ventilation	Work Practices	Normal GMP
Protective Gloves	Rubber or vinyl gloves desirable if gross contact likely	Eye Protection	Splash goggles
Other Protective Clothing or Equipment	Eyes, nose, mouth, and exposed skin areas should be covered as needed to help prevent injury		

SECTION 7 - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Normal GMP handling and storage procedures. Store in sealed container to prevent dusting.

Steps to be Taken in Case Material is Released or Spilled: Clean by vacuum or broom sweeping and remove to disposal container.

Waste Disposal Methods: Cover with soda ash or sodium bicarbonate to neutralize. Mix and add water if necessary. Scoop up slurry or wash down drain with excess water. All procedures to be done in accordance with applicable regulations.

SECTION 8 - ADDITIONAL INFORMATION

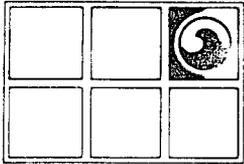
Citric Acid is Generally Recognized as Safe as a multiple purpose food substance under 21 CFR 182.1033.

Signature of Person Responsible for Preparation	<i>[Signature]</i>	Date Prepared	October 1, 1985
Telephone No.	(219) 262-7638	Date Revised	
	Weekends, evenings, holidays: (219) 264-8371		

The opinions expressed herein are those of qualified experts within Miles Laboratories, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Miles Laboratories, Inc., it is the user's obligation to determine the conditions of safe use of the product.

GROUNDWATER TECHNOLOGY, INC.
LETTER OF DECEMBER 9, 1988
DESCRIBING UPGRADED CONTROL SYSTEM

ATTACHMENT C



**GROUNDWATER
TECHNOLOGY, INC.**

6879 South Emporia Street, Englewood, CO 80112 (303) 799-8338

Fax: (303) 799-8337

9 December, 1988

232-799-5009

Mr. Ned Kendrick
Montgomery and Andrews
325 Paseo de Peralta
P.O. Box 2307
Santa Fe, NM 87504-2307

RECEIVED-7
DEC 13 1988
MONTGOMERY ET AL

Dear Mr. Kendrick:

Per my site visit to the Bloomfield facility on 17 October, 1988 and in direct response to the inadvertent pumping of product through the air stripper, I would like to propose the following plan for groundwater, product and equipment management for the facility. The following items outline the work steps to be completed by Groundwater Technology Inc. (GTI).

Step I: Equipment modifications.

To facilitate cleaning of accumulated scale and any residual hydrocarbons from the air stripping system, GTI has installed several valves and related piping to the stripper system. The attached process flow diagram show permanent modifications to the system. Groundwater Technology, Inc. has analyzed scale samples to determine chemical composition and solubilities for scale dissolution by chemical methods after mechanical removal of a majority of the scale. The results of those analyses are attached.

Groundwater Technology, Inc. has replaced the Low Level and High Level Alarm sensors (conductivity probes) in Tanks 102 and 106, with a combination conductivity/density probe which are suspended from the top of each tank to the proper depth in the tank (see attached figure). This modification is the most fail safe method for protecting against accidental discharges due to probe failure. As you are aware product was recently pumped through the air stripper because the conductivity probe became fouled with emulsified product and/or bacterial slime. The coating of the probe with a mixture containing entrained water caused the probe to continually sense a conducting environment while immersed in

a non-conducting environment (product and/or air). Additional design modifications are underway to render the entire system as fail safe as possible. Power interrupter panels are being designed by ORS Environmental Equipment to shut down southern refinery or diesel spill area equipment in case liquid levels in Tanks 102 or 106 trip the High High Alarms (HHA). The attached schematics show the current and proposed alarm/shut-down configurations for tanks 102 and 106 should liquid levels in the tanks trip the HHA's. A conducting environment (water) at tank 102 would trigger the following:

1. Interrupt power to the transfer pump from tank 106 and Recovery Well water pumps.
2. Interrupt power to air compressor.
3. Close solenoid on gravity water feed from storage.

A conducting environment in tank 106 would trigger the following:

1. Interrupt power to southern refinery recovery well water pumps.
2. Close air solenoid valve to deactivate pneumatic pumps.

The current audible alarm system will remain in place.

Step II: Designated clean tank number 102.

Tank 102 should be isolated as a clean tank which will never contain phase-separated product. This will eliminate the possibility of pumping product into the air stripping system. Exact methods for isolation will be finalized in the near future. Additional methods may include utilizing tank 106 as a pre-separator for fluids pumped from southern refinery wells.

Step III: Monitoring of tanks and recovery and monitor wells.

Groundwater Technology, Inc. strongly suggests the regular weekly monitoring of all recovery wells, tanks and recovery

Montgomery and Andrews
December 9, 1988

3

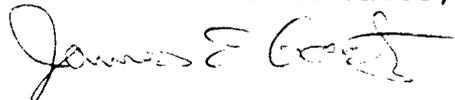
well pumped fluid volumes which are an active part of the water and product collecting system. Regular monitoring will maximize recovery and accurately document water and product movement throughout the system. Regular monitoring is another safety feature to reduce the possibility of equipment failure. Please find attached a suggested format for data collection. Adherence to this program will maximize product recovery thus reducing the life of the project.

The above steps should be in conjunction with regular monitoring and maintenance (especially of all probes in tanks 102 and 106) already occurring at the site. We will be contacting you soon for finalization of these plans.

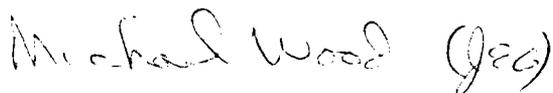
Please find attached the results of solubility tests conducted on scale removed from the air stripping tower. Tower cleaning was based on these results. Two mechanical rinses of the air stripper system were performed prior to chemical dissolution of the scale. A program is being designed whereby air stripper maintenance can be performed on a regular basis.

Sincerely,

GROUNDWATER TECHNOLOGY, INC.



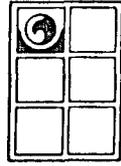
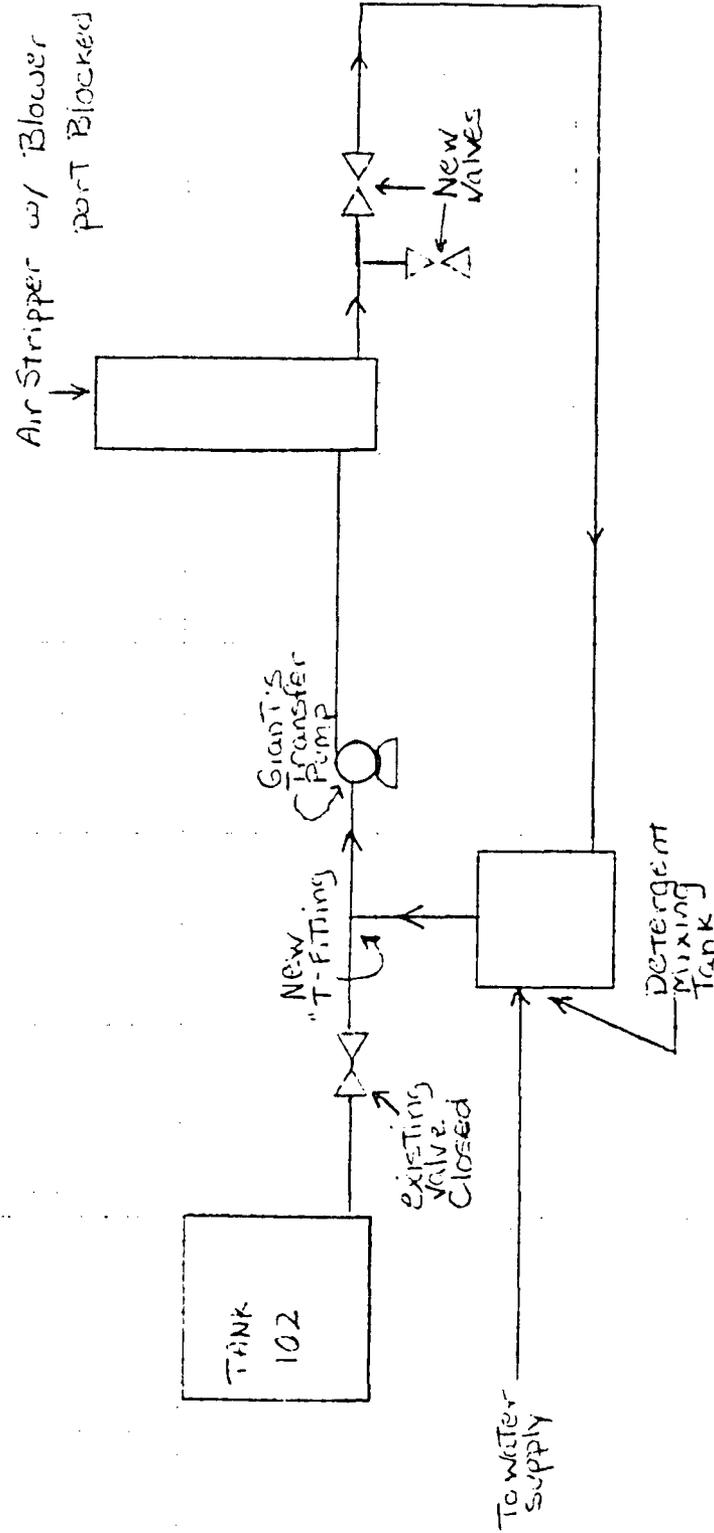
J.E. Goetz, C.P.G.
Rocky Mountain District Manager



Michael Wood
New Mexico Territory Manager

Attachments

Process Flow Diagram



FILE COPY

October 28, 1988

To: Jim Goetz
From: Bob Bly

Re: AS/Scale Solubility
Montgomery & Andrews

Project No.: 232-799-5009-29

Solubility of the scale in aqueous solutions of citric acid and sulfamic was tested. Small portions of the scale were weighed and soaked in solutions of the above acids to determine their effectiveness in dissolving the scale. Citric acid is much more soluble than sulfamic acid (see attached data). Concentrated solutions of both were tested. Solubility of the scale in cold (ambient temperature) solutions was not high, although evolution of gas and coloration of the solution indicated that the scale is attacked by the acid solution.

In summary, the citric acid seems to be a preferable choice, primarily because of its greater solubility and potential complexing ability with metal ions. Both acid solutions have pH less than 1.

1. Citric Acid, $C_6H_8O_7$, Formula Weight 192.1

Solubility: 133 g/100 ml water (cold) 57% (w/w)

Tested a 25% (w/w) solution for solubility of the scale. At ambient temperature, solubility is less than 0.5 g/l. At 85 °C, the solubility is greater than 10 g/l. Evolution of gas is observed at ambient temperature, and coloration of the solution increases with increasing scale weight, indicating dissolution of the scale is effective without heating.

2. Sulfamic Acid, NH_2SO_3H , Formula Weight 97.1

Solubility: 14.7 g/100 ml water (cold) 12.8% (w/w)
 47.1 g/100 ml water (80°C) 32.0% (w/w)

Tested a 30% (w/w) solution for solubility of the scale. At ambient temperature, the sulfamic acid is not completely dissolved. Results on scale solubility were not obtained. Heating to 85 °C, solubility was between 10 and 20 g/l, but when cooled to ambient temperature the sulfamic acid crystallized out of solution.

Calculation for a material balance on the scale composition was attempted. A metals analysis gave 21.1% Ca, 9.1% Fe, 0.4% Mn, and 0.1 % Mg. Assuming these metals are present as their carbonates, about 2/3 of the sample is accounted for. Alternative assumptions of other anions, or oxides, does not

satisfactorily improve the low material balance recovery. The best resolution of the difference is presence of other metals which were not determined in the present analysis. Chromium and nickel are potential additional metals, present in various steel alloys. Analysis for common anions such as chloride and sulfate may be desirable for more complete characterization.



Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

Page 1 of 1

10/28/88 rw
CLIENT: James E. Goetz
Groundwater Technology, Inc.
3620 Wyoming NE #104
Albuquerque, NM 87111
PROJECT#: 232-799-5009-29
LOCATION: Bloomfield, NM
SAMPLED: 10/18/88 BY: J. Goetz
RECEIVED: 10/20/88 BY: K. Fillinger
ANALYZED: 10/27/88 BY: R. Bly
MATRIX: Sediment R. Heines

TEST RESULTS

PARAMETER	LAB #	34000B		
	I.D. #	AS/SCALE		

Solubility in Citric Acid *

Solubility in Sulfuric Acid *

* See Attached.

Emma POPEK (S.K.)
EMMA P. POPEK, Director



10/26/88 JP

Page 1 of 1

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

CLIENT: James E. Goetz
Groundwater Technology, Inc.
3620 Wyoming NE #104
Albuquerque, NM 87111
PROJECT#: 232-799-5009-28
LOCATION: Bloomfield, NM

SAMPLED: 10/18/88 BY: J. Goetz
RECEIVED: 10/20/88 BY: K. Fillinger
ANALYZED: 10/25/88 BY: A. Mamangun
MATRIX: Sediment C. Miller
UNITS: mg/kg

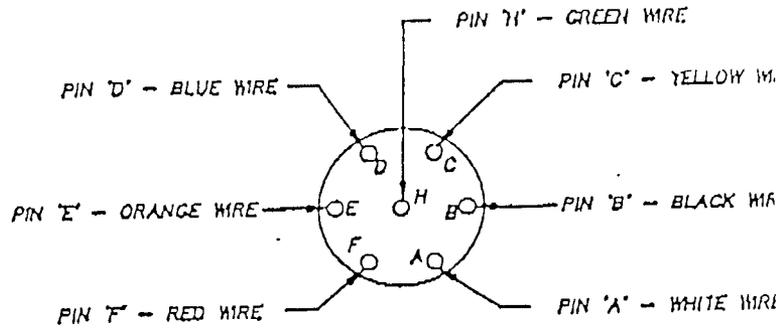
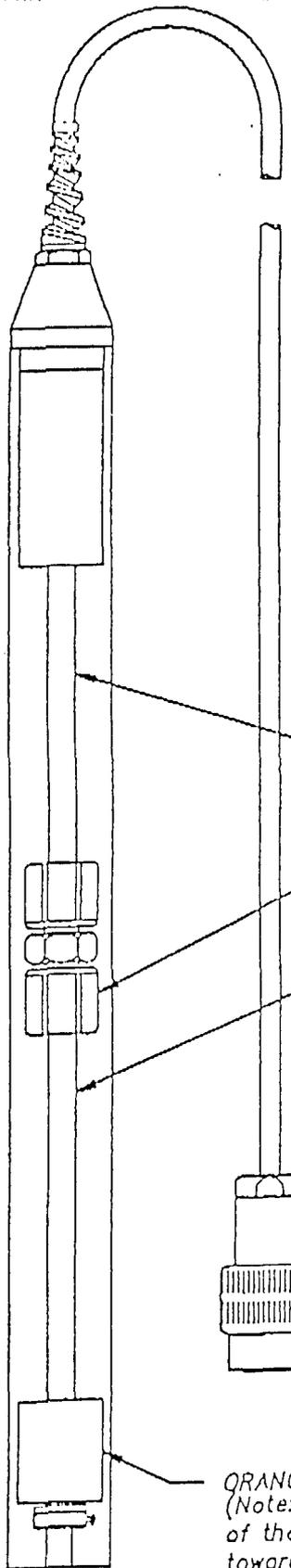
TEST RESULTS

PARAMETER	MDL	LAB #	34000A
		I.D.#	AS/SCALE
Manganese	0.5		4100
Magnesium	0.5		920
Iron	0.5		90800
Calcium	1.0		211000

MDL = Method Detection Limit; compound below this level would not be detected.

METHOD: EPA 3050/6010

Emma P. Popek (S.K.)
EMMA P. POPEK, Director

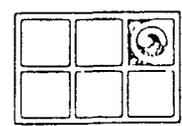


UNIVERSALLY WIRED

ORANGE FLOAT
 (Note: The magnet end
 of the float points
 toward the union.)

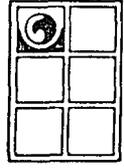
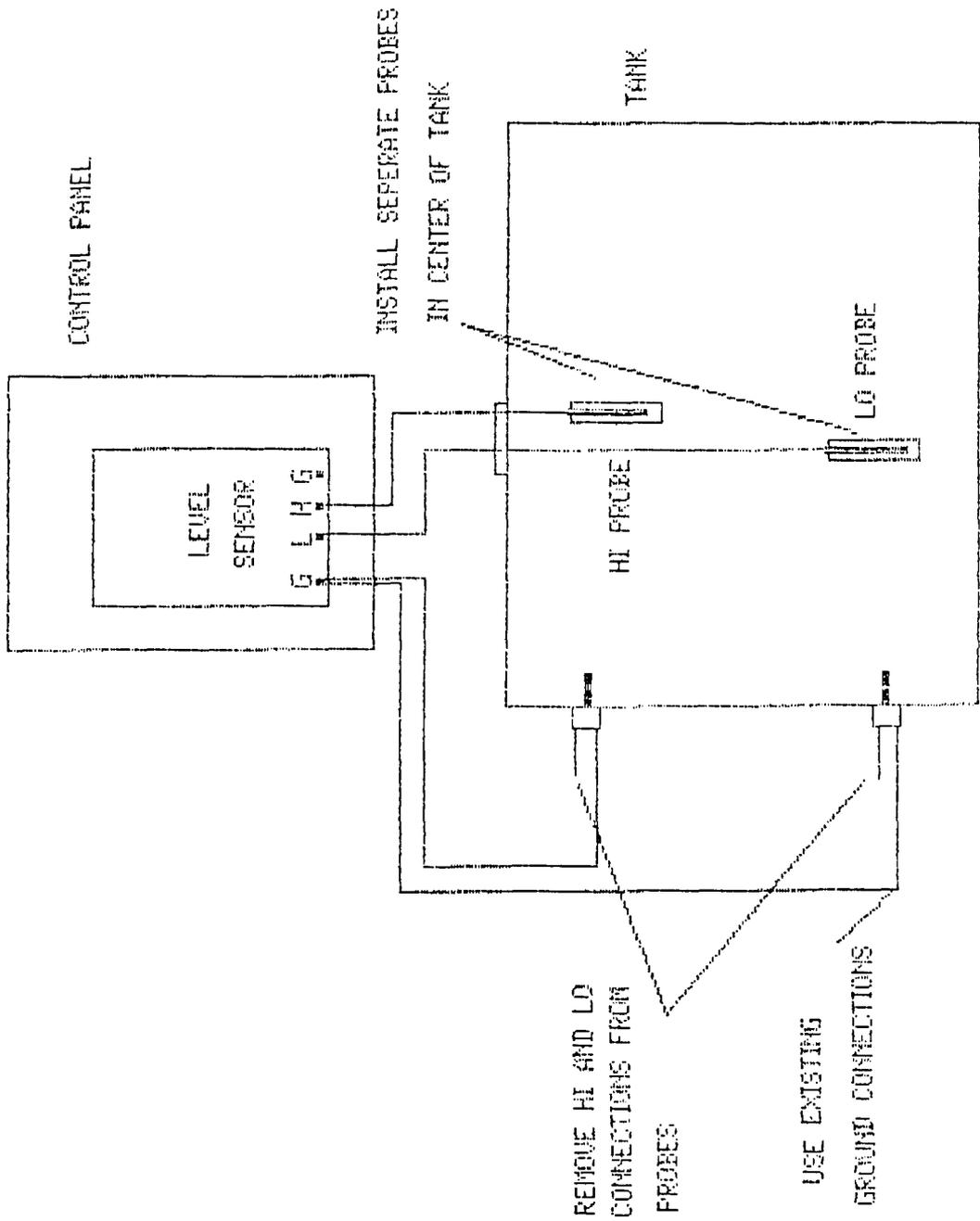
The cable is marked numerically every foot, with a 9 digit number. To find the depth, record the first number, lower probe, and when a reading is desired, subtract the first number from the last number. (eg. XXXXXXXX97 : XXXXXXXX32 = 65 ft.) (Last number - first number = depth)

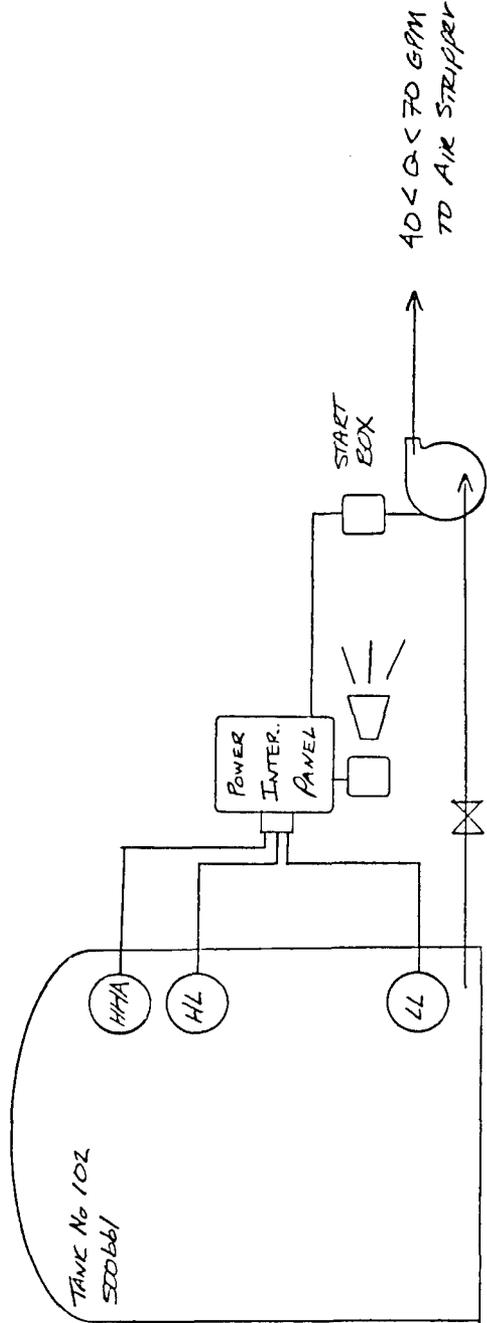
SMALL DIAMETER
 POWER INTERRUPT
 CONDUCTIVITY
 PROBE



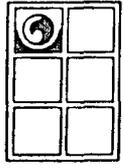
GROUNDWATER
 TECHNOLOGY

CONSULTING GROUNDWATER GEOLOGISTS



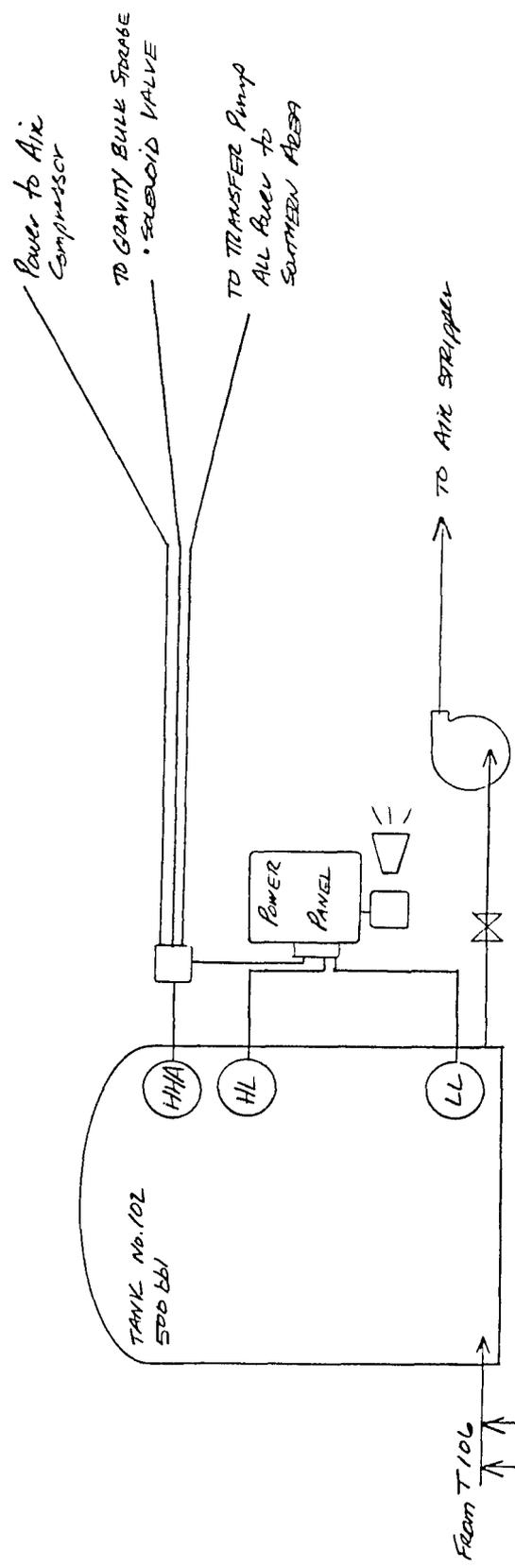


GIANT REFINING, FARMINGTON, NM
CURRENT CONTROL SCHEME - TYPICAL



GROUNDWATER
TECHNOLOGY

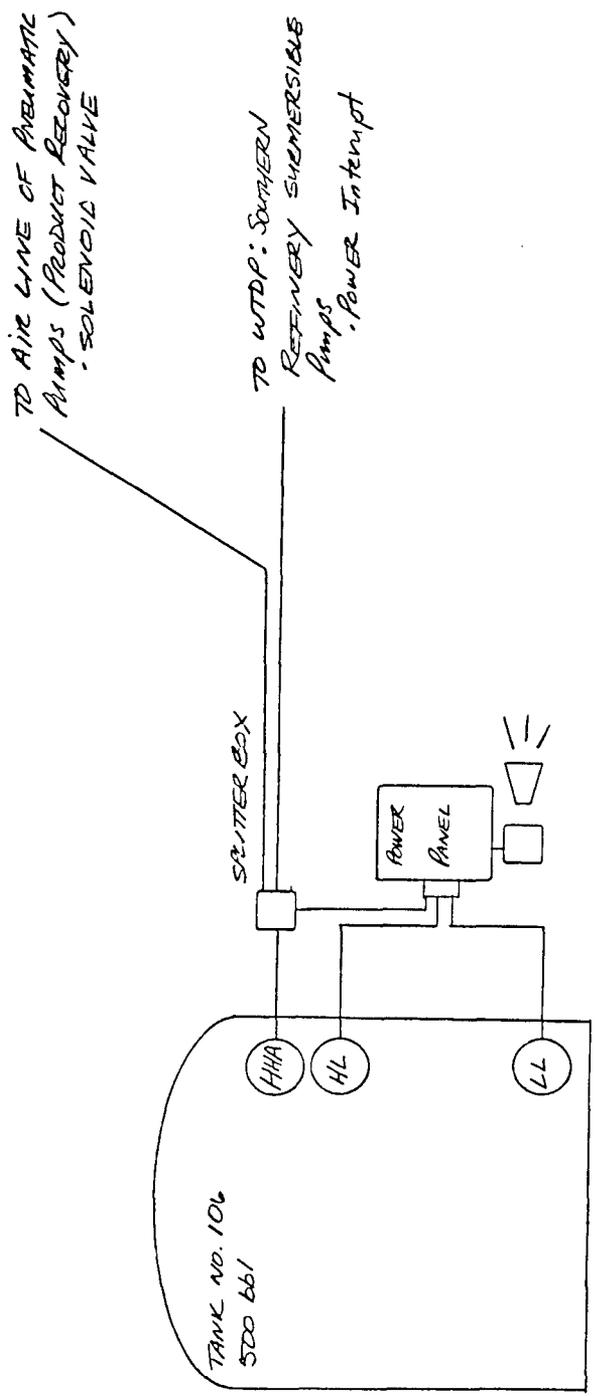
CONSULTING GROUNDWATER GEOLOGISTS



GIANT REFINING, FARMINGTON, NM
 Proposed Control Scheme T 102

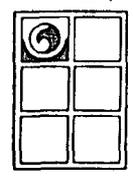
Revised 12/19/65 EES

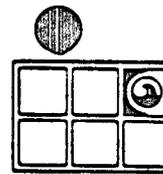




GIANT REFINING, FARMINGTON, NM
 PROPOSED CONTROL SCHEME T# 106
 DIESEL AREA

REVISED 12/9/85 ECS





GROUNDWATER
TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

DATA SHEET FOR:

GIANT BLOOMFIELD REFINERY

DATE _____

WELL/ TANK	DTW	DTP	PT	METER/TOTALIZER READINGS COMMENTS
102				
106				
PROD. SO. REF.				
PROD. D.S.A.				
GRW 1				
GRW 2				
GRW 3				
GRW 4				
GRW 5				
GRW 6				
GRW 10				
GRW 11				
GRW 12				
GRW 13				
AIR STRIPPER				

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

December 9, 1988

HAND-DELIVERED

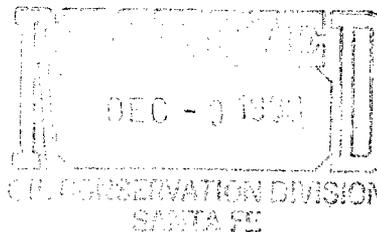
ALBUQUERQUE OFFICE
707 Broadway, N.E.
Suite 500
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677
Telecopy (505) 242-9677

REPLY TO SANTA FE OFFICE

Seth D. Montgomery
Victor R. Ortega
Jeffrey R. Brannen
John B. Pound
Gary R. Kilpatric
Thomas W. Olson
William C. Madison
Walter J. Melendres
Bruce Herr
Robert P. Worcester
John B. Draper
Nancy Anderson King
Janet McL. McKay
Joseph E. Earnest
W. Perry Pearce
Sarah M. Singleton
Stephen S. Hamilton
Bradford V. Coryell
Michael H. Harbour
Mack E. With
Katherine W. Hall
Robert J. Mroz
Richard L. Puglisi
Galen M. Buller
Edmund H. Kendrick

Charles W. N. Thompson, Jr.
Jay R. Hone
Deborah J. Van Vleck
James C. Murphy
James R. Jurgens
Ann M. Maloney
Arturo Rodriguez
Anne B. Hemenway
Joan M. Waters
Deborah S. Dungan
Daniel E. Gershon
Anne B. Tallmadge
Kenneth B. Baca
Robert A. Bassett
Susan Andrews
Joseph E. Whitley
Paula G. Maynes
Neils L. Thompson
Cynthia S. Murray
Nancy A. Taylor
Rod D. Baker
Joel P. Serra
James C. Brockmann
Sheila Scott Harris



Mr. David G. Boyer
Chief, Environmental Bureau
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87501

Re: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Boyer:

On behalf of Giant Industries, Inc., I am enclosing three copies of a Spill Prevention Control and Countermeasure ("SPCC") Plan prepared for us by Geoscience Consultants, Ltd. ("GCL"). The Plan is provided in accordance with your request and is part of the referenced discharge plan application.

I have been informed by GCL of errata in the original discharge plan application submission dated March 1, 1988. On page 9 of that document, "Tank 23" should be "Tank 22" with a capacity of "420,000" gallons rather than "210,000" gallons.

Mr. David G. Boyer
December 9, 1988
Page 2

If you have any questions regarding the enclosed submission,
please contact me.

Sincerely yours,



Edmund H. Kendrick

EHK:mp;225
Enclosure
File #8361-85-09

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

December 9, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Industries, Inc.
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan Application
Giant Industries, Inc.
Bloomfield Refinery (GW-40)

Dear Mr. McClenahan:

The ground water Discharge Plan for Giant Industries Inc., Bloomfield Refinery located in Sections 22 and 27, Township 29 North, Range 12 West (NMPM), San Juan County, New Mexico is hereby approved with the conditions listed below. In addition to these conditions, the approved plan consists of the Discharge Plan application dated March 1, 1988, and the supplementary materials dated June 1, August 8, and November 9, 1988.

The conditions of discharge plan approval and the reasons for such conditions are:

1. No discharges are authorized at the proposed land application site near the southern property boundary until OCD and Giant reach agreement on monitoring requirements for that activity.
2. Submittal of quarterly (vs. semi-annual) reports of ground water elevations and product thickness, and analytical results of discharge and ground water samples. This data is being collected monthly and quarterly, and more frequent submission to OCD will allow technical staff to better evaluate the effectiveness of the remedial activity.

The discharge plan was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. It is approved pursuant to Section 3-109. Please note subsections 3-109.E and 3-109.F, which provide for possible future amendment of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

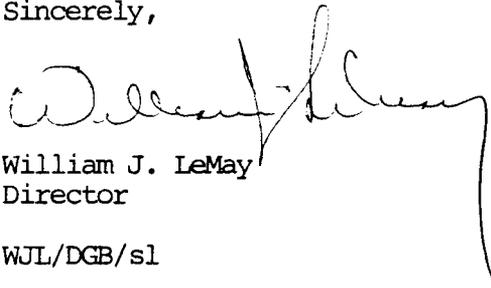
The monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheets. Any inadvertent omission from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3-107.C, you are required to notify the director of any facility expansion, production increase, or process modification that would result in any significant modification in the discharge of water contaminants.

Pursuant to subsection 3-109.G.4, this plan approval is for a period of five (5) years. This approval will expire December 9, 1993, and you should submit an application for new approval in ample time before that date.

On behalf of the staff of the OCD, I wish to thank you and your staff, and consultants for cooperation during this discharge plan review.

Sincerely,



William J. LeMay
Director

WJL/DGB/sl

Attachment

cc: Frank Chavez, OCD Aztec Office
Dennis McQuillan, EID - Santa Fe
David Tomko, EID - Farmington
Kim Bullerdick, Giant Industries
Randy Hicks, Geoscience Consultants
Ned Kendrick, Montgomery and Andrews
Roberts & Jolley, Farmington

GIANT BLOOMFIELD REFINERY

Monitoring and Reporting Schedule*

The schedule below summarizes the routine monitoring and reporting agreed to be performed by Giant as part of the discharge plan for the Giant Bloomfield Refinery (GW-40). While this summary is meant to be inclusive, if any differences occur between the schedule presented here and presented in the discharge plan, the discharge plan (including subsequent correspondence) is the controlling document.

A. Monitoring

<u>Weekly</u>	<u>Discharge Plan Reference</u>
1. Perform a visual inspection of the recovery pumps, air stripper, storage tanks, pipelines, infiltration trenches and associated ancillary equipment.	3/1/88 Discharge Plan, p. 75.
2. Monitor the total flow from each recovery well and discharge lines.	3/1/88 Discharge Plan, p. 75.
3. Measure water levels in all storage tanks.	3/1/88 Discharge Plan, p. 75.
 <u>Monthly</u>	
1. Monitor the total flow discharged to infiltration trenches.	3/1/88 Discharge Plan p. 75.
2. Monitor water levels and product thickness in monitor wells GBR-7, 8, 10, 13, 15, 17, 19, 21, 22, 24, 25, and 33 and all operating recovery wells.	3/1/88 Discharge Plan, p. 75.
3. Sample air stripper influent and effluent for VOC's using EPA method 601/602.	Discharge Plan plus Giant 6/1/88 letter
4. Sample air stripper effluent for PAH's, Cl, SO ₄ , TDS.	Giant 11/9/88 letter (#21).
5. Measure specific conductance of water from GBR-14 (GRW-13).	Giant 11/9/88 letter (#3).

* Monitoring requirements for the land application area have not been finalized and are not included. This sheet will be updated when they are complete.

Quarterly

- | | | |
|------|---|---|
| 1. | Measure water levels and product thickness in all wells. | 3/1/88 Discharge Plan, p. 75. |
| ✓ 2. | Sample GBR-6, 8, 13, 15, 17, 24D, 30, 31, and 33 for VOC's, PAH's, cations/anions, and TDS. | 3/1/88 Discharge Plan, p. 75, plus Giant 6/1/88 letter and 8/8/88 letter (#22, p. 5). |
| ✓ 3. | Sample GBR-14 as above except exclude PAH's. | Giant 11/9/88 letter (#3). |

B. REPORTING

Quarterly

- | | | |
|------|---|---|
| ✓ 1. | Ground water elevations and product thickness. | 12/9/88 OCD Approval letter, Condition 2. |
| ✓ 2. | Analytical results of discharge and ground water samples. | 12/9/88 OCD Approval letter, Condition 2. |

Semi-annually

- | | | |
|----|--|-------------------------------|
| 1. | Fluid quantities pumped. | 3/1/88 Discharge Plan, p. 76. |
| 2. | Fluid quantities discharged. | 3/1/88 Discharge Plan, p. 76. |
| 3. | Locations of discharges. | 3/1/88 Discharge Plan, p. 76. |
| 4. | Relevant field information. | 3/1/88 Discharge Plan, p. 76. |
| 5. | Changes in the plan during the period. | 3/1/88 Discharge Plan, p. 76. |



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

December 9, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Industries, Inc.
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan for
Giant Industries, Inc.
Bloomfield Refinery (GW-40)

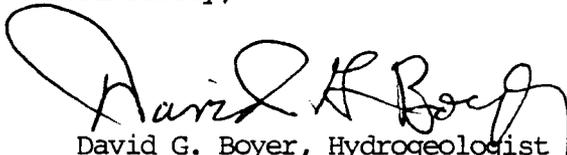
Dear Mr. McClenahan:

This letter is to notify you that the revised refinery map submitted to the Oil Conservation Division on October 27 was unacceptable for use in our review of the discharge plan, and remains unuseable for location of refinery features. The map (Plate 1) provided with the 3/1/88 Discharge Plan application provides excellent contrast, and major features and tanks, in addition to monitoring wells, are clearly labeled.

Please provide a revised map of a quality similar to that of the 3/1/88 map within 30 days of receiving this letter. If an acceptable map cannot be furnished to us by that date, please contact this office to arrange an alternate submittal date.

Thank you for your cooperation in this matter.

Sincerely,



David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/sl

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

December 2, 1988

ALBUQUERQUE OFFICE
Suite 500
7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927
Telephone (505) 242-9677

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

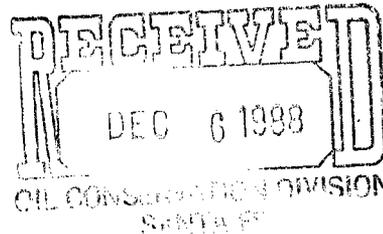
Telephone (505) 982-3873
Telecopy (505) 982-4289

LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO ALBUQUERQUE OFFICE

Seth D. Montgomery	Katherine W. Hall
Victor R. Ortega	Edmund H. Kendrick
Jeffrey R. Brannen	Helen C. Sturm
John B. Pound	Richard L. Puglisi
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Jay R. Hone	Susan Andrews
Charles W. N. Thompson, Jr.	Joseph E. Whitley
John M. Hickey	David L. Skinner
Mack E. With	Elizabeth A. Glenn
Galen M. Buller	



Mr. Bill Murphy
Project Manager
Bureau of Land Management
435 Montano Road, N.E.
Albuquerque, New Mexico 87107

Re: RI/FS Scoping Process for the Lee Acres Landfill

Dear Mr. Murphy:

The "Meeting Announcement" issued by the BLM on October 15, 1988 sets December 3, 1988 as the deadline for submitting comments on the "Scoping" of the RI/FS process for the Lee Acres Landfill. Pursuant to that deadline, Giant Refining Company ("Giant") submits its comments on the information covered at the three public meetings held pursuant to that announcement.

The "Meeting Announcement" provides that the subjects to be covered at the meetings and on which comments are required by December 3, 1988 relate to an overview of the community's role in the process, the roles and responsibilities of the BLM, and the range of issues to be addressed. After attending these meetings, Giant believes that some comment on this very general discussion of the RI/FS process is required.

The principal concern of Giant relates to the inclusion within the RI/FS process of a tremendous amount of acreage outside the area of the Lee Acres Landfill. We understand that

these areas are being included because they are possible additional sources of contamination. Giant cannot address each of the other possible sources included within the study area as shown on the map displayed at the meeting, however, Giant is concerned that the site of its Bloomfield Refinery and areas far outside the hydraulic basin influenced by the landfill are included within that area. As BLM is aware, Giant and the New Mexico Oil Conservation Division have devoted a substantial amount of time and expense in connection with the Bloomfield Refinery. Inclusion of that area within the Lee Acres Landfill study area, and examination of potential refinery contamination, appears to be a duplication of expense, time and effort. Giant has drilled some forty monitoring wells on its site and has provided extensive information to the New Mexico Oil Conservation Division ("OCD") in connection with the site, which has been shared with the New Mexico Environmental Improvement Division ("EID"). At the public meetings, no indication was made that the information developed jointly by Giant and the OCD would be utilized. Instead, it appears that the BLM and Roy F. Weston, Inc. ("Weston"), with whom BLM has contracted, propose to drill additional duplicative wells on the Giant acreage as part of its Lee Acres Landfill study. Giant believes that this additional drilling and study is an unnecessary expenditure of resources.

Further, Giant is concerned that BLM's examination of the Bloomfield Refinery and other locations surrounding the Lee Acres Landfill is inappropriate. To the best of Giant's knowledge, BLM, without any directive from a governmental entity, has taken it upon itself to embark upon an extremely expensive examination of not just contamination for which it is responsible, but also of all other potential sources of contamination in the general vicinity of the Lee Acres Landfill. Giant objects to such an unsolicited examination of the activities of surrounding landowners and will strenuously oppose any request by BLM that it pay for BLM's unrequested investigation of Giant.

Although the foregoing concerns and objection are the only comments Giant has in response to the specific issues addressed at the "Scoping" meetings on which these comments are required by December 3rd, there are additional areas which Giant believes are not being properly addressed, including matters in the Roy F. Weston, Inc. overall technical approach plan which was recently forwarded to Mr. Edmund Kendrick of this firm. Giant's concerns include:

- EID has expressed concern with the objectivity of the investigative work done by BLM and Weston. The BLM and Weston appear to have repeatedly taken the

position that no contaminants from the landfill have entered the groundwater. All existing data, however, must be carefully examined before any such sweeping generalizations can be made. Giant is concerned by EID's implication that BLM's investigation, which undoubtedly has been extremely expensive, thus far has represented something other than an objective search for the truth. See, e.g., June 29, 1988 letter from EID to BLM (appended hereto as Attachment 1); July 11, 1988 letter from EID to EPA (appended hereto as Attachment 2); September 29, 1988 letter from EID to BLM (appended hereto as Attachment 3).

- Giant is concerned that the RI/FS process does not take as one of its major goals a survey of information which is already available or readily obtainable. In order to be cost effective, the RI/FS process should develop a plan to fill in data gaps. The present proposal, both as discussed at the three public meetings and as supplemented by the overall technical approach plan which has been provided to Giant, does not appear to consider information which is presently available or readily obtainable either with regard to groundwater or air quality matters. The present plan, therefore, proposes investigations which may be far in excess of what is necessary to fill in data gaps, and accordingly, does not appear to be a cost effective approach to this problem. Examples of potentially unnecessary actions identified in the overall technical approach plan include:

1. Approximately sixty "piezocone soundings" are proposed, but no justification is provided for the collection of the "geotechnical parameters" measured by these soundings.

2. There is no reference to the large body of data currently available on groundwater chemistry, contaminant migration, geology and geohydrology collected by Giant, OCD and the EID in the last three years; many of the proposed tasks in the RI/FS would essentially duplicate these efforts.

3. Considerable amounts of meteorological data have been compiled by the EID for this part of the San Juan Basin, but the proposed air quality investigation makes no reference to this information.

- Giant is concerned that existing well locations and screened intervals are not appropriate to accurately study the impacts of the Lee Acres Landfill. This matter has been discussed, and certain well locations have been criticized by representatives of the OCD and the EID. The number, locations and screened intervals of future wells should be carefully considered prior to their installation.
- Giant is concerned that the sampling program as proposed calls for the sampling of contaminants that have not been demonstrated to exist on site, such as massive amounts of testing for pesticides, PCB's or the extensive list of metals proposed in Weston's initial scoping document. Giant is also concerned that the sampling program does not include sampling for contaminants at appropriate detection limits. It is Giant's position that Weston and BLM should use detection limits appropriate to New Mexico Water Quality Control Commission groundwater standards.
- Weston has proposed to ignore any chemical data from existing PVC wells. We do not believe that this is appropriate, as EPA does recognize the use of existing PVC wells as RCRA quality monitoring systems.
- The proposed surface water investigation appears to contain possible technical flaws. The "indicator parameters" selected for statistical evaluation of surface water quality are autocorrelative. This means that the selected parameters (Eh, pH, conductivity, total dissolved solids and dissolved gases) were all expressions of the total ionic strength and composition of the water. Any significant change in water chemistry would likely cause changes in all of the these parameters. Also, it is extremely likely that significant changes in water chemistry will be

Mr. Bill Murphy
December 2, 1988
Page 5

observed in any natural channel. Relatively pure rain water will dissolve channel material, leading to strong downstream increases in dissolved solids, as well as changes in Eh and pH. A more productive approach might be to focus on the changes and concentrations of site-specific pollutants, rather than examining changes in the levels of natural constituents.

In summary, after attending the "Scoping" meetings, Giant's primary concern is that the area selected for study has been needlessly and inappropriately expanded and that this expansion will unnecessarily increase project costs. In addition, although outside the area on which comments were requested, Giant is concerned that, among other things, information presently available will apparently not be utilized in conducting the RI/FS, broad reaching investigations will be undertaken rather than investigations designed to fill in specific data gaps, and technical concerns expressed by the OCD and the EID are not being adequately addressed.

Thank you for providing Giant with the opportunity to comment on the initial "Scoping" of the RI/FS process. Although Giant has many concerns regarding BLM's actions, it appreciates the courtesies that have been extended to it by BLM and BLM's consideration of these comments.

Sincerely,


W. Perry Pearce

WPP:mp;160
#8361-88-11
Attachments

Mr. Bill Murphy
December 2, 1988
Page 6

bcc (w/attachments):
Kim H. Bullerdick, Esq.
Mr. Bob McClenahan
David G. Boyer ✓
Dennis McQuillan



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

November 22, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Industries, Inc.
Route 3, Box 7
Gallup, New Mexico 87301

RE: Unauthorized discharges at Giant Bloomfield Refinery

Dear Mr. McClenahan:

On the morning of November 18, 1988, I participated in a conference call with Mr. Jim Goetz of Ground Water Technology Inc. (GTI) and Mr. Edmund Kendrick of Montgomery and Andrews regarding the unauthorized disposal into the infiltration gallery of cleaning solutions and wastewater from cleaning of the air stripper at your Giant Bloomfield Refinery during the week of October 24, 1988. The cleaning was necessary to remove scale and hydrocarbon residue that had affected the efficiency of the stripper. Below are the facts as I understand them.

On October 27, 1988, Mr. Roger Anderson and Ms. Jami Bailey of my staff met with Mr. Michael Wood of GTI who was at the site cleaning the tower. During the visit they inquired as to what would be done with the spent cleaning solution and the waste material. They were informed by Mr. Wood that the fluids and waste are usually disposed of in the infiltration system. At that time both Mr. Anderson and Ms. Bailey notified Mr. Wood not to dispose of the material in the infiltration gallery and that disposal must be approved by our office. He was further told by them to have you contact our office to make arrangements for this disposal. Subsequently, we were informed by Mr. Goetz on November 18, that disposal to the infiltration system had occurred. This disposal was not approved by OCD and was contrary to direct instructions by OCD staff.

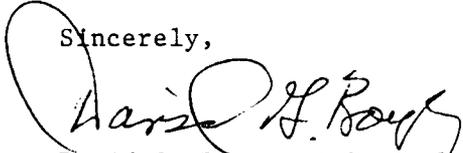
Since late June 1988 when the stripper was placed in operation, several malfunctions of the system have occurred, the most serious one prior to this occasion being direct discharge of petroleum product to the infiltration gallery on October 10. In an October 25, letter from Mr. Kendrick, Giant stated that they would submit a description of planned operational practices to minimize further malfunctions. Such a description has not yet been received.

Because of the seriousness of the October 27 incident and continuing malfunction of the equipment, I am considering recommending that enforcement action be taken in this matter. Before making such a recommendation, I am requesting that Giant provide an explanation of the circumstances relating to the unauthorized discharge, and submit the description of future operational and cleaning practices proposed to prevent additional unauthorized discharges. Accordingly, within two weeks of receipt of this letter, Giant should provide the following information:

1. A detailed narrative description of procedures used in cleaning the stripper tower along with dates of cleaning;
2. A list and composition of chemicals used in the cleaning including MSD sheets and manufacturers instructions;
3. Estimation of volumes, diluted concentrations and pH of the cleaning chemicals used in the tower and the pH and volumes of liquids and solids discharged to the infiltration gallery;
4. Types, volumes, and disposition of any waste fluids or solids from the cleaning not discharged to the infiltration gallery; and
5. Complete details of the upgraded control system, and future operating and cleaning procedures.

Upon receipt of this information OCD will perform a review and make a decision at that time as to what action to take in response to these continuing serious problems. If you have any questions, or wish to schedule a meeting after OCD receipt and review of this material, please contact me at (505) 827-5812.

Sincerely,



David G. Boyer, Hydrogeologist
Environmental Bureau Chief

cc: Robert Stovall, OCD Legal Counsel
OCD Aztec Office
Dennis McQuillan, NMEID - Santa Fe
Edmund Kendrick, Montgomery & Andrews - Santa Fe
Jim Goetz, GTI - Albuquerque



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

November 22, 1988

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M E M O R A N D U M

TO: FILE

FROM: ROGER ANDERSON, Environmental Engineer 

SUBJECT: GIANT BLOOMFIELD REFINERY UNIT

On October 27, 1988 between 10 and 12:00 noon, visited Giant Bloomfield site. Talked to Michael Wood (GTI) while he was cleaning the air stripper. Mr. Wood informed Jami Bailey and myself they were using sulfamic acid to remove scale. We asked Mr. Wood where he was going to dispose of the spent acid. He told us they usually dump it in the infiltration trench. We told him under no circumstances dispose of the waste in the trench, but tell Bob McClenahan to contact our office and make arrangements for its disposal. He said he would contact Mr. McClenahan.

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

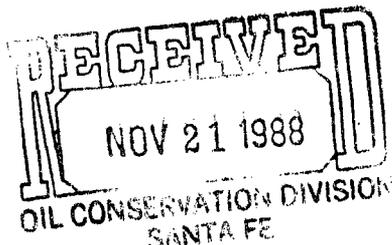
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November 17, 1988



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REPLY TO SANTA FE OFFICE

Mr. David G. Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87503

Re: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Boyer:

In our November 9, 1988 response to your comments on the Bloomfield Refinery Discharge Plan, we indicated that we would submit an SPCC Plan to you by November 18, 1988. We recently received a draft SPCC Plan from our consultants. Because we believe further revisions are necessary and we understand that approval of the Discharge Plan is not contingent on prior submission of the SPCC Plan, we plan to finalize the SPCC Plan and submit it to you by December 9, 1988.

Thank you for your consideration in this matter.

Sincerely yours,


Edmund H. Kendrick

EHK/gr:213
File #8361-85-09

MONTGOMERY & ANDREWS
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November 9, 1988

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Mr. David G. Boyer
Chief, Environmental Bureau
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail, Rm. 206
Santa Fe, New Mexico 87501

Re: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery

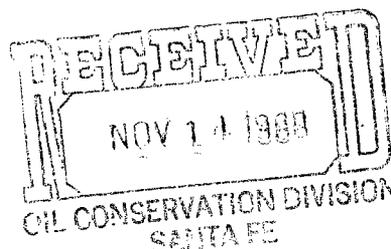
Dear Mr. Boyer:

Please find enclosed three copies of the response of Giant Industries to NMOCD comments of September 20, 1988 on the Bloomfield Refinery Discharge Plan. If you have any questions regarding this submittal, please contact me.

Sincerely yours,

Edmund H. Kendrick
Edmund H. Kendrick

EHK/gr:208
Enclosures
File #8361-85-09



File copy

RESPONSE TO NMOCD COMMENTS OF SEPTEMBER 20, 1988
ON BLOOMFIELD REFINERY DISCHARGE PLAN

General Comments

2. A. Accepted

B. Giant proposes the following schedule for monitoring the application of treated water.

Prior to start-up and at the end of the test application, Giant will sample GRW 1-6, GBR 5, 7, 13 and 20 for specific conductance and water levels. If a significant change has occurred in a well, Giant will immediately sample that well for VOCs, major cations/anions and TDS. These samples will be sent to a laboratory for analysis. For the purposes of this monitoring, an increase of 15% in specific conductance or a 0.5 foot rise in fluid levels will be considered significant.

After cessation of the application, recovery wells will be sampled twice per week for specific conductance. GBR 5, 7, 13 and 20 will be sampled weekly for specific conductance.

3. Accepted.

4. Giant will empty all tanks, except those used in connection with the recovery action.

6. A. Attached is a potentiometric surface map for October 6, 1988. Four wells were not utilized in this evaluation due to evidence of perched water. One dual completion well shows evidence of natural or induced downward gradients. The four wells which appear to tap perched units are GBR- 5, 7, 21S, and 23.

GBR-5 and 7 are completed above a shale lens which was identified between 55 feet and total depth (65 feet) in GBR-6. GBR-38 shows that this same shale lens (as a clay and claystone between 60 and 70 feet) is underlain by a more permeable sandy claystone. GCL believes that the more permeable sandy claystone is penetrated by GBR-6 and is responsible for the lower water level and the shale/claystone lense perches water in GBR-5 and 7. Lithologic data also support perched water in GBR-21S and 23 (See cross sections in discharge plan).

GBR-24S and 24D show different water levels despite the lack of a confining layer. This discrepancy may be due to a more pronounced effect at depth of pumping of nearby wells. Prior to constant pumping, water levels in the shallow and deep completions matched more closely. Although it may be more accurate to average the water levels to obtain a "true" water level of a 10 foot screened interval, GCL has elected to use 24D for consistency and because it does not change the interpretation.

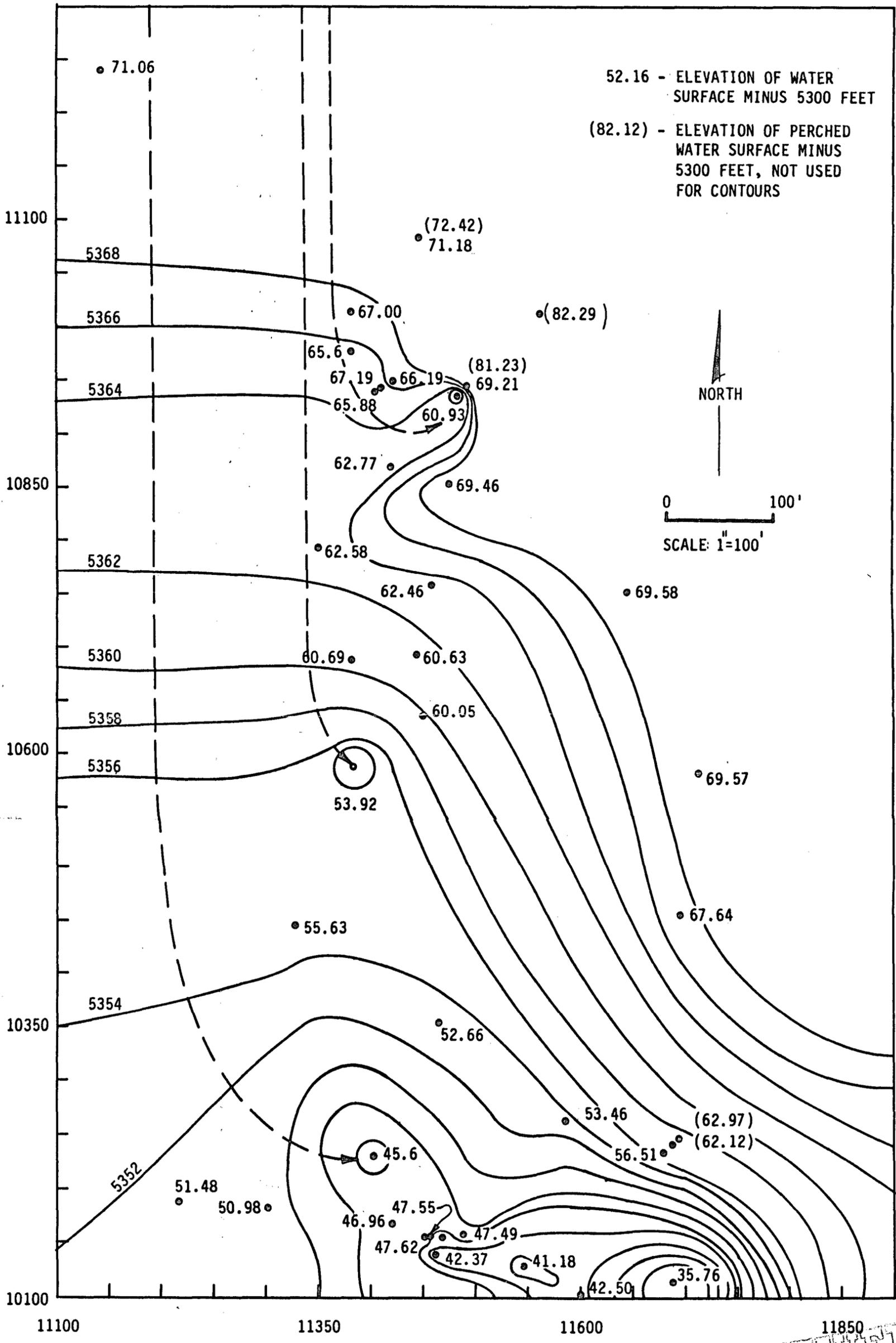
The interpretation for October is similar to the interpretation of water level data from earlier submissions. Earlier submissions, however, did not utilize wells which showed more than 0.25 feet of floating hydrocarbon. At that point in time, GCL questioned the validity of the 0.8 conversion factor as applied to hydrocarbon thicknesses in the southern refinery area wells. Although we have not fully resolved our questions as to the applicability of this conversion factor at this time, all data are utilized in the October interpretation and hydrocarbon thicknesses are multiplied by 0.8 prior to interpretation.

- B. The additional wells are installed. A survey of all new wells has been completed. Well logs, well elevations and well coordinates will be submitted to OCD upon completion of final drafting.

Specific Comments

- 4. A revised map was submitted by Mr. McClenahan to NMOCD on October 27, 1988.
- 9
 - A. During controlled flooding, all recovery wells will be operating.
 - B. GBR-6 may be used periodically, but consistent pumping from this well is not anticipated.
- 10. See earlier response for General Comment 2.
- 12. An SPCC plan will be submitted on or before November 18, 1988. Additionally, minor modifications have been made to the pumping design which will detect high water levels in tanks, stop pumps when necessary and prevent overflows. "As-built" drawings will be submitted to NMOCD when modifications are completed.
- 18. The fire water pond is drained.
- 21. Accepted.

File copy



WATER LEVELS FOR OCTOBER 6, 1988

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OIL CONSERVATION DIVISION
SANTA FE

MONTGOMERY & ANDREWS

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October 31, 1988

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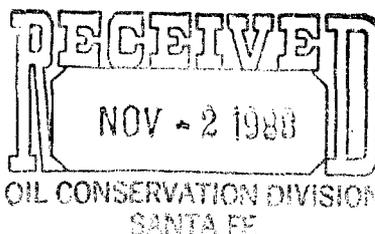
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Mr. David Boyer
New Mexico Oil Conservation Division
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87503

Re: Temporary Discharge at Giant's Bloomfield Facility

Dear Mr. Boyer:

This letter is to inform your office as to the discharge activity at Giant's Bloomfield facility.

On October 10th, Giant shut down the air stripper system, and consequently ceased discharging. While the system has been shut down, Giant has taken the opportunity to remove the scale that has been deposited on the air stripper packing and to modify and upgrade the control system for site water management.

Giant anticipates starting the air stripper again on Thursday, November 3, and running it only during daylight hours until the upgraded control system is completed.

If you have any questions regarding this matter, please feel free to call me at 982-3873.

Sincerely,

A handwritten signature in cursive script that reads "Edmund H. Kendrick".

Edmund H. Kendrick

EHK/gr:199
File #8361-85-09
cc: Charles Wohlenberg, SEO

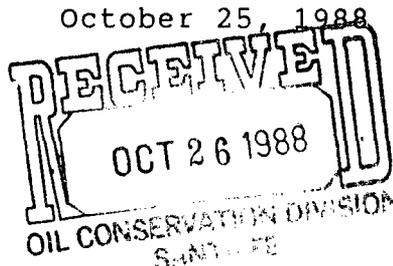
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REPLY TO SANTA FE OFFICE

Mr. David Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504

Re: Giant's Bloomfield Refinery

Dear Mr. Boyer:

I am writing to confirm the verbal notification that Bob McClenahan gave you on October 13, 1988 concerning a malfunction of the ground water treatment and collection system at the Bloomfield Refinery. I understand that the requirements of Section 1-203 of the Water Quality Control Commission regulations do not apply to this occurrence, which was a result of remedial actions related to an approved temporary discharge plan. However, because I understand that you would like to receive the same information called for by Section 1-203(A)(1), a description of the occurrence is presented below addressing the topics set forth in that section:

a. Owner and Person in Charge of Facility

- 1) Owner - Giant Industries, Inc. Post Office Box 9156, Phoenix, Arizona 85068, (602) 274-3584;
- 2) Person in Charge - Frank Fujimoto, Giant Refining Company, 606 U.S. Highway 64, Farmington, New Mexico 87401, 632-3306.

Mr. David Boyer
October 25, 1988
Page 2

- b. Facility - Giant Refining Company's Bloomfield Refinery.
- c. Date, Time, Location and Duration of Discharge - Sometime in the morning of October 10, 1988, at the infiltration gallery receiving effluent from the air stripper for an unknown duration.
- d. Source and Cause of Discharge - The source of the discharge was the North Intermediate Storage Tank containing recovered ground water. The cause is not certain, but is believed to be a malfunctioning water level switch that failed to turn off the pump that draws water from the tank into the air stripper. As a result, a thin layer of hydrocarbon product was drawn into the air stripper, and some of this product was discharged from the air stripper into the infiltration gallery.
- e. Description of Discharge - Hydrocarbon product and water containing dissolved hydrocarbons.
- f. Estimated Volume of Discharge - Less than 50 gallons of hydrocarbon product and an unknown amount of water containing dissolved hydrocarbons.
- g. Mitigation - Giant has discontinued the operation of the air stripper and the discharge of recovered ground water into the infiltration gallery pending a redesign of the ground water collection and treatment system. A description of planned operational practices to minimize the possibility of the introduction of hydrocarbon product into the air stripper will be presented to the Oil Conservation Division in a separate letter.

Please do not hesitate to contact me should you have any further questions concerning the foregoing. Because of the interest of the Environmental Improvement Division and the State Engineer in this site, copies of this letter are being forwarded to those agencies.

Sincerely,


Edmund H. Kendrick

EHK/gr:31
File #8361-85-09
cc: Dennis McQuillan, EID
Charles Wohlenberg, SEO

MONTGOMERY & ANDREWS
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October 21, 1988

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Katherine W. Hall
Edmund H. Kendrick
Helen C. Sturm
Richard L. Puglisi
Arturo Rodriguez
Joan M. Waters
James C. Murphy
James R. Jurgens
Ann M. Maloney
Deborah J. Van Vleck
Anne B. Hemenway
Roger L. Prucino
Deborah S. Dungan
Helen L. Stirling
Rosalise Olson
William P. Slattery
Kenneth B. Baca
Daniel E. Gershon
Anne B. Tallmadge
Michael R. Roybal
Robert A. Bassett
Paula G. Maynes
Neils L. Thompson
Susan Andrews
Joseph E. Whitley
David L. Skinner
Elizabeth A. Glenn

HAND-DELIVERED

Mr. David Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504

Re: Giant's Bloomfield Refinery

Dear Mr. Boyer:

As I discussed with Roger Anderson today, Giant will be submitting information on the recent malfunction of the ground water treatment and collection system by the middle of next week. Your consideration in this matter is appreciated.

Sincerely,



Edmund H. Kendrick

EHK/gr:191
File #8361-85-09

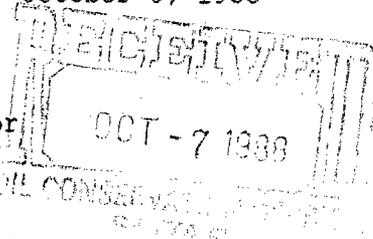


UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Suite D, 3530 Pan American Highway NE
Albuquerque, New Mexico 87107

October 6, 1988

Mr. William J. Lemay, Director
Oil Conservation Division
State Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87504-2088



Dear Mr. Lemay:

This responds to your public notice dated September 12, 1988, in which several proposed groundwater discharge plans were described. We have reviewed all of the plans and have not identified any resource issues of concern to our agency in the following:

GW-38, New Mexico State University, Dona Ana County, Las Cruces, NM.
GW-17, ACID Engineering, Lea County, NM.
GW-40, Giant Bloomfield Refinery, San Juan County, Bloomfield, NM.

These comments represent the views of the Fish and Wildlife Service. If you have any questions concerning our comments, please contact Tom O'Brien at (505) 883-7877 or FTS 474-7877.

Sincerely yours,

Michael J. Donahoo
Acting Field Supervisor

cc:

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Regional Administrator, Environmental Protection Agency, Attn: Kathy Hollar,
Office of Ground Water, Dallas, Texas
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife
Enhancement, Albuquerque, New Mexico



ENVIRONMENTAL IMPROVEMENT DIVISION
Harold Runnels Bldg. - 1190 St. Francis Drive
Santa Fe, New Mexico 87503

GARREY CARRUTHERS
GOVERNOR
CARLA L. MUTH
SECRETARY
MICHAEL J. BURKHART
DEPUTY SECRETARY

Richard Mitzelfelt
Director

RECEIVED-7

OCT 7 1988

Montgomery ET AL

September 29, 1988

Larry Woodard, State Director
Bureau of Land Management
P.O. Box 1449
Santa Fe, NM 87501

Dear Mr. Woodard:

The purpose of this letter is to provide specific comments on the data and interpretations presented by the Bureau of Land Management (BLM) and its contractor Roy F. Weston, Inc. at our July 29, 1988 meeting and to provide recommendations on future investigations at the Lee Acres site.

The analysis of all of the data available to EID leads our staff to a different set of conclusions than those of Weston, Inc. For example, we do not use bacteriological data pertaining to residential wells to interpret water chemistry because we have found samples from wells which lack sanitary seals generally do not reflect the true quality of the aquifer. We do not feel that "accidental self contamination" is a likely explanation of the existing geochemical and hydraulic data.

< The Weston analysis disregards geochemical and hydraulic data which we feel must be considered. Specifically, the soil gas survey is acknowledged but not considered in the discussion and conclusions; the U.S. Geological Survey electromagnetic induction survey is neither acknowledged nor considered; and many data obtained from Giant Refinery monitoring wells are excluded from interpretive maps. >

We feel that the omission of this information has lead the Weston analysis to invalid interpretation. Hydraulic interpretations are improved with regard to K and v, but the data contains several transcription errors. We feel it is unreasonable to assume that the direction of ground-water flow parallels the slope of the top of the bedrock. It is also inappropriate to assume that hydraulic conditions today are the same as during the operational lives of the wastewater ponds and to utilize bedrock water levels to prepare an alluvial potentiometric surface map. The EID's position on the direction of ground-water flow remains unchanged from my June 29, 1988 letter.

Larry Woodard, State Director
September 29, 1988
Page 2

Potentiometric surface maps for the basal alluvium and bedrock are needed. The chloride map displayed by Weston erroneously contained bicarbonate concentrations, rather than chloride, for several residential wells (e.g. Stark).

BLM expressed some concern about EID's map of stiff diagrams and the fact that analyses did not represent a narrow period of time. Enclosed for your information are stiff diagrams for several wells over time. As you can see with the Reynolds well, for example, the stiff diagrams from 1985 through 1988 are very similar.

Regarding well completion, BLM 23 was not screened in the uppermost saturated sandstone as required by the SOW. In the future, the EID suggests that BLM request well drilling bids on a cost per foot basis and that a hydrogeologist supervise the drilling to determine the appropriate depth and completion. It was agreed at our meeting that shallow and intermediate wells are needed in the vicinity of BLM 23. The EID also suggests that monitoring wells be installed immediately south of the two largest waste water lagoons.

The EID remains concerned with the charge balances of some of BLM's analyses. We find questionable the anomalously low chloride values for wells BLM 30 and 31 on the 3/10/88 sampling date. The charge balance for BLM 30 was off by +21%. These low chloride values were used in the preparation of BLM's stiff diagrams while all other analyses of these wells show much higher levels.

Weston used EPA method 624 while EID used EPA methods 601 and 602 for the analysis of purgeable organics. We find that latter methods generally have a lower detection limit than method 624 and are the preferred technique.

The EID suggests that the soil gas survey be repeated and that BLM and Giant Refinery cooperatively investigate the area south of the Highway. Specifically, well nests should be installed between the Reynolds and Bustos wells and immediately north or west of the M. Duggins well. The EID believes that BLM and Giant Refinery also should jointly contain the comingled plume south of the Highway.

We understand that BLM has awarded a contract to Roy F. Weston, Inc. for a Remedial Investigation Feasibility Study/Environmental Impact Study (RI/FS/EIS) to commence this year. We further understand that Roy F. Weston, Inc. will be tasked to clarify the current questions about groundwater contamination from the landfill and the plume moving downgradient from the landfill.

Larry Woodard, State Director
September 29, 1988
Page 3

We wish to continue to work together and to proceed with remedial actions including containment. Very important issues such as the effect of air stripping on total dissolved solids concentrations need to be addressed. We stand ready to work cooperatively with BLM and with Giant Industries, Inc. toward these goals.

Sincerely,



Richard Mitzelfelt, Director

Enclosure

RM/DM

cc: Tito Madrid, EID District 1
David Tomko, EID Farmington
Kirkland Jones, EID Deputy Director for Waste Management Programs
Steve Cary, EID Superfund
Dennis McQuillan, EID Ground Water
Stuart Castle, EID Ground Water
David Boyer, OCD
Robert McClenahan, Giant Industries, Inc.
Randall Roberts, Attorney at Law



MEMORANDUM OF MEETING OR CONVERSATION

<input checked="" type="checkbox"/> Telephone	<input type="checkbox"/> Personal	Time	Date 9/21/88
---	-----------------------------------	------	-----------------

<u>Originating Party</u>	<u>Other Parties</u>
--------------------------	----------------------

NED KENDRICK Montgomery & Andrews	R ANDERSON - OCA
--------------------------------------	------------------

Subject
Giant Bloomfield air stripper analysis

Discussion
Ned informed us the results of the 7/8/88 sampling of the air stripper effluent to the infiltration trench exceeded standards for Benzene at 23 PPB. Since the sampling the system has been modified, the pump has been slowed, the tank cleaned and a two-pump system installed on the tank. The effluent was re-sampled the week of 9/12

Conclusions or Agreements

Distribution

Signed *R. Anderson*



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

September 20, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan Application
Giant Industries, Inc.
Bloomfield Refinery (GW-40)

Dear Mr. McClenahan:

The Oil Conservation Division (OCD) has received and reviewed Giant's submittal dated August 8, 1988. The submittal was in response to OCD's April 29, 1988 comments on the above referenced discharge plan. OCD has issued public notice and, pending the need for a public hearing, will issue approval based upon satisfactory resolution of remaining issues as detailed in this letter. References listed pertain to comments listed in OCD's letter of April 29, 1988. Only comments needing responses are listed below.

General Comments

1. Accepted.
2. Giant's response is acceptable provided the following monitoring program (in addition to that already provided in Section 7.0 of the discharge plan) is agreed to as part of the land application program.
 - A. Treated application water:
For each 5 or 10 day application,
 - (1) one grab sample for VOC's* during each treatment;

*VOC includes aromatic and halogenated volatile organic compounds dissolved in water.

- (2) one sample for TDS and major cations/anions composited from water collected at the start, midpoint, and end of the application; and,
- (3) daily sampling for specific conductance, corrected for temperature.

B. Recovery and monitoring wells:

- (1) Sample specified wells (GRW 1-6, GBR 5, 7, 13, 20) prior to start and at end of test application for VOC, major cations/anions and TDS,
- (2) Sample monitoring wells (GBR 5, 7, 13, 20) weekly for specific conductance,
- (3) Sample recovery wells twice weekly for specific conductance.

See also response #9 under Specific Comments.

3. Accepted provided Giant agrees to the additional monitoring listed below:
 - A. Quarterly Sampling of previously agreed monitoring wells GBR-17, 24D, 30, and 31; plus GBR-14 (GRW-13) for VOC's, major cations/anions, and TDS.
 - B. Monthly measurement of specific conductance from well GBR-14 (GRW-13).
4. Will all tanks except those used for water storage be emptied?
5. Accepted.
6. A. OCD has used the data submitted in Giant's Attachment #3 to construct water level maps for May and June, 1988. Provide well numbers and reasons for exclusion of wells not used in compiling your ground water elevation maps.
 - B. When will the additional wells be installed? As soon as possible after completion provide OCD with information on locations, geologic logs, and water levels for any new monitor/recovery wells completed.

Specific Comments

- 1-3. Accepted.
4. The map submitted with Attachment #7 is too dark to be useful. Resubmit several copies with contrast similar to Plate 1 in the original March 1 discharge plan.
- 5-8. Accepted.
9. A. OCD review of water level data shows that the recovery wells will capture fluids from the controlled flooding area if operated properly. Review of the data for May indicates that wells GBR-43 and 44 (GRW 4 and 6) were either shut off, or had recovered their water level at the time of measurement. In June, GBR 37 (GRW 5) did not show capture of fluids. During controlled flooding all wells must operate to capture fluids. During other times wells should operate sufficiently to recover fluids being carried southward by the natural gradient.
B. Will GBR-6 be used as as recovery well?
10. See earlier "General Comment" #2.
11. (Complete)
12. Giant needs to propose a date for SPCC plan submittal. Giant also must provide a design to be approved prior to plan approval to detect high water levels in the intermediate storage tank(s), and to shutdown pumps or transfer pumped fluids to other tanks to prevent overflows.
- 13-16. Accepted.
17. (Complete)
18. By what date will the fire pond be drained?
- 19-20. Accepted.
21. OCD believes several month's data on PAH removal will need to be established before considering eliminating monthly stripper sampling. In addition to VOC's, OCD will require at least monthly stripper effluent sampling for chloride, sulfate and TDS. Quarterly sampling will also include major cations/anions.
22. (Complete)
23. Noted.

Mr. Robert L. McClellan, Jr.
September 20, 1988
Page 4

24-26. Accepted.

27-28. (Complete)

New Item

p.76. To better track effectiveness of cleanup efforts, OCD requests quarterly submittal of all analytical results and product thickness/water level elevations. Semi-annual reporting of other information remains acceptable.

If you have any questions on the additional information requested, please contact me at 827-5812.

Sincerely,



David G. Boyer, Hydrogeologist
Environmental Bureau Chief

cc: Frank Chavez, OCD - Aztec
Dennis McQuillan, EID - Santa Fe
David Tomko, EID - Farmington
Kim Bullerdick, Giant
Randy Hicks, Geoscience Consultants
Ned Kendrick, Montgomery & Andrews
Roberts & Jolley, Farmington

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

September 13, 1988

Roberts and Jolley
Attorneys at Law
P. O. Drawer 2364
Farmington, New Mexico 87299

Dear Mr. Roberts:

Enclosed is the public notice on Giant Refinery's discharge plan, a copy of BLM's reply to EPA's proposal to place the Lee Acres site on the Superfund list, and a copy of the Albuquerque Journal's recent article on the situation.

I am no longer surprised, but continue to be appalled at BLM's misstatements of fact and conclusions in their technical analysis of the Superfund hazard ranking. The attempt by BLM to place much of the blame for contamination on the residents themselves is the newest and most distressing part of this analysis.

The Oil Conservation Division will continue to require investigation and remedial action for contamination caused by parties under its jurisdiction, and provide you with copies of our correspondence.

Sincerely,


David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB:sl

Enclosure



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

September 7, 1988

GARREY CARRUTHERS
GOVERNORPOST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

RE: NOTICE OF PUBLICATION

Advertising Manager
FARMINGTON DAILY TIMES
P. O. Box 450
Farmington, New Mexico 87401

Dear Sir:

Please publish the attached notice one time immediately on receipt of this request. Please proofread carefully, as any error in a land description or in a key word or phrase can invalidate the entire notice.

Immediately upon completion of publication, please send the following to this office:

1. Publisher's affidavit in duplicate.
2. Statement of cost (also in duplicate).
3. CERTIFIED invoices for prompt payment.

We should have these immediately after publication in order that the legal notice will be available for the hearing which it advertises, and also so that there will be no delay in your receiving proper payment.

Please publish the notice not later than Sept 16, 1988.

Sincerely,

William J. LeMay
Director

WJL:sl

Attachment

AFFIDAVIT OF PUBLICATION

Copy of Publication

No. 90000

STATE OF NEW MEXICO,
County of San Juan:

Donald being duly

sworn, says: That he is the Notary of

THE FARMINGTON DAILY TIMES, a daily newspaper of general circulation published in English at Farmington, said county and state, and that the hereto attached Legal Notice

was published in a regular and entire issue of the said FARMINGTON DAILY TIMES, a daily newspaper duly qualified for the purpose within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico for one consecutive (days) (weeks) on the same day as follows:

First Publication September 27, 1990

Second Publication _____

Third Publication _____

Fourth Publication _____

and that payment therefor in the amount of \$ 50.00 has been made.

Betty Shipp

Subscribed and sworn to before me this 1 day

of September, 1990.

J. Shorter
NOTARY PUBLIC, SAN JUAN COUNTY, NEW MEXICO

My Commission expires: June 23, 1990

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND
NATURAL RESOURCES
DEPARTMENT OIL
CONSERVATION DIVISION
Notice is hereby given that pursuant to the New Mexico Water Quality Control Commission Regulations, the following discharge plan has been submitted for approval to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088 Santa Fe, New Mexico 87504-2088. Telephone (505) 827-5800.

(GW-40) Giant Bloomfield Refinery, Robert L. McClenahan, Jr., Environmental Coordinator, Route 3, Box 7, Gallup, New Mexico 87301, has submitted a discharge plan application for its Bloomfield Refinery located five miles west of Bloomfield in the NW 1/4, NW 1/4 Section 27, SW 1/4, SW 1/4 Section 22, Township 29 North, Range 12 West, NMPM San Juan County, New Mexico. The application addresses discharges to ground water associated with remedial action currently underway to recover lost petroleum product and cleanup contaminated ground water. Fluids pumped from recovery wells will undergo gravity separation of petroleum and water. The recovered water will be processed by an air stripping unit to remove organic water contaminants to below state health standards for ground water. Up to 100 gallons per minute of treated water will be discharged to the ground water through buried infiltration trenches located to aid in the cleanup of soil and water contaminants. Water flooding of contaminated soil and water zones is also proposed to flush contaminants to the recovery wells where they will be captured. Regular sampling of monitor wells will gauge the effectiveness of the flooding. The application also addresses spill/leak prevention at the site. The refinery is currently inactive and no plans have been

submitted to Oil Conservation Division for future refining or processing of hydrocarbons. In addition the plan does not address truck fueling and maintenance activities since these will be discontinued at the facility by the end of 1988. Ground water most likely to be affected by discharges at the site is at a depths of 25 to 40 feet with a total dissolved solids content ranging between 3000 and 5000 milligrams per liter.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, he Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on his 7th day of September. To be published on or before September 16, 1988.
SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
WILLIAM J. LEMAY,
Director

Legal No. 22357 published in the Farmington Daily Times, Farmington, New Mexico on Sunday, September 11, 1988.

P 612 458 851

RECEIPT FOR CERTIFIED MAIL

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NOT FOR INTERNATIONAL MAIL

(See Reverse)

* U.S.G.P.O. 1983-403-517

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PS Form 3800, Feb. 1982



ENERGY MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

September 7, 1988

RE: NOTICE OF PUBLICATION

Albuquerque Journal
717 Silver SW
Albuquerque, NM 87102

Dear Sir:

Please publish the attached notice one time immediately on receipt of this request. Please proofread carefully, as any error in a land description or in a key word or phrase can invalidate the entire notice.

Immediately upon completion of publication, please send the following to this office:

1. Publisher's affidavit in duplicate.
2. Statement of cost (also in duplicate).
3. CERTIFIED invoices for prompt payment.

We should have these immediately after publication in order that the legal notice will be available for the hearing which it advertises, and also so that there will be no delay in your receiving proper payment.

Please publish the notice not later than Sept 16, 1988.

Sincerely,

William J. LeMay
Director

WJL:s1

Attachment

□ 612 458 711

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
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(See Reverse)

PS Form 3800, Feb. 1982
* U.S.G.P.O. 1983-403-517

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NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND
NATURAL RESOURCES
DEPARTMENT

OIL CONSERVATION DIVISION
Notice is hereby given that pursuant to the New Mexico Water Quality Control Commission Regulations, the following discharge plan has been submitted for approval to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

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Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

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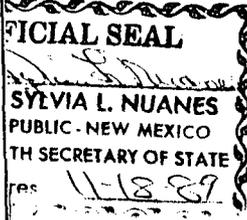
GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 7th day of September. To be published on or before September 16, 1988.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
s/WILLIAM J. LEMAY, Director
Journal, September 14, 1988

STATE OF NEW MEXICO } ss
County of Bernalillo }
THOMAS J. SMITHSON

..... being duly sworn declares and
says that he is **NAT'L ADV. MGR.** of the Albuquerque Journal, and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Session Laws of 1937, and that payment therefore has been made or assessed as court costs; that the notice, a copy of which is hereto attached, was published in said paper in the regular daily edition,

for 1 times, the first publication being on the 14 day
of Sept, 1988, and the subsequent consecutive
publications on Sept 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 1988.



Thomas J. Smithson
Sworn and subscribed to before me, a Notary Public in and for the County of Bernalillo and State of New Mexico, this 14 day of September, 1988.

PRICE \$ 28.70
Statement to come at end of month.
ACCOUNT NUMBER C80932

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 7th day of September. To be published on or before September 16, 1988.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION



WILLIAM J. LEMAY, Director

S E A L

P 612 458 937

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
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(See Reverse)

PS Form 3800, Feb. 1982
* U.S.G.P.O. 1983-403-517

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Return receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	\$
Postmark or Date	

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STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to the New Mexico Water Quality Control Commission Regulations, the following discharge plan has been submitted for approval to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088 Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

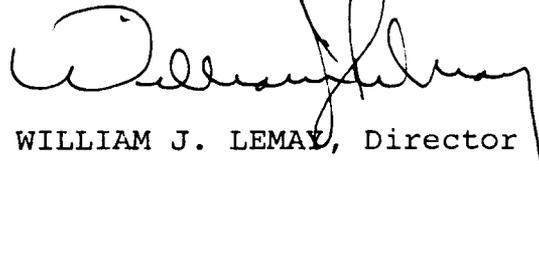
(GW-40) Giant Bloomfield Refinery, Robert L. McClenahan, Jr., Environmental Coordinator, Route 3, Box 7, Gallup, New Mexico 87301, has submitted a discharge plan application for its Bloomfield Refinery located five miles west of Bloomfield in the NW $\frac{1}{4}$, NW $\frac{1}{4}$ Section 27, SW $\frac{1}{4}$, SW $\frac{1}{4}$ Section 22, Township 29 North, Range 12 West, NMPM San Juan County, New Mexico. The application addresses discharges to ground water associated with remedial action currently underway to recover lost petroleum product and cleanup contaminated ground water. Fluids pumped from recovery wells will undergo gravity separation of petroleum and water. The recovered water will be processed by an air stripping unit to remove organic water contaminants to below state health standards for ground water. Up to 100 gallons per minute of treated water will be discharged to the ground water through buried infiltration trenches located to aid in the cleanup of soil and water contaminants. Water flooding of contaminated soil and water zones is also proposed to flush contaminants to the recovery wells where they will be captured. Regular sampling of monitor wells will gauge the effectiveness of the flooding. The application also addresses spill/leak prevention at the site. The refinery is currently inactive and no plans have been submitted to Oil Conservation Division for future refining or processing of hydrocarbons. In addition the plan does not address truck fueling and maintenance activities since these will be discontinued at the facility by the end of 1988. Ground water most likely to be affected by discharges at the site is at a depths of 25 to 40 feet with a total dissolved solids content ranging between 3000 and 5000 milligrams per liter.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 7th day of September. To be published on or before September 16, 1988.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

A handwritten signature in black ink, appearing to read 'William J. Lemay', written over the typed name below.

WILLIAM J. LEMAY, Director

S E A L

Site's Pollution Potential Ignites State-BLM Fight

War of Studies Waged Over Landfill at Lee Acres

By Nolan Hester

JOURNAL STAFF WRITER

BLOOMFIELD — There's not much to see at the Lee Acres landfill, which hugs an unnamed arroyo between Farmington and Bloomfield. Behind the shiny chain-link fence, some metal drums and oil-stained dirt provide the only clues to the bureaucratic battle being fought over this patch of tumbleweeds.

Lee Acres is one of six New Mexico sites nominated for possible cleanup under the federal Environmental Protection Agency's hazardous waste Superfund program. Whether Lee Acres makes the final Superfund list depends on who wins a war of words and studies: the federal Bureau of Land Management, which owns the landfill site, or the New Mexico Environmental Improvement Division, which accuses the BLM of downplaying the landfill's potential to pollute downstream drinking water wells and even the San Juan River.

Lee Acres jumped into the headlines three years ago, when National Guardsmen in gas masks sealed off the landfill after an unknown gas cloud burned the face and hands of a caretaker. The gas came from unlined lagoons at the landfill, which was run by San Juan County. Local businesses, EID officials said, apparently dumped a variety of toxic industrial solvents into the

MORE: See AGENCIES on A4



RICHARD PIPES / JOURNAL

The Bureau of Land Management closed the Lee Acres landfill three years ago after toxic fumes erupted.

EPA Considers 6 New Mexico Areas To Join Superfund Cleanup Program

The Lee Acres landfill near Farmington is just one of six new sites in New Mexico that the federal Environmental Protection Agency is considering for the Superfund hazardous waste cleanup program.

The sites, which were nominated by the EPA and the state Environmental Improvement Division, were picked based on an elaborate scoring system that considers the pollutants involved, their closeness to residential areas and their potential for causing future problems. The EPA has no deadline for deciding which of the six will make the final cleanup list. The five sites besides the Lee Acres landfill are:

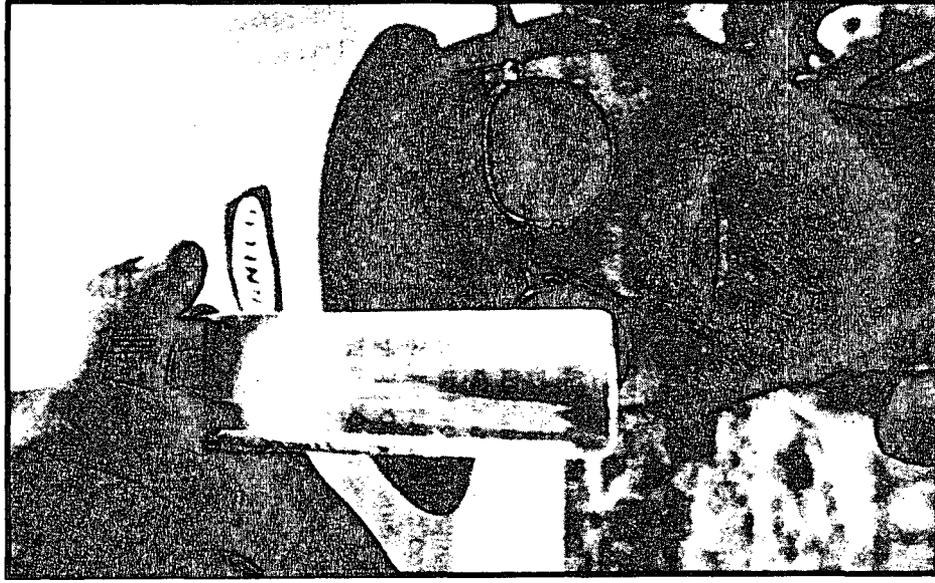
- The abandoned **Prewitt Refinery** in McKinley County. High levels of benzene,

toluene and xylene, all of which are considered extremely dangerous, have been found in the groundwater and several private water wells, said Ron Conrad of the state EID.

■ The abandoned **silver-ore processing plant of Cimarron Mining Co. in Carrizozo.** The facility used cyanide to leach silver from ore, said Conrad. While cyanide has polluted the groundwater, he said there are no drinking water wells in the nearby area.

■ The abandoned **Cal West Metals battery recycling operation in Lemitar**, just north of Socorro. Conrad said the firm took apart car batteries to reuse the lead inside. Lead, which can cause brain damage — especially in young

MORE: See EPA on PAGE A4



Bill Olson, a state hydrologist, checks for pollution from the Lee Acres landfill. The state is accusing the federal Bureau of Land Management of soft-pedaling the landfill's potential to pollute drinking water wells.

Agencies Dispute Site's Pollution

CONTINUED FROM PAGE A1

lagoons for about five years. State tests soon found some of the same solvents, which can cause cancer, in private water wells within the Lee Acres subdivision, a half-mile south of the landfill. Those wells were shut down.

The landfill also was quickly closed, the toxic fumes neutralized and the lagoons filled. Lee Acres just as quickly fell from the public spotlight. But the landfill remains at center stage in the state-federal fight over whether landfill wastes have polluted the underlying groundwater.

Linda Reynolds says she wants some action to clean up the pollution. Reynolds and her husband, Ron, live less than a mile south of the landfill in the Lee Acres subdivision, just east of the same arroyo that winds past the landfill. About 55 people live in the subdivision, which Reynolds said was built before the landfill lagoons opened. Reynolds first noticed problems with her private well in November, 1984.

"The water killed all my grass, all my trees, my goldfish," she said. Boiled noodles turned brown and Cremona "curdled like cottage cheese" in her coffee. Reynolds' doctor has told her that the polluted water may give her gallbladder and kidney problems.

Under a court order sought by the state, the BLM put Reynolds and 12 nearby families on Bloomfield city water in May, 1987. That's not good enough for Reynolds.

"If this keeps on, the San Juan River's going to be contaminated," she says. "The BLM's just dragging their feet on it."

If the EPA agrees that Lee Acres should become an official Super-

fund site, cleanup could cost the BLM an estimated \$2 million to \$6 million. Federal agencies like the BLM cannot tap the national \$8.5 billion Superfund account to pay for such cleanups. Instead, BLM would have to pick up the tab. Superfund money would still be used to pay for EID and EPA supervision of the BLM's cleanup work.

BLM's national director Robert Burford urged EPA's director, Lee Thomas, to keep Lee Acres off the Superfund list. In a letter to Thomas, Burford argued that no pollution ever left the landfill. Instead, the BLM has blamed the closed Giant refinery nearby for any pollution.

Giant, along with the state EID, disagrees. In November 1986, a fuel line broke and 15,000 gallons of diesel soaked into the arroyo sand. But Dennis McQuillan, an EID groundwater scientist for the Lee Acres site, said the chemical "fingerprint" of the diesel is completely different from the solvents escaping the landfill.

Giant attorney Kim Bullerick said his firm quickly installed wells to intercept the diesel before it moved downstream. The cleanup effort continues.

Chris Shuey of the Albuquerque-based environmental group, Southwest Research and Information Center, agreed that Giant is not the problem. "I'm not one who easily praises industry, but the company has been responsible. It's really been the federal agency that's been recalcitrant."

Shuey said the BLM is setting a bad example by not cleaning up the landfill. "We can't expect citizens and businesses to do something that the government doesn't want to do," he said.

McQuillan complains that the BLM has deliberately ignored studies that show a serious problem at

Lee Acres. While Lee Acres residents now have city water, McQuillan said the state remains worried about the plume of pollution moving down the tiny arroyo. "There may be other wells downstream that could be affected," he said. "The BLM needs to do the studies to tell us whether that plume threatens the San Juan River."

A recent closed-door meeting between both sides turned into a shouting match, with state officials calling the BLM and its consultants liars, say some of those who attended the session. Officially, spokesmen for both agencies declined to reveal who said what.

But McQuillan said, "We were very angry with the (BLM) report we got. There were some harsh words. When they give us a report that's a snow job, a whitewash, a coverup, how do they expect us to react?"

Noting that they already have spent \$2 million for studies, BLM officials say they're committed to cleaning up the problem — if there is one. "The state seems to be jumping the gun," said Bernie Hyde, chief of BLM's hazardous waste section in Washington, D.C. Despite the state's charges, he said BLM is not trying to save money by ignoring its problems. "We could go to the Congress and get that money. We have no reason to avoid cleaning up this site," he said.

The BLM is concerned about the landfill even though it is fighting Superfund status, said Hyde. The agency has just signed a contract for a 2½ year study to track down whatever pollution problems might plague the area. If problems are found, the agency will clean them up, he said.

However, McQuillan said the BLM is getting off to the wrong start by ignoring crucial past stud-

ies. Those studies, which he said clearly point to the landfill as the culprit, include:

- A July 1986 test for solvents and volatile organic compounds, paid for by BLM, which shows bulls-eye patterns of pollution leaving the landfill.

- A 1987 survey by the U.S. Geological Survey. It found that groundwater generally flows south from the landfill — straight to the Lee Acres subdivision. The BLM argues that the underground flow is west, and, so, landfill pollution would flow too far west to have polluted the Reynolds' well.

- Finally, McQuillan noted that the solvents have only been found downstream of the landfill and never upstream — ruling out any source north of the landfill. And, he added, every water sample from the Reynolds well matches the chemical fingerprint of the landfill and not the Giant refinery.

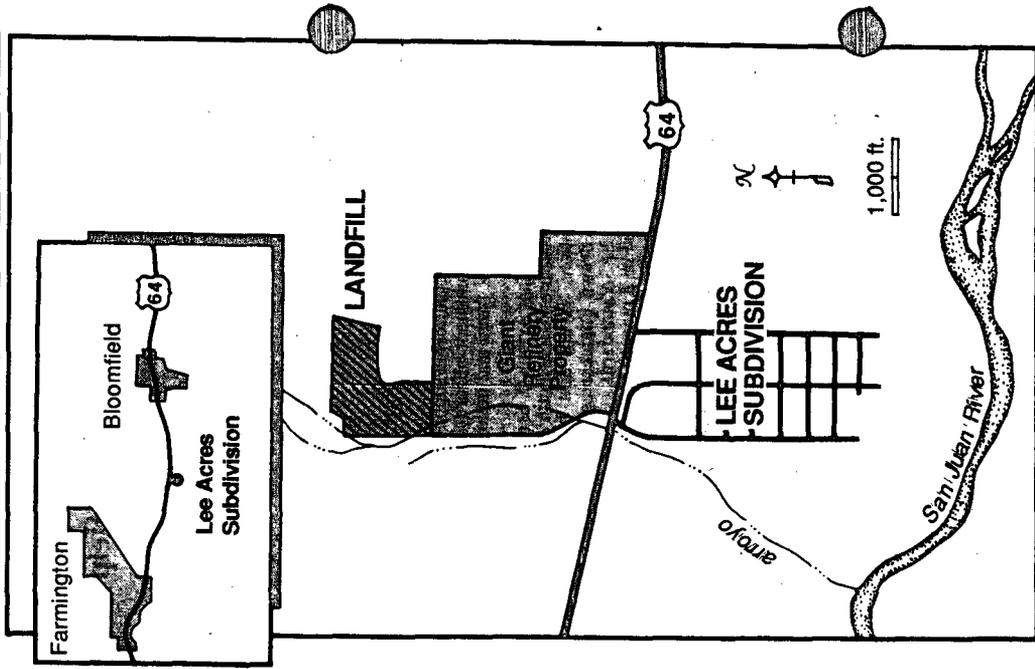
Hyde rejects all of McQuillan's points. "They are only indications," he said. "They do not prove anything."

Hyde argued that the kind of solvents found in the Reynolds' well are so common that the family could have accidentally contaminated the well using a widely sold grease cleaner. "A pint can of Gunk could have contaminated that whole aquifer," he said.

In a recent letter to the EPA, Hyde complained that the EPA has unfairly singled out the BLM and ignored the role of San Juan County, which operated the landfill. Hyde said the county may be "getting a free ride at substantial cost to the U.S. taxpayers."

San Juan County manager Jim Neblett said the county has taken no position on the issue. But because of the risk that the county could be found financially liable, he said, "We're real hesitant to make any

LEE ACRES LANDFILL



CAROL COOPER/IDEER/JOURNAL

officially, suspicions run high on both sides. The EPA has no timetable for when it will decide whether to make Lee Acres a Superfund site. In the meantime — officially — the BLM well sampling at the site — just to keep each other honest.

EPA Considers Six N.M. Areas For Superfund

CONTINUED FROM PAGE A1

children, has been found in soil downwind of the operation.

■ **The abandoned Cleveland Mill 5 miles northeast of Silver City.** Amy Childers of the EID said dangerous levels of arsenic, lead, silver and zinc have leached from 12,000 cubic yards of mill tailings at the site. Those metals have shown up five miles downstream in Little Walnut Creek. Childers said the metals may have polluted the nearby groundwater as well.

■ **The Pagano Salvage yard in Los Lunas.** The yard burned oil contaminated with toxic PCBs — polychlorinated biphenyls — to salvage copper from used electrical wiring. Paul Karas of the EID said the PCBs have soaked 4 feet into the ground. Groundwater lies just 5 feet below the surface, and Karas said 11,000 people use groundwater within three miles of the site.

If any of the sites make the Superfund list, they will join four existing Superfund sites:

■ **The Atchison, Topoka and Santa Fe refueling yard in Clovis.** The EPA held hearings in August on its plans to remove the site from the Superfund list. EPA officials said diesel fuel floating on nearby groundwater will be cleaned up by the state under a non-Superfund program. The company has also said it will drain nearby Santa Fe Lake and remove any potentially hazardous sediments, said Amy Childers of the state EID.

■ **United Nuclear Corp.'s Church Rock uranium mill tailings.** Seepage from the tailings have contaminated three groundwater zones along Pipeline canyon. The EPA has proposed to combat the problem by selectively pumping the groundwater and treating it. The plan also calls for placing deed restrictions on some land around the site to ensure that no drinking water wells are drilled in the future. The federal Nuclear Regulatory Commission still must approve the plan. Cleanup is estimated to cost \$9 million to \$37 million.

■ **Homestake Mining's uranium mill near Milan.** In 1984, the firm paid to pipe city water to area residents south of the mill after seepage polluted nearby groundwater. The firm also is paying for a long-term study of whether radon gas from the tailings threatens nearby residents. That study should be done by December.

■ **The San Jose area in Albuquerque's South Broadway industrial zone.** The EPA has held a series of public hearings this summer on its plans for removing industrial solvents from the local groundwater. That plan breaks into three parts: cleanup at the Van Waters and Rogers chemical plant at 3301 Edmunds SE, cleanup around the General Electric plant at 336 Woodward SE and possible cleanup of remaining solvents between the two plants.

MONTGOMERY & ANDREWS

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August 25, 1988

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Hand-Delivered

Mr. David Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504

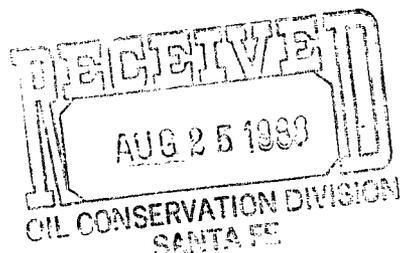
Re: Giant's Bloomfield Refinery

Dear Mr. Boyer:

I am writing to confirm the verbal notification that I gave Roger Anderson of your office on August 17, 1988 concerning a spill of recovered ground water at the Bloomfield Refinery. I understand that the requirements of Section 1-203 of the Water Quality Control Commission regulations do not apply to this spill, which occurred as a result of remedial actions related to an approved temporary discharge plan. However, because I understand that you would like to receive the same information called for by Section 1-203(A)(1), a description of the spill is presented below addressing the topics set forth in that section:

a. Owner and Person in Charge of Facility

- 1) Owner - Giant Industries, Inc. Post Office Box 9156, Phoenix, Arizona 85068, (602) 274-3584;



Mr. David Boyer
August 25, 1988
Page 2

- 2) Person in Charge - Frank Fujimoto, Giant Refining Company, 606 U.S. Highway 64, Farmington, New Mexico 87401, 632-3306;
- b. Facility - Giant Refining Company's Bloomfield Refinery;
- c. Date, Time, Location and Duration of Discharge - Sometime between 6 a.m. and 9 a.m., August 16, 1988, at the North Intermediate Storage Tank (see location on Plate 1 of Giant's discharge plan application) for an estimated duration of one hour;
- d. Source and Cause of Discharge - Source was the North Intermediate Storage Tank containing recovered ground water; cause is not certain, but is believed to be cavitation of the water in the tank by the pump that draws the water to the air stripper;
- e. Description of Discharge - Hydrocarbon product and water containing dissolved hydrocarbons;
- f. Estimated Volume of Discharge - 300 gallons of liquid, of which less than 50 gallons was hydrocarbon product and the remainder was water containing dissolved hydrocarbons;
- g. Mitigation - Discharge was contained in a recently constructed berm around the North Intermediate Storage Tank.

Please do not hesitate to contact me should you have any further questions concerning the spill. Because of the interest of the Environmental Improvement Division and the State Engineer in this site, copies of this letter are being forwarded to those agencies.

Sincerely,



Edmund H. Kendrick

EHK/gr:31
File #8361-85-09
cc: Dennis McQuillan, EID
Charles Wohlenberg, SEO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

August 23, 1988

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

Mr. Randall S. Roberts
Roberts & Jolley
P. O. Drawer 2364
Farmington, New Mexico 87499

Dear Randy:

I am responding to your letter of August 16, 1988, to David Boyer. I preface my response by stating that the OCD is very concerned with getting an early resolution to the environmental problems, and that the Division agrees that the Public should be kept informed.

In that end the OCD will endeavor to provide you with copies of correspondence originated by the OCD in this matter. We also have no objection to developing a repository in the Farmington EID office. In fact we believe an accessible central repository is an excellent idea. The OCD has no control or authority to require other State or federal agencies to comply with your request and we cannot take any action in that regard.

With respect to notice of meetings, the OCD staff members are under no legal obligation to invite any particular parties to any meeting. The staff members are not subject to the Open Meetings law and it would be up to their discretion as to whether or not to invite your clients to OCD originated meetings. Certainly we do not have any authority to insure that your clients are noticed in on any meetings called by any other parties, including BLM and Giant.

OCD is concerned that cleanup and containment of the contaminants proceeds expeditiously, and it is our understanding that Giant is now in the process of doing such cleanup work.

We certainly have no objection to cooperating with and keeping your clients informed to what the current status of the cleanup process is, and please feel free to contact this office any time you have any questions or suggestions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Robert G. Stovall".

ROBERT G. STOVALL,
General Counsel

RGS/dr

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

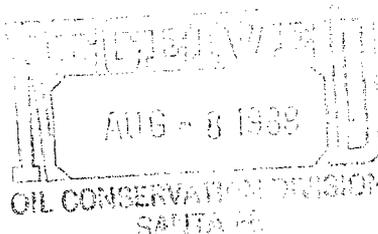
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August 8, 1988

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REPLY TO SANTA FE OFFICE

David G. Boyer
Chief, Environmental Bureau, Hydrogeologist
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87501

Re: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Boyer:

Please find enclosed three copies of the response of Giant Industries to NMOCDD comments of April 29, 1988 on the Bloomfield Refinery Discharge Plan. If you have any questions regarding this submittal, please contact me.

Sincerely yours,

Edmund H. Kendrick

EHK:mp:68
Enclosure
File #8361-87-07

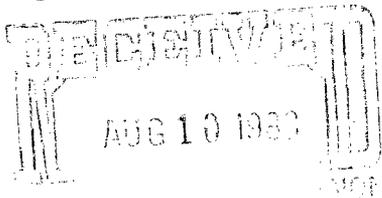
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Elizabeth A. Glenn

Mr. David Boyer
Chief, Environmental Bureau
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87501

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Boyer:

For your information, please find attached a table showing new recovery well numbers and their corresponding old numbers. If you have any questions, do not hesitate to contact me.

Sincerely,

Edmund H. Kendrick

EHK:mp:66
Attachment
File #8361-87-07

GIANT BLOOMFIELD REFINERY
RECOVERY WELL I.D.'s

June 27, 1988

Previous Recovery Well I.D.

New Recovery Well I.D.

GBR-38
GBR-42
GBR-29
GBR-43
GBR-37
GBR-44
GBR-36
GBR-27
GBR-28
GBR-14

GRW-1
GRW-2
GRW-3
GRW-4
GRW-5
GRW-6
GRW-10
GRW-11
GRW-12
GRW-13

[JBD:485]

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ATTORNEYS AND COUNSELORS AT LAW

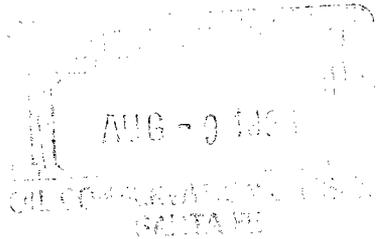
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Rosalise Olson
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Anne B. Tallmadge
Michael R. Roybal
Robert A. Bassett
Paula G. Maynes
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August 4, 1988



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REPLY TO SANTA FE OFFICE

Mr. David Boyer
Chief, Environmental Bureau
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87501

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Boyer:

For your information, please find attached a table showing new recovery well numbers and their corresponding old numbers. If you have any questions, do not hesitate to contact me.

Sincerely,

John B. Draper
for Edmund H. Kendrick

EHK:mp:484

Attachment

File #8361-87-07

cc: Kim H. Bullerdick, Esquire (w/attachment)
Mr. Bob McClenahan (w/o attachment)
Mark F. Sheridan, Esquire (w/o attachment)

GIANT BLOOMFIELD REFINERY
RECOVERY WELL I.D.'s

June 27, 1988

Previous Recovery Well I.D.

New Recovery Well I.D.

GBR-38
GBR-42
GBR-29
GBR-43
GBR-37
GBR-44
GBR-36
GBR-27
GBR-28
GBR-14

GRW-1
GRW-2
GRW-3
GRW-4
GRW-5
GRW-6
GRW-10
GRW-11
GRW-12
GRW-13



GROUNDWATER
TECHNOLOGY, INC.

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

July 22, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Edmund H. Kendrick
MONTGOMERY & ANDREWS
P. O. Box 2307
Santa Fe, New Mexico 87504-2307

RE: Spill at Giant Bloomfield Refinery

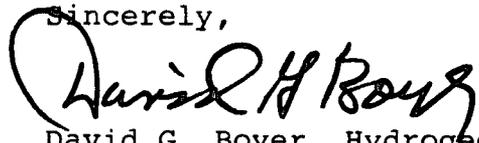
Dear Mr. Kendrick:

The Oil Conservation Division has received and evaluated your July 12, 1988, letter regarding the July 1-2 overflow incident at the North Intermediate Storage Tank. Because the tank, storing recovered product and water, is located at the site of several product recovery wells and any fluids not recovered as result of Giant's remedial action will be captured by those wells, the remedial action already taken by Giant is considered sufficient for this incident.

To avoid similar occurrences at the site, please specify what modifications will be made to the recovery and storage system to prevent future overflows. Your response will be incorporated into and made part of the pending discharge plan for the site.

If you have any questions, please contact me at 827-5812.

Sincerely,



David G. Boyer, Hydrogeologist
Environmental Bureau Chief

cc: OCD - Aztec
Charles Wohlenberg, SEO
Robert McClenahan, Jr., Giant Industries

MONTGOMERY & ANDREWS

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July 19, 1988

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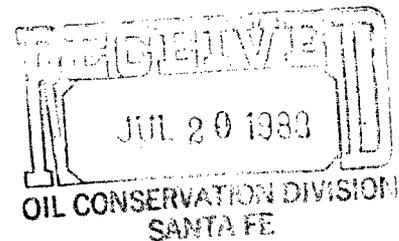
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REPLY TO SANTA FE OFFICE



David G. Boyer, Chief
Environmental Bureau/Hydrologist
Energy, Minerals & Natural Resources Department
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail, Room 206
Santa Fe, New Mexico 87501

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Boyer:

In response to your request that Giant examine hydrologic conditions downgradient of its Bloomfield refinery, the Company proposes to take the following actions:

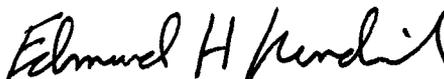
1. Giant will review available water quality and water level data for all wells adjacent to and hydrologically downgradient of the refinery. Based upon this review, Giant will prepare an inventory of well locations where Giant proposes to conduct water level measurements and sampling. The inventory will be provided to the Oil Conservation Division ("OCD") within two months after Giant receives approval of the actions proposed herein.
2. Giant will attempt to obtain landowner permission to measure water levels at, and obtain water samples from, the well locations where Giant proposes to conduct water level measurements and sampling.

David G. Boyer, Chief
July 19, 1988
Page 2

3. Within two months after completion of the well inventory, Giant will obtain a water sample for laboratory analysis from each well to which it is given access. Giant will attempt to conduct all sampling within a one-week period.
4. Water samples will be analyzed for chlorides, sulfates, TDS, and major cations. Additionally, EPA Method 601/602 will be used to analyze the samples for organic constituents.
5. Giant will take monthly water level measurements at the wells to which it is given access. The measurements will be taken for three consecutive months, commencing within two months after completion of the well inventory. Each month's measurements will be taken within a one-week period. Giant may ask the United States Geological Survey to take the specified measurements.
6. Within two months after receipt of the laboratory analyses and water level measurements, Giant will provide OCD with a report setting forth the results of the sampling and water level measurement program.

If the specified actions are acceptable, please contact me at your convenience.

Sincerely,



Edmund H. Kendrick

EHK/gr:46
File #8361-85-09

MONTGOMERY & ANDREWS
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July 12, 1988

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REPLY TO SANTA FE OFFICE

Mr. David Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504

Re: Giant's Bloomfield Refinery

Dear Mr. Boyer:

I am writing to confirm the verbal notification that I gave you yesterday concerning a spill of recovered ground water at the Bloomfield Refinery. I understand that the requirements of Section 1-203 of the Water Quality Control Commission regulations do not apply to this spill, which occurred as a result of remedial actions related to an approved temporary discharge plan. However, because I understand that you would like to receive the same information called for by Section 1-203(A)(1), a description of the spill is presented below addressing the topics set forth in that section:

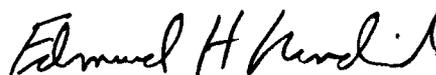
- a. Person in Charge of Facility - Frank Fujimoto, Giant Refining Company, 606 U.S. Highway 64, Farmington, New Mexico 87401, 632-3306; Owner of Facility - Giant Industries, Inc., Post Office Box 9156, Phoenix, Arizona 85068, (602) 274-3584;

Mr. David Boyer
July 12, 1988
Page 2

- b. Facility - Giant Refining Company's Bloomfield Refinery;
- c. Date, Time, Location and Duration of Discharge - Sometime between 4 p.m. July 1, 1988 and 10 a.m. July 2, 1988 at the North Intermediate Storage Tank (see location on Plate 1 of Giant's discharge plan application) for an unknown duration;
- d. Source and Cause of Discharge - Source was the North Intermediate Storage Tank containing recovered ground water; cause is not certain, but is believed to be a malfunctioning water level switch that failed to activate the pump that draws water from the tank into the recently-installed air stripper;
- e. Description of Discharge - Hydrocarbon product and water containing dissolved hydrocarbons;
- f. Estimated Volume of Discharge - 500 gallons of hydrocarbon product and an unknown amount of water containing dissolved hydrocarbons;
- g. Remedial Actions - Hydrocarbon-stained soil was removed and placed in the bermed soil storage area on the east side of the refinery site.

Please do not hesitate to contact me should you have any further questions concerning the spill or Giant's remedial actions. Because of the interest of the Environmental Improvement Division and the State Engineer in this site, copies of this letter are being forwarded to those agencies.

Sincerely,



Edmund H. Kendrick

EHK/gr:31
File #8361-85-09
cc: Dennis McQuillan, EID
Charles Wohlenberg, SEO

MONTGOMERY & ANDREWS

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July 1, 1988

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REPLY TO SANTA FE OFFICE

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Galen M. Butler	

Mr. William J. LeMay
Director
Oil Conservation Division
State Land Office Building
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: Temporary Discharge at Giant's Bloomfield Refinery

Dear Mr. LeMay:

In accordance with your letter of June 10, 1988, Giant Industries, Inc. has begun discharging treated ground water at its Bloomfield Refinery on June 24, 1988. As requested, samples were taken from storage tanks as well as from the influent and effluent of the air stripper. Results will be forwarded to your office when received.

If you have any questions, please call Bob McClenahan of Giant, or myself.

Sincerely,

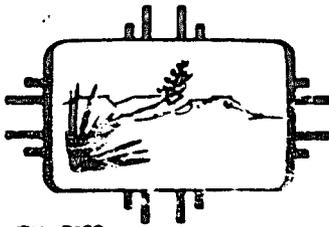


Edmund H. Kendrick

EHK/gr:15
File #8361-85-09

Mr. William J. LeMay
July 1, 1988
Page 2

cc: David Boyer, OCD
Kim Bullerdick, GI
Randy Hicks, GCL
Bob McClenahan, GI
Dennis McQuillan, EID
Charles Wohlenberg, State Engineer Office
Mike Wood, GTI



NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

Post Office Box 968
Santa Fe, New Mexico 87504-0968

ENVIRONMENTAL IMPROVEMENT DIVISION

Michael J. Burkhardt
Director

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

June 29, 1988

RECEIVED-7
JUL 7 1988
Montgomery ET AL

Mr. Larry L. Woodard
Bureau of Land Management
New Mexico State Office
P.O. Box 1449
Santa Fe, New Mexico 87504-1449

Dear Mr. Woodard:

Thank you for your letter of June 10, 1988 and for the draft Preliminary Investigation Report of the same date prepared by Roy F. Weston, Inc. The New Mexico Environmental Improvement Division (EID) has completed a preliminary review of the Weston report and will have detailed comments prepared for our July 29, 1988 meeting.

In general, the Weston report contains a large volume of useful and well organized raw data especially in Appendices A and E. We are grateful for this. However, many assertions in the Weston report directly contradict the existing data base. Critical examples include:

"The finding that localized flow in the vicinity of the landfill is westward toward the arroyo is consistent with the findings of Peter, et al. (1987)." (page 4-3)

"Ground water does not flow southward from the landfill towards Giant Refinery wells GBR-32 AND GBR-18. Therefore, no volatile organics plume can be inferred to the south and southwest of the landfill." (page 4-47)

"Ground water flows from the landfill westward into the arroyo channel and then to the southwest. Therefore, waters containing potential contaminants from the landfill would not be flowing toward the Michael Duggins or Duggin/Harmon wells." (page 4-48)

ATTACHMENT 1

Larry L. Woodward
Page 2
June 29, 1988

The logic behind these statements is defective in several areas. It is inappropriate to assume that present hydraulic conditions are similar to those during the operational lives of the unlined waste ponds. Moreover, the alluvial potentiometric surface map upon which these assertions are based (Plate 4) is inconsistent with the findings of Peter, et al. (1987). The westward-sloping water table contours in Plate 4 are extrapolated over an area for which no control points are available, and in fact, some contours are located in an area identified by Peter, et al. as being dry. Conversely, the January 1988 water-level contours (Plate 5) clearly indicate that well GBR-32 is hydraulically downgradient from the lagoon areas.

"Examination of the stiff diagrams and trilinear plots show striking similarity between alluvial water chemistry both up and downgradient of the landfill." (page 4-9)

Examination of the map of stiff diagrams provided to you in my May 25, 1988 letter shows starkly contrasting chemistries between wells up and downgradient of the landfill. Several stiff diagrams and trilinear plots critical to geochemical interpretation are missing from the Weston analysis including well GBR-32 and the landfill lagoons. Clearly, the landfill is a source of significant chloride contamination in the alluvial aquifer.

Statements regarding EID's electromagnetic (EM) induction survey (pages 1-7 to 1-8)

The Weston report should acknowledge and discuss the EM survey conducted by the United States Geological Survey (Peter, et al. 1987). The USGS also found a linear anomaly of high terrain conductivity values and hypothesized, as did EID, that it could represent a zone of mineralized ground water. The Weston report fails to refute this hypothesis which, in our opinion, remains the most likely explanation of the anomaly.

Larry L. Woodward
Page 3
June 29, 1988

BLM's explanation of the water level in well BLM-23 is inadequate.

Is the water level the result of confined or unconfined conditions? This matter is very important due to the presence of significant downward vertical hydraulic gradients in the area and due to the fact that the water level in this well is considerably higher in elevation than in the other two bedrock wells.

These and other misinterpretations and/or deficiencies, without correction, will render any future Weston report unacceptable to EID. We expect a thorough and objective evaluation of all available data and are deeply concerned about the manner with which BLM is conducting its investigation.

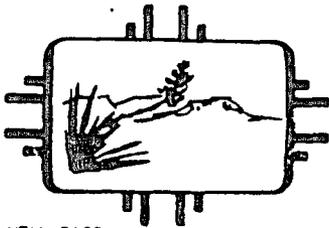
Sincerely,



for Michael J. Burkhart
Director

MJB/DM/js

cc: Tito Madrid, EID District I
David Tomko, EID Farmington
Richard Mitzelfelt, Deputy Director
Kirkland Jones, Deputy Director
Steven Cary, CERCLA
Dennis McQuillan, Ground Water Bureau
David Boyer, OCD



NEW MEXICO
HEALTH AND ENVIRONMENT
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ENVIRONMENTAL IMPROVEMENT DIVISION

Michael J. Burkhart
Director

GARREY CARRUTHERS
Governor

LARRY GORDON
Secretary

CARLA L. MUTH
Deputy Secretary

July 11, 1988

RECEIVED-7

JUL 15 1988

Montgomery ET AL

The Honorable Lee M. Thomas
Administrator
Environmental Protection Agency
401 M. Street S.W.
Washington, District of Columbia 20460

Dear Mr. Thomas:

The Environmental Improvement Division (EID) has received a copy of the June 29, 1988 letter from Mr. Robert Burford, Director, Bureau of Land Management (BLM) to yourself. Please be advised that the EID disagrees with BLM's assertion that the landfill is not a source of ground-water contamination.

Enclosed for your information are letters from myself to Mr. Larry Woodard, BLM State Director, explaining our concerns about the manner with which BLM has conducted its investigation and interpreted the data. The Weston report referenced in Mr. Burford's letter omits critical data and misinterprets the data presented. A thorough and objective analysis of all available data clearly indicates that the Lee Acres landfill and Giant Refinery have contaminated ground water with chlorinated solvents/chlorides and aromatic hydrocarbons respectively. Additionally, we are unaware of any enforcement order that your Region VI office has against this refinery.

The EID believes that the Lee Acres landfill is imminently worthy of being placed on the National Priority List and concurs with your efforts to do so.

Sincerely,

Michael J. Burkhart
Director

MJB:DM:js

enclosure

cc: Tito Madrid, EID District I
Dave Tomko, EID Farmington
Richard Mitzelfelt, Deputy Director
Steven Cary, CERCLA

~~Donna McQuillan, General Counsel~~
David Boyer, OCD

ATTACHMENT 2

EQUAL OPPORTUNITY EMPLOYER

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

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June 21, 1988

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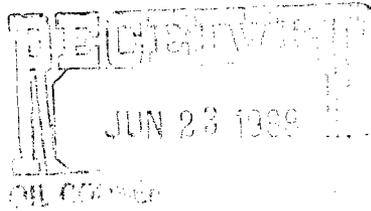
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REPLY TO SANTA FE OFFICE



Mr. Charles A. Wohlenberg
New Mexico State Engineer Office
District 1
2340 Menaul N.E., Suite 206
Albuquerque, New Mexico 87107-1884

Re: Giant Industries, Inc.: File SJ-2131

Dear Mr. Wohlenberg:

Following up on our conversation of yesterday, I understand that you have given Giant Industries verbal approval to continue using certain wells for pollution recovery and to discharge recovered water into infiltration trenches as approved by the Oil Conservation Division. I understand this verbal authorization will be effective pending your written approval of an extension of your temporary authorization in this matter dated February 19, 1988.

Thank you very much for your assistance.

Sincerely,

Edmund H. Kendrick

EHK/gr:179

File #8361-85-09

cc: ~~David Boyer, OCD~~

Robert L. McClenahan, Jr., GI

Kim Bullerdick, Esq., GI

Mike Wood, GTI

Randy Hicks, GCL

Dennis McQuillan, EID

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
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June 13, 1988

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REPLY TO SANTA FE OFFICE

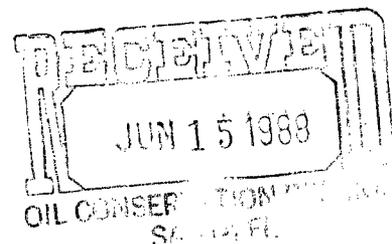
Mr. Charles A. Wohlenberg
New Mexico State Engineer Office
District I
2340 Menaul, N.E., Suite 206
Albuquerque, New Mexico 87107-1884

Re: Giant Industries, Inc.: File SJ-2131

Dear Mr. Wohlenberg:

As we discussed today, I am writing to request an extension of the temporary authorization for Giant Industries to use certain wells for pollution recovery. This authorization was granted in your letter dated February 19, 1988 and expires on June 15, 1988. For your reference in considering Giant's request, I am enclosing copies of the following documents:

1. letter dated February 19, 1988 from your office to Giant granting temporary authorization to pump recovery wells;
2. letter dated June 1, 1988 from our firm to the Oil Conservation Division requesting approval for Giant to discharge recovered ground water for 120 days pending approval of Giant's permanent discharge plan application; and



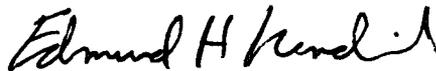
Mr. Charles A. Wohlenberg
June 13, 1988
Page 2

3. letter dated June 10, 1988 from the Oil Conservation Division to our firm authorizing such discharge for 120 days.

We anticipate that the Oil Conservation Commission will grant final approval of Giant's permanent discharge plan application within the next six months, although more time may be required. Consequently we request your written approval of an extension of the temporary authorization for at least six months, with the understanding that more time may be needed in the future to allow for approval by the Oil Conservation Division of Giant's permanent discharge plan application.

Thank you very much for your assistance with this matter.

Sincerely,



Edmund H. Kendrick

EHK/gr:175
Enclosures
File #8361-85-09
cc: (w/o enclosures)
~~David Boyer, OGD~~
Robert L. McClenahan, Jr., GI
Kim Bullerdick, Esq., GI
Mike Wood, GTI
Randy Hicks, GCL
Dennis McQuillan, EID



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

OCD-File Copy

*Julia Brogan for
Edmund Kendrick
6/10/88*

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

June 10, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Edmund H. Kendrick
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

RE: Temporary Discharge at Giant Bloomfield Refinery

Dear Mr. Kendrick:

The Oil Conservation Division (OCD) has received and reviewed your application dated June 1, 1988, requesting temporary approval to discharge without an approved discharge plan up to 75 gpm of air-stripped ground water. The discharge will be from the hydrocarbon recovery system to infiltration trenches upgradient of the recovery area. The application states that the effluent will meet Water Quality Control Commission (WQCC) ground water standards for organic constituents, and that the temporary approval is for the time period prior to OCD approval of the discharge plan previously submitted. The temporary approval will authorize discharge of ground water already recovered and allow reclamation efforts currently underway to continue uninterrupted.

The application was submitted pursuant to WQCC Regulation 3-106.B. For good cause shown the application is approved pursuant to that regulation with the following conditions:

1. The starting date of the 120-day period is the date discharge first commences into the infiltration trench, provided that OCD receives written notification of the starting date within ten (10) days after it commences. If no such notification is received, the expiration date for the discharge shall be 120-days from the date of this letter unless the discharge plan is approved prior to such expiration.
2. The discharge is authorized provided OCD receives chemical analyses for inorganic cations and anions (including chloride, sulfate and total dissolved solids) within 30-days from the date of this letter. Such analyses shall be submitted for the individual storage tanks and for the final effluent discharged to the trenches.

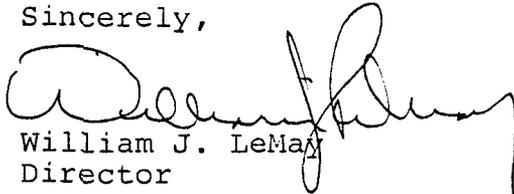
Mr. Edmund H. Kendrick
June 10, 1988
Page 2

3. The air stripper shall be installed such that effluent samples can be obtained at both the stripper inlet and outlet pipes.

Please be advised that the approval of this plan does not relieve you of liability should your operations result in actual pollution of surface of ground waters which may be actionable under other laws and/or regulations.

If there are any questions, please call David Boyer at (505) 827-5812.

Sincerely,



William J. LeMay
Director

cc: OCD - Aztec
Robert L. McClenahan, Jr., GI
Kim Bullerdick, GI
Randy Hicks, GCL
Mike Wood, GTI
Dennis McQuillan, EID
Charles Wohlenburg, State Engineer Office

David B.

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

June 1, 1988

Hand Delivered

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7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

LOS ALAMOS OFFICE
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901 18th Street
Los Alamos, New Mexico 87544

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REPLY TO SANTA FE OFFICE

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Victor R. Ortega
Jeffrey R. Brannen
John B. Pound
Gary R. Kilpatric
Thomas W. Olson
William C. Madison
Walter J. Melendres
Bruce Herr
Robert P. Worcester
James C. Compton
John B. Draper
Nancy Anderson King
Alison K. Schuler
Janet McL. McKay
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W. Perry Pearce
Brad V. Coryell
Michael H. Harbour
Robert J. Mroz
Sarah M. Singleton
Jay R. Hone
Charles W. N. Thompson, Jr.
John M. Hickey
Mack E. With
Galen M. Buller

Katherine W. Hall
Edmund H. Kendrick
Helen C. Sturm
Richard L. Puglisi
Arturo Rodriguez
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James C. Murphy
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Deborah J. Van Vleck
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Kenneth B. Baca
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Anne B. Tallmadge
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Robert A. Bassett
Paula G. Maynes
Neils L. Thompson
Susan Andrews
Joseph E. Whitley
David L. Skinner
Elizabeth A. Glenn

RECEIVED

JUN 1 1988

OIL CONSERVATION DIVISION

Mr. William J. LeMay
Director
Oil Conservation Division
Post Office Box 2088
State Land Office Building
Santa Fe, New Mexico 87504-2088

Re: Temporary Discharge at Giant's Bloomfield Refinery

Dear Mr. LeMay:

Giant Industries, Inc. hereby requests approval to discharge recovered ground water in accordance with WQCC Regulation 3-106.B. at the Bloomfield Refinery for 120 days while the submitted discharge plan application is being approved.

Giant is installing an air stripper capable of treating 75 GPM of both stored and ongoing pumped ground water from on site. The effluent shall meet WQCC ground water standards for organic constituents and will be discharged to one or more infiltration galleries located in the arroyo, upgradient of the recovery wells in the diesel spill area. (See map provided as Attachment A.)

Prior to discharging any water, samples from wells GBR-17, 24D, 30 and 31 will be analyzed for TDS, major Cations and Anions, Polynuclear Aromatics (PAH's), Volatile Aromatics and Halocarbons. Additionally, the tanks used for water storage (#22, #24 and #32) will be sampled for the same parameters. The specific conductance of water in these tanks has been measured recently and values are provided in Attachment B.

Mr. William J. LeMay
June 1, 1988
Page 2

The air stripper is designed and being installed by Ground Water Technology, and is two feet in diameter with a packed bed height of 18 feet. The packing utilized is Jaeger Tripack #2 with a total volume of 56 cubic feet. The measured infiltration rate in the location of the infiltration galleries is approximately 2.8 GPM/ft². Two parallel galleries are being installed. The approximate dimensions of each one are 3 to 4 feet wide, 75 feet long and 9 to 10 feet deep. Gravel (3/4" diameter) is being placed in the gallery with drain pipes to distribute the water along the trench. The total depth of gravel will be 6 to 7 feet. The gravel bed will be covered with plastic and then natural soil to grade. As built drawings will be provided when completed.

The air stripper influent and effluent will be sampled on a monthly basis to confirm treatment. The analyses will be the same as initially conducted on the well and tanks. The wells (GRB-17, 24D, 30 and 31) will be sampled on a quarterly basis. The total flow through the system will be provided to both your office and the State Engineer on a monthly basis.

If you have any questions, please feel free to contact me at 982-3873.

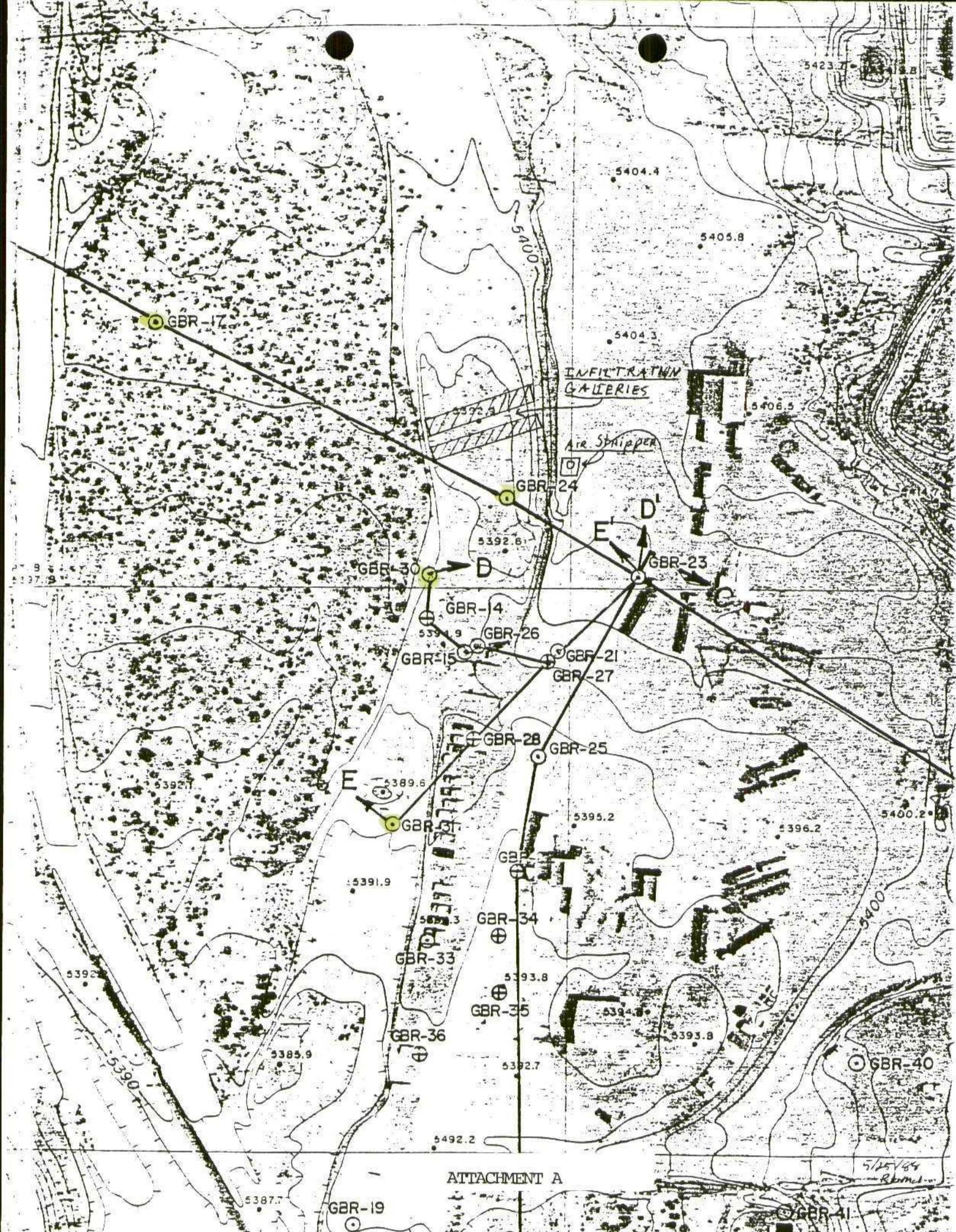
Sincerely,



Edmund H. Kendrick

EHK/lcj:153

cc: David Boyer, OCD
Robert L. McClenahan, Jr., GI
Kim Bullerdick, GI
Mike Wood, GTI
Randy Hicks, GCL
Dennis McQuillan, EID
Charles Wohlenburg, State Engineer Office



ATTACHMENT A

5/25/84
R. Bond

ATTACHMENT B

Tanks 22, 24 and 32 were sampled for conductivity on May 26, 1988.
The results are as follows:

<u>TANK</u>	<u>CONDUCTIVITY</u>
22	4800 uOhs/cm
24	5000
32	5100

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

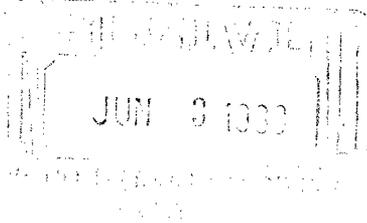
OF COUNSEL
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Elizabeth A. Glenn

June 1, 1988



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Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

Mr. David Boyer
Chief, Environmental Bureau
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504-2088

Re: Analyses of Ground Water West of Giant's
Bloomfield Refinery

Dear Mr. Boyer:

I am enclosing for your information copies of analyses conducted by Groundwater Technology, Inc. of ground water withdrawn from the arroyo west and north of the refinery on April 20, 1988. I understand that the EID also took samples on that day. It would be appreciated if you could provide us with copies of any analyses of such samples that you receive.

Sincerely,

Edmund H. Kendrick

EHK/gr:157
Enclosures
File #8361-85-09
cc: Dennis McQuillan, EID (w/encl.)

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

05/10/88 rw
PROJECT MGR: Michael Wood
Groundwater Technology, Inc.
3620 Wyoming NE
Albuquerque, NM 87111

PROJECT #: 232-799-5009-8
LOCATION: Farmington, NM

SAMPLED: 04/20/88 BY: T. LePage
RECEIVED: 04/22/88 BY: K. Biava
ANALYZED: 04/29/88 BY: P. Sra
MATRIX: Water
UNITS: ug/L (ppb)

TEST RESULTS

COMPOUNDS	MDL	LAB #	21156	21157	21158	21159
	I.I.D. #		6BR-17	6BR-19	6BR-31	6BR-32
Benzene	0.5		<0.5	26	<0.5	<0.5
Toluene	0.5		<0.5	3.3	<0.5	<0.5
Ethylbenzene	0.5		<0.5	17	<0.5	<0.5
Xylenes	0.5		<0.5	120	<0.5	<0.5
Chlorobenzene	0.5		<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5		<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5		<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	0.5		<0.5	<0.5	<0.5	<0.5

MDL = Method Detection Limit; compound below this level would not be detected.

METHOD:
EPA Method 8020

Safy Khalifa /EM7
SAFY KHALIFA, Ph.D., Director

Entered AHT

05/10/88 rw

PROJECT MGR: Michael Wood
Groundwater Technology, Inc.
3620 Wyoming NE
Albuquerque, NM 87111

Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

PROJECT #: 232-799-5009-8
LOCATION: Farmington, NM

SAMPLED: 04/20/88 BY: T. LePage
RECEIVED: 04/22/88 BY: K. Biava
ANALYZED: 04/29/88 BY: P. Sra
MATRIX: Water
UNITS: ug/L (ppb)

TEST RESULTS

COMPOUND	MDL	LAB #	21156	21157	21158	21159
		I.D.#	6BR-17	6BR-19	6BR-31	BR-32
Bromodichloromethane	0.5		0.5	0.5	0.5	0.5
Bromoform	0.5		0.5	0.5	0.5	0.5
Bromomethane	0.5		0.5	0.5	0.5	0.5
Carbon tetrachloride	0.5		0.5	0.5	0.5	0.5
Chlorobenzene	0.5		0.5	0.5	0.5	0.5
Chloroethane	0.5		0.5	0.5	0.5	0.5
2-Chloroethylvinyl ether	1.0		1.0	1.0	1.0	1.0
Chloroform	0.5		0.5	0.5	0.5	1.1
Chloromethane	0.5		0.5	0.5	0.5	0.5
Dibromochloromethane	0.5		0.5	0.5	0.76	0.5
1,2-Dichlorobenzene	0.5		0.5	0.5	0.5	0.5
1,3-Dichlorobenzene	0.5		0.5	0.5	0.5	0.5
1,4-Dichlorobenzene	0.5		0.5	0.5	0.5	0.5
Dichlorodifluoromethane	0.5		0.5	0.5	0.5	0.5
1,1-Dichloroethane	0.5		0.5	5.9	4.8	5.7
1,2-Dichloroethane	0.5		0.5	5.0	0.5	0.5
1,1-Dichloroethene	0.2		0.2	0.2	0.2	0.2
trans-1,2-Dichloroethene	0.5		0.5	35	58	160
1,2-Dichloropropane	0.5		0.5	0.5	0.5	0.5
cis-1,3-Dichloropropene	0.5		0.5	0.5	0.5	0.5
trans-1,3-Dichloropropene	0.5		0.5	0.5	0.5	0.5
Methylene chloride	0.5		0.5	0.5	0.5	0.5
1,1,2,2-Tetrachloroethane	0.5		0.5	0.5	0.5	0.5
Tetrachloroethene	0.5		0.5	1.0	0.5	17
1,1,1-Trichloroethane	0.5		4.4	0.5	2.9	1.9
1,1,2-Trichloroethane	0.5		0.5	0.5	0.5	0.5
Trichloroethene	0.5		0.5	7.2	7.3	16
Trichlorofluoromethane	0.5		0.5	0.5	0.5	0.5
Vinyl Chloride	1.0		1.0	1.0	1.0	1.0

MDL = Method Detection Limit.

METHOD:
EPA Method 8010

Safy Khalifa /EM7
SAFY KHALIFA, Ph.D., Director



STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

May 3, 1988

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery
March 1, 1988

Dear Mr. McClenahan:

My letter of April 29 contained several typographical errors on page 6. Enclosed for your use is a corrected page 6 and an extra copy of the letter. Please contact me at 827-5812 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "David G. Boyer".

David G. Boyer, Chief
Environmental Bureau/Hydrogeologist

Enclosure

DGB:sl



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

April 29, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery
March 1, 1988

Dear Mr. McClenahan:

The Oil Conservation Division (OCD) has received and reviewed the above referenced discharge plan, and this letter provides formal written comments and requests additional clarifying information regarding the plan. A meeting between OCD, Giant and their consultant on the discharge plan took place on April 20, 1988, and issues discussed at that meeting are also referenced in this letter. The document submitted March 1 and the April 20 discussion provide a framework for Giant receiving an approved plan for routine trucking operations, and discharges associated with the on-going and proposed remedial action.

General Comments

After review of the plan and subsequent discussion on April 20, the following general comments are made:

1. Several areas have been mentioned as land application sites for controlled sprinkling of treated water. After discussions on April 20, it is OCD's understanding that sprinkling is not now being proposed and will not be used without Giant seeking prior authorization and approval. If this understanding is incorrect, please clarify Giant's intentions on sprinkler discharge.
2. A land application site to be used for controlled flooding is proposed for the south refinery area. In addition to other technical issues (discussed later in this letter), OCD is concerned about salt leaching of the natural soils. Prior to approval of this part of the plan, Giant will need to quantify the magnitude of additional salt that will be added to the ground

water system. As discussed at the meeting, field testing in lieu of bench tests will be considered if specifics are provided.

3. OCD believes that it is premature to approve an infiltration trench on the west bank of the arroyo at the southern refinery property boundary. The extent, magnitude and movement of contamination (whether it be Giant's or from Lee Acres Landfill) south of the highway (US 64) has not yet been defined and the impact of Giant's proposed action is unknown.

Similarly, if the upgradient infiltration trench is proposed to be located in the arroyo west of the current monitoring well network (GBR-24, 26, 30 etc.), monitoring will need to be conducted prior to discharge to establish baseline conditions. Since ground water in the arroyo in the proposed west infiltration areas may contain contaminants from the landfill and no recovery wells are downgradient, the impacts of the proposal must be carefully evaluated using data that is not yet available.

4. There is considerable ambiguity in the plan about what actions and completion dates are proposed by Giant to prevent and detect additional leaks at the truck fueling area. Specifics and detailed engineering plans were not provided with the discharge plan. In the discussion Giant indicated the truck facility may be moved to another location south of Bloomfield, but no decision has been made. Accordingly, Giant is given until July 1, 1988 to notify OCD of its decision to move the facility. If it is not to be moved, Giant must provide detailed plans, specifications and the proposed construction schedule to OCD by that date for review and approval.
5. The State Engineers Office must be contacted for permitting of the monitor well installation.
6. OCD continues to believe that not enough is known about site hydrogeology to adequately model the impacts of recovery pumping (see specific comments #19 and 27). Therefore OCD requests that Giant perform the following actions prior to plan approval:
 - a. An experienced hydrologic consultant independent from Geoscience must review the totality of aquifer test information and analyses, and make recommendations as to their validity and usefulness, and whether additional tests are necessary; and
 - b. A consultant experienced in ground water modeling must review the hydrologic model, aquifer parameters used in calibration, and the interpretative results for accuracy of the model in predicting water levels and capture zones during recovery pumping.

Specific Comments:

1. The "affirmation" provided with the discharge plan should be signed by the person with Giant who has responsibility for the plan's preparation and submittal.

2. Page 1: Although the TDS of the ground water in some of the contaminated refinery monitor wells is 5000 mg/l or greater, OCD believes a more accurate representation of the range of concentrations is between 2500 and 4000 mg/l TDS. Also, two wells sampled by OCD in November, 1986 (GBR 19 and 30) had concentrations less than 2000 mg/l.

Giant is not responsible for cleanup of ground water contamination that comes onto their property from another source (i.e. Lee Acres) and is captured by them during cleanup of discharges caused by Giant. Additionally, it is not possible to totally separate out what portion of TDS concentration is from Giant and what portion is from Lee Acres. To assist OCD in evaluating what WQCC TDS, chloride and sulfate limits should be authorized for discharge to the infiltration trench, Giant is required to provide, prior to discharge, general water chemistry analyses (cations/anions) of representative samples from each of the north and south intermediate storage tanks and the final storage tank(s) which will provide water to the stripper.

3. P. 5, Table 2-1: Water wells located in Section 28 are missing from the table.
4. Plate 1: Monitor/recovery wells north of the north intermediate storage tank are not clearly identified; one well is not labeled. Please provide corrected replacement copies of this plate and an extra copy for field use.
5. P. 17: The discharge plan states that air stripping, "if necessary", will be achieved through use of an air stripper tower and use of water sprinklers. At the April 20th meeting, Giant indicated that current plans are to pump all water through the stripper tower prior to discharge. Please confirm this method of treatment in writing.
6. P. 14: Plate 1 does not show the truck maintenance facility nor that leach field. OCD requests that Section 3.1.5 be modified to provide a summary of actions taken previously by Giant to prevent commingling of any spills or leaks in the truck maintenance garage with domestic wastewater. A history of use of that facility (including dates) is also requested.
7. P. 14, 16: Samples in Table 3-1 were not analyzed for polynuclear aromatic hydrocarbons. These are common in diesel fuels (See Table 3-9, p. 34), and the efficiency of sprinkler stripping of PAH's is not known.
8. P. 22: Included with infiltration trench design information should be a commitment to dismantle or plug injection pipes upon closure.
9. P. 24: I have doubts about the capability of three of the five wells listed as monitor wells (GBR-13, 20 and 25) to perform satisfactorily during the controlled flooding. GBR-13 and 25 are located off and upgradient of the flooding site; GBR-20 is completed starting at five feet below the top of a silty clay zone. No aquifer tests have been performed at the flooding site to evaluate interconnection of the wells or the ability

of the formations to transmit water. Additionally, Figure 5-4 and plate A2 show that the likely gradients from the site both under static conditions and during recovery pumping is westerly rather than southerly towards the southern area recovery wells. The wells which are proposed to be pumped to capture the released hydrocarbons need to be specified. Additional work will need to be performed before OCD approval of the flooding, and additional monitor/recovery wells located southwest of the flooding area may be needed for observation/capture of released hydrocarbons.

10. P. 27: WQCC regulations specifically include natural salts as contaminants to be regulated when discharges of effluent are made to the surface. While OCD can maintain some flexibility in this matter, especially since some increases are from the landfill, OCD will not accept further significant increases in TDS to cleanup Giant's contamination. The magnitude of salt increases expected must be estimated by Giant prior to plan approval.
11. P. 37: The contingency plan is acceptable as presented.
12. P. 38: An SPCC plan for the facility must be provided.
13. P. 39: In addition to monthly inspections, berms must be inspected after significant rainfall.
14. P. 39: What is the proposed date of the first piping pressure test and how frequently will they be repeated?
15. P. 39: If the truck fueling area is not to be moved, OCD will need specifics on fuel pipe leak detection methodology (other than periodic pressure tests), details of berm and sump system at the fueling area, and on the long-term upgrade of the piping system.
16. P. 39: Provide MSD sheets and location information on chemicals used or stored at the site.
17. P. 40: When the discharge plan is approved, spill reporting comes under the discharge plan rather than WQCC Section 1-203. Giant must report all spills that meet the criteria of Section 1-203.A and take the necessary or appropriate corrective actions to contain and remove or mitigate the damage caused by the spill. Spills should be first reported by oral notification within 24 hours of occurrence followed by written confirmation including action taken.
18. P. 41: Provide the anticipated date of the fire-pond closure, and notify OCD when it has been drained.
19. P. 49-59: Site Hydrogeology: OCD commented extensively on this subject in our November 20, 1987, letter to Mr. W. Perry Pearce of the Montgomery and Andrews law firm. Additional review of the aquifer test material by your consultant resulted in several changes to the aquifer parameters for several of the wells. Several of these values are closer to

what OCD had obtained in our evaluation. However, values for GBR-14 still show considerable disagreement. After a review of this material and the discussion in Appendix D, OCD stands by our conclusion in the November 20 letter: We believe the results of the tests are inconclusive and that additional tests need to be conducted and analyzed before predictive calculations and design of recovery systems are finalized.

20. P. 54, Table 5.3: This table needs to be revised to correctly summarize T and S results of Geoscience's aquifer test analyses discussed on pages 55 to 58.
21. P. 63, p. 75: Monthly analyses from the air stripper shall also include major cations/anions, TDS, and WQCC PAH's.
22. P. 63, p 75: Quarterly analyses from the designated wells shall also include halogenated and aromatic hydrocarbons (method 601/602); major cations/anions, TDS, and WQCC PAH's.
23. P. 70, p. 75: Samples taken for analysis for WQCC metals shall be field filtered prior to acidification so that dissolved (vs. total) concentrations of contaminants are determined.
24. P. 76: OCD understands that no discharges will be made without prior air stripping (see specific comment #5).
25. P. 76: No changes in the discharge plan are authorized without prior OCD approval.
26. P. 76: See specific comment #17 for reporting of unplanned releases.
27. Appendix A: OCD does not currently have the expertise to fully evaluate the assumptions and results of the finite-difference ground water flow model presented in Appendix A of the report. However, review of the discussion sections presented with the model raised questions about the inputs used in model calibration:
 - A. Single-well pump test results from GBR-14, 27 and 29 were used to estimate long-term drawdown under steady-state conditions (P. A-3). As stated previously, OCD questions some of the aquifer test data, especially that for GBR-14.
 - B. Hydraulic conductivity zones were said to be defined over the flow domain according to observed geologic conditions. Pump test results were used by Geoscience where available. Outside the regions of pump test influence, hydraulic conductivity was estimated on the basis of lithologic description obtained from well logs (P. A-15). However, the results shown in Plate A1 do not make sense when related to the totality of known arroyo alluvium well log lithologies and the general relationship of sandstone and alluvium permeabilities.

Although logs of two wells (GBR-14, 30) close to the north Low Conductivity Zone show poorly sorted mixtures of silty, clayey sand and gravel, other arroyo wells show relatively coarse grained material opposite some of the saturated and screened intervals (GBR-17, 31). Attached Table 4 of the preliminary USGS report ("Hydrogeologic characteristics of the Lee Acres Landfill Area, San Juan County, New Mexico", USGS Water-Resources Investigations Report 87-4246) shows similar variation in both lithology and hydraulic conductivity (K). Because of the wide K variation, the use of the low K value of arroyo alluvium should be restricted to those wells close to the north Low Conductivity Zone.

The selection of a sandstone K of 35 gpd/ft² was apparently based on the aquifer test of GBR-29. The lithology of this well was logged as sandstone in most of the completion interval during drilling. However, GBR-38 to the east shows 12 feet of saturated fine to coarse grained sand above sandstone bedrock. (Logs of GBR-42 and 43 closer to GBR-29 were not included in Appendix B for comparison). Similarly, wells immediately to the west of GBR-29 do not show sandstone at equivalent depths. The OCD previously stated that the most likely permeable zone for GBR-29 was a medium to coarse grained sand at 45 feet. If this is the case, K of the upper saturated portions of GBR-29 and 38 more closely resembles K of higher permeability arroyo alluvium or valley sediments than K of sandstones. For comparison, the range of sandstone permeabilities given by Freeze and Cherry (Groundwater, 1979) is between 10⁻⁴ and 10 gpd/ft². For fine and medium grained sandstone, and sandstone with shale, K is not likely to be at the high range of this scale.

OCD's conclusion is that the hydraulic conductivity zones shown on Plate A1 need to be reevaluated for inputs in the model used to predict aquifer drawdowns expected from recovery pumping.

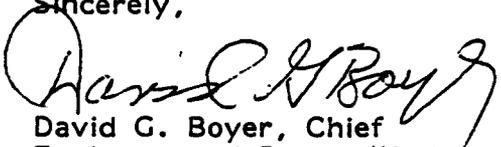
28. Appendix B: Logs of boreholes/wells 41-46 were not included.

OCD expects to conduct sampling of some of the monitor wells in early June. You will be notified several weeks in advance of our anticipated schedule.

Mr. Robert L. McClellan
April 29, 1988
Page 7

If you have any questions on our comments or on the information requested,
please contact me at 827-5812.

Sincerely,



David G. Boyer, Chief
Environmental Bureau/Hydrogeologist

Attachment

DGB:sl

cc: Frank Chavez, OCD-Aztec
Dennis McQuillan, EID
Kim Bullerdick, Giant Industries
Randy Hicks, Geosience Consultants
Ned Kendrick, Montgomery & Andrews

DGB:sl

Table 4. Aquifer-coefficient measurements

[Consolidation stress calculated for the unit weight of mixed-grained sand = 108 pounds per cubic foot. Hydraulic gradient assumed to range from 0.01 to 0.06 foot per foot. Measurements made by method described in Olson and others, 1985.]

Hole or pico- meter number in fig. 3	Description	Sample depth to		Consolida- tion stress, in pounds per square inch	Porosity	Hydraulic conduc- tivity, in feet per day	Range of average interstitial velocity, in feet per day
		Depth to depth, in feet below land surface	water, in feet below land surface				
3	Coarse sand	37.5	34.8	43.2	0.43	0.36	4.9 - 35
6	Clayey sand	40.0	33.1	44.3	.38	.28	.0002 - .0017
9	Silty sand	48.0	32.0	49.9	.42	.26	.0027 - .0258
11	Clayey sand	41.0	34.9	45.9	.38	.32	.0001 - .0009
11	Sand	51.0	34.9	53.4	.38	.29	.14 - 1.12
12	Sand	35.4	26.8	38.2	.44	.37	.60 - 4.28

OCD, EID, Giant Refinery Meeting 4/20/88

on Giant Bloomfield Discharge Plan

Dave passed out notes of OCD, EID meeting on
Giant 3/21/88
pump tests

DGB - suggest additional aquifer tests,

R.H. - 60 day aquifer test March 1987, ^{*} data provided to Boyer
after 60 day pump response matched modeling efforts

R.M. - 75 gpm air stripper purchased for system
- will be NE of tank in diesel area
- treatment based on benzene
- infiltration trench will be in wash approx
50' north of GBR-24

DGB - is this discharge covered by NPDES permit ??
- he thinks not, especially if discharged thru buried
infiltration lines

R.M. - infiltration tests next week
- wells in south refinery pumps at 2 gpm/well
- good depression in w.t. thru good depression in W. table
- when stripper in wells will be pumped harder
- do we need temporary discharge plan

DGB - yes,
R.H. - will supply temporary discharge request
- county going to drain fire point in mid April to DM
water to go to rail track
- water levels ~~are~~ measured this last week

approve 4 or 5?

- R.M.
- borings completed in E. tank farm area by GTI
 - casing refusals at 20'-30', no indication of organic with HNH meter
 - will address ^{this} ~~isolate~~ discharge plan

DGB

- wants indication of ^{general chemistry} G.C. of diesel tanks used for storage of water produced for infiltration
- need to look south of highway
- presentation to address this

R.M.

- should be legal issue with Giant

DGB

- may need formal order to proceed with work

? Kim G.R.

- should not need formal order
- " be able to present something ^{→ plan of investigation} in 60-90 days

e.R.

- what kind of response needed

Kim G.R.

- will get back in 2 weeks after talks to Giant about it

DGB

review of DR. - specific pt.

- disagree with background TDS of 5000 ppm
- missing pg. table 2-1
- truck maint. & beach fields not on map, ^{at}

- will all discharge go thru stripper

R.M. - Yes, tank will be drained in batch

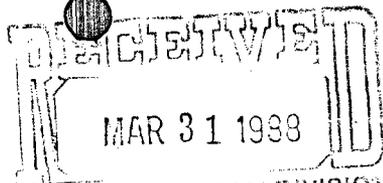
- will not request info on sprinkling since for now this proposal has been dropped

R.M. - put in letter as disclaimer for no unauthorized discharge

- what was found in old pond area
 - R.M. - clays into shallow depth
 - stained soils as move towards south well are
- concerned about floods, changing gradient to south instead of SW.
- * R.H. - don't plan on producing a g.w. mound enough to affect gradients
- need to quantify salts in floodable areas in order to determine impacts
- ⊙
- info on maint. at site ie. strippers, trucks fuel, area truck maintenance

Attendees

DGB	Dave Boyer, OCD
	Bill Olson, EIP
	Jami Bailey, OCD
R.M.	Robert McClenahan, Giant Refinery
R.H.	Randy Hicks, Geoscience Consultants
	Kim ?, Giant
?	, Giant lawyer?



March 29, 1988
OIL CONSERVATION DIVISION
SANTA FE



Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

David G. Boyer
Oil Conservation Division
P.O. Box 2088
Land Office Building
Santa Fe, NM 87501

RE: Temporary Discharge Request for Giant's Bloomfield Refinery

Dear Mr. Boyer:

Giant hereby withdraws the request dated January 15, 1988, for a temporary discharge permit at our Bloomfield facility.

Thank you for your assistance in this matter.

Sincerely,

Carl D. Shook

CDS:ds

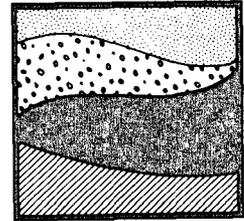
cc: William Lemay (OCD)
Robert McClenahan, Jr.
Kim Bullerdick

Geoscience Consultants, Ltd.



500 Copper Avenue NW, Suite 200
Albuquerque, New Mexico 87102
(505) 842-0001 FAX (505) 842-0595

1109 Spring Street, Suite 706
Silver Spring, Maryland 20910
(301) 587-2088



RECEIVED
APR 25 1988
STX

March 21, 1988

Mr. Dave Boyer
New Mexico Oil Conservation District
P.O. Box 2088
Land Office Building
Sante Fe, NM 87501
Through: Mr. Ned Kendrick, M&A

Dear Mr. Boyer:

Please find enclosed the information you requested, through Bob McClenahan. This table contains Y (Northings), X (Eastings), and Z (Top of casing) coordinates for all wells at Giants Bloomfield Refinery. GBR-44 is listed with incorrect North and East values. The correct approximate values are:

North	10220.0
East	11394.5

If I can be of any further assistance, please do not hesitate to contact me at (505)842-0001.

Thank you.

Yours very truly,
GEOSCIENCE CONSULTANTS, LTD.

Jack Kirby
Jack Kirby
Geologist

Concurred,
GEOSCIENCE CONSULTANTS, LTD.

Randall T. Hicks
Randall T. Hicks
Senior Vice President
Technical Services

JK/RTH/1f/M&A/BOYER002.LTR

cc w/enclosure: Bob McClenahan
Kim Bullerdick

PT.	NORTH	EAST	NAME	TOP OF CASING	CONCR. SLAB	GROUND
25.	10248.00	11696.18	GBR-5	5395.09	5393.10	5392.70
65.	10235.41	11679.98	GBR-6	5394.34	5392.76	5392.38
66.	10241.55	11687.80	GBR-7	5395.15	5393.04	5392.53
63.	10150.28	11486.73	GBR-8	5389.86	5388.01	5387.57
62.	10155.35	11467.59	GBR-9	5389.04	5388.11	5387.64
61.	10157.79	11458.56	GBR-10	5390.23	5388.28	5387.73
28.	10160.42	11447.98	GBR-11	5389.50	5388.21	5387.80
29.	10355.10	11465.23	GBR-13	5392.13	5390.58	5390.30
73.	10977.84	11382.00	GBR-14	5395.82	5393.93	5393.53
72.	10944.47	11411.38	GBR-15	5397.47	5395.16	5394.82
13.	11240.19	11141.69	GBR-17	5402.69	5401.79	5401.30
4.	12021.64	11528.06	GBR-18	5421.90	5420.29	5419.80
76.	10438.60	11321.53	GBR-19	5393.01	5392.19	5391.74
26.	10254.66	11601.00	GBR-20	5393.72	5392.02	5391.60
10.	10945.78	11492.75	GBR-21	5400.89	5397.83	5397.60
17.	10751.42	11458.80	GBR-22	5397.47	5394.42	5393.88
9.	11014.34	11563.06	GBR-23	5403.96	5401.04	5400.60
12.	11083.96	11447.00	GBR-24	5396.95	5393.88	5393.50
15.	10853.81	11476.29	GBR-25	5397.03	5395.39	5395.00
14.	10949.97	11421.89	GBR-26	5395.78	5394.48	5394.10
11.	10937.41	11483.66	GBR-27	5398.48	5397.35	5396.90
16.	10868.86	11419.18	GBR-28	5396.81	5395.79	5395.30
27.	10134.61	11550.03	GBR-29	5389.09	5388.26	5387.90
74.	11014.84	11382.06	GBR-30	5396.15	5394.92	5394.63
75.	10794.15	11350.85	GBR-31	5393.83	5391.96	5391.47
71.	12061.95	11143.06	GBR-32	5416.77	5413.26	5412.76
69.	10689.08	11382.64	GBR-33	5396.64	5393.77	5393.35
68.	10694.24	11445.12	GBR-34	5394.47	5394.42	5393.43
67.	10644.16	11447.15	GBR-35	5393.75	5393.61	5393.35
70.	10588.79	11377.90	GBR-36	5394.14	5392.53	5392.36
60.	10167.89	11419.53	GBR-37	5389.40		5387.80
64.	10114.02	11688.26	GBR-38	5393.92	5391.69	5391.62
1.	11000.00	11000.00	SEC CORNER	5397.19		
5.	11462.65	11760.48	PARAFIN PIT '1'	5413.15		5409.60
6.	11206.51	11614.70	LOADING PACK		5306.31	
18.	10737.88	11514.60	DIESEL PUMPS		5395.15	
21.	10633.71	11555.50	OFFICE		5395.10	
24.	10332.10	11928.65	BURN PIT		5405.50	
30.	10465.94	11523.95	PUMP HOUSE		5394.34	
33.	10940.62	11404.69	STEEL WELL	5394.36	N. A.	5394.40
44.	12078.25	11749.51	5' DIA. SEEP HOLE			
57.	10267.42	11939.17	FIRE HYDR.			5316.30
58.	11747.82	11982.51	LAST WELL POND WATER	5440.06		5439.40 5440.75
80.	10940.84	11404.56	GBR-39	5397.52	5394.91	5394.36
81.	10584.07	11713.64	GBR-40	5401.35	5401.16	5400.54
82.	10455.92	11694.52	GBR-41	5396.69	5396.60	5396.15
83.	10101.23	11600.33	GBR-42	5391.15	5390.39	5389.90
84.	10139.83	11476.47	GBR-43	5389.90	5387.99	5387.54
85.	10753.19	11645.82	GBR-44	5390.84	5388.92	5388.57
86.	10241.94	11403.77	FUTURE WELL	5389.68	5389.05	5388.62

WATER LEVEL INFORMATION

SAMPLE DATE
08/11/87

WELL NUMBER	EASTINGS	NORTHING	WATER ELEVATION
GBR-05	11696.00	10248.00	5364.04
GBR-06	11679.98	10235.41	5356.47
GBR-07	11687.80	10241.55	5362.15
GBR-08	11486.73	10150.28	5349.04
GBR-09	11467.59	10155.35	5348.54
GBR-10	11485.56	10157.79	5349.57
GBR-11	11447.98	10160.42	5349.98
GBR-13	11465.23	10355.10	5352.69
GBR-14	11382.00	10977.84	5363.64
GBR-15	11411.38	10944.47	5367.61
GBR-17	11141.69	11240.19	5369.69
GBR-18	11528.06	12021.64	5408.19
GBR-19	11321.53	10438.60	5355.04
GBR-20	11601.00	10254.66	5354.73
GBR-21D	11492.75	10945.78	5369.52
GBR-22	11458.80	10751.42	5362.25
GBR-23	11563.06	11014.34	5380.66
GBR-24D	11447.00	11083.96	5370.79
GBR-25	11476.29	10853.81	5369.15
GBR-26	11421.89	10949.97	5363.76
GBR-27	11483.66	10937.41	5379.81
GBR-28	11419.18	10868.86	5362.50
GBR-29	11550.03	10134.61	5348.44
GBR-30	11382.06	11014.84	5364.13
GBR-31	11350.85	10794.15	5360.65

GBR-32	11143.06	12061.95	5382.27
GBR-33	11382.64	10689.08	5359.43
GBR-34	11445.12	10694.24	5360.55
GBR-35	11447.15	10644.16	5359.16
GBR-36	11377.90	10588.79	5358.36
GBR-37	11419.53	10167.89	5349.00
GBR-38	11688.26	10114.02	5352.21
GBR-39	11404.56	10940.84	5364.49

SAMPLE DATE
11/10/87

WELL NUMBER	EASTINGS	NORTHING	WATER ELEVATION
GBR-05	11696.00	10248.00	5363.49
GBR-06	11679.98	10235.41	5355.93
GBR-07	11687.80	10241.55	5361.82
GBR-08	11486.73	10150.28	5348.38
GBR-09	11467.59	10155.35	5348.04
GBR-10	11485.56	10157.79	5349.30
GBR-11	11447.98	10160.42	5349.48
GBR-13	11465.23	10355.10	5352.55
GBR-14	11382.00	10977.84	5355.57
GBR-15	11411.38	10944.47	5365.57
GBR-17	11141.69	11240.19	5369.36
GBR-18	11528.06	12021.64	5399.82
GBR-19	11321.53	10438.60	5354.76
GBR-20	11601.00	10254.66	5354.28
GBR-21D	11492.75	10945.78	5369.06
GBR-22	11458.80	10751.42	5360.26
GBR-23	11563.06	11014.34	5380.13

GBR-24D	11447.00	11083.96	5369.50
GBR-25	11476.29	10853.81	5368.58
GBR-26	11421.89	10949.97	5363.28
GBR-27	11483.66	10937.41	5379.61
GBR-28	11419.18	10868.86	5360.46
GBR-30	11382.06	11014.84	5363.65
GBR-31	11350.85	10794.15	5360.27
GBR-32	11143.06	12061.95	5381.73
GBR-33	11382.64	10689.08	5359.80
GBR-34	11445.12	10694.24	5360.02
GBR-35	11447.15	10644.16	5358.52
GBR-36	11377.90	10588.79	5357.80
GBR-37	11419.53	10167.89	5347.74
GBR-38	11688.26	10114.02	5349.95
GBR-39	11404.56	10940.84	5363.53

Giant Refining - Bloomfield
Meeting with Good, McQuillan, Olson,
Bailey & Boyer 3/21/88

Meeting was held to discuss salt problems at refinery and impact of remedial actions on increasing or decreasing salt load in arroyo ~~is~~ from infiltration trenches.

Observations -

- ① Giant is only responsible for salt added by them - not high TDS or Cl from BLM.
- ② Air stripping will concentrate salts but allowed under discharge of "weight of water, contaminants" in water diverted (3-109. b.1.)
- ③ Giant responsible for leaching of additional salts in arroyo - should quantify but sand should be fairly clean since has been transported and washed.
- ④ Trench for infiltration not good idea in arroyo at SW property boundary. - Premature right now.
- ⑤ Land flooding in S.E. area needs salt leaching quantified

(2)

- (5) OCT should proceed to inform Giant its time to move off site and investigate extent of movement of plume. BLM doing this already in area. Tracklog survey may be useful.
- (6) As part of remedial action (but not D.P.), Giant ~~also~~ need to look at spills at ~~the~~ tanks in east area (near soil storage area).

Notes of Roff 3/22/88

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

March 1, 1988

ALBUQUERQUE OFFICE
Suite 500
7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

FEDERAL EXPRESS

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MAR 2 1988

OIL CONSERVATION DIVISION

Seth D. Montgomery	Katherine W. Hall
Victor R. Ortega	Edmund H. Kendrick
Jeffrey R. Brannen	Helen C. Sturm
John B. Pound	Richard L. Puglisi
Gary R. Kilpatric	Arturo Rodriguez
Thomas W. Olson	Joan M. Waters
William C. Madison	James C. Murphy
Walter J. Melendres	James R. Jurgens
Bruce Herr	Ann M. Maloney
Robert P. Worcester	Deborah J. Van Vleck
James C. Compton	Anne B. Hemenway
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Sarah M. Singleton	Neils L. Thompson
Jay R. Hone	Susan Andrews
Charles W. N. Thompson, Jr.	Joseph E. Whitley
John M. Hickey	David L. Skinner
Mack E. With	Elizabeth A. Glenn
Galen M. Buller	

Mr. William J. LeMay
Director
Oil Conservation Division
State Land Office
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: Discharge Plan Application (GW-40)
Giant Industries, Inc./Bloomfield Refinery

Dear Mr. LeMay:

On behalf of our client, Giant Industries, Inc., I am enclosing the discharge plan application for Giant's Bloomfield Refinery, prepared for us by Geoscience Consultants, Ltd. The application consists of one volume of text, two volumes of appendices and one volume of plates. After you have had an opportunity to review the application, we would be pleased to discuss it with you and with members of your staff.

Very truly yours,



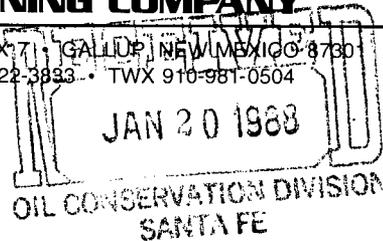
Edmund H. Kendrick

EHK/gr:14
Enclosures
File #8361-85-09
cc: Mr. David Boyer (w/3 sets of encls.)

GIANT REFINING COMPANY

ROUTE 3, BOX 7, GALLUP, NEW MEXICO 87301
(505) 722-3883 • TWX 910-981-0504

January 15, 1988



Mr. William Lemay
Director, Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

RE: Temporary Discharge at Giant's Bloomfield Refinery

Dear Mr. Lemay:

Pursuant to New Mexico Water Quality Control Commission ("NMWQCC") Regulation 3-106.B., Giant Industries, Inc. ("Giant") requests Oil Conservation Division ("OCD") approval to discharge treated groundwater at its Bloomfield Refinery in order to continue containment and clean-up pumping at the site while a discharge plan application is being prepared.

NMWQCC Regulations 1-201.B. and 3-106.B. provide that a person intending to make a temporary discharge must provide the following information: (1) the name of the person making the discharge; (2) the address of the person making the discharge; (3) the location of the discharge; (4) an estimate of the concentration of water contaminants in the discharge; and (5) the quantity of the discharge. In response, Giant hereby states the following:

Name of Person Discharging:

Giant Industries, Inc.

Address of Discharger:

Route 3, Box 7
Gallup, New Mexico 87301

Location of Discharge:

Giant's Bloomfield refinery, located in the NW 1/4 Section 27 and SW 1/4 Section 22, T. 29N, R. 12W, San Juan County, New Mexico, approximately 5 miles west of Bloomfield on U.S. Highway 64. In particular, the discharge will be made in the refinery's lower bermed soil storage area.

Concentration of Contaminates in the Discharge:

Giant seeks to discharge recovered groundwater from the refinery site. This water has been pumped to the surface to contain and remove contaminants from the subsurface. It is currently being stored in four (4) storage tanks previously used by the refinery. Free hydrocarbons recovered with the water have been separated and dissolved hydrocarbons partially removed by exposure to air.

The water will be sprayed over the soil storage area utilizing sprinklers to air strip the remaining hydrocarbons. Based on an examination of scientific literature and a previous on-site test Giant anticipates that over 90% of these compounds will be stripped by this type of treatment. The water will only be sprayed during daylight work hours and spraying will be manually controlled.

The concentration of contaminants in stored water has been tested. The results of these tests are appended as Attachment 1. They show contamination values prior to treatment. Giant expects a 5-10% evaporative loss and over 90% stripping of volatile organics to occur during treatment.

Quantity of Discharge:

The quantity of discharge will be determined by weather conditions. Giant currently has 800,000 gallons of water in storage and expects to pump approximately 25,000 additional gallons of water per day from the subsurface for containment purposes. The average daily discharge requested is 45,000 gallons. This will allow Giant to discharge the water it will be recovering and to draw down its inventory of stored water.

Monitoring:

Giant is installing two monitoring wells, one up-gradient and one downgradient of the discharge site. Additionally, a lysimeter will be installed under the discharge area. Discharged water will be sampled after sprinkling on a bi-weekly basis to determine treatment levels. Monitor wells will be sampled initially and every three (3) months during discharge for the organic contaminants detected in recovered groundwater, as identified in Attachment 1. The lysimeter will be sampled on a monthly basis for both organics and metals.

Mr. William Lemay
January 15, 1988
Page Three

In summary, Giant requests that it be allowed to temporarily discharge water for 120 days while a discharge plan application is being prepared. This temporary discharge is necessary for continuation of Giant's containment and clean-up activities.

If you have any questions about this matter, please contact Bob McClenahan of my staff.

Sincerely,

Carl D. Shook

Carl D. Shook
Vice President Refining Operations
Giant Refining Company

CDS:ds

Enclosures

cc: David Boyer
OCD, Aztec
Kim Bullerdick, Giant Industries, Inc.
Bob McClenahan



INDICATORS
PROJECT:

SAMPLE DATE: 9/09/87
LAB RECEIPT DATE: 9/11/87
MATRIX: WATER

SAMPLE ID: TK 47
LOCATION:
LAB SAMPLE #: 3323-1
UNITS: mg/l

<u>ANALYSIS DATE</u>	<u>CONSTITUENT NAME</u>	<u>DILUTION FACTOR</u>	<u>DETECTION LIMIT</u>	<u>RESULT</u>
9/17/87	ALKALINITY (ALK HCO3) BICARBONATE	1	1	494
9/17/87	ALKALINITY (ALK CO3) CARBONATE	1	1	ND
9/16/87	TOTAL DISSOLVED SOLIDS (TDS)	1	10	4030
9/22/87	CYANIDE (CN)	1	0.01	ND
9/17/87	CORROSIVITY (pH)		---	6.9

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: *Smith*

DATE: 2 OCTOBER 1987

IONS
PROJECT:

SAMPLE DATE: 9/09/87
 LAB RECEIPT DATE: 9/11/87
 MATRIX: WATER

SAMPLE ID: TK 47
 LOCATION:
 LAB SAMPLE #: 3323-1
 UNITS: mg/l

<u>ANALYSIS DATE</u>	<u>CONSTITUENT NAME</u>	<u>DILUTION FACTOR</u>	<u>DETECTION LIMIT</u>	<u>RESULT</u>
9/16/87	CALCIUM (Ca)	25	1.0	566
9/21/87	IRON (Fe)	100	0.030	66.6
9/16/87	MAGNESIUM (Mg)	25	0.10	68.3
9/21/87	MANGANESE (Mn)	4	0.010	3.08
9/25/87	POTASSIUM (K)	1	1.0	2.91
9/17/87	SODIUM (Na)	50	0.5	661
9/17/87	CHLORIDE (Cl)	200	20	1210
9/17/87	FLUORIDE (F)	1	0.05	0.43
9/17/87	NITRATE (NO ₃ -N)	4	0.40	1.22
9/17/87	SULFATE (SO ₄)	200	20	1080

NOTE: ND = NOT DETECTED
 NA = NOT ANALYZED

PROJECT MANAGER: *C.P.W.*

DATE: 2 OCTOBER 1987



METALS
PROJECT:

SAMPLE DATE: 9/09/87
LAB RECEIPT DATE: 9/11/87
MATRIX: WATER

SAMPLE ID: TK 47
LOCATION:
LAB SAMPLE #: 3323-1
UNITS: mg/l

<u>ANALYSIS DATE</u>	<u>CONSTITUENT NAME</u>	<u>DILUTION FACTOR</u>	<u>DETECTION LIMIT</u>	<u>RESULT</u>
9/14/87	ARSENIC (As)	1	0.010	ND
9/23/87	BARIUM (Ba)	1	0.060	ND
9/14/87	CADMIUM (Cd)	1	0.003	0.009
9/15/87	TOTAL CHROMIUM (Cr Tot)	1	0.010	0.023
9/17/87	LEAD (Pb)	1	0.002	ND
9/22/87	MERCURY (Hg)	1	0.0005	ND
9/14/87	SELENIUM (Se)	1	0.010	ND
9/15/87	SILVER (Ag)	1	0.010	0.010

NOTE: ND = NOT DETECTED
NA = NOT ANALYZED

PROJECT MANAGER: *JAH*

DATE: 2 OCTOBER 1987

EPA METHOD 601/602
PROJECT:SAMPLE DATE: 9/09/87
LAB RECEIPT DATE: 9/11/87
ANALYSIS DATE: 9/17/87
MATRIX: WATER
ANALYST: MGBSAMPLE ID: TK47
LOCATION:
LAB SAMPLE #: 3323-1
UNITS: ug/l
DILUTION FACTOR: 10

CONSTITUENT NAME	DETECTION LIMIT	RESULT
CHLOROMETHANE	0.2	ND
BROMOMETHANE	0.6	ND
DICHLORODIFLUOROMETHANE	0.4	ND
VINYL CHLORIDE	0.5	ND
CHLOROETHANE	1	ND
METHYLENE CHLORIDE	0.2	ND
TRICHLOROFLUOROMETHANE	0.7	ND
1,1-DICHLOROETHENE	0.7	ND
1,1-DICHLOROETHANE	0.5	17.3
TRANS-1,2-DICHLOROETHENE	0.9	12.2
CHLOROFORM	0.5	ND
1,2-DICHLOROETHANE	0.7	8.6
1,1,1-TRICHLOROETHANE	0.3	ND
CARBON TETRACHLORIDE	0.8	ND
BROMODICHLOROMETHANE	0.4	ND
1,2-DICHLOROPROPANE	0.3	ND
TRANS-1,3-DICHLOROPROPENE	1.1	ND
TRICHLOROETHENE	0.6	2.9
DIBROMOCHLOROMETHANE	0.7	ND
1,1,2-TRICHLOROETHANE	0.3	ND
CIS-1,3-DICHLOROPROPENE	0.7	ND
2-CHLOROETHYL VINYL ETHER	0.3	ND
BROMOFORM	0.9	ND
1,1,2,2-TETRACHLOROETHANE	0.3	ND
TETRACHLOROETHENE	0.3	ND
BENZENE	2	178
TOLUENE	4	142
CHLOROBENZENE	1.6	ND
ETHYLBENZENE	1	40.8
1,3-DICHLOROBENZENE	4	ND
1,2-DICHLOROBENZENE	4	ND
1,4-DICHLOROBENZENE	6	ND
M-XYLENE	9.0	104
O,P-XYLENE	7.5	130

113 % SURROGATE RECOVERY

COMMENTS: ND = NOT DETECTED
MDL 10 x NORMAL DUE TO HIGH LEVELSPROJECT MANAGER: *JMH*

DATE: 2 OCTOBER 1987



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

November 20, 1987

Mr. W. Perry Pearce, Attorney
Montgomery & Andrews, PA
P. O. Box 2307
Santa Fe, New Mexico 87504-2307

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Pearce:

The Oil Conservation Division has completed a comprehensive review of the report entitled "Soil and Ground Water Investigations and Remedial Action Plan, Giant Industries, Inc., Bloomfield Refinery, Bloomfield, New Mexico" dated June, 1987. The report was prepared by Geoscience Consultants, Ltd. of Albuquerque. Specific comments are provided in the material enclosed with this letter. I hope these comments will be of assistance as Giant completes preparation of its discharge plan.

Because of our small staff and heavy work load, the Oil Conservation Division did not comment immediately on the report in writing. Since a discharge plan application is being prepared by Giant for this site, report sections that are relative to the proposed application were planned to be discussed by Oil Conservation Division in our discharge plan response. Our comments on the application would be provided within the 60-day regulatory response period for discharge plans allowed under Water Quality Control Commission (WQCC) Regulations. However, because of a misunderstanding between the Environmental Bureau and GCL, Oil Conservation Division agreed to provide complete comments on the June report.

In a February 25, 1987, letter to Robert L. McClenahan, Jr., of Giant Industries, Oil Conservation Division commented on earlier GCL reports. Several issues mentioned in that letter (items 6, 7, and 8) remain to be addressed, or information provided with the discharge plan. A copy of this letter is also attached.

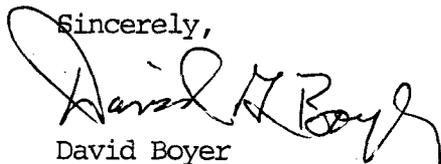
As mentioned in Item 10 of the February 25 letter, all proposed discharges to the subsurface will need to be addressed in the discharge plan. New discharges planned to begin prior to discharge plan approval can receive approval for up to 120-days under WQCC Regulations.

Finally, the issue of off-site contamination will need to be addressed, though not necessarily in the currently proposed discharge plan. As mentioned in Item 10 of the February 25 letter, a formalized settlement agreement between all parties is

the Oil Conservation Division's preferred way to proceed. Until that time Giant's remedial action to contain and recover hydrocarbons on the property will need to continue.

Please contact me at 827-5812 if you have any questions on this matter.

Sincerely,



David Boyer
Hydrogeologist
Environmental Bureau Chief

Enc.

DB:sl

cc: Carlos A. Guerra, Giant Industries, Phoenix
Robert L. McClenahan, Giant Refinery, Gallup
Albert A. Gutierrez, Geoscience Consultants, Ltd., Albuquerque

OCD REVIEW OF
GIANT-BLOOMFIELD, JUNE 1987 REMEDIAL REPORT

Specific Comments

Section 1. Executive Summary:

1. p. 1, paragraph 3. The summary lists known ground water contamination zones. Other possible contamination zones may be located near the API separator's wastewater pond/slop pit, and various tanks that may have lost crude oil, product or intermediate fluids (see Table 2-1, May 23, 1986, "Report on Environmental Investigations at Giant Industries, Inc. Bloomfield Refinery, Bloomfield, New Mexico", prepared by Geoscience Consultants, Ltd., (GCL) Albuquerque.)" Therefore, the introductory sentence should read: "The known groundwater contamination zones..."

Section 2. Historical Background:

1. p. 3. OCD agrees that Lee Acres is the most likely source of chlorinated hydrocarbons, and high chlorides found in the domestic wells. However, our sampling shows that at least two domestic wells in the subdivision have benzene-toluene-xylene (BTX) contamination characteristic of refinery waste fluids.

2. p. 5, figure 2.1. Not all the names and locations on the map are correct or up-to-date: Mulliken vs. Malliken, Duggins-Harmon vs. Duggins; missing are M. Duggins and Bustos, both near the Reynolds well. EID (Dennis McQuillan) should be contacted to verify all map names and locations.

Section 3. Summary of Investigation:

1. p. 8. Previous to Section 3.1 "Soil Investigations," insertion of a section on "Spills and Releases" is appropriate. This section, found in the May 23, 1986, report is not included in subsequent reports. Inclusion is crucial to understanding why certain of the soil and ground water investigations were undertaken.

2. p. 9, Table 3.1 and Plate 1. This information could be made more complete by listing the purpose of the well (exploratory, monitor, recovery, etc.) in the table, and showing all locations on Plate 1 (including boreholes not completed as wells). Plate 1, as a site location map, also should show all tanks (with I.D. number) at the refinery, including those added since the 1978 photograph date. Available information on depth, age, completion interval, water level, etc. for the abandoned supply and "Steel" wells should be included with the table.

2. p. 8. Expand on why GBR-39 and 40 were not completed as wells.

3. p. 11. Provide a summary figure here showing Giant's estimate (as of date of the report) of the approximate location on the property of refinery plumes and the Lee Acres plume as determined by monitor well analyses and other documented information.

4. p. 13. In addition to chlorinated hydrocarbons, EID determined early on that high levels of chlorides were also a characteristic of the contaminant plume (see p. 23 of the 1986 McQuillan and Longmire report that is referenced in your Section 10.)

Section 4. Site Hydrogeology:

1. p. 14., Plates 2A & 2B. As a result of phone discussions with GCL, revised Plates 2A, 2B and 3 were submitted on September 17, 1987. Cross section plates 2A and 2B still contain significant errors with respect to both factual presentation of the driller's lithologic logs and in the geologic interpretation of the material.

A. Presentation of driller's logs:

- (1) Cross section A-A':
 - (a) Elevation of well GBR-24 is incorrect (should be 5394)
 - (b) GBR-23 driller's log shows a shale from 22 to 26 feet. This is shown correctly on the drawing but the material immediately surrounding the well is shown as a silty sand.
- (2) Cross section C-C', GBR-23:

The 22-26 feet interval is mapped here as a sandy shale while the same interval for the same well in cross section A-A' shows the interval only as a shale.

B. Geologic Interpretation:

- (1) Cross section C-C':

Between GBR-25 and 22, a definite contact between the consolidated sandy shale and the unconsolidated clayey sand is shown. It is unlikely this contact exists as shown since the underlying sand appears to be well sorted, clean replacement sand, and not sand weathered in place from the sandstone.
- (2) Cross sections D-D' and E-E':

The 5-8 feet of sand and shale inter-tonguing shown between GBR-26 and 27, and GBR 28 and 27 is unlikely. This is because the facies contact is between consolidated and unconsolidated sediments, and the boundary, though unknown, would be abrupt, not transitional.
- (3) Interpretation would be enhanced if recent data from the logs of wells GBR 34, 35, 37 and 38 were mapped on the appropriate cross sections.

2. p. 17, Table 4-1. Include year that static water level measurements were made. More recent measurements should be included up through the date of the report.

3. p. 20, figure 4-2. The water level elevation for the shallow well, 21(s), is used is this figure. That elevation is ten feet higher than the mapped contour. (Compare with the use of the water level elevation for well 21(D) in Figure 6-2, p. 49.)

Sections 4.1 to 4.3. Hydrologic Characteristics of the Diesel Spill Area, Southern Refinery Area, and Truck Fueling Area:

1. OCD independently evaluated the aquifer test data using a variety of methods and techniques, and arrived at significantly different results for a number of the tests. However, the GCL analysis was thorough, used a variety of techniques not previously used by me, and raised a number of questions that probably can be definitively answered only by some additional testing of the existing wells. In particular, GCL's analyst showed both knowledge of the various techniques and their application. The correction technique for product thickness was of special interest and seems to be based on sound principles.

OCD's review differed from GCL's in that we believe that casing storage effects are significant in analysis of GBR-14 and 27 (pumped wells), and that drawdown due to such effects was mistakenly characterized as boundary effects. Also, we believe that effects of partial penetration were over emphasized, and that saturated thickness used in calculating permeabilities from transmissivities should be limited to screened/gravel packed saturated thickness of the test well bore. Likewise, use of Jacob's correction is important in alluvium wells such as GBR-14 where the saturated thickness is unlikely to exceed 40 feet. Finally, the analytical results must be critically reviewed using the geologic and lithologic data derived from the drilling logs.

2. GBR-27 pump test (P. 22 and Appendix C). OCD's analysis showed that casing storage effects were overcome at a maximum time of 140 minutes (for an estimated 2" diameter pump inside a 5" diameter well) for uncorrected product thicknesses and at about 80 minutes for corrected thicknesses. Examination of the plots past those times shows an increase in slope at 260 minutes that is due to a boundary which is likely the sandstone surrounding the wellbore. Since the well was packed with sand, this too must be dewatered before the aquifer properties of the surrounding sandstone can be determined. Using this approach, the sandstone was found to have a product-corrected transmissivity of 14.7 gpd/ft. If a saturated thickness of 40 feet is used, hydraulic conductivity (K) is approximately 0.4 gpd/ft² which is about midrange for a friable sandstone (Groundwater & Wells, 2nd edition, p. 75; Groundwater by Freeze and Cherry, p. 29). Since aquifers are stratified horizontally, and horizontal permeability is generally greater than the vertical permeabilities, the effects of partial penetration were thought to be minimal in these highly stratified sediments. Therefore, these calculations plus examination of the drillers log shows the above T value to be representative of this very fine to medium grained sandstone.

For GBR-25, the value of $T = 387$ gpd/ft is thought to be too high since the well is 82 feet away and the lithology variable. I suspect the low drawdown resulting in a high T is due to poor hydraulic communication because of the varying lithology. Further calculation using T and a saturated aquifer thickness of 40 feet, shows a permeability of about 10 gpd/ft², which is outside the sandstone ranges given above. A longer test (greater than 16 hours) would provide further verification and might overcome any effects of delayed yield.

3. GBR-14 pump test (p. 22-24 and Appendix C). OCD's analysis shows that only one drawdown test (that at $Q = 2$ gpm) can be used because of casing storage effects at other rates. Also, a correction for aquifer dewatering is appropriate here. This test at late times showed $T = 105$ gpd/ft. The only recovery test of use was for $Q = 1$ gpm which showed $T = 96$ gpd/ft. Therefore OCD's T estimate is about 100 gpd/ft.

OCD's analysis shows the alluvium to be about 7 times more transmissive than the sandstone. Since the effective saturated thickness is estimated to be 35-40 feet in both instances, the alluvium is also about 7 times more conductive than the sandstone. Further evidence for these values of saturated thickness in this section of the arroyo comes from the USGS April 22, 1987, preliminary hydrogeologic investigation report on the Lee Acres landfill area.

The GCL analysis for GBR-15 provided a value for T of 128.5 gpd/ft using a saturated thickness of 75.3 ft. However, the log for GBR 15 shows a sandy clay at 45-60 feet. This would provide an effective saturated thickness of only about 11 feet, reducing the T to approximately 18.7 gpd/ft. This curve match was made by GCL using only five points, one of which deviated severely from the Theis curve. Therefore, the GBR-15 analysis should not be relied upon for accurate parameters.

4. Combined GBR-14, 27 and 28 Pump Test (p. 24-25 and Appendix C). GCL uses the values from earlier tests of GBR-14 and 27, along with data from this test to match predicted drawdown with pumping drawdown at well GBR-28. The T and S thus obtained are 2100 gpd/ft and 0.02 respectively. Both values are unlikely given the drillers log information. Using a maximum effective saturated thickness of 40 feet $K = T/d = 2100/40 = 52$ gpd/ft² which is outside the range for friable sandstone. S is also an order of magnitude high compared to other values previously determined and given the 3 feet of clay overlying the screened sandstone zone. Also, as discussed above, T values for GBR-14 and 27 are thought by OCD to be too high.

OCD assumed the three wells acted as single central well. Since each well was pumped using a top filling bailer, it was further assumed that steady state conditions were established with a constant $Q = 0.5$ gpm for each well. Using these values, a T of 192 gpd/ft was calculated for observation wells outside the three-well ring. However, because of the several assumptions, the data is considered insufficient to provide T values that can be used with any confidence.

Because of the wide range of T and S values and numerous assumptions made, the results of either GCL or OCD analyses for the 3-well test should not be used for predictive calculations.

5. Southern Refinery Area Characteristics (p. 25 and Appendix C): OCD's results for GBR-29 were similar to GCL's. However, the fact that only 0.76 feet of drawdown were recorded after pumping at 2 gpm for 32 hours shows that a very permeable zone is present. From the logs, this zone is likely to be at a depth of 45 feet. This low drawdown produced an even lower drawdown at GBR-8. Because only four separate drawdown values were recorded for ten time values, OCD declines to try to estimate these values

of T and S. Before predictive calculations are made in this area, the well should be step-tested to determine an optimum pumping rate, and then pumped to determine aquifer characteristics.

6. Truck Fueling Area Characteristics (p. 26). Given the previous discussion, OCD believes that current information is not sufficient to characterize the hydrogeology here. We believe that if designs of recovery systems to be located here are based on the previous calculations, additional aquifer tests and analyses are needed.
7. Finite-Difference Ground Water Flow Model (Appendix E). OCD did not perform a detailed review of the predictive model. GCL used single well pump test results from GBR 14, 27 and 29 in the model. OCD believes that two of these values determined by GCL are in error. Also, the 62.5 feet value of saturated thickness used in the model (p. 16, Appendix E) is double the values (22-32 feet) derived from drillers logs and static water level measurements for these wells.
8. Summary. Comparison of GCL and OCD analyses are shown in the table below. OCD believes that results of the aquifer tests performed here are inconclusive and that additional tests need to be conducted and analyzed before predictive calculations and design of recovery systems are finalized. The tests should be better designed (constant Q is best), of longer duration (up to several days) and measurements for both product thickness and water levels made to the nearest 0.01 feet. Slug or bailer tests may also be appropriate. Although the data was both difficult to use and subject to varying interpretations as detailed above, GLC's analyst did a thorough job of review. The write-up is very complete and the results were discussed using site geology information.

Comparisons of GLC and OCD Aquifer Test Results
for Giant Bloomfield Refinery
(Modified from Table 4-3, p. 23)

<u>Diesel Spill Area</u>	<u>T (gpd/ft)</u>		<u>S</u>	
	<u>GCL</u>	<u>OCD</u>	<u>GCL</u>	<u>OCD</u>
GBR-14	792	100	NA	NA
GBR-15	128	ND *	0.0045	ND
GBR-25	387	336 *	0.00016	0.00029 *
GBR-27	126	14.7	NA	NA
<u>Southern Refinery Area</u>				
GBR-8	2340	ND	0.051	ND
GBR-29	1040	928	NA	NA

NA - Not Applicable using test method

ND - Not Determined by OCD

* - See Text Discussion

Section 5. Soil Contamination:

1. p. 27, 28, 30. Additional investigation is needed to determine if groundwater beneath the wastewater retention pond and evaporation pond is contaminated. In the unlined wastewater pond area, contaminated soil was detected from the surface to the bottom of the backhoe pit, and the evaporation pond had a portion of its liner removed for pond expansion.
2. p. 29. Information given in Table 5-1 (p. 35) indicates soil contamination in all samples taken at the site of the underground catch tank in the truck loading area. Groundwater in both GBR-23 and 24 (the nearest down gradient monitor wells) also shows BTX contamination. The extent of contamination around this now abandoned fueling unit needs to be documented, as remedial action may be required.
3. p. 29. OCD records are available that document from 1977 the volumes of water discharged from the AMOCO gas well.
4. Table 5-1, p. 34-35, and Table 5-2, p. 36. If available, the depths of the soil sampled should be listed.

Section 6. Groundwater Contamination:

1. Table 6.6, p. 44-45. Abbreviations should be defined when used. For example, TCE and trichloroethene are listed in separate columns, but are the same compound. TCA may refer to 1,1,1-Trichloroethene, 1,1,2-Trichloroethene, or 1,1,2,2-Tetrochloroethene. Also, several OCD-collected samples showed positive, and traces of compounds that were listed as "not detected" in the Table were reported as "confirmed" by our state scientific laboratory on the analysis sheets.
2. p. 49-54, Figures 6-2 to 6-7. Dates of water levels used in drawing the maps should be shown.
3. p. 51. Figure 6-4. Contour intervals should be labeled or specified (see, for example, Figure 6.3, p. 50).
4. p. 55. GCL explains the two-pronged lobe in figure 6-5 as possibly being the result of low conductivity on the west side of the diesel spill area. However, it is unlikely that 0.1 feet of product could move 100 feet at 90° to the natural hydraulic gradient in only two weeks. Since GBR-14 was pumped during this interval, it is likely to have had some impact on product movement.
5. p. 62. The terrain electromagnetic conductivity survey (shown in figure 7 on p. 12, McQuillan and Longmire, 1986) did not extend as far as shown on that figure. It reached only to the western-most storage tank (Tank 1). The elevated levels seen could be due to metal interference or fire water pond seepage.
6. p. 63. GBR-18 contamination may have come from produced water discharges. From October, 1977 (when water reporting was started) through the end of 1984 (a tank was installed in 1985), 1406 barrels (or 59,052 gallons) were reported to have been discharged to the unlined pit.

7. p. 64, paragraph 1. DCA (1,2-dichloroethane) was found in refinery wells unaffected by other chlorinated solvents. Therefore, the statement should be revised to reflect that solvents other than DCA can be assumed to come from the landfill.

8. p. 64, paragraph 2. As pointed out in earlier correspondence from OCD, Giant's contamination on its property is extensive in the area of the arroyo and, based on EID and OCD sampling, has migrated off site to the south. Contamination includes both floating and dissolved product. The characterization by GCL that the Lee Acres contamination "overshadows" Giant's contamination is not shared by OCD. Though the characteristics of the pollution are different, they pose an equally serious threat to ground water in Lee Acres.

Section 7. Remedial Action Addressing Soil Contamination:

1. p. 66. Borehole and outcrop data which were used to conclude that ground water under the storage/biodegradation sites will be protected by shale bedrock need to be specified.

2. p. 68. See earlier OCD comments on report Section 5. Although the underground catch tank was removed, impacts to ground water, if any, have not been determined.

3. p. 69. Provide the full name of the receiving company and the location where the 13 drums of waste were shipped.

4. p. 69. Three lines of the final paragraph on p. 69 are repeated on p. 77.

5. p. 78. During treatment of contaminated water at the bermed storage area by sprinkling, only organic contaminants will be removed. The process will need to be controlled so that leaching of salts to ground water is prevented. See also OCD comment 6, this section.

6. p. 77-81. All discharges to the subsurface planned as part of soil remedial action must be approved by OCD as part of an approved discharge plan or, if temporary, approved for a period not to exceed 120-days as per Water Quality Control Commission (WQCC) Regulation 3-106.B. In addition to hydrocarbon contamination, the Oil Conservation Division is concerned that any permitted discharges through either leaching or direct injection not cause salt levels to exceed WQCC standards.

Section 8. Remedial Action Addressing Ground Water Contamination:

1. The comments immediately above on the necessity of having OCD approval prior to discharging also apply to activities proposed in this section. Also, the State Engineer Office has recently adopted rules regarding use of recovery wells that may be applicable in this situation.

2. p. 82. Although the Steel Well, GBR-15, and GBR-26 are proposed by GCL to be used to provide precise monitoring of remedial actions, GBR-26 and the Steel Well appear to be clogged as discussed earlier in the report (p. 24-25).

3. p. 86, p. 91. OCD believes that some of the hydrologic parameters, and the saturated thickness used as inputs by GCL to the remedial action model maybe in error. Therefore, model outputs and predictions need to be reevaluated, and the model rerun when additional information becomes available.

4. p. 88. The locations of the tanks used for storage of recovered produced water need to be shown on Plate 1.

5. p. 90. Clean-up in the Diesel Spill Area must include dissolved hydrocarbons as well as floating product. Therefore, pumping in excess of the time to recover only floating product must be anticipated.

6. p. 90, Section 8.2, Southern Refinery Area Plan.
At some point, Giant will need to address the off-site contamination caused by discharges leaving the property at the southern boundary. Since these have commingled with fluids coming from Lee Acres, the problem becomes legally complex and will require cooperation from Giant, BLM and the other various governmental agencies involved in the investigation.

7. p. 95, Section 8.4. This paragraph should be revised to state that the fire fighting drill area seep does not now present an environmental hazard because water is currently being collected by a pipe in a gravel filled trench.

8. p. 95-100, Section 8.5. Although some recovered ground water may be low in dissolved hydrocarbons, GCL and Giant need to be aware that OCD also is concerned about discharge of treated water having salt concentrations greater than WQCC standards. The discharge plan must address both dissolved hydrocarbons and salts. Specifics as to location, design and operation of treatment must be provided in the discharge plan.

Section 9. Monitoring and Reporting:

1. p. 101-102. Specific proposals on monitoring and reporting will need to be provided in the discharge plan.

2. p. 101. Discharges to ground water will need to meet WQCC standards for total dissolved solids, chloride and sulfates in addition to hydrocarbon standards.

Section 10. Bibliography

1. p. 103. The earlier (Feb. 6, 1986; May 23, 1986; and December 1, 1986) GCL reports on the refinery need to be referenced here.



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

November 19, 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. W. Perry Pearce
Montgomery and Andrews, PA
P. O. Box 2307
Santa Fe, New Mexico 87504-2307

RE: Request for Extension
Discharge Plan (GW-40)
Bloomfield Refinery and Transportation Facility

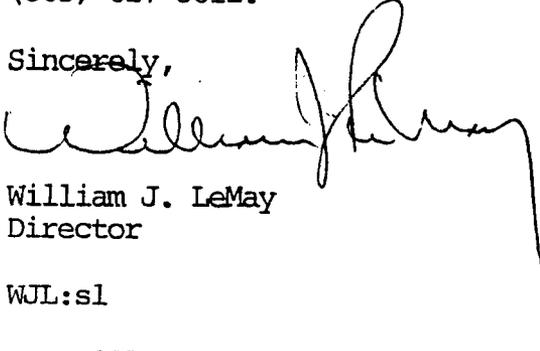
Dear Mr. Pearce:

The Oil Conservation division (ODC) has received your request, dated November 12, 1987 for an extension for the submission of a discharge plan for the above referenced facility. The notification requiring the filing of a discharge plan was dated December 29, 1987 and extended on May 4, 1987, and October 1, 1987.

Pursuant to Water Quality Control Regulation 3-106.A. and for good cause shown, Giant Refining Company is hereby granted an extension to March 1, 1988 for the submission of a discharge plan for the Bloomfield facility. This extension is granted to allow additional site characterization of the refinery property and the consideration of additional remedial measures.

If you have any questions or comments, please feel free to contact David Boyer at (505) 827-5812.

Sincerely,


William J. LeMay
Director

WJL:sl

cc: OCD - Aztec
R. L. McClenahan Jr. - Giant

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

November 12, 1987

ALBUQUERQUE OFFICE
Suite 500
7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

Seth D. Montgomery	John M. Hickey
Victor R. Ortega	Mack E. With
Jeffrey R. Brannen	Galen M. Buller
John B. Pound	Katherine W. Hall
Gary R. Kilpatric	Edmund H. Kendrick
Thomas W. Olson	Helen C. Sturm
William C. Madison	Richard L. Puglisi
Walter J. Melendres	Arturo Rodriguez
Bruce Herr	Joan M. Waters
Robert P. Worcester	James C. Murphy
James C. Compton	James R. Jurgens
John B. Draper	Ann M. Maloney
Nancy Anderson King	Deborah J. Van Vleck
Alison K. Schuler	Anne B. Hemenway
Janet McL. McKay	Roger L. Prucino
Jean-Nikole Wells	Deborah S. Dungan
Mark F. Sheridan	Helen L. Stirling
Joseph E. Earnest	Rosalise Olson
Stephen S. Hamilton	William P. Slattery
W. Perry Pearce	Kenneth B. Baca
Brad V. Coryell	Daniel E. Gershon
Michael H. Harbour	Anne B. Tallmadge
Robert J. Mroz	Michael R. Roybal
Sarah M. Singleton	Robert A. Bassett
Jay R. Hone	Paula G. Maynes
Charles W. N. Thompson, Jr.	Neils L. Thompson

David Boyer, Chief
Environmental Bureau
Oil Conservation Division
State Land Office Building
Post Office Box 2088
Santa Fe, New Mexico 87502

RECEIVED
NOV 12 1987
OIL CONSERVATION DIVISION

Re: Discharge Plan - Giant's Bloomfield Refinery

Dear Dave:

This letter is a request for a further extension of time to submit a Discharge Plan for the Giant-Bloomfield Refinery. Giant and its consultants are currently in the process of preparing this plan and are not able to meet the current deadline.

Among the tasks requiring this extension are the necessity of additional site characterization of the refinery property and the consideration of additional remedial measures. Based upon these requirements, Giant requests until March 1, 1988 to submit this Discharge Plan.

Thank you for your consideration of this matter.

Sincerely,


W. Perry Pearce

WPP:mp:94
#8361-85-09



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

JIM REY CARRUTHERS
GOVERNORPOST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

October 1, 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTEDMr. W. Perry Pearce
Montgomery and Andrews
P.O. Box 2307
Santa Fe, NM 87504-2307RE: Request for Extension
Discharge Plan (GW-40)
Bloomfield Refinery and Transportation Facility

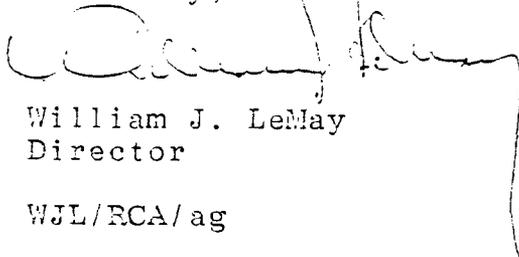
Dear Mr. Pearce:

The Oil Conservation Division (OCD) has received your request, dated September 28, 1987 for an extension for the submission of a discharge plan for the above referenced facility. The notification requiring the filing of a discharge plan was dated December 29, 1987 and extended on May 4, 1987.

Pursuant to Water Quality Control Regulation 3-106.A. and for good cause shown, Giant Refining Company is hereby granted an extension to November 13, 1987 for the submission of a discharge plan for the Bloomfield facility. This extension is granted to allow for the receipt of pump test data and the analysis of sampling data necessary for the design of an air stripper system.

If you have any questions or comments, please feel free to contact David Boyer at (505) 827-5812.

Sincerely,

William J. LeMay
Director

WJL/RCA/ag

cc: CCD - Aztec
R.L. McClenahan, Jr. - Giant

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
William R. Federici

J. O. Seth (1883-1963)
A. K. Montgomery (1903-1987)
Frank Andrews (1914-1981)

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

September 28, 1987

HAND-DELIVERED

ALBUQUERQUE OFFICE
Suite 500
7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

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Robert J. Mroz	Michael R. Roybal
Sarah M. Singleton	Robert A. Bassett
Jay R. Hone	Paula G. Maynes
Charles W. N. Thompson, Jr.	Neils L. Thompson

David Boyer, Chief
Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504-2088

Re: Discharge Plan - Giant Bloomfield Refinery

Dear David:

Under the current schedule, Giant Refining Company is to submit a discharge plan for its Bloomfield Refinery on September 30, 1987. The current status of the effort to prepare such a discharge plan requires an extension of that deadline.

Although Giant has made progress toward the completion of this discharge plan, certain data sampling which is necessary for the design of an air stripper system has not yet been completed and, in addition, certain pump test data relating to the draw down of the aquifer is not yet available. Both of these items are important elements in the design of an appropriate discharge plan.

Based upon the unavailability of this important data and the importance of that data to the discharge plan, Giant Refining Company hereby requests an extension until Friday, November 13, 1987 to submit this plan. We believe that the granting of this application for extension will result in the submission of a more useful discharge plan to our mutual benefit.

David Boyer, Chief
Environmental Bureau
September 28, 1987
Page 2

Thank you for your consideration of this matter.

Sincerely,

A handwritten signature in cursive script, appearing to read "W. Perry Pearce".

W. Perry Pearce

WPP:mp:10
#8361-85-09

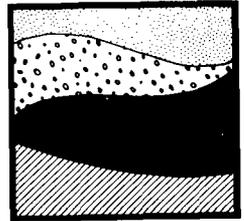
Geoscience Consultants, Ltd.

GCL

September 11, 1987

500 Copper Avenue NW, Suite 200
Albuquerque, New Mexico 87102
(505) 842-0001 FAX (505) 842-0595

1109 Spring Street, Suite 706
Silver Spring, Maryland 20910
(301) 587-2088



Mr. David Boyer
New Mexico Oil Conservation Division
State Land Office Building
Santa Fe, New Mexico

HAND DELIVERED

RE: Correction to Cross Section (Plate 2) of April, 1987 Submission

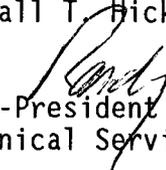
Dear Dave:

After my conversation with you last night, I performed another review of the above-referenced plate. I found numerous discrepancies between the lithologic and well completion logs in Appendix B of the report and Plate 2. The revised cross sections correct errors associated with the location of well screens and mislabeling of lithologic units, and eliminates section G-G'.

There is no excuse for the existence of these errors, however correction of the cross sections does not result in a reinterpretation of the geology, hydrology, water chemistry or engineering design for the product containment system. Screen locations were misplaced by 5 feet on some wells. Mislabeling of lithologic units included silty sand labeled as clayey sand, clayey sand labeled as silty sand, shale labeled as silty sand and several other transpositions. I believe that you will agree that significant interpretational errors do not exist.

I apologize for the lack of consistency between Plate 2 and Appendix B. If portions of the text are unclear or you discover other discrepancies, please call me and I will remedy the situation in the same expedient manner in which this cross section was corrected.

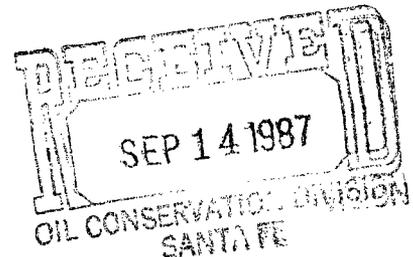
Randall T. Hicks, CPGS


Vice-President
Technical Services

Enclosures

RTH/lS/M&A/BOYER001.LTR

cc: Mark Sheridan, Montgomery and Andrews
Carlos Guerra, Giant Industries, Phoenix
Bob McClenahan, Giant Refining, Gallup



MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
A. K. Montgomery
William R. Federici

J. O. Seth (1883-1963)
Frank Andrews (1914-1981)

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

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Telecopy (505) 982-4289

July 17, 1987

ALBUQUERQUE OFFICE
Suite 500
7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

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Brad V. Coryell	Helen L. Stirling
Michael H. Harbour	Rosalise Olson
Robert J. Mroz	William P. Slattery
Sarah M. Singleton	Kenneth B. Baca

RECEIVED

JUL 17 1987

OIL CONSERVATION DIVISION

HAND DELIVERED

Mr. William J. LeMay
Director
Oil Conservation Division
State Land Office
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Mr. LeMay:

On behalf of our client, Giant Industries, Inc., I am enclosing a report on investigations of soil and ground water contamination at Giant's Bloomfield Refinery, prepared for us by Geoscience Consultants, Ltd. The latter part of the report outlines a remedial action plan for the containment and removal of such contamination. As you will see, our consultants believe that the implementation of this plan will be effective in preventing contamination originating within the refinery from migrating off the refinery site. However, our consultants also recognize that such actions cannot address the far more extensive contamination emanating from the Lee Acres landfill. After you

Mr. William J. LeMay
July 17, 1987
Page 2

have had an opportunity to review the report, we will be happy to discuss it with you and with members of your staff.

Sincerely,



Edmund H. Kendrick

EHK:jem:17
Enclosure
File #8361-85-09
Copy: Mr. David Boyer (w/o enclosure)

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION



GARREY CARRUTHERS
GOVERNOR

May 4, 1987

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Carl Shook, Vice President
Refinery Operations
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Request for Extension
Discharge Plan (GW-40)
Bloomfield Refinery and Transportation Facility

Dear Mr. Shook:

The Oil Conservation Division (OCD) has received your request, dated April 22, 1987, for an extension for the submission of a discharge plan for your Bloomfield facility. The notification requiring the filing of a discharge plan was dated December 29, 1987.

Pursuant to Water Quality Control Regulation 3-106.A. and for good cause shown, Giant Refining Company is hereby granted an extension to September 30, 1987 for the submission of a discharge plan for your Bloomfield facility. This extension is granted to allow for the inclusion of the site's ground water remedial action program.

If you have any questions or comments, please feel free to contact David Boyer at (505) 827-5812.

Sincerely,

A handwritten signature in cursive script, appearing to read "W. J. Lemay".

for WILLIAM J. LEMAY
Director

WJL/RA/cr

cc: OCD - Aztec
R.L. McClenahan, Jr. - Giant



MEMORANDUM OF MEETING OR CONVERSATION

<input checked="" type="checkbox"/> Telephone	<input type="checkbox"/> Personal	Time 2:00	Date 4/29/87
---	-----------------------------------	--------------	-----------------

<u>Originating Party</u>	<u>Other Parties</u>
David Terry - Brewer + Assoc.	Jimmie Bailey

Subject
Destruction of monitor well

Discussion
Terry called to say that they were improving a road way in the LeeVere area and a monitor well in the right of way was about to be covered over. His description of it was that it was a 2" diam. galvanized or stainless well, & he could not give an exact location. I told him NOT to destroy the well until permission was granted by the owner, that the info obtained from the well could be important in a lawsuit. I called Mr. Cleaveland from Grant, but he was unavailable. I informed Perry Pierce who called Geoscience. Mr. Cleaveland later called back & I told him the situation. I also called Dennis M^cQ who called USGS.

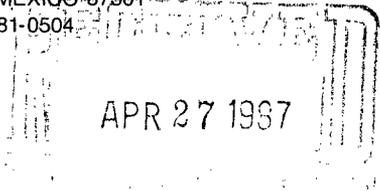
Conclusions or Agreements
Terry called at 4 PM to say that Grant disclaimed it & they didn't care if it was destroyed, that USGS said it was "probably" theirs, but since it was used only for W.C. measurements, they didn't care if it was gone (at this time Terry noted the well was south of US64). I told him since USGS wasn't absolutely positive it was theirs, he had signed better call Dennis to get EIO clearance too.

Distribution
Dave Boyer
Jimmie Bailey

GIANT
REFINING COMPANY

to Dan I B

ROUTE 3, BOX 7 • GALLUP, NEW MEXICO 87301
(505) 722-3833 • TWX 910-981-0504



April 22, 1987

Mr. William Le May
Director, Oil Conservation Division
P.O. Box 2088
Land Office Building
Santa Fe, NM 87501-2088

RE: Discharge Plan for Giant's Bloomfield Refinery and
Transportation Facility

Dear Mr. Le May:

Pursuant to the Water Quality Control Commission Regulations,
Section 3-106.A., Giant hereby requests an extension
to the submission date for the discharge plan at our
Bloomfield facility.

The reason we feel that an extension is justified is to
allow the inclusion of the site's ground water remedial
action program as part of the plan. The volume and quality
of water that will be generated by our recovery systems is
not currently known. However, it will be the major source
of water needing to be treated and disposed of at the facility.
Drilling of recovery wells is currently underway, and a
more definitive value for both the volume and quality of
water to be treated can be made in approximately three
months.

We are working closely with David Boyer of your staff on
the remedial action plan, and he will be kept apprised
of the progress.

A favorable response to our request for an extension would
be appreciated.

Sincerely,

Carl D. Shook

CDS:ds

cc: Roger Anderson, OCD
Oil Conservation Div. - Aztec, NM
R.L. McClenahan, Jr.

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION



GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

April 4, 1987

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: Proposed Work at Giant's Bloomfield Refinery

Dear Mr. McClenahan:

Your letter of March 30, 1987, describing work to be conducted at the Bloomfield site the week of April 20 has been received, and the Oil Conservation Division concurs with the work as proposed. Our only comment is that the upgradient wells, to the extent possible, should be located so as to be free of influence from the raw water ponds. This was discussed with you by phone today.

I will be in Farmington that week, and expect to be on site for most of the drilling work. See you then.

Sincerely,

A handwritten signature in cursive script that reads "David G. Boyer".

David G. Boyer
Hydrogeologist/Environmental Bureau Chief

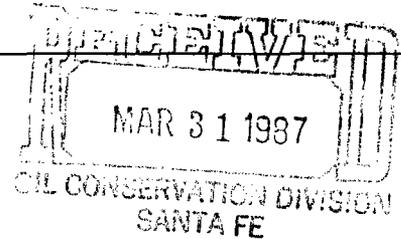
DGB/cr

cc: Randy Hicks, GCL
Kathy Peter, USGS
Carlos Guerra, Giant
Dennis McQuillan, NMEID

GIANT

REFINING COMPANY

ROUTE 3, BOX 7 • GALLUP, NEW MEXICO 87301
(505) 722-3833 • TWX 910-981-0504



March 30, 1987

David G. Boyer
NMOCD
P.O. Box 2088
Land Office Building
Santa Fe, NM 87501

RE: Additional Work Planned at Giant's Bloomfield Refinery

Dear Mr. Boyer:

The analysis of work performed at the Bloomfield Refinery indicates that additional wells need to be installed at the site so that the floating hydrocarbon contamination can be contained. Giant proposes to install up to four new recovery wells in the southern refinery area and one in the fuel terminal area. In addition, the installation of one or two monitor wells in the arroyo area is being considered.

The first phase of this work will be to install two wells, 5 or 6" diameter, approximately 130 feet either side, running east-west, of GBR-29 (X1 and X4 on attached Fig. 1). These will be drilled to bedrock and screened over the entire water bearing zone of the alluvium. After development and pumping characterization, the spacing, location and need for two additional wells (X2 and X3) will be determined. These wells will be pumped at a rate sufficient to depress the water table for containment and removal of existing floating hydrocarbons.

A monitor/recovery well is proposed to enhance the removal of the diesel spilled near the fuel terminal. This well is planned to be west-southwest of GBR-22, near the fence line. It is believed that between GBR-22 and this new well, the diesel in this area can be contained and removed.

The well(s) location in the arroyo has not been fully determined at this time. If installed they will be Stainless Steel monitoring wells and placed in a location believed to be upgradient from all refinery influence.

Drilling is anticipated to begin the week of April 20. The actual dates will be sent as soon as the drillers can be scheduled.

David G. Boyer
March 30, 1987
Page Two

I hope this plan meets with your approval. If you have any questions or comments, please don't hesitate to give me a call.

Sincerely,



Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Refining Company

RLM:ds

Attachment

cc: Randy Hicks, GCL
Carlos Guerra
Mark Sheridan, Montgomery & Andrews
Earl Blanchard
Kathy Peter, USGS
Frank Fujimoto

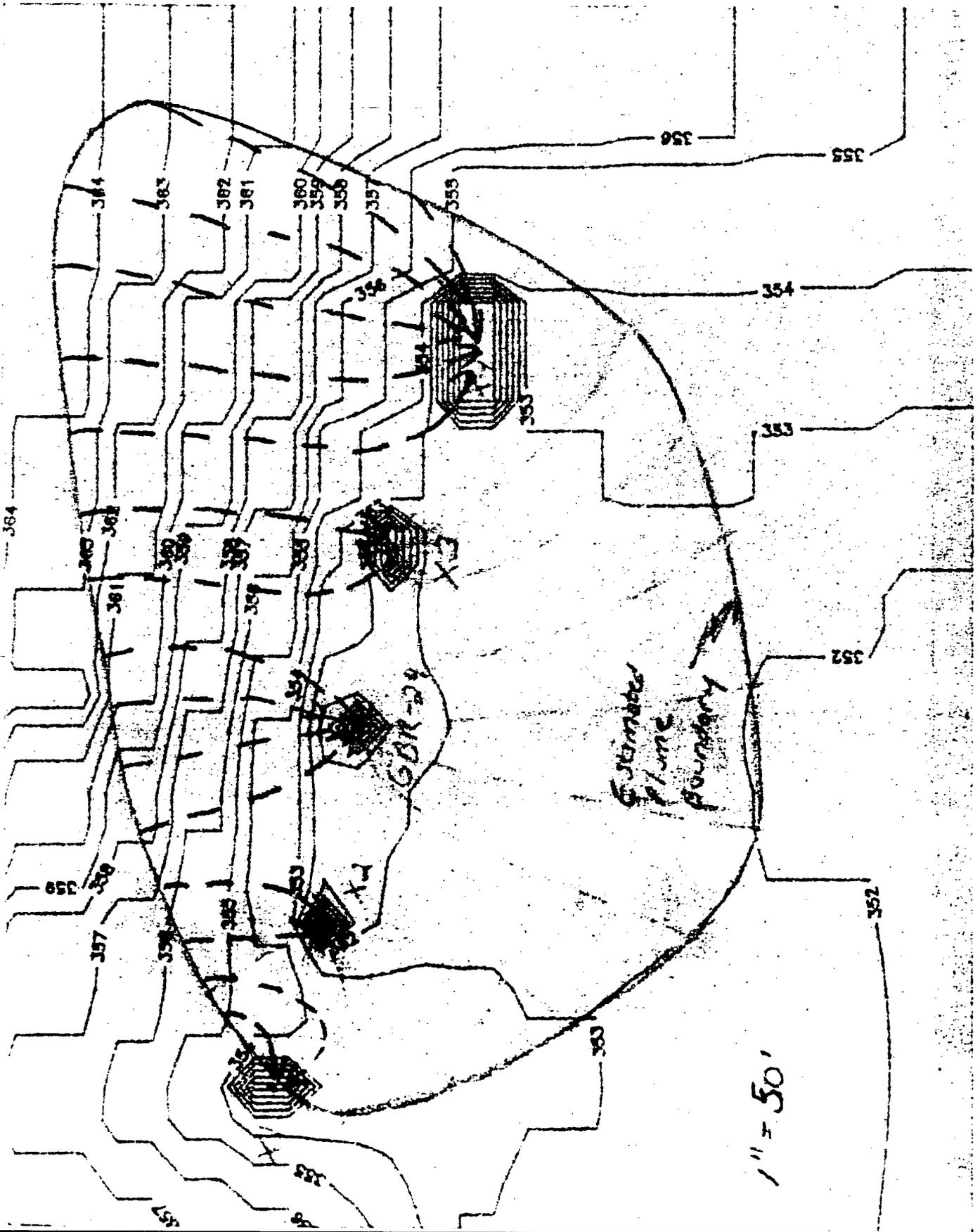


Fig. 1



United States Department of the Interior

GEOLOGICAL SURVEY

Water Resources Division
505 Marquette NW, Room 720
Albuquerque, New Mexico 87102

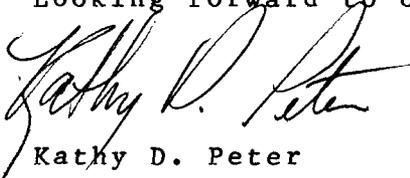
March 17, 1987

David G. Boyer
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Dear Dave:

This letter is to confirm our meeting on March 24, 1987 at 9:30 in the USGS conference room on the seventh floor of the Western Bank building. The purpose of this meeting is to briefly review the work completed so far in the Lee Acres area and discuss planned work. In particular, we need to review standard methods and quality control applicable to our investigations.

Looking forward to our meeting,



Kathy D. Peter

CC: Chuck Pettee, BLM, Santa Fe
Bob McClenahan, Giant, Gallup
Alberto Gutierrez, Geoscience, Albuquerque
Dennis McQuillan, NMEID, Santa Fe
Dave Boyer, NMOCD, Santa Fe

①

Estimates of un-retarded Plume Velocity (ft/day)

$$V = \frac{KI}{\theta}$$

where K = Permeability (gal/day/ft²)
 I = Hydraulic Gradient (ft/ft)
 θ = Porosity

K range (from Table 1) 1 - 100 gal/day/ft²

- I range - upper arroyo (pond to GBR-17) : 0.045
 (from Table 2) - middle arroyo (GBR-17 to 31) : 0.023
 - middle-lower (GBR-31 to 19) : 0.022
 - lower (GBR-19 to 11) : 0.021
 - Lee Acres (topographic map) : 0.017
 - Diesel Recovery area (23/24/31) : 0.091
 - Lower Recovery area (5/8/20) : 0.093
- θ range - 0.15 (poorly sorted) to 0.35 (well sorted)
 (Choose 0.20 since have mixtures)

Velocity for K Ranges (gal/day/ft²)
 (arroyo area, $I = 0.022$)

	1	5	10	50	100
ft/day	0.0155	0.074	0.15	0.74	1.5
ft/yr	5.37	26.8	53.7	268	537
ft/20 yrs	107	537	1,070	5370	10,700

(Lee acres, $I = 0.017$)

ft/day	0.011	0.057	0.11	0.57	1.1
ft/yr	4.15	20.7	41.5	207	415
ft/20 yrs	83	415	830	4150	8300

(2)

Are these estimates reasonable?

Assume plume front is at Reynolds well. Distance to landfill pits between 3500 - 4000 feet (3750' average)

What K values needed to move fluid that distance over 20 years? 25 years?

$$K = V \cdot \frac{\theta}{I} \quad (I = 0.022)$$

For 20 years:

$$3750' / 20 \text{ yrs} = 187.5 \text{ ft/yr}$$

$$K = 187.5 \times \left(\frac{.12}{.022} \times \frac{7.48}{365} \right)$$

$$K = 35 \text{ gpd/ft}^2$$

For 25 years:

$$3750 / 25 = 150 \text{ ft/yr}$$

$$K = 30 \text{ gpd/ft}^2$$

Therefore it is entirely reasonable to have a plume of mobile contaminants travel this distance over this period of time.

Prepared by D. H. Boyer 3/6/87

Table 1

(3)

ARROYO wells (with screened interval) =

GBR-17 Silty sand (12') 1-10 gpd/ft²
 Sand (Fine coarse) (6') 100-1000 gpd/ft²

GBR-14 Clayey sand & gravel (10') 10-200 gpd/ft²
 Poorly sorted gravel (5') 200 gpd/ft²
 Clayey gravel (5') 10-200 gpd/ft²
 Clayey sand (5') 1-100 gpd/ft²
 Coarse gravel (5') 1000 gpd/ft²

GBR-31 Sandy clay (4.5') 0.1 gpd/ft²
 Gravel (4') 500-1000 gpd/ft²

GBR-19 Sand (fine-medium) (2') 100-1000 gpd/ft²
 Clayey sand/sandy clay (4') 0.1-1 gpd/ft²
 Clay (3) 10⁻² gpd/ft²

Conclusion - For all wells in arroyo, some portion of log shows sand or gravel meaning water movement is fast in those sections. Degree of interconnection is unknown but likely enough continuous coarse material so that movement is relatively fast. Using GBR-17 (near center of arroyo) select range from 1 to 100 gpd/ft² for K values.

4

Table 2

Gradient Calculations

Gradient Between 17/18/24

$$\frac{108.6 - 69.1}{870} = \frac{39.5}{870} = 0.045$$

Between 17, 24 & 31:

$$\frac{8'}{345'} = 0.023$$

Down array (Lower portion GBR-K/E 11)

$$\frac{10'}{500'} = 0.020$$

Between 31/22/19

$$\frac{4'}{180'} = 0.022$$

Between 11/13/19

$$\frac{3.5}{170'} = 0.021$$

Between 20/11/8

$$\frac{6.2}{130'} = 0.048$$

Between 5/11/8

$$\frac{14.5}{150'} = 0.10$$

Between 5/20/8 $\frac{63 - 56}{75} = 0.093$

GBR 23/24/31

$$\frac{79.7 - 64}{172} = \frac{15.7}{172} = 0.091$$

Topographic Lower Array (Lee Area)

$$\frac{20'}{1200'} = 0.017$$

Upper Array (Grant Area)

$$\frac{20}{1200} = 0.017$$

(1)

3/24/87 - Meeting with USGS, Geoscience,
ET&, BLM OCT (K. Peter, Randy Hicks, Dennis,
McQuillen, C. Pelle, D. Boyer) (w/o lawyer)
Giant - Nothing much in the way of
additional investigation, except
in response to Boyer's letter - onsite
only. No decision on raw water
pond - to consult with county.
Giant recognitions will have to go off property
eventually - But first will contain and recover ^{product}

Short term USGS-BLM Verbal agreement
Most w/in 6 months

USGS ① to do water samples (List
to be provided) of 2-3 sites
on river (look for volatiles)
(April)

② to do water level survey - to
survey in all well heads
in arroyo, Giant & subdivision
well inventory (April - May)

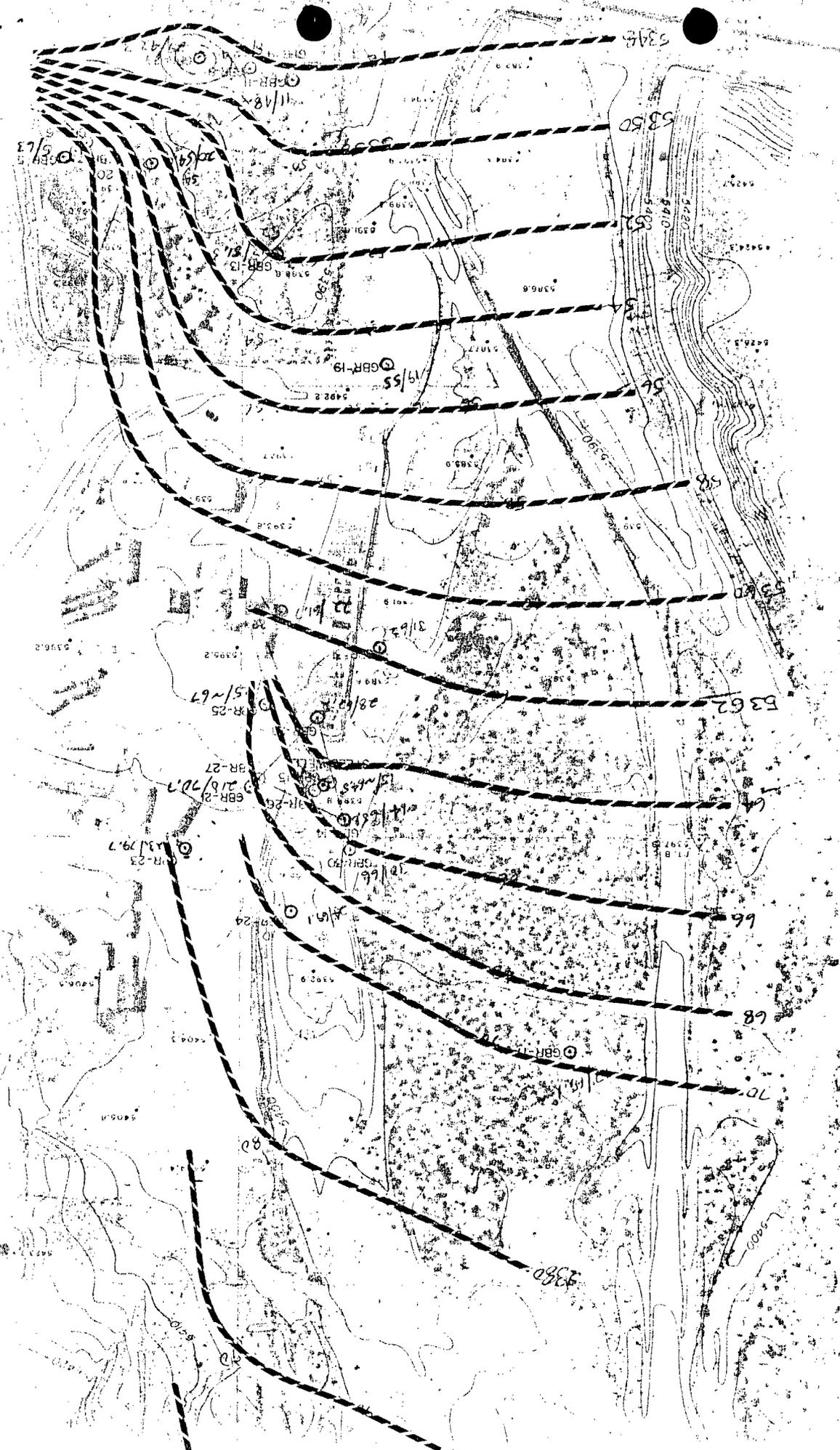
③ to sample piezometers for
inorganics (incl Sn, Br); will
install W.L. recorders on 3, plus
one on #13. ~~Area~~ ^{well} of Giant.
Late April - early May. (USGS # 3, 13,
Reynolds). Monthly measurements
for year. Two crest-stage recorders
& rain gauge - Giant may observe.

(4) Monitor wells - 5 sets of 3
 Water table, alluvial, bedrock
 1 upgradient, opposite landfill,
 by ^{GS}#13 by #5 by Highway.
 bedrock wells will be more
 complex - will have dual
 casing. Plan to drill not
 earlier than September. Sampling
 in October. Will sample
 domestic wells for PAH before
 deciding on monitor well
 suite.

(5) Plan soil gas survey in subdivision
 within 6 months.

Long term (Tentative schedule - Nothing firm)
 (1) Wells south of highway - late '87
 seismic survey (\$40,000 plus)
 Need to find "embers" in
 alluvium - wide range (Aug '87)

New Guidance - "RCRA Ground-Water
 Monitoring Technical Enforcement
 OSWER-9950.1 Guidance Document, September
 1986;" EPA Office of Waste
 Programs Enforcement, Office of
 Solid Waste & Emergency Response,



AGENDA

**Bureau of Land Management/
NM Environmental Improvement Division**

**Meeting on Lee Acres Landfill
March 9, 1987, 9:00 a.m.**

- I. Introduction of Participants
 - A. Proposed Procedure

- II. Technical Data Presentation by Environmental Improvement Division (EID)
 - A. Lee Acres (Dennis McQuillan)
 - B. Giant Refinery (David Boyer)
 - C. Questions and Answers

- III. Technical Data Presentation by Bureau of Land Management
 - A. General Outline
 - B. Questions and Answers

- IV. Investigation and Remediation
 - A. EID's Perspective
 - 1. Requirements
 - 2. Technical Feasibility
 - B. BLM's Reactions and Concerns

- V. General Discussion

*See Litigation
File for attendees*

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION



February 25, 1987

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert L. McClenahan, Jr.
Environmental Coordinator
Giant Industries, Inc.
Route 3, Box 7
Gallup, New Mexico 87301

Re: Ground Water Investigation at the Giant Industries, Inc.
Bloomfield Refinery, Bloomfield, New Mexico.

Dear Mr. McClenahan:

The purpose of this letter is to provide Oil Conservation Division (OCD) comments on the progress to date of Giant's investigation and remedial action at the Bloomfield Refinery. These comments are based on the investigation reports by Geoscience Consultants, Ltd., provided OCD by Giant (dated May 23, 1986 and December 1, 1986), and by field visits to the refinery by OCD staff on June 5, July 8, and November 20-21, 1986; and on January 21 and 29, 1987. All sampling results from these visits have been previously provided to Giant and their consultants. These comments will also serve to provide guidance as you move into planning additional remedial work, and prepare for submittal of the discharge plan.

Today, Giant is the only party that has undertaken subsurface investigation to determine current water quality conditions. As you know, BLM has installed several piezometers within the past several weeks, but they are to be used only for water level determinations. Giant is to be commended for the promptness in drilling new wells and installing hydrocarbon recovery systems in response to discovery of contamination.

The status of the EID-BLM lawsuit is that the case is in Federal District Court and BLM has responded to EID's complaint. No meetings that may lead to a negotiated settlement between the parties have been scheduled. Copies of the pleadings to date are being sent under separate cover to Giant and their attorneys.

The comments provided below do not include all the comments of OCD staff on the reports, but instead address only major areas or issues that we believe need discussion or attention. We do have some questions about other material in the reports that we would like to discuss at a convenient time. Page numbers shown below reference the May (M) or December (D), 1986 report.

1. The information available to date indicates that in the areas where Giant has undertaken subsurface investigation, a considerable area of ground water degradation has occurred. Review of Giant and OCD analyses of the monitor and recovery wells shows that free product and/or refinery type waste exist in ground water from the southern end of the refinery at Highway 64 north at least 1000 feet to the area of well GBR-24. Based on this information, I disagree with the report's contention (D, p. 1, 2, 30) that Giant's contamination is localized and insignificant when compared to that from Lee Acres. The wells closest to the arroyo (including upgradient well GBR-17) also show halogenated hydrocarbons and increased levels of chlorides which are not characteristic of Giant's refinery waste and likely have migrated from the Lee Acres landfill.
2. In addition to hydrocarbon spills in the truck loading/fueling area, the May report indicates that an unlined "slop pit" with a capacity of between 67,000 and 101,000 gallons received all refinery wastes between 1973 and 1978, and that an unlined evaporation pond was in use from 1980 to 1982 (M, p. 3-4). Also production area losses were not controlled by catchment drains until 1979, and hydrocarbon losses prior to then were caught by the storm water containment areas (M, p. 5-6). Excavation in both areas showed oil-stained soil at depth indicating that wastewater and oil had migrated to at least that level and likely further downward. Wells located at the south end of the storm water area (especially GBR-5) have shown free product. No wells have been drilled near the site of the "slop pit" and evaporation pond. There is a high likelihood of free oil being present in the subsurface in this area. Giant will need to address this issue in future submittals since recovery operations in the southern refinery area will not be effective if free product exists beneath the "slop pit" area and is available to migrate.
3. Contrary to assertions made in both reports (M, p. 2, 9; D, p.2, 11) at least one major chlorinated solvent has been identified by OCD as having its source at the refinery. 1, 2-dichloroethane, commonly known as "EDC",

has been found in samples from the burn pit seep which is a perched water source recognized by both Giant and OCD as not being connected with landfill leachate. EDC was also found in numerous refinery monitor/recovery wells, especially those having high dissolved levels of benzene, toluene, and xylene (GBR 10, 11, 27).

EDC has been commonly used as an additive to leaded gasoline and has been found by the Environmental Improvement Division in ground water contaminated by leaky underground storage tanks at service stations. EDC has several physical and chemical properties that are of concern in evaluating its effect on ground water quality. Compared to other aromatic and halogenated organic volatiles it is very soluble (8,690 mg/l vs. 1,780 for benzene), has a higher specific gravity (1.25 vs. 0.88 for benzene), and is less likely to be sorbed on soils (Kow [Octanol/Water Partition Coefficient] 18 vs. 135 for benzene). In essence this means that compared to dissolved benzene, more EDC is likely to be carried further in ground water at greater depths.

EDC at 3 ppb was found this past autumn by EID and OCD in two samples taken a month apart for a domestic well (Mulliken) close to the arroyo at a distance of about 2500 feet from the southern end of the refinery and about 5500 feet from the landfill lagoons. These results (and location map) are enclosed and show no other organics.

4. With the exception of EDC no verified organic contamination of the type associated with chlorinated solvents or refinery waste has been found in wells south of the Reynolds/Duggins wells. Additionally, chloride concentrations, which may be indicative of landfill leachate, are anomalously high in Lee Acres only in the area of the Reynolds/Duggins wells. Therefore the figure in the December report (D, p. 28) showing the estimated extent of the Lee Acres leachate plume is incorrect and the area of contamination is greatly over estimated. This is based on available data including sampling of many subdivision wells, some not shown on the enclosed figure. The plume, however, is moving. The Duggins well, which had 40 mg/l chloride and no organics detected at 1 ppb in 1985, had over 200 mg/l chloride in 1986 with numerous organics characteristic of both landfill and refinery wastes.
5. Within the Diesel Spill Area additional wells other than those shown in Figure 4-2 (D, p. 25) have free product.

GBR-26 and 30 have product as indicated in Table 4-1 (D, p.18). These recent results were not reflected in the figure, and the plume of free product is slightly larger than shown in Figures 4-2 and 5-1 (D, p. 31). Based on this information and the report's criteria for drilling new exploratory wells (D, p.31), at least one additional well (x-1a) is required. The location of the well is dependent on the slope of the water table (potentiometric gradient) in that area which was not shown on any of the plates. Such a water table map (or maps) would be useful since complete water levels are available for at least May, August, and October 1986. It would be useful to see changes in area water levels due to the effect of arroyo runoff from summer rainfall.

6. Both reports discuss spray application of untreated water recovered from the wells to soils stored in the bermed area northeast of the refinery process area (M, p.31; D, p.7, 40). These soils were removed from several pits and have various levels of hydrocarbons. At this time the OCD is not requiring and does not expect to require that these soils be treated other than by natural degradation processes. At their current location, they do not pose a risk to water supplies, and the location is not accessible to the public. If contaminated water containing BTX and/or chlorinated hydrocarbons is applied to the site, a very good operational plan will be needed to be prepared and approved by OCD prior to such application. While a treatment schedule such as that shown in Table 5-1 (D, p. 41) is useful, actual conditions may preclude following the schedule exactly. For example, last summer several days of extremely heavy rainfall occurred in the area. Such events will need to be factored into any operational plan by considering such things as actual rainfall, evaporation rate, antecedent moisture conditions, etc. Tensiometers or other in situ moisture measurements might be necessary. A small, well-controlled pilot operation using a liner or tank may be useful to determine final contaminant concentrations for any leachate that migrates downward. Giant should work and consult with OCD so as not to proceed with work that may not be necessary. Giant should also be aware that disposal of chlorinated solvents in that manner may subject you to RCRA requirements not under OCD's control.
7. An abandoned water well was shown as being sampled as part of the January, 1986, reconnaissance sampling (M, p. 14). Please provide information on the location of

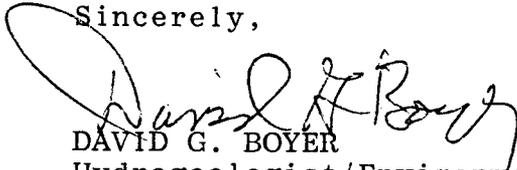
the well, basic data (if available) on construction, depth, use, etc., and the analysis results. This well is not shown in either of the recent state and USGS ground water reports for the area.

8. Provide formal as-built plans for the fluid recovery system at the burn pit seep. Also please provide an additional copy of Plate 1 (Site Location Map) for the May report.
9. The raw water pond appears to be leaking severely. Seepage water can be seen on the surface at the bottom of the bermed area on the south and west sides of the pond. A slumped area of earth and a fracture are present north of the southwest corner. Although the quality of the pond water is good (Cl = 8 mg/l, SO₄=86, TDS=253), white salts indicative of evaporation can be seen at the seepage areas. Water in GBR-18, immediately southwest of the pond, shows Cl=240 mg/l, SO₄=2800 and TDS=4900 mg/l. This water entering the shallow alluvial system both degrades the inorganic water quality and will likely cause the existing contaminant plume to move faster and further than would otherwise occur. It will also complicate cleanup efforts if, as expected, some cleanup of inorganics (especially chlorides from the landfill area) is required.
10. OCD concurs with the generalized goals of regional remedial action at the Lee Acres/Giant site that were presented in the December report (D, p. 42). It is OCD's preference to have such action formalized in a settlement agreement between all parties under the New Mexico Water Quality Control Commission Regulations. These Regulations include numerical ground water standards to which ground water must be restored unless naturally occurring background is higher, or unless it can be demonstrated, after some period of effort, that such standards cannot be met due to technological incapability when using the technology approved in a final reclamation plan. Until negotiations toward a settlement agreement are initiated, Giant should continue remedial action as instituted, and should initiate such further action as might be necessary to contain and recover hydrocarbon liquids and/or dissolved constituents. Prior to drilling of new monitor/recovery wells, or the installation of major treatment units, or below ground systems (e.g. infiltration galleries), Giant should contact and consult with OCD regarding such

systems, their location and operation. With respect to any systems for spray application or reinjection of water, such discharges will need to be included under the pending discharge plan.

If you have any questions on this matter, please contact me at 827-5812, or at the address given above.

Sincerely,



DAVID G. BOYER
Hydrogeologist/Environmental
Bureau Chief

enc.

cc: Carlos A. Guerra, Giant Industries
Mark F. Sheridan, Montgomery and
Andrews
Alberto A. Gutierrez, GCL
Jennifer Pruett, NMEID

P 612 458 442

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to McClenahan - Giant Industries	
Street and No. Rt 3, Box 7	
P.O., State and ZIP Code Gallup, N.M. 87301	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	\$
Postmark or Date	

★ U.S.G.P.O. 1983-403-517

PS Form 3800, Feb. 1982

**WATER-QUALITY INVESTIGATIONS
AT THE LEE ACRES LANDFILL AND VICINITY
SAN JUAN COUNTY, NEW MEXICO**

**Prepared
Dennis McQuillan and Patrick Longmire**

February 1986

**Environmental Improvement Division
Ground Water/Hazardous Waste Bureau
P.O. Box 968
Santa Fe, NM 87504
(505) 827-2912**

**Denise Fort, Director
Environmental Improvement Division**

**Ernest C. Rebeck, Chief
Ground Water/Hazardous Waste Bureau**

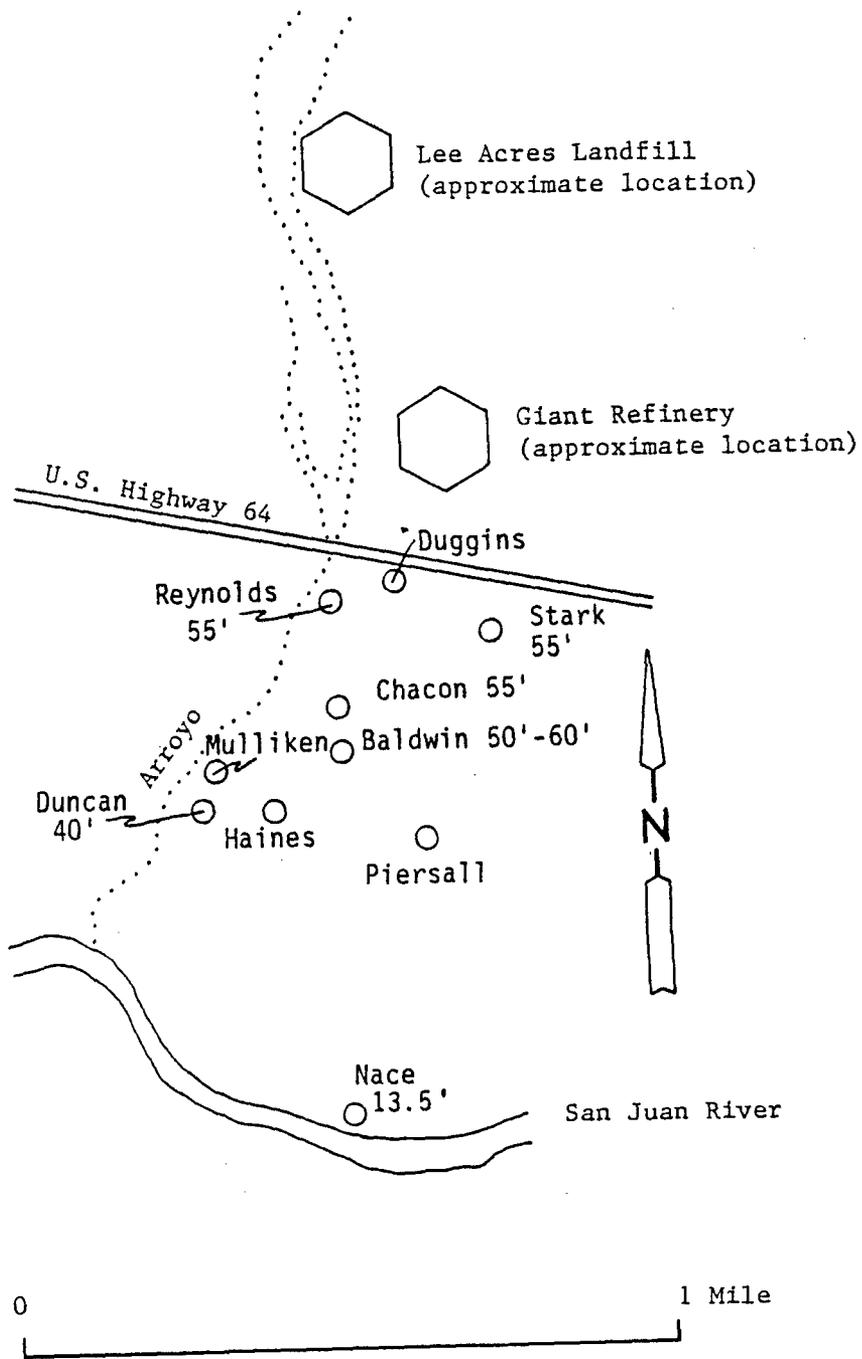


Figure 6. Locations and Reported Depths of Wells Sampled.

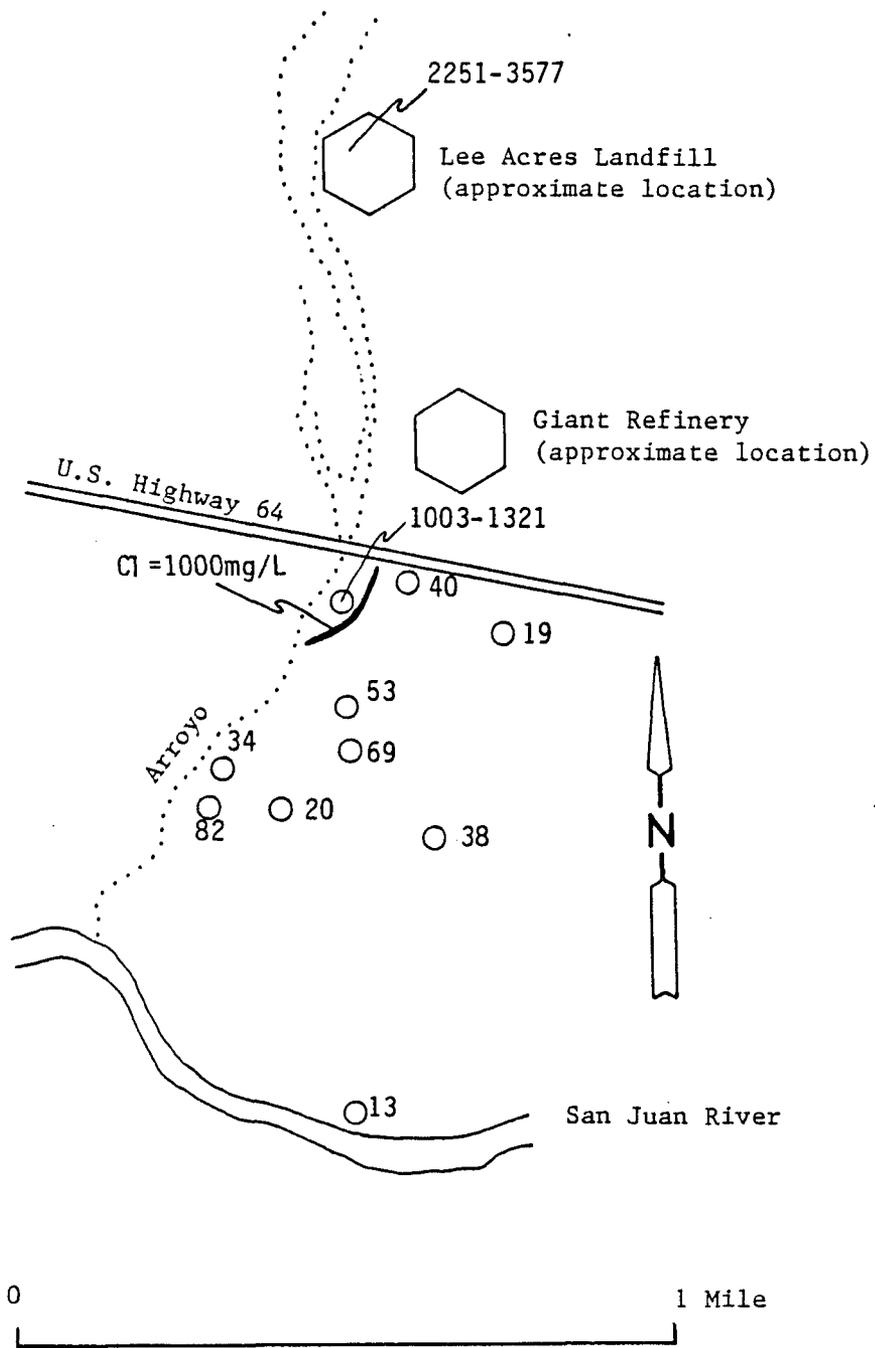


Figure 15. Chloride Concentrations of Well Waters and Lagoon Water in mg/L. Contour interval is 1000mg/L.

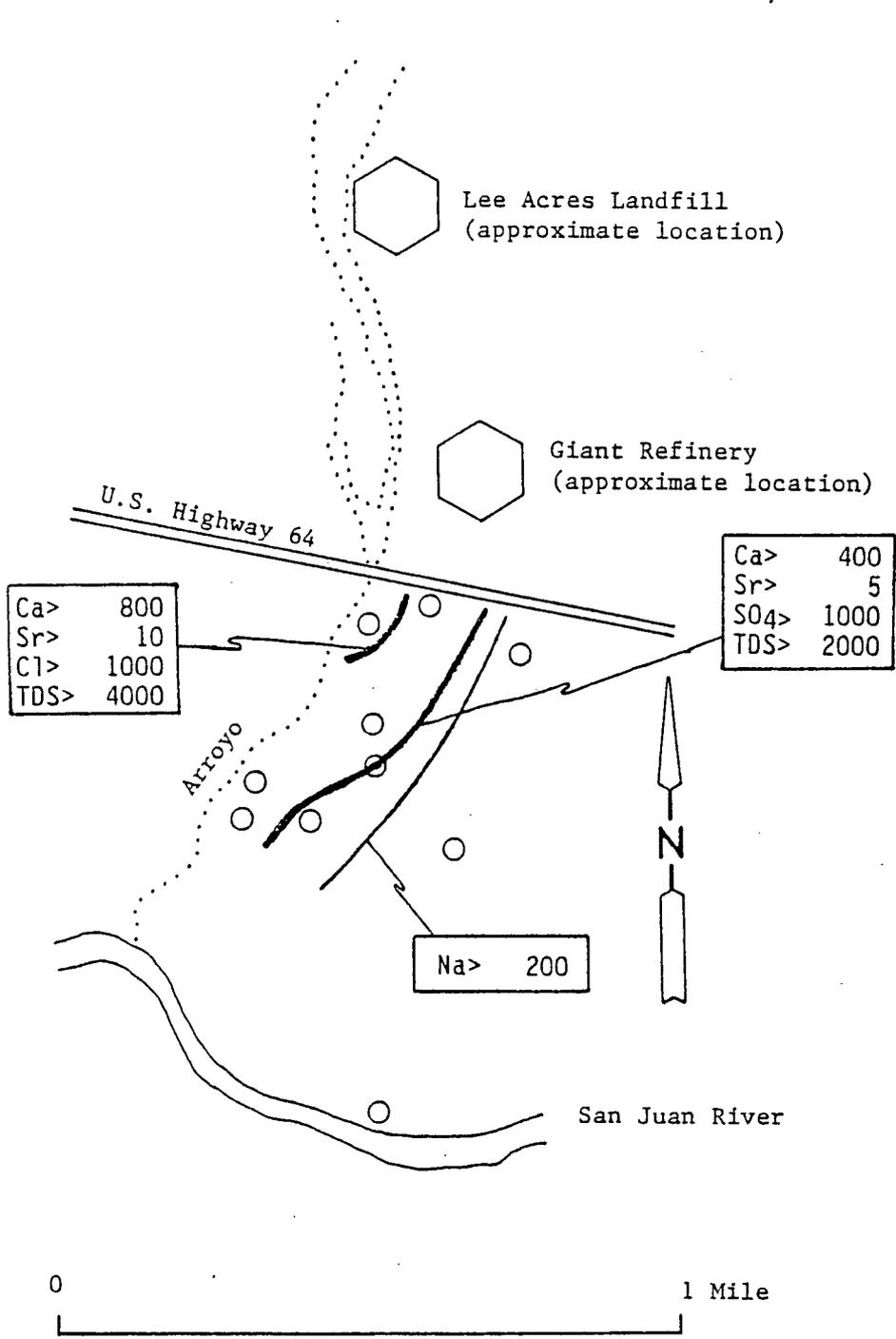
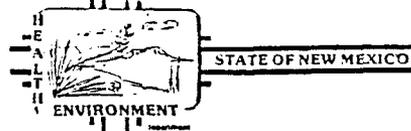


Figure 17. Summary of Water Quality Data for the Alluvial Aquifer. All concentrations are mg/L.



REPORT TO: David Boyer S.L.D. No. OR- 1378A,B
N.M. Oil Conservation Division DATE REC. 11-26-86
P. O. Box 2088
Santa Fe, N.M. 87504-2088 PRIORITY 2

PHONE(S): 327-5812 USER CODE: 8 2 2 3 5
SUBMITTER: David Boyer CODE: 2 6 0

SAMPLE COLLECTION CODE: (YYMMDDHHMMIII) 8 6 1 1 2 1 1 3 0 2 2 9 8

SAMPLE TYPE: WATER , SOIL , FOOD , OTHER: _____ CODE: _____

COUNTY: San Juan; CITY: Los Alamos CODE: _____

LOCATION CODE: (Township-Range-Section-Tracts) 29N+12W+28+421 (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS **EXTRACTABLE SCREENS**

- | | |
|---|--|
| <input type="checkbox"/> (753) Aliphatic Purgeables (1-3 Carbons) | <input type="checkbox"/> (751) Aliphatic Hydrocarbons |
| <input checked="" type="checkbox"/> (754) Aromatic & Halogenated Purgeables | <input type="checkbox"/> (760) Organochlorine Pesticides |
| <input type="checkbox"/> (765) Mass Spectrometer Purgeables | <input type="checkbox"/> (755) Base/Neutral Extractables |
| <input type="checkbox"/> (766) Trihalomethanes | <input type="checkbox"/> (758) Herbicides, Chlorophenoxy acid |
| Other Specific Compounds or Classes | <input type="checkbox"/> (759) Herbicides, Triazines |
| <input type="checkbox"/> | <input type="checkbox"/> (760) Organochlorine Pesticides |
| <input type="checkbox"/> | <input type="checkbox"/> (761) Organophosphate Pesticides |
| <input type="checkbox"/> | <input type="checkbox"/> (767) Polychlorinated Biphenyls (PCB's) |
| <input type="checkbox"/> | <input type="checkbox"/> (764) Polynuclear Aromatic Hydrocarbons |
| <input type="checkbox"/> | <input type="checkbox"/> (762) SDWA Pesticides & Herbicides |

Remarks: _____

FIELD DATA:

pH= _____; Conductivity= _____ umho/cm at _____ °C; Chlorine Residual= _____ mg/l
Dissolved Oxygen= _____ mg/l; Alkalinity= _____ mg/l; Flow Rate _____ / _____
Depth to water _____ ft.; Depth of well _____ ft.; Perforation Interval _____ - _____ ft.; Casing: _____

Sampling Location, Methods and Remarks (i.e. odors, etc.)
M Mulliken - Strong septic odors, black sediment
Sample from B. yard top near well

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities. (signature collector): David Boyer Method of Shipment to the Lab: Hand Delivered

This form accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____

Samples were preserved as follows:
 NP: No Preservation; Sample stored at room temperature.
 P-Ice: Sample stored in an ice bath (Not Frozen).
 P-Na₂S₂O₃: Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from William Olson to Mary C. Eiler
at (location) HED/SLD on 11/26/86 - 4:00 PM and that

the statements in this block are correct. Evidentiary Seals: Not Sealed Seals Intact: Yes No

Signatures William Olson Mary C. Eiler

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- (753) Aliphatic Purgeables (1-3 Carbons)
- (754) Aromatic & Halogenated Purgeables
- (765) Mass Spectrometer Purgeables
- (766) Trihalomethanes
- Other Specific Compounds or Classes
- _____
- _____
- _____
- _____
- _____

EXTRACTABLE SCREENS

- (751) Aliphatic Hydrocarbons
- (760) Organochlorine Pesticides
- (755) Base/Neutral Extractables
- (758) Herbicides, Chlorophenoxy acid
- (759) Herbicides, Triazines
- (760) Organochlorine Pesticides
- (761) Organophosphate Pesticides
- (767) Polychlorinated Biphenyls (PCB's)
- (764) Polynuclear Aromatic Hydrocarbons
- (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
aromatic purgeables	ND		
1,2-dichloroethane	3		
* DETECTION LIMIT *	1ppb	+ DETECTION LIMIT +	+

ABBREVIATIONS USED:
 N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT
 T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)
 [RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: _____

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Intact: Yes No . Seal(s) broken by: [Signature] date: 12-2-86

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: 2 Dec 86. Analyst's signature: [Signature]

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: [Signature]

86-1309-C

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud NE

Albuquerque, NM 87106 841-2570



REPORT TO: Dennis McQuillan S.L.D. No. OR- 1307
EID - Ground Water DATE REC. 11-17-86
P.O. Box 968
Santa Fe, N.M. 87504-0968 PRIORITY 3

PHONE(S): 827-2912 USER CODE: 519131010
 SUBMITTER: McQuillan CODE: MICQ

SAMPLE COLLECTION CODE: (YYMMDDHHMMII) 861102811045MICQ

SAMPLE TYPE: WATER , SOIL , FOOD , OTHER: _____ CODE: _____

COUNTY: San Juan; CITY: Lep Acres CODE: _____

LOCATION CODE: (Township-Range-Section-Tracts) 29N+12W+28+4211 (10N06E24342)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- (753) Aliphatic Purgeables (1-3 Carbons)
- (754) Aromatic & Halogenated Purgeables
- (765) Mass Spectrometer Purgeables
- (766) Trihalomethanes
- Other Specific Compounds or Classes
- _____
- _____
- _____
- _____
- _____

EXTRACTABLE SCREENS

- (751) Aliphatic Hydrocarbons
- (760) Organochlorine Pesticides
- (755) Base/Neutral Extractables
- (758) Herbicides, Chlorophenoxy acid
- (759) Herbicides, Triazines
- (760) Organochlorine Pesticides
- (761) Organophosphate Pesticides
- (767) Polychlorinated Biphenyls (PCB's)
- (764) Polynuclear Aromatic Hydrocarbons
- (762) SDWA Pesticides & Herbicides

Remarks: _____

FIELD DATA:

pH= _____; Conductivity= 2550 umho/cm at 17.5°C; Chlorine Residual= _____ mg/L
 Dissolved Oxygen= _____ mg/l; Alkalinity= _____ mg/l; Flow Rate _____
 Depth to water _____ ft.; Depth of well _____ ft.; Perforation Interval _____ ft.; Casing _____

Sampling Location, Methods and Remarks (i.e. odors, etc.)
Mulliken Well, sampled at backyard tap

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities. (signature collector): Dennis McQuillan Method of Shipment to the Lab: air, auto

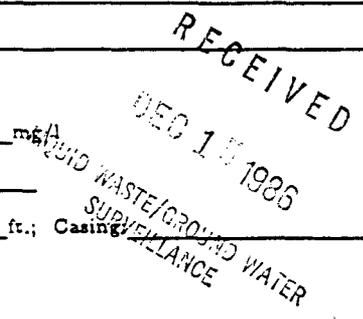
This form accompanies 2 Septum Vials, _____ Glass Jugs, and/or _____

Samples were preserved as follows:
 NP: No Preservation; Sample stored at room temperature.
 P-ice Sample stored in an ice bath (Not Frozen).
 P-Na₂S₂O₅ Sample Preserved with Sodium Thiosulfate to remove chlorine residual.

CHAIN OF CUSTODY

I certify that this sample was transferred from _____ to _____
 at (location) _____ on _____ - _____ and that
 the statements in this block are correct. Evidentiary Seals: Not Sealed Seals Intact: Yes No

Signatures _____



85-0383 Environmental Improvement Division
& Environment Department
P.O. Box 968 - Crown Building
Santa Fe, New Mexico 87504-0968
ATTENTION: Longmire
BUREAU: GW/HW

LABORATORY

LAB NUMBER

SLD Users Code No. 57300

ALL CONTAINERS WHICH THIS FORM ACCOMPANIES ARE COLLECTIVELY REFERRED TO AS "SAMPLE".

CERTIFICATE OF FIELD PERSONNEL

Sample Type: Water Soil Other _____
Water Supply and/or Code No. James Mulliken
City & County Lee Acres SPO Box - E, San Juan Co, 87401
Collected (date & time) 8504300925 By (name) Longmire/Earp - EID
pH= 7.21; Conductivity= 2490 umho/cm at 14.6 °C; Chlorine Residual= _____
Dissolved Oxygen= _____ mg/l; Alkalinity= _____; Flow Rate= _____
Sampling Location, Methods & Remarks (i.e. odors etc.)
Spigot, strong sulfide odor

I certify that the statements in this block accurately reflect the results of my field analyses, observations and activities. Signed _____
I certify that I witnessed these field analyses, observations and activities and concur with the statements in this block. Signed _____

Method of Shipment to Laboratory _____
THIS FORM ACCOMPANIES 2 septum vials with teflon-lined discs identified as: specimen _____; duplicate _____; triplicate _____; blank(s) _____, and _____ amber glass jug(s) with teflon-lined cap(s)-identified as _____, and _____ other container(s) (describe) _____ identified as _____
Containers are marked as follows to indicate preservation (circle):
NP: No preservation; sample stored at room temperature (~20°C).
P-ICE: Sample stored in an ice bath:
P-Na₂O₃S₂: Sample preserved with 3 mg Na₂O₃S₂/40 ml and stored at room temperature.

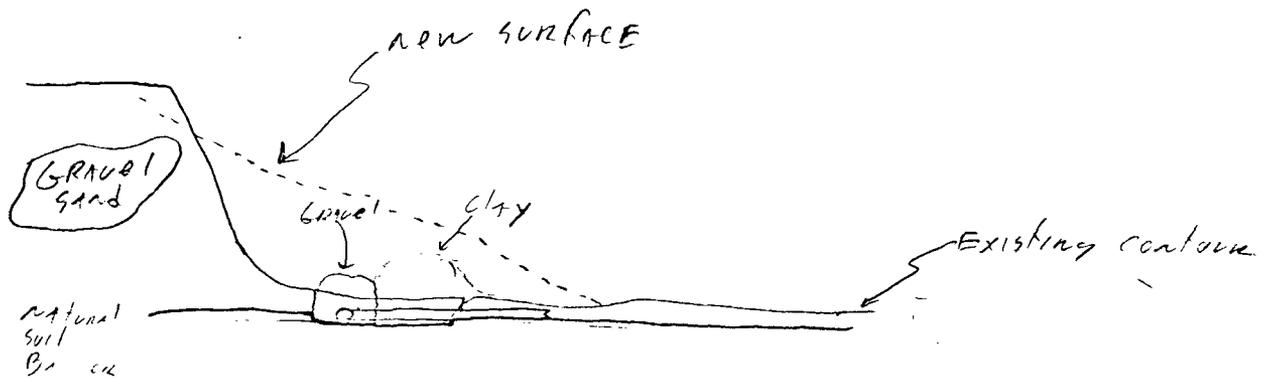
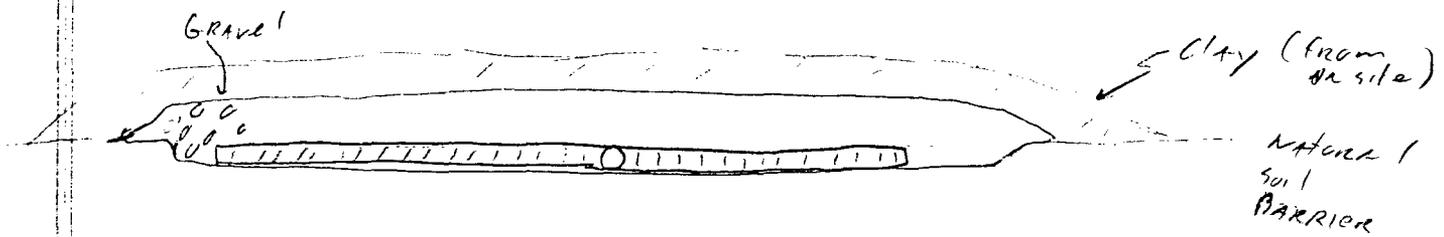
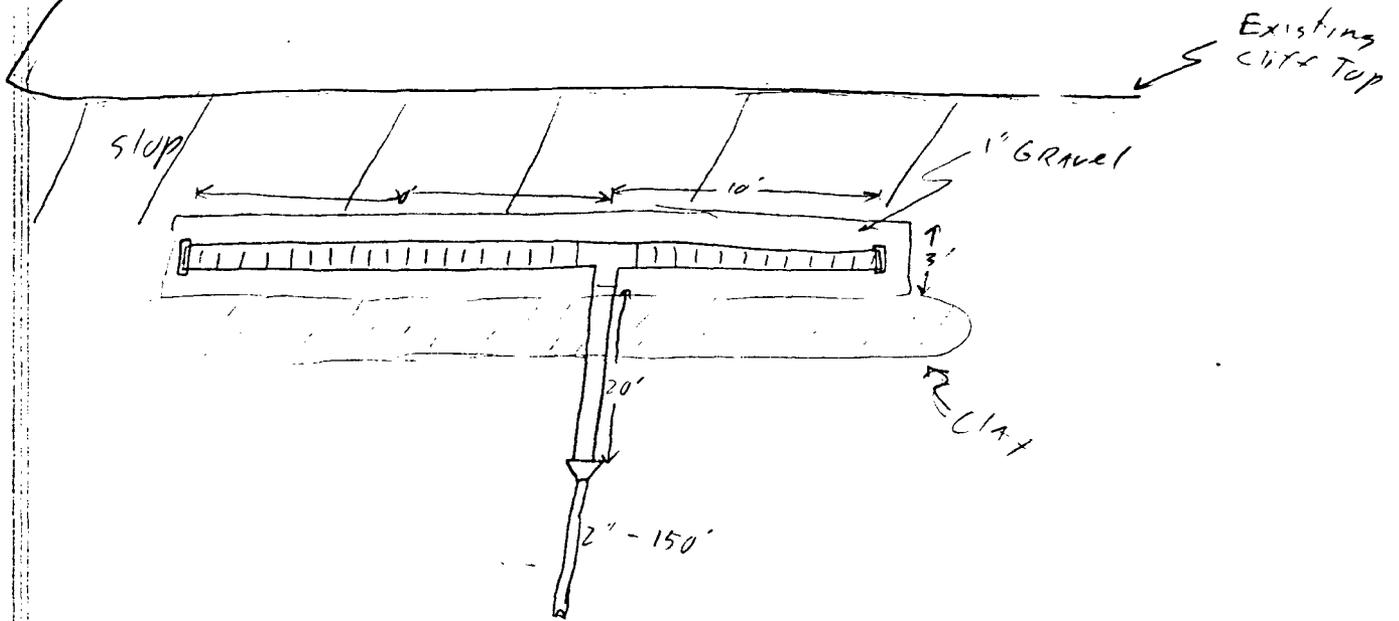
CERTIFICATE(S) OF SAMPLE RECEIPT

I (we) certify that this sample was transferred from _____ to _____ at (location) _____ on _____ (date & time) _____ and that the statements in this block are correct.
Disposition of Sample _____ Seal(s) Intact: Yes No
Signature(s) _____

I (we) certify that this sample was transferred from _____ to _____ at (location) _____ on _____ (date & time) _____ and that the statements in this block are correct.
Disposition of Sample _____ Seal(s) Intact: Yes No
Signature(s) _____

RECEIVED
JUN 24 1985
LIQUID WATER / GROUND WATER SURVEILLANCE

Burn Pit leachate collection system



ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISIONTONY ANAYA
SECRETARYPOST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-6800

December 30, 1986

John Kaszuba
Geoscience Consultants
222 Copper Square
560 Copper Avenue N.W.
Albuquerque, NM 87107

Dear Mr. Kaszuba:

On November 20th and 21st, yourself, Dave Boyer and I sampled seventeen of the monitor wells at the Giant Refinery near Bloomfield, New Mexico. During the sampling we expressed our concern about cross contaminating the monitor wells by not cleaning the bailers with Laboratory cleaning soap and not using clean rope when going from well to well. We stated at the time that a laboratory cleaning soap should be used in cleaning bailers and that clean rope be put on the bailers especially after a well containing product has been sampled. As you were concerned about whether you were following proper sampling procedures, I said I would send you a copy of our field sampling procedures. Enclosed you will find a draft copy of the New Mexico Oil Conservation Division field sampling procedures.

If you have any questions please feel free to call me.

Sincerely,

William Olson
Hydrologist



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONY ANAYA
GOVERNOR

December 29, 1986

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501-2088
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Carl Shook, Vice Pres.
Refining Operations
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

RE: DISCHARGE PLAN REQUIREMENT FOR BLOOMFIELD REFINERY AND
TRANSPORTATION FACILITY

Dear Mr. Shook:

Under the provisions of the Water Quality Control Commission (WQCC) Regulations, you are hereby notified that the filing of a discharge plan for your existing Bloomfield Refinery and transportation facility located in Section 17, Township 29 North, Range 12 West, NMPM, San Juan County, New Mexico, is required.

This notification of discharge plan requirement is pursuant to Sections 3-104 and 3-106 of the WQCC regulations. The discharge plan defined in Section 1-101.P. of the WQCC Regulations, should cover all discharges of effluent or leachate at the plant site or adjacent to the plant site. Included in the application should be plans for controlling spills and accidental discharges at the loading facility (including detection of leaks in buried underground tanks and/or piping), and information on locations of, and discharges to septic tanks and leach fields. If detailed information is available at the time of discharge plan submittal on land application, re-injection wells, or other discharges planned as part of an approved remedial action plan, such information should be submitted for inclusion in the plan.

A copy of the regulations is enclosed for your convenience. Also enclosed is a copy of an OCD guide to the preparation of discharge plans for gas processing plants. These guidelines are also applicable to refineries since many processes and effluents are similar. Three copies of your discharge plan should be submitted for review purposes.

Section 3-106-A. of the regulations requires a submittal of the discharge plan within 120 days of receipt of this notice unless an extension of this time period is sought and approved for good cause. Section 3-106.A. also allows the discharge to continue

without an approved discharge plan until 240 days after written notification by the director that a discharge plan is required. An extension of this time may be sought and approved for good cause.

If there are any questions on this matter, please feel free to call David Boyer (827-5812) or Roger Anderson at 827-5885 as they have the assigned responsibility for review of all discharge plans.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. L. Stamets", followed by a large, stylized number "6".

R. L. STAMETS
Director

RLS:RCA:dp

Enc.

cc: OCD-Aztec

5:1e

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION



December 23, 1986

TONY ANAYA
GOVERNOR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

Received by:

*Mark
Guller*

*M & A
12/23/86
3:30 PM*

Mr. Mark F. Sheridan
Montgomery & Andrews
Attorneys at Law
P. O. Box 2307
Santa Fe, N.M. 87504-2307

RE: PRELIMINARY REPORT ON GROUND WATER INVESTIGATIONS AT
GIANT INDUSTRIES, INC., BLOOMFIELD REFINERY

Dear Mr. Sheridan:

Your letter of December 8, 1986, to Mr. David Boyer, Environmental Bureau Chief, requesting confidentiality of portions of the above-referenced report has been reviewed in conjunction with the provisions of the applicable section of the Water Quality Act [74-6.12.(B)]:

"Effluent data obtained by the commission or a constituent agency shall be available to the public. Other records, reports or information obtained by the commission or a constituent agency shall be available to the public, except upon a showing satisfactory to the commission or a constituent agency that the records, reports or information or a particular part thereof, if made public, would divulge methods or processes entitled to protection as trade secrets."

Review of those sections of the report enumerated in the request did not reveal any portion that, if made public, would divulge methods or processes entitled to protection as trade secrets.

Examples of the type of information that are entitled to be kept confidential include (but are not limited to) computer codes for proprietary ground water flow and solute transport models, but not hydrogeologic and water quality data used as model inputs; design and/or circuit data for pumps, geo-physical, water level or contaminant detection equipment, or other such devices for detecting or removing such contamination, but not their location of use or installation; and exact

Mr. Mark Sheridan cont.

December 23, 1986

-2-

biological and chemical composition of nutrients added to enhance in situ biodegradation, but not total volumes of fluids applied.

The types of information not entitled to be kept confidential include location, water level and lithologic logs of water monitor wells; water quality analyses from such wells, when such reports or information have been requested by the agency; and conclusions or inferences drawn from the scientific data presented in the requested report.

The information in the Giant report is of the latter type and not entitled to be kept from the public domain under the provisions of the Water Quality Act. If you disagree with this finding, please contact the OCD in writing giving specifics as to your objections by December 31, 1986. If we do not hear from you by that date, we will make the report available to the public for review upon request.

Giant Refining Company has been cooperative in undertaking contamination investigation at the Bloomfield site and providing OCD with the requested information and data. Giant is the only entity which to date has provided actual subsurface information in the area of the Lee Acres Landfill. Such cooperation with the State of New Mexico and OCD was directly pivotal in the decision to not issue a RCRA administrative compliance order at the facility. I hope that we will continue to receive such cooperation in the resolution of this issue.

If you desire further information, you may contact me by phone at 827-5812.

Sincerely,



R. L. STAMETS,
Director

DGB:dp:et

cc: Charles Roybal, Acting Secretary, EMD
D. G. Boyer, Environmental Bureau Chief
Jeff Taylor, Legal Counsel, OCD
Robert L. McClenahan, Jr.
Carlos A. Guerra, Giant Phoenix

GIANT
REFINING COMPANY

ROUTE 3, BOX 7 • GALLUP, NEW MEXICO 87301
(505) 722-3833 • TWX 910-981-0504

December 12, 1986

Richard L. Stamets
Director
NMOCD
P.O. Box 2088
Land Office Building
Santa Fe, NM 87501

RE: Diesel leak at Giant's Bloomfield Refining Truck Terminal

Dear Mr. Stamets:

This letter is a follow-up to a conversation with Mr. Roger Anderson of your staff on November 26, regarding a diesel leak at our Bloomfield truck terminal located at the refinery site. The leak in an underground transfer line occurred around the week of November 10, and resulted in the loss of approximately 15,000 gallons of diesel. The leak occurred a few feet north of the fueling terminal, northeast of GBR-22. After the leak was discovered a recovery pump was placed in GBR-22 (a 2" well) to recover as much hydrocarbon as possible.

Further work will be done based upon the effectiveness of the recovery program currently underway.

Sincerely,



Bob McClenahan, Jr.
Environmental Coordinator
Giant Refining Company

RLM:ds

cc: Carl Shook
Jerry Puckett
Rodger Anderson, OCD
Claude Schleyer, Geoscience Consultants, Ltd.
Frank Chavez, OCD, Aztec



MEMORANDUM OF MEETING OR CONVERSATION

OIL CONSERVATION DIVISION

<input checked="" type="checkbox"/> Telephone	<input type="checkbox"/> Personal	Time 12:30	Date 11/26/86
---	-----------------------------------	---------------	------------------

<u>Originating Party</u> BOB McCLANAHAN - GIANT REF	<u>Other Parties</u> ROGER ANDERSON - OCD DAVE BOYER - OCD
--	--

Subject
DIESEL LEAK AT BLOOMFIELD FACILITY

Discussion
BOB CALLED TO NOTIFY OF A 15,000 gal DIESEL LEAK FROM AN UNDERGROUND PIPE SUPPLYING THE FUEL ISLAND. LEAK WAS APPX 2-WEEKS AGO BUT WAS NOT REPORTED TO HIM UNTIL 11/25/86. PRODUCT IS NOW APPEARING IN GBR-22. GIANT WILL FORWARD WRITTEN SPILL REPORT. THEY WERE VERBALLY INFORMED A D.P. WILL be required.

Conclusions or Agreements

distribution
GIANT-FILE

Signed



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONY ANAYA
GOVERNOR

December 9, 1986

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501-2088
(505) 827-5800

MEMORANDUM

TO: R. L. STAMETS, DIRECTOR, OCD
JEFF TAYLOR, LEGAL COUNSEL, OCD

FROM: DAVID G. BOYER, ENVIRONMENTAL BUREAU CHIEF *DGB*

SUBJECT: LETTER FROM MONTGOMERY & ANDREWS, DATED 12/8/86

I disagree very strongly with this letter. This information is not covered by the "trade secret" provision of the Water Quality Act, it is rightfully in the public domain, and it will make recordkeeping (separate files) administratively difficult. When the public health is at risk, we do not need^{to} and should not keep contamination information secret -- we can^{be} accused of a "coverup", defending the industry, etc. This is very bad precedent that can do nothing but make us look bad.

I am taking a firm stand on this because it will make our job more difficult to administer the regulations, and may renew calls for moving environmental affairs back to EID.

DGB:dp

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
A. K. Montgomery

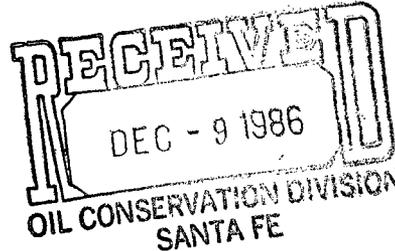
J. O. Seth (1883-1963)
Frank Andrews (1914-1981)

Seth D. Montgomery
Victor R. Ortega
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Deborah J. Van Vleck
Anne B. Hemenway
Roger L. Prucino
Kay E. Mares
Deborah S. Dungan
Helen L. Stirling
Rosalise Olson

December 8, 1986

HAND-DELIVERY



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Santa Fe, New Mexico 87504-2307

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Telecopy (505) 982-4289

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707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

Mr. David Boyer
State of New Mexico
Oil Conservation Division
State Land Office
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: Preliminary Report on Groundwater Investigations
at Giant Industries, Inc. Bloomfield Refinery

Dear Mr. Boyer:

I refer to our telephone conversation this morning concerning the confidentiality of the above-referenced report. Pursuant to the Water Quality Act, N.M. Stat. Ann. § 74-6-12 (1978), we believe that the following portions of the report should be kept confidential:

1. The entire table of contents, including the list of tables, list of appendices, list of plates and list of figures;
2. the last three sentences on page 7;
3. the second page of Table 3-1, located at page 10;
4. the reference to Montgomery & Andrews' response to N.M.E.I.D. Administrative Order 1003, found at page 11;
5. Section 3.2 on page 12;
6. the first sentence of Section 4.1 and the last two sentences of Section 4.1, both found on page 15;
7. Table 4-1;
8. Section 4.3 on page 24;

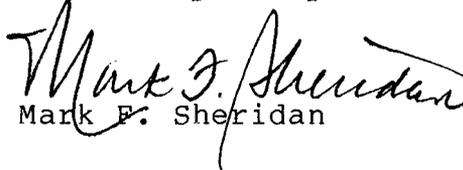
Mr. David Boyer
December 8, 1986
Page 2

9. Section 4.4 found at pages 24 and 26;
10. Figure 4-2 found at page 25;
11. Section 5.1 through Section 5.4, including Figures 5-1 through 5-6, all of which are located from pages 30 through 40;
12. Table 5-1 at page 41;
13. Appendix B in its entirety; and
14. Plates 2 and 3 found at the very end of the report.

Giant Industries, Inc. is willing to permit O.C.D. to furnish the Environmental Improvement Division with a copy of the report, provided E.I.D. is willing to maintain the confidentiality of the aforementioned sections. With respect to other state and federal agencies and the public at large Giant believes that the parts of the report designated in this letter should not be disclosed. With respect to the specific request of the United States Geological Survey for a copy of the report for use in designing a regional groundwater study, Giant and its consultants from Geoscience Consultants, Ltd. are willing to meet with representatives of the U.S.G.S. to assist them in formulating such a study. Giant is not willing to give the Government unrestricted access to its report, however.

As I mentioned in our conversation, Giant's request to maintain the confidentiality of all sections enumerated above is not necessarily fixed in stone. We would be happy to discuss any claim of confidentiality with representatives from your office or from the E.I.D., particularly as such information may assist the state in providing relevant testimony to Congress concerning groundwater contamination emanating from the Lee Acres Landfill. After you have had an opportunity to review this letter, please call me should you have any questions or wish to discuss the matter further.

Yours very truly,


Mark F. Sheridan

MFS:mp
#8361-85-09

department. 1980 Op. Att'y Gen. No. 80-38.

No responsibility by state records center to determine compliance of promulgated rules with hearing and notice requirements. — See 1978 Op. Att'y Gen. No. 78-7.

Am. Jur. 2d, A.L.R. and C.J.S. references. — See Am. Jur. 2d Health §§ 1, 3, 4, 9 to 16.

9-7-7. Organizational units of department; powers and duties specified by law; access to information.

Those organizational units of the department and the officers of those units specified by law shall have all of the powers and duties enumerated in the specific laws involved. However, the carrying out of those powers and duties shall be subject to the direction and supervision of the secretary and he shall retain the final decision-making authority and responsibility for the administration of any such laws as provided in Subsection B of Section 7 [9-7-6B NMSA 1978] of the Health and Environment Department Act. The department shall have access to all records, data and information of other state departments, agencies and institutions, including its own organizational units not specifically held confidential by law.

History: 1978 Comp., § 9-7-7, enacted by Laws 1977, ch. 253, § 8.

Cross-references. — See cross-references under 9-7-4 NMSA 1978.

9-7-8. Directors.

The secretary shall appoint, with the approval of the governor, "directors" of such divisions as are established within the department. The positions so appointed are exempt from the Personnel Act.

History: 1978 Comp., § 9-7-8, enacted by Laws 1977, ch. 253, § 9.

directors, see 9-7-6B(9) NMSA 1978.

Cross-references. — As to appointment of

Personnel Act. — See 10-9-1 NMSA 1978 and notes thereto.

9-7-9. Bureaus; chiefs.

The secretary shall establish, within each division, such "bureaus" as he deems necessary to carry out the provisions of the Health and Environment Department Act [9-7-1 to 9-7-13 NMSA 1978]. He shall employ a "chief" to be the administrative head of such [each] bureau. The chief [chiefs] and all subsidiary employees of the department shall be covered by the Personnel Act unless otherwise provided by law.

History: 1978 Comp., § 9-7-9, enacted by Laws 1977, ch. 253, § 10.

Personnel Act. — See 10-9-1 NMSA 1978 and notes thereto.

9-7-10. Behavioral health services division created.

The "behavioral health services division" is created in the health and environment department. Within the behavioral health services division there shall be a mental health bureau, an alcoholism bureau, a drug abuse bureau and a developmental disabilities bureau.

History: 1978 Comp., § 9-7-10, enacted by Laws 1977, ch. 253, § 11; 1983, ch. 177, § 1.

Cross-references. — See cross-references under 9-7-4 NMSA 1978.

The 1983 amendment inserted "an alcoholism bureau" and substituted "drug" for "substance" in the second sentence.

Effective dates. — Laws 1983, ch. 177, contains no effective date provision, but was enacted at the session which adjourned on March 19, 1983. See N.M. Const., art. IV, § 23.

Appropriations. — Laws 1982, ch. 5, § 1, appropriates \$600,000 from the general fund to the behav-

ioral health services division of the health and environment department for expenditure in the seventy-first fiscal year for the purpose of contracting for services with public or nonprofit mental health organizations incorporated in New Mexico and its continual operation for at least three years. To establish twenty-four hour transitional living arrangements in the areas of need throughout the state, as determined by the health and environment department, for the transitional treatment in half-way houses residential accommodations of psychiatric patients to assist them in adjusting to permanent normal life patterns, and provides that any unexpended or

Chapter 9
Executive Department
Supplement

C. Any party aggrieved by any final judgment of the district court under this section may appeal to the court of appeals as in other civil actions.

D. As an additional means of enforcing the Water Quality Act or any regulation of the commission, the commission may accept an assurance of discontinuance of any act or practice deemed in violation of the Water Quality Act or any regulation adopted pursuant thereto, from any person engaging in, or who has engaged in, such act or practice, signed and acknowledged by the chairman of the commission and the party affected. Any such assurance shall specify a time limit during which such discontinuance is to be accomplished.

History: 1953 Comp., § 75-39-9, enacted by Laws 1967, ch. 190, § 9; 1970, ch. 64, § 5.

Voluntary compliance no bar to assessment of civil penalties and cleanup costs. — The voluntary compliance provision of Subsection A does not apply to the remedies provided in Subsection B. The absence of voluntary compliance actions on the part of the state in a case does not prevent the state from seeking civil penalties and costs of cleanup under Subsection B. *State ex rel. New Mexico Water Quality Control Comm'n v. Molybdenum Corp. of Am.*, 89 N.M. 552, 555 P.2d 375 (Ct. App.), cert. denied, 90 N.M. 8, 558 P.2d 620 (1976).

Law reviews. — For comment, "Control of Industrial Water Pollution in New Mexico," see 9 Nat. Resources J. 653 (1969).

Am. Jur. 2d, A.L.R. and C.J.S. references. — 61A Am. Jur. 2d Pollution Control §§ 534 to 547.

Injunction against pollution of stream by private persons or corporations, 46 A.L.R. 8.

Validity and construction of statutes, ordinances or regulations controlling discharge of industrial wastes into sewer system, 47 A.L.R.3d 1224.

Preliminary mandatory injunction to prevent, correct or reduce effects of polluting practices, 49 A.L.R.3d 1239.

Right to maintain action to enjoin public nuisance as affected by existence of pollution control agency, 60 A.L.R.3d 665.

Validity, under federal constitution, of state statute or local ordinance regulating phosphate content of detergents, 21 A.L.R. Fed. 365.

39A C.J.S. Health and Environment §§ 150 to 154.

74-6-11. Emergency procedure.

Notwithstanding any other provision of the Water Quality Act [74-6-1 to 74-6-4, 74-6-6 to 74-6-13 NMSA 1978], if any person is causing or contributing to water pollution of such characteristics and duration as to create an emergency which requires immediate action to protect human health, the director of the environmental improvement agency [environmental improvement division of the health and environment department] shall order the person to immediately abate the water pollution creating the emergency condition. If the effectiveness of the order is to continue beyond forty-eight hours, the director of the environmental improvement agency [environmental improvement division of the health and environment department] shall file an action in the district court, not later than forty-eight hours after the date of the order, to enjoin operations of any person in violation of the order.

History: 1953 Comp., § 75-39-10, enacted by Laws 1967, ch. 190, § 10; 1970, ch. 64, § 6; 1971, ch. 277, § 52.

Environmental improvement agency. — See same catchline under 74-6-4 NMSA 1978.

Law reviews. — For comment, "Control of Indus-

trial Water Pollution in New Mexico," see 9 Nat. Resources J. 653 (1969).

Am. Jur. 2d, A.L.R. and C.J.S. references. — 61A Am. Jur. 2d Pollution Control §§ 493, 538, 539.

39A C.J.S. Health and Environment § 144.

74-6-12. Limitations.

A. The Water Quality Act [74-6-1 to 74-6-4, 74-6-6 to 74-6-13 NMSA 1978] does not grant to the commission or to any other entity the power to take away or modify property rights in water, nor is it the intention of the Water Quality Act to take away or modify such rights.

B. Effluent data obtained by the commission or a constituent agency shall be available to the public. Other records, reports or information obtained by the commission or a constituent agency shall be available to the public, except upon a showing satisfactory to the commission or a constituent agency that the records, reports or information or a particular part thereof, if made public, would divulge methods or processes entitled to protection as trade secrets.

C. The Water Quality Act does not authorize the commission to adopt any regulation with respect to any condition or quality of water if the water pollution and its effects are confined

Effective dates. — Laws 1978, ch. 61, § 2, makes the act effective on March 31, 1978.

Emergency clauses. — Laws 1978, ch. 61, § 3,

makes the act effective immediately. Approved February 24, 1978.

71-2-7. Electrical generation plant; Tularosa basin.

The legislature finds that there is a great potential for conservation of fossil fuels, generation of electrical energy and the production of usable water in the siting of an electrical generating plant in the Tularosa basin, and directs the energy and minerals department to make a detailed study of such potential, and, using its powers to interact with the public and private sectors, present to the legislature a feasibility study for such a plant, showing how it would fit into the department's statewide energy plan.

History: 1953 Comp., § 65-13-8.7, enacted by Laws 1978, ch. 62, § 1.

Repeals and enactments. — Laws 1978, ch. 62, § 1 repeals 65-13-8.6, 1953 Comp. (former 71-2-7 NMSA 1978), relating to electrical generation plant in Tularosa basin, and enacts the above section.

Effective dates. — Laws 1978, ch. 62, § 2, makes the act effective on March 31, 1978.

Emergency clauses. — Laws 1978, ch. 62, § 3, makes the act effective immediately. Approved February 24, 1978.

71-2-8. Confidentiality; penalty.

The provisions of any confidential contract or any other confidential information required or possessed by the department shall be held confidential by the department upon written request of the party supplying it, and any employee of the department, whether temporary or permanent, who willfully violates the provisions of this section shall be guilty of a high misdemeanor. Nothing in this section shall be construed to prevent statistical information from being derived from the information in the hands of the department or its use in public hearings before the department or in appeals from decisions of the department for which such information is essential. Notwithstanding the provisions of Sections 10-15-1 through 10-15-4 NMSA 1978 or any other act requiring meetings of public bodies to be open, the department may close that part of any meeting where confidential information covered by this section is discussed by the department.

History: 1953 Comp., § 65-13-13, enacted by Laws 1975, ch. 289, § 18; 1977, ch. 255, § 105.

71-2-9. Notification of contract or production.

Every producer shall notify the energy and minerals department of:

A. the completion of a well capable of producing oil, natural gas or liquid hydrocarbon individually, or any combination thereof, or geothermal energy in commercial quantities, with sufficient detail to allow the department to suggest a manner in which the products could be used in furtherance of its statewide plan, within five days after completion of the well, and not less than five days before the producer enters into a binding agreement for, or otherwise provides for the disposition of, the products or geothermal energy of the well under an agreement or disposition which covers any period longer than six months; or

B. his intent to enter into a binding agreement covering the disposition of the products or geothermal energy of a potential well or series of wells at least five days before he enters into the agreement.

History: 1953 Comp., § 65-13-14, enacted by Laws 1975, ch. 289, § 19; 1977, ch. 255, § 106.

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
A. K. Montgomery

J. O. Seth (1883-1963)
Frank Andrews (1914-1981)

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
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ALBUQUERQUE OFFICE
Suite 500
7 Broadway Place
707 Broadway, N.E.
Post Office Box 26927
Albuquerque, New Mexico 87125-6927

Telephone (505) 242-9677

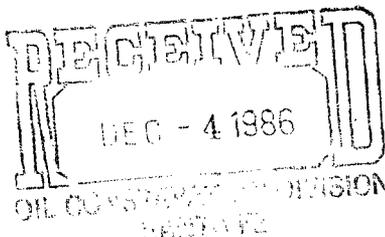
LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

December 3, 1986

HAND-DELIVERED



Seth D. Montgomery	Sarah M. Singleton
Victor R. Ortega	Jay R. Hone
Jeffrey R. Brannen	Charles W. N. Thompson, Jr.
John B. Pound	John M. Hickey
Gary R. Kilpatric	Mack E. With
Thomas W. Olson	Galen M. Buller
William C. Madison	Katherine W. Hall
Walter J. Melendres	Edmund H. Kendrick
Bruce Herr	Helen C. Sturm
Michael W. Brennan	Richard L. Puglisi
Robert P. Worcester	Arturo Rodriguez
James C. Compton	Joan M. Waters
John B. Draper	Terri A. Mazur
Nancy M. Anderson	Stephen R. Kotz
Alison K. Schuler	Christine Gray
Janet McL. McKay	James C. Murphy
Jean-Nikole Wells	James R. Jurgens
Mark F. Sheridan	Ann M. Maloney
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W. Perry Pearce	Roger L. Prucino
Stephen J. Rhoades	Kay E. Mares
Brad V. Coryell	Deborah S. Dungan
Michael H. Harbour	Helen L. Stirling
Robert J. Mroz	Rosalise Olson

Mr. Richard L. Stamets
Director
Oil Conservation Division
State Land Office
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Mr. Stamets:

On behalf of our client, Giant Industries, Inc., I am enclosing a preliminary report on groundwater investigations at Giant's Bloomfield Refinery, prepared for us by Geoscience Consultants, Ltd. The report provides an assessment of the nature and extent of groundwater degradation in the vicinity of Giant's Bloomfield Refinery. As you will see, our consultants believe that remedial action aimed at the two groundwater problem areas on the refinery property will not be cost effective without a plan for addressing the far more extensive contamination emanating from the Lee Acres landfill. After you have had an opportunity to review the report, we will be happy to discuss it with you and with members of your staff.

Yours very truly,

Mark F. Sheridan
Mark F. Sheridan

MFS:mp
#8361-86-01

Enclosure

cc: Mr. David Boyer (w/o encl.)
bcc: Carlos A. Guerra, Esquire (w/o encl.)
Mr. Alberto A. Gutierrez (w/o encl.)

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

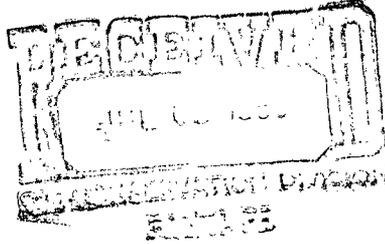
OF COUNSEL
A. K. Montgomery

J. O. Seth (1883-1963)
Frank Andrews (1914-1981)

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Thomas W. Olson
William C. Madison
Walter J. Melendres
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Christine Gray
James C. Murphy
James R. Jurgens
Ann M. Maloney
Deborah J. Van Vleck
Anne B. Hemenway
Roger L. Prucino
Kay E. Mares

July 7, 1986



SANTA FE OFFICE
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LOS ALAMOS OFFICE
Suite 120
901 18th Street
Los Alamos, New Mexico 87544

Telephone (505) 662-0005

REPLY TO SANTA FE OFFICE

Mr. David Boyer
New Mexico Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504-2088

Re: Giant Industries, Inc./Bloomfield Refinery

Dear Dave:

I am informed that you have requested a copy of the report which Geosience Consultants, Ltd. has prepared for us relating to their investigation of the Giant Industries, Inc. Bloomfield Refinery.

Enclosed with this letter please find a copy of such report. If I can be of any further assistance, please do not hesitate to contact me.

Sincerely,

W. Perry Pearce, by EHK
W. Perry Pearce

WPP:mp
#8361-86-01
Attachment

cc: Carlos A. Guerra, Esquire (w/o attachment)
Mr. Randall T. Hicks (w/o attachment)

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

OF COUNSEL
A. K. Montgomery

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J. O. Seth (1883-1963)
Frank Andrews (1914-1981)

May 23, 1986

HAND-DELIVERED

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RECEIVED

MAY 23 1986

OIL CONSERVATION DIVISION

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Kay E. Mares

REPLY TO SANTA FE OFFICE

Mr. Richard L. Stamets, Director
New Mexico Oil Conservation Division
State Land Office
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: Giant Industries, Inc. - Bloomfield Refinery

Dear Dick:

Enclosed with this letter please find the report prepared by Geoscience Consultants, Ltd. of Albuquerque on the Bloomfield Refinery owned by Giant Industries. Once again I want to thank you for the one week extension on the time of submitting this report. We believe that the quality of the report was improved with that extension.

The enclosed report indicates, as we suspected, that there are some areas of concern which may need remedial action at this closed refinery site. In order to avoid any delay during the course of the investigation which has led up to the preparation of this report, we have proceeded with a remedial plan which is discussed in the report. While I am sure that you and your staff will be interested in these remedial steps and might have wished to participate in their formulation, it seemed to us that because of the work in progress in doing the study and the availability of personnel and equipment, that it was more appropriate to proceed to begin the remedial actions rather than further delay those actions.

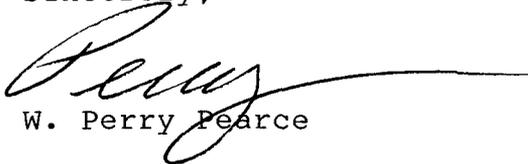
Mr. Richard L. Stamets, Director
May 23, 1986
Page 2

Giant is particularly concerned that the maximum remedial action be implemented as quickly as possible in order to alleviate any concerns in this area and continues to take steps which are outlined in the report to solve the problems which have been found.

Representatives of Giant and I look forward to visiting with you to discuss these matters once you have had an opportunity to review and digest this report.

Thank you for all your assistance with this matter.

Sincerely,



W. Perry Pearce

WPP:dml
Enclosure
8361-85-09

cc: Carlos A. Guerra, Esq. (w/enclosure)
Mr. Alberto Gutierrez (w/o enclosure)

MONTGOMERY & ANDREWS

PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

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May 9, 1986

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REPLY TO SANTA FE OFFICE

Richard L. Stamets, Director
New Mexico Oil Conservation Division
State Land Office
Post Office Box 2088
Santa Fe, New Mexico 87501

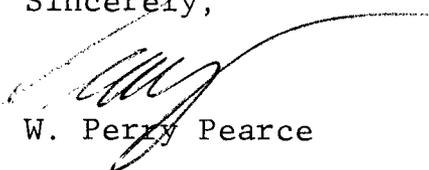
Re: Giant Industries - Bloomfield Refinery

Dear Dick:

This letter confirms our telephone conversation of Friday, May 9 during which you granted a request from Giant Industries for a one week extension from the May 16 date for Giant Industries to submit a report on its Bloomfield Refinery. The report will now be provided to you and your staff on or before May 23, 1986.

Thank you for your consideration in this matter.

Sincerely,


W. Perry Pearce

WPP:dml

8361-85-09

cc: Carlos A. Guerra, Esq.
Geoscience Consultants, Ltd.

GIANT INDUSTRIES, INC.

P.O. BOX 9156 • PHOENIX, ARIZONA 85068
7227 NORTH 16TH STREET
(602) 274-3584 • TWX 910-951-4231

April 23, 1986

FEDERAL EXPRESS

Mr. Richard L. Stamets
Director, NMOCD
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: Oil Conservation Division Letter Concerning
Alleged Discharges at Bloomfield Refinery

Dear Mr. Stamets:

Giant Industries, Inc. ("Giant") has received your letter of April 3, 1986 which discusses certain concerns of the New Mexico Oil Conservation Division ("NMOCD") regarding Giant's Bloomfield Refinery. It appears that NMOCD is of the opinion that groundwater problems may exist at the Bloomfield Refinery as the result of either existing or past discharges. A summary of Giant's understanding of the points addressed in your letter is as follows:

- 1) NMOCD believes that a Notice of Intent to Discharge may be required for the truck maintenance shop and for any planned modifications to the shop's existing discharge.
- 2) NMOCD believes that there may be an "industrial type" discharge from the truck maintenance shop.
- 3) NMOCD believes that Giant may have failed to notify NMOCD about the "seep" which was observed by NMOCD on October 24, 1985 and, therefore, may have violated Section 74-6-10 NMSA (1978).
- 4) NMOCD is requesting that Giant cease discharges to the septic tank at the truck maintenance shop.
- 5) NMOCD is requesting that Giant submit, on or before May 16, 1986, a work plan and schedule for an investigation of the potential impact to groundwater of the "seep".

Giant agrees with the NMOCD that an unregulated "industrial type" discharge with the ability to contaminate drinking water supplies is a serious matter. As such, Giant has employed the law firm of Montgomery & Andrews ("M & A") who in turn has contracted with Geoscience Consultants, Ltd. ("GCL") to investigate such a possibility. Based upon preliminary investigations, Giant would like to respond to NMOCD's concerns in the same sequence in which they are listed above:

Mr. Richard Stamets
Director, NMOCD
Page Two
April 23, 1986

- 1) Giant does not agree that a Notice of Intent to Discharge is required for septic tank discharges at the truck maintenance shop. All discharges to the septic tank at the facility have ceased, and no modifications to the septic tank system are anticipated. Previous discharges consisted only of wastewater from a clothes washing machine and from toilet facilities. All shop drainage is contained in the building and is not discharged to the subsurface, and all solvents are reclaimed for recycling and shipped off site for treatment.
- 2) As stated previously, "industrial type" discharges from the truck maintenance shop do not presently occur and have not occurred since the Bloomfield Refinery's closure in June 1982. All waste oils and solvents are captured and recycled off site.
- 3) NMOCD maintains that a discharge may have occurred at the Bloomfield Refinery:

...[O]f oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property.... (WQCC Regulation 1-203).

On several occasions, GCL scientists and Giant staff have witnessed plant growth at the seep as well as frequent consumption of the seep water by animal life. Although subsequent laboratory analyses of this water has revealed that its quality exceeded WQCC standards, visual examinations have demonstrated that animal or plant life was not directly affected by any discharge from the subsurface.

Upon receipt of the laboratory results, Mr. Perry Pearce of M & A was in contact with NMOCD, and a proper notification of the discharge was made. We do not believe, therefore, that a violation of Section 74-6-10 NMSA (1978) has occurred. Rather, we believe that the steps taken by Giant after the discovery of the potential environmental effects of the seep demonstrate Giant's responsiveness to the situation.

- 4) As stated above, discharges to the septic tank at the truck maintenance shop have ceased.
- 5) Enclosed is a copy of Giant's proposed work plan and schedule of investigation for the Bloomfield Refinery to determine the potential impact of the observed seep on groundwater quality. Several items of the work plan have been completed, while others are still in progress. In accordance with the work plan, Giant has bored monitoring wells at the facility, and a chemical analysis of groundwater samples from the wells is pending.

Mr. Richard Stamets
Director, NMOCD
Page Three
April 23, 1986

As you will note from the enclosed work plan, Giant will remove contaminated soil from the burn pit area on or about April 28 - 29, 1986. The contaminated soil will be stockpiled in a bermed area on the northwest portion of the Bloomfield Refinery. Samples of underlying material at the burn pit area will be analyzed to insure that any potential source for groundwater contamination is removed from the site. Following receipt of the analyses, an on site land treatment program for the contaminated soil will be finalized and implemented. On or before May 16th, NMOCD will receive a more detailed work plan of the remedial action at the facility. Results of our initial investigation will also be summarized in said report.

In addition to the foregoing, Giant hereby notifies NMOCD that a diesel spill recently occurred at the Bloomfield Refinery. A pipeline rupture resulted in the loss of an undetermined amount of product. Boreholes are presently being drilled to determine whether this spill may have impacted groundwater. The enclosed work plan also contains several work elements which address the potential impact of the spill.

Should you have any questions or comments concerning this letter, please contact either Mr. Perry Pearce of M & A or me at your convenience.

Very truly yours,



Carlos A. Guerra, Esq.
General Counsel

CAG:jks

Enclosure

cc W/Enc: Messrs. W. Perry Pearce, M & A
Randall T. Hicks, GCL
D. Boyer, NMOCD - Santa Fe
F. Chavez, NMOCD - Aztec
E. Rebeck, NMEID - Santa Fe

WORK PLAN FOR SOIL AND GROUNDWATER INVESTIGATIONS
AND REMEDIAL ACTION DESIGN
BLOOMFIELD REFINERY

DECEMBER 1985

Shallow Soil Sampling in Areas of Potential Contamination:

- o Sample the Amoco gas well site and its associated produced water pits;
- o Sample the oil/water separator and lined evaporation pond for refinery wastewater;
- o Sample the tank drain pits located at crude storage tanks #1, #2 and #3;
- o Sample the abandoned burn pit and the leach field for the septic tank;
- o Use a fully steam cleaned hand auger to sample intervals at 1, 3, 5 and 10 feet (soil conditions permitting) at the above sites and two background sites; and
- o Identify areas where deep drilling may be required.

DECEMBER 1985 - APRIL 1986

Burn Pit Remedial Design:

- o Define the exact location of the buried burn pit through aerial photography and site survey;
- o Define the extent of contaminated soil by drilling and trenching; and
- o Take soil and groundwater samples for confirmation of analyses.

APRIL 1-18

Deep Soil Coring in Areas of Potential Soil Contamination:

- o Employ hollow stem auger coring system to carefully examine unsaturated zone in selected areas;
- o Collect representative samples of unsaturated and saturated zone lithologies;
- o Install 2-inch PVC or galvanized steel wells to determine groundwater chemistry and gradients;

APRIL 1-18 (CONTINUED)

- o Analyze selected soil and groundwater samples;
- o Bore piezometer holes and complete 2" PVC piezometers around the diesel spill area;
- o Measure water levels and determine product thickness, if any;
- o Complete lithologic logs of boreholes and completion diagrams;
- o Purge and develop all wells by air lifting;
- o Use a clear bailer or oil/water indicating paste to determine product thickness in groundwater and record groundwater levels; and
- o Perform slug recovery tests on selected piezometers to roughly determine the aquifer characteristics.

APRIL 21-MAY 30

Data Evaluation/Test Pumping:

- o Calibrate and run a computer model of the pump test to determine pump test parameters, expected drawdown, and the number and location of observation wells;
- o Drill a 5-inch well for aquifer test pumping;
- o Update the water table map;
- o Construct a product thickness map;
- o Evaluate lithological data;
- o Determine the location of recovery wells;
- o Finish any additional 2-inch piezometer installations;
- o Conduct an aquifer test at a pumping rate and duration determined by computer modeling;
- o Excavate contaminated soil areas and remove soil to treatment areas;
- o Input pump test data into aquifer simulation computer model for development of effective remedial action scenarios at diesel spill area; and
- o Drill and complete any required recovery wells for free floating product.

MAY 30-JULY 30

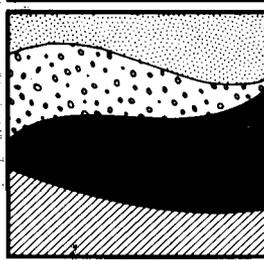
Design remedial action for any soil and/or groundwater contamination, if required.

Geoscience
Consultants, Ltd.

Giant

APR 11 1986

APR 14 1986



Mr. David Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: March 24, 1986 letter regarding East Lee Acres Landfill

Dear Mr. Boyer:

We are in receipt of your package of information regarding the investigations conducted to date at the East Lee Acres Landfill. Giant appreciates the additional data and correspondence, some of which we had not yet seen. Furthermore, as soon as the report from BLM's consultants is available, we would like to obtain a copy.

Regarding the discussion of impoundments at the Giant Refinery, it is important to clarify various points in your letter. The impoundments labeled #1 and #3 on your aerial photo (copy enclosed) have always been fresh water impoundments for use as refinery raw water and potable water supply. The impoundment labeled #2 is a produced water pit owned by AMOCO at their gas well (GCU150M-SW1/4 SW1/4, Sec. 22, T29N, R12W). Your pit labeled #4 was a tank drain pit for adjacent crude storage tanks with contents consisting primarily of paraffin and heavy oils which will be collected, analyzed and stored appropriately until transferred to proper disposal. The oil-stained soil in the pit will be excavated and the pit will be visually inspected, sampled and analyzed prior to backfilling to demonstrate removal of contamination. The contaminated soil will be treated on site within a suitably bermed area to biodegrade the oily fraction and potential organic compounds in the soil while preventing run-on and runoff.

The area around impoundment #5 is the only area that has received plant wastewater during the operation of the refinery from 1973 to 1982. Between 1973 and 1978, wastewaters were discharged to an unlined wastewater pond just to the south of the existing impoundment. The use of the unlined pond was discontinued in 1978 when a lined wastewater impoundment was constructed. The pond was lined from 1978 until a liner failure caused the temporary use of the facility in a partially lined condition until the refinery closed in 1982. At the time that our report was developed, we were not yet aware of the details of the operation of the lagoon (including that it was unlined for a period of time). This history was revealed through interviews conducted subsequently with former employees of the refinery.

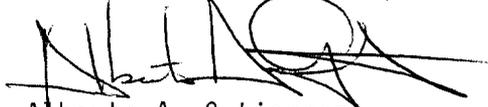
Headquarters
500 Copper Avenue N.W., Suite 325
Albuquerque, New Mexico 87102
(505) 842-0001

Washington Area Office
5513 Twin Knolls Rd., Suite 216
Columbia, Maryland 21045
(301) 596-3760

Mr. David Boyer
April 11, 1986
Page 2

At the present time, it appears that the seep (labeled #6 on your photo) would more appropriately be described as a discharge from the subsurface that exceeds WQCC standards since it represents the apparent seepage of a perched ground water zone beneath the burn pit rather than a current discharge to the subsurface. GCL is, at the present time, conducting a review of potential sources of this observed seep and conducting a remedial action which will be presented to NMOCD by May 16, 1986. I hope this clarifies the interpretation of data in the "Request for Further Data Acquisition" dated August 1, 1985. If you have any questions or comments regarding this clarification, please contact me in our Albuquerque office.

Yours very truly,
GEOSCIENCE CONSULTANTS, LTD.



Alberto A. Gutierrez
President

AAG/mh/GIANT/BOYER004.LTR

Enclosure

cc: R.L. Stamets
E. Rebeck, EID
D. McQuillan, EID
C. Guerra, Giant Industries, Inc.
E. Blanchard, Giant Industries, Inc.
W.P. Pearce, Montgomery & Andrews

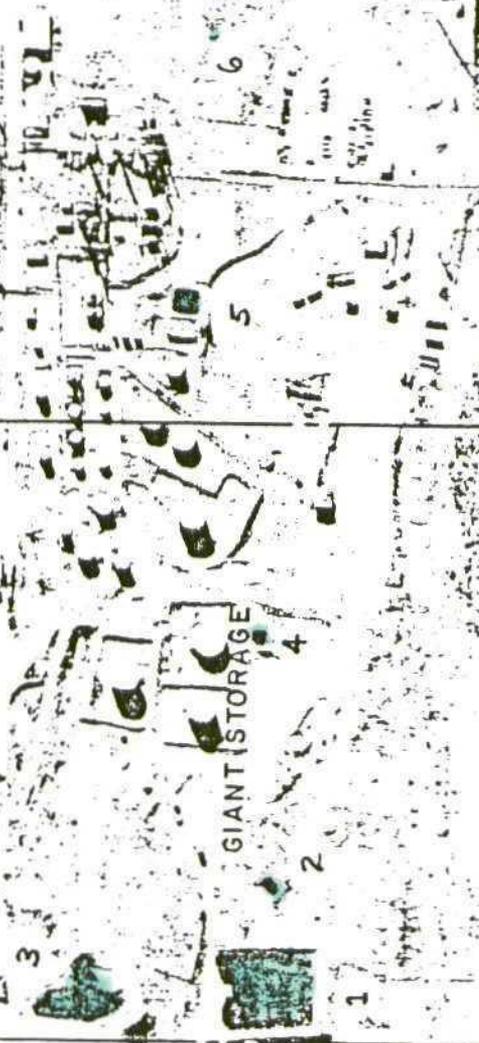
ED D. COFFEY L

GIANT

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GIANT STORAGE

SAN JUAN
COUNTY LANDFILL



22

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BARBRA TAYLOR
BK 796 PG 418

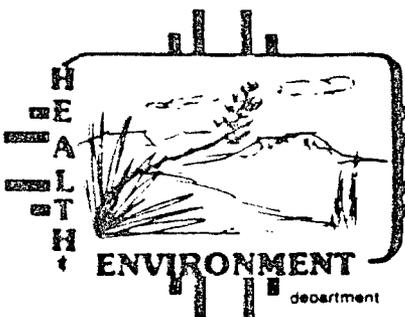
FARMINGTON SCHOOL
DISTRICT NO. 5
BK 464 PG 164

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north

TONEY ANAYA
GOVERNOR

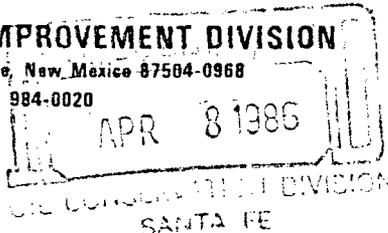
DENISE D. FORT
DIRECTOR



STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION

P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020



April 7, 1986

Richard L. Stamets, Director
Oil Conservation Division
Department of Energy and Minerals
State Land Office Bldg.
P.O. Box 2088
Santa Fe, NM 87503

Dear Mr. Stamets:

Enclosed is a report on the results of an electromagnetic induction survey performed at the Lee Acres landfill site in San Juan County. EID supports your effort to persuade Giant Industries Inc., to characterize their past waste disposal practices and their effects on soil and ground water quality.

If we can assist in document review or in any other way, please contact Richard Perkins at 827-2921.

Yours truly,

Denise Fort, Director *DF*
Environmental Improvement Div.

DF/RP/aw

cc:

encl:

Only One Tested Lee Acres Well Unsafe, EID Says

By Nolan Hester

JOURNAL STAFF WRITER

While eight private water wells in the Lee Acres subdivision near Bloomfield have high mineral levels, state officials say just one contains petroleum byproducts that make it unsafe for drinking.

Information released by the state Environmental Improvement Division's public information office Wednesday mistakenly said several wells were involved. Seeking to reassure alarmed residents still using private wells, EID hydrologist Dennis McQuillan said Friday that dangerous levels of trichloroethane and benzene were found in a single well. The family using the well switched to bottled water last fall, he said.

Roughly 80 percent of the subdivision's 100 people use water from Bloomfield's municipal water system.

EID took samples from 10 private wells last spring and fall after the Lee Acres Landfill, which lies a mile north of the subdivision across U.S. 64, erupted with poisonous hydrogen sulfide gas. McQuillan said unlined waste lagoons at the landfill may be responsible for contaminating Lee Acres private wells. The landfill is now closed.

The landfill, which is leased by San Juan County from the Bureau of Land Management, sits next to an arroyo directly upstream from the subdivision. McQuillan said another possible source for the well pollutants could be the Giant Refinery, which also lies upstream of Lee Acres. More tests will be needed before the

source can be pinpointed, he said.

McQuillan said another 12 private wells will be checked this month for pollution. He urged anyone in the immediate Lee Acres area using a private well to contact the EID for a free water-quality test.

High levels of minerals were found in eight wells and while far above the state standard, McQuillan said the levels did not present an immediate health threat.

EID and BLM officials will meet next week to decide whether to pursue cleanup of the site under state or federal hazardous waste laws. However, Richard Perkins, a manager within EID's Ground Water and Hazardous Waste Bureau, said cleanup probably could not begin for at least nine months, regardless of which option is used.

Alb. Journal Saturday April 5, 1986

Authorities Fear Tainted Water In Subdivision

By Nolan Hester

JOURNAL STAFF WRITER

A Bloomfield landfill that erupted with poisonous gas last spring, forcing evacuation of the area, also may have polluted the drinking water of a nearby subdivision.

In a report released Wednesday, scientists of the state Environmental Improvement Division and Oil Conservation Division say water in private wells within the Lee Acres subdivision is no longer safe to drink. The water, said EID hydrologist Dennis McQuillan, is contaminated with unsafe levels of benzene and trichlorethane, both common petroleum byproducts.

Samples of the water were analyzed after a disposal lagoon at the nearby Lee Acres landfill began giving off hydrogen-sulfide gas in April 1985. The gas made several landfill workers dizzy and the New Mexico National Guard cordoned off the area until the EID was able to neutralize the lagoon.

The lagoon, located on federal Bureau of Land Management prop-

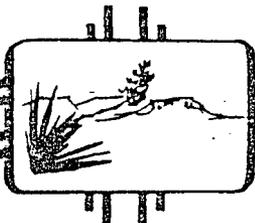
erty but operated by San Juan County, was used to dispose of waste water from oil drilling operations. McQuillan said the lagoon, which since has been closed, contained high levels of chloride.

Wastes seeping from the lagoon's bottom could have contaminated the local wells. But the report says another possible pollution source is a nearby oil refinery run by Giant Refining Inc. Giant attorney Ned Kendrick said company officials would have no comment until they can study the report.

While 80 percent of the subdivision's residents receive water from nearby Bloomfield, McQuillan warned that anyone still using local wells should find another drinking source. The EID said further testing will be needed to pinpoint the pollution's source.

The BLM has also completed its own preliminary report on the pollution, which has not been released. Bureau spokesman Lee Keesling said the BLM is talking with the state to decide what other tests might be needed.

EID NEWS



NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION

Denise Fort, Director

PUBLIC INFORMATION OFFICE
Post Office Box 968
Santa Fe, New Mexico 87504-0968
827-2841

FOR IMMEDIATE RELEASE:

CONTACT:

April 2, 1986

Dennis McQuillan 827-2912
Richard Perkins 827-2921

SANTA FE, NEW MEXICO -- An investigation of a San Juan County landfill has found ground water contamination in a nearby residential community that may be related to landfill and industrial disposal practices, according to state environmental officials.

The yearlong investigation of the Lee Acres landfill in San Juan County by the state Environmental Improvement Division and the Energy and Minerals Oil Conservation Division followed an April 1985 incident in which hydrogen sulfide gas was released from the liquid lagoon at the landfill. EID retained a private firm to eliminate the hydrogen sulfide gas, and San Juan County officials subsequently closed the landfill for liquids disposal.

During the investigation, EID collected samples of waste fluids from the lagoon and investigated several private water supply wells in the nearby Lee Acres community. Results from the sampling of the lagoon show that a complex mixture of toxic and hazardous wastes had been disposed of at the landfill in unlined pits, according to EID hydrogeologist Dennis McQuillan. McQuillan said the mixture includes produced waters from oil and gas fields in the region, septage, spent acid, waste oil and chlorinated solvents from industrial discharges.

Water sampled from a Lee Acres domestic well contained excessive concentrations of chloride and detectable volatile organic compounds, including benzene and trichloroethane, McQuillan said. "The water from the well is unfit for domestic use because of these constituents," he said. McQuillan noted that approximately 80 percent of the Lee Acre residents have been using public water supplied from Bloomfield and EID has tested additional residents' drinking water wells during the past year.

EID Director Denise Fort said the investigation of the landfill indicates that ground water resources apparently have been degraded by existing contaminant discharges, but that additional data is needed to determine the exact source and the extent of the existing contamination plume. The nearby Giant refinery as well as the landfill lagoons could be considered a possible cause of ground water contamination, she noted.

Fort said the EID report recommends continuing the cooperative investigation with OCD and the Federal Bureau of Land Management, which owns the landfill, to identify the parties responsible for the contamination. "Appropriate and necessary steps will then be taken to contain or mitigate the damage caused by the contamination," Fort stated.

She added, "There is clearly a need for a thorough hydrogeologic investigation of this region, which will also provide additional data indicative of conditions at landfills throughout the state where similar disposal practices have occurred."



TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION



1935 - 1985

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

April 3, 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Carlos A. Guerra
General Counsel
Giant Industries, Inc.
7227 North 16th Street
Phoenix, Arizona 85020

RE: DISCHARGES AT GIANT INDUSTRIES' BLOOMFIELD REFINERY

Dear Mr. Guerra:

This letter is written to inform you of certain State regulatory requirements regarding existing and past discharges at Giant Industries' Bloomfield Refinery. We have reason to believe that such discharges exceed New Mexico Water Quality Control Commission Standards for Ground Water and may have caused ground water to exceed such standards at a place of present or future use. This letter is also to remind you that a Notice of Intent to Discharge is required for the proposed modifications to discharges from the truck maintenance shop.

On October 24, 1985, a shallow surface geophysical survey at the adjacent Lee Acres Landfill was made which included authorized traverses on refinery property. During that survey, David Boyer of my staff discovered a hydrocarbon seep emanating from the hillside at the southwest corner of the property. This is shown as location #1 on the accompanying map. Mr. Boyer, accompanied by Frank Fujimoto of Giant Industries, and James Hunter of Geoscience Consultants, took two samples of the discharge at the site. These showed benzene at 2.20 and 4.10 mg/l (NM Ground Water Standard 0.01 mg/l), and 1, 2-dicloroethane (EDC) at 0.008 and less than 0.01 mg/l (NM Ground Water Standard 0.01 mg/l). Complete organic and inorganic analysis results from the sampling became available from NM Scientific Laboratory Division in early January 1986, and have been sent to Geoscience Consultants at their request.

In a letter dated November 21, 1985, W. Perry Pearce of the Montgomery & Andrews law firm, representing Giant, stated that the seep was probably caused by flow from a septic tank leach field through an abandoned burn pit. The source for the septic tank system is thought to be the active truck maintenance facility to the east of the discharge site (location #2). The truck maintenance shop is said by Mr. Fujimoto to discharge

Mr. Carlos A. Guerra

April 3, 1986

Page 2

mainly wash water, although there are some solvents stored on site, and floor drains are located in the work area. Fluids from the shop are thought to be commingling with materials in the old pit and discharging partially or wholly in the observed seep. Until Mr. Boyer's visit on October 24, this Division was unaware of any industrial type discharges at the refinery since production operations ceased in 1982.

The accompanying map showing the seep and truck maintenance locations was photocopied from a blueprint made from an aerial photograph taken by Brewer and Associates of Farmington as part of their design work for the proposed Crouch Mesa Road. The blueprint is dated March 31, 1981, and careful examination shows a dark area at the seep location. Further, communication with a Farmington Environmental Improvement Division (EID) field environmentalist, who visits the landfill as part of his duties, revealed that he had seen discoloration of surface material for the past several years. Therefore, preliminary information indicates that the discharge has been present for at least the past several years.

Pursuant to Section 1-203 of the New Mexico Water Quality Control Commission (WQCC) Regulations (enclosed), "any person in charge of a facility, as soon as he has notice or knowledge of a discharge from the facility, of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property," shall immediately:

1. notify the Environmental Improvement Division (or alternately the OCD if that agency has jurisdiction) of the "nature, amount and location of the discharge"; and
2. "take appropriate and necessary steps to contain and remove or mitigate the damage caused by the discharge."

To the best of our knowledge, neither this Division nor the EID has received the required notification. Lack of such notification is a violation of Section 74-6-10 NMSA (1978), the New Mexico Water Quality Act, and is subject to the penalties provided for therein.

Because the results of the sampling conducted by Oil Conservation Division (OCD) show benzene at levels between 200 and 400 times State Ground Water Standards and show certain other aromatic or halogenated compounds at or near State standards, the Division considers this an extremely serious matter since the discharge is a threat to nearby drinking water supplies. Contamination of such supplies is a violation of the Water Quality Act. Therefore, pursuant to Section 74-6-10 NMSA (1978), Giant Industries is directed to immediately cease discharges to the leach field from the truck maintenance shop. If such discharges are necessary to continue shop operation, they should be directed to storage tanks or other temporary containment prior to proper disposal.

Mr. Carlos A. Guerra
April 3, 1986
Page 3

Also, Giant Industries is directed, pursuant to Section 1-203 of the Regulations to take appropriate and necessary steps to contain and remove, or mitigate the damage caused by the discharge. On or before May 16, 1986, Giant Industries is directed to present to the OCD for review and approval a work plan and schedule for the investigation of the existing and future impact on ground water of this discharge and any other discharges that should have been reported pursuant to Section 1-203. Such plan should also address proposed remedial action if contamination is found. Mr. Pearce's letter of November 21 indicates that some elements of such a plan were under development at that time. To date, the Division has received no further communication regarding these plans.

Mr. Pearce's letter indicates that Giant is preparing modifications of the discharge from the truck maintenance shop. Consequently, Giant is reminded that pursuant to Sections 1-201. and 3-106.B of the Regulations, the filing of a Notice of Intent to Discharge is required for new or modified discharges at the truck maintenance facility at the Bloomfield Refinery. If discharges are such that they may move directly or indirectly into ground water, a discharge plan as defined in Section 1-101.P of the WQCC Regulations will almost certainly be required. Any discharge from a new or modified facility without Division notification, and without approval if required, is a violation of the Regulations.

This letter is an attempt to gain your voluntary compliance with the Water Quality Act and the Regulations adopted thereunder. Given such compliance, this Division can and will work with Giant in review of the workplan, in the investigation of the impact of the seep, and in review of any proposed discharge plan. If you have any questions, please contact Mr. Boyer at (505) 827-5812.

Sincerely,



R. L. STAMETS
Director

RLS:DGB:dp

Enc.

cc: D. Boyer, OCD ✓
F. Chavez, OCD, Aztec
E. Rebeck, EID
W. Perry Pearce, Montgomery & Andrews
Alberto Gutierrez, Geoscience Consultants

ED D. COFFEY

GIANT

GIANT

GIANT STORAGE

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LANDFILL

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BARBRA TAYLOR
BK 796 PG 418

BLM

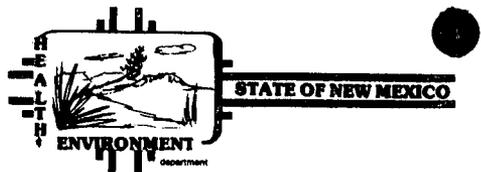
FARMINGTON SCHOOL
DISTRICT NO. 5
BK. 464 PG. 164

north

Date

Revision

CROUCH MESA COUNTY RO



MEMORANDUM

DATE: March 26, 1986

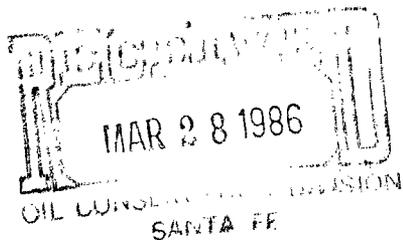
TO: David Boyer, Oil Conservation Division

FROM: *DT*
David Tomko, EID Farmington Field Program Manager

SUBJECT: GIANT REFINERY SEEP

This is to follow-up our phone conversation of March 25, 1986 regarding the seep along the earthen bank at Giant Refinery west of the vehicle maintenance building. As I live east of Bloomfield, I have been driving past Giant Refinery daily since 1979. I recall observing a dark stain on the soil beginning around 1980 or 1981. A trench was dug south across the hillside to a small pit as early as 1981. While the refinery was in operation, the seep appeared to be actively flowing with a dark colored liquid. The seep area is much drier now than in previous years.

I hope this adequately addresses your concerns regarding the seep. Please call me should you have any questions.



Enclosure

DAT:lm

cc: Dennis McQuillan, Ground Water Surveillance Section
File



TONY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION



1935 - 1985

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

March 24, 1986

Alberto Gutierrez, President
Geoscience Consultants, Ltd.
500 Copper Avenue N.W., Suite 325
Albuquerque, New Mexico 87102

RE: REQUEST FOR ADDITIONAL DATA, EAST LEE ACRES LANDFILL

Dear Mr. Gutierrez:

This agency has received your letter of February 26, 1986, requesting available data and results of sampling at the above-referenced site, and copies of correspondence between the agencies and operators. Copies of this information are enclosed. The Oil Conservation Division (OCD), Environmental Improvement Division (EID), and the Bureau of Land Management are cooperating in preparing a plan and schedule for on-site investigations, including the drilling and installation of monitor wells. When such planning and scheduling has been completed, Geoscience and Giant Industries will be provided copies of available documents.

Regarding the information provided in the Geoscience document entitled "Concerns and Request for Further Data Acquisition, East Lee Acres Landfill" that was enclosed with your letter, page 1-1 of the document asserts that "Giant has never had any unlined waste-water impoundments nor land treatment facilities on the Bloomfield Site." The attached aerial photo blueprint dated 3-31-81 from Brewer & Associates, Inc., showing the landfill and proposed Crouch Mesa Road, also shows at least five surface impoundments. During the EM geophysical surveys conducted by EID and OCD on October 24, 1986, the traverse lines went near several of the impoundments on the Giant property. EID and OCD representatives, accompanied by Giant representative, Frank Fujimoto, were in the vicinity of impoundments #1, 2, 4 and 5. Impoundment #1 is refinery raw water storage, now used to supply San Juan Downs. The past or current use of impoundments #2 and 3 is unknown. Impoundment #4 appears to have received discharges from the tank storage area. My understanding is that impoundment #5 was in use during refinery operation for cooling water recirculation and may also have received API separator wastewater. The composition and concentration of the fluids that were in pond 5 are unknown. Additionally, during the EM survey, a discharge was found emanating from the hillside at location #6. The area of the discharge was approximately 5 x 30 feet. Two analyses of the discharge show benzene at 2.20 and 4.10 mg/l (NM Ground Water Standard 0.01 mg/l), and 1, 2-dichloroethane (EDC) at 0.008 and less than 0.01 mg/l (NM Standard

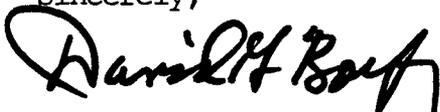
Alberto Gutierrez, President
March 24, 1986
Page 2

0.01 mg/l). Other aromatic hydrocarbons and other organic compounds not identified were also detected. These results were previously provided to you.

Based on the available information, Giant apparently did have discharges to unlined impoundments, and also has a current discharge to the subsurface that exceeds WQCC standards. Therefore, in addition to the ground water investigation by OCD and EID suggested in your February 26 letter, it appears that subsurface investigation by Giant within the refinery boundaries would also be prudent to determine impacts of groundwater from any past or current discharges. The OCD will communicate directly with Giant Industries regarding the necessity for such studies or other action.

If you have any questions on this material, please contact me at 827-5812.

Sincerely,



DAVID G. BOYER
Environmental Bureau Chief

DGB:dp

Enclosures

cc: R. L. Stamets
E. Rebeck, EID
D. McQuillan, EID
C. Guerra, Giant Industries
W. Perry Pearce, Montgomery & Andrews

ED D. COFFEY L

GIANT

GIANT

GIANT STORAGE

SAN JUAN
COUNTY LANDFILL

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BARBRA TAYLOR
BK 796 PG 418

B.L.M.

FARMINGTON SCHOOL
DISTRICT - NO. 5
BK 464 PG. 164

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ED D. COFFEY L

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COUNTY LANDFILL

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BK 796 PG 418

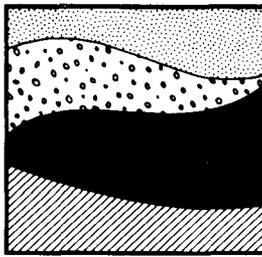
B, L M

FARMINGTON SCHOOL
DISTRICT NO. 5

BK. 464 PG. 164

north

**Geoscience
Consultants, Ltd.**



February 26, 1986

Mr. David G. Boyer
Hydrogeologist
NMOCD
Land Office Building
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: Request for additional data, East Lee Acres Landfill

Dear Mr. Churan:

Enclosed is a copy of our document "Concerns and Request for Further Data Acquisition, East Lee Acres Landfill." This document describes all information presently available to Giant Industries, Inc. (Giant), and summarizes Giant's concerns regarding potential movement of ground-water contamination from the East Lee Acres Landfill onto the Bloomfield Refinery site.

Giant believes that the owners of the landfill site and/or the operators of the landfill should perform a contamination assessment to determine:

- o The nature and extent of possible ground water contamination in the landfill area
- o The rates and directions of any contaminant migration
- o What steps may be necessary to mitigate the effects of potential contamination on downgradient facilities and water users

Giant is convinced that a thorough geohydrologic investigation of the site, followed by the installation of a permanent ground water monitoring network in the landfill area, is the minimum prudent and reasonable course of action for the owners/operators of the East Lee Acres Landfill.

Giant hereby requests that the owners/operators of the landfill provide:

- o Any records relating to waste quantities, dates of dumping operations, and waste analyses
- o A plan and schedule for all site studies, including a monitor-well installation and ground water sampling program

Headquarters
500 Copper Avenue N.W., Suite 325
Albuquerque, New Mexico 87102
(505) 842-0001

Washington Area Office
5513 Twin Knolls Rd., Suite 216
Columbia, Maryland 21045
(301) 596-3760

- o Results of any and all future investigations and analyses
- o A copy of all correspondence between the regulatory agencies and the owner/operators of the landfill

Organic compounds similar to those found in both the landfill impoundments have been detected in domestic wells downgradient of the landfill and the Bloomfield Refinery. For this reason, Giant believes that time is of the essence in resolving questions regarding the source of this apparent ground-water contamination.

Please contact me at our Albuquerque, New Mexico office if you have any questions concerning this request. Your prompt attention to this matter is greatly appreciated.

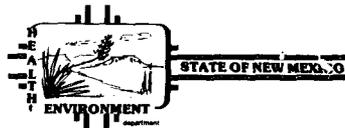
Very truly yours,
GEOSCIENCE CONSULTANTS, LTD.



Alberto A. Gutierrez
President

AAG/1s/MONT&AND/BOYER003.LTR

Enclosures



Date 3-26-86

To David Boyer

Building/Room O.C.D.

- | | |
|---|--|
| <input type="checkbox"/> For Your Attention | <input type="checkbox"/> For Your Recommendation |
| <input type="checkbox"/> For Your Information | <input type="checkbox"/> For Your Approval |
| <input type="checkbox"/> Please Comment | <input type="checkbox"/> Please Return |
| <input type="checkbox"/> Please See Me | <input type="checkbox"/> Please File |
| <input type="checkbox"/> Please Handle | <input type="checkbox"/> Please Mail |
| <input type="checkbox"/> Approved | <input checked="" type="checkbox"/> As Requested |

Telephone Call: Number _____ Time Called _____

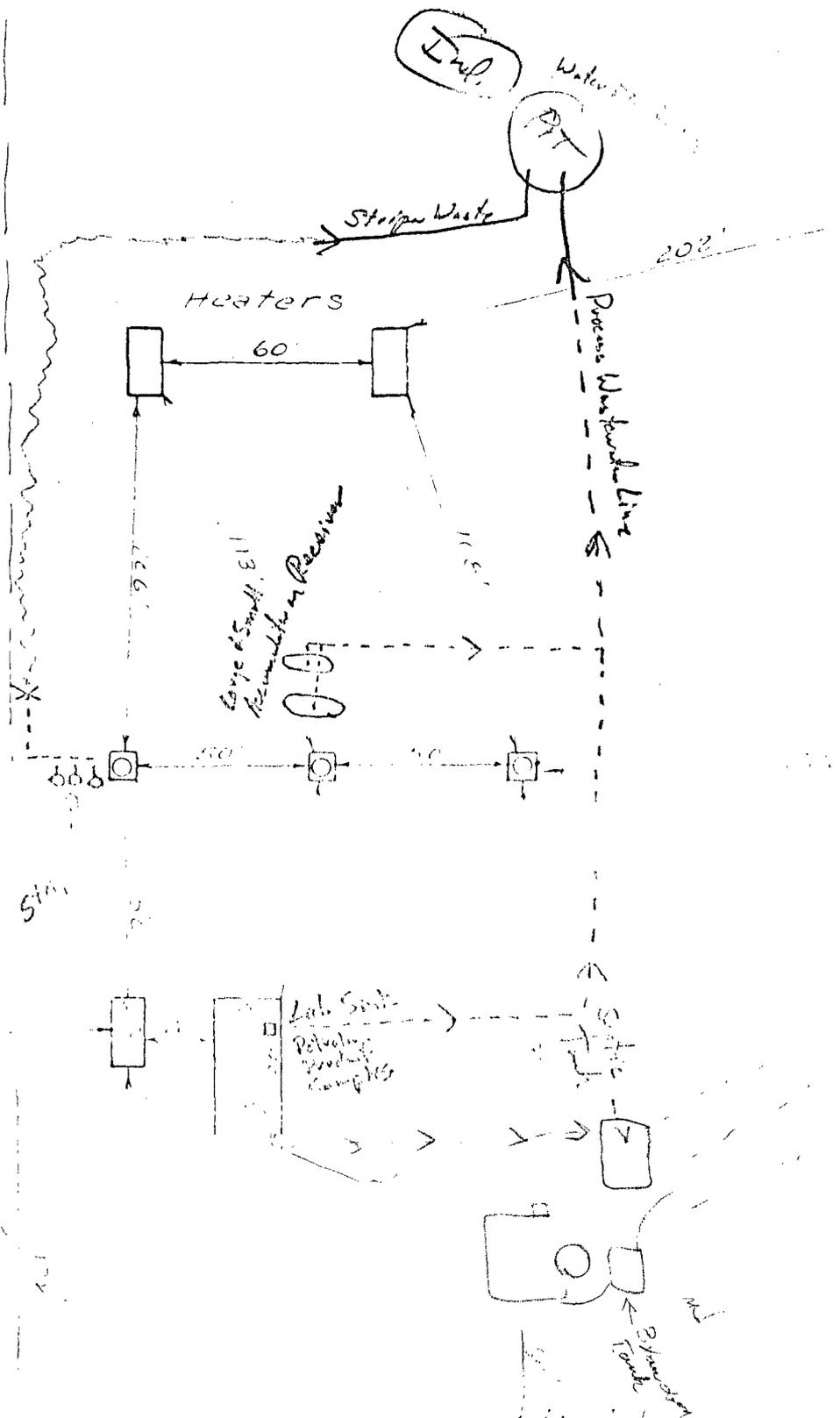
MESSAGE

Copies of the permit applications for Giant Refinery's 3 septic systems are enclosed. I could not copy the blue-line diagram of the 8 refinery area. The section enclosed almost wiped out our xerox.

From David Tomko

Building/Room Farmington E.I.D. office

Property Line



17/6/77 @

17/6/77

Handwritten notes for takes



GLASS REFINERY

SYSTEM #1

PLANT RESTROOMS

2 OR 3 PEOPLE PER SHIFT

35 GAL / PERSON / SHIFT

SHOWERS INCLUDED IN USAGE FIGURE

9 PEOPLE / DAY WORK AT THE FACILITY

$$\begin{array}{r} 4 \\ 35 \\ \times 9 \\ \hline 315 \text{ GAL} \end{array}$$

$$\begin{array}{r} 315 \\ 1.5 \\ \hline 1575 \\ 315 \\ \hline 472.5 \end{array}$$

MINIMUM TANK CAPACITY 750 GAL

EST. PERCOLATION RATE 5 minutes / inch

$$\begin{array}{r} 2.2 \overline{) 315} \\ 143.18 \text{ FT} \end{array}$$

150 FT MINIMUM

1 TRENCH 2' WIDE X 75' LONG

GREAT WEST ENERGY

5250

SYSTEM #2

BRUCE CHIVERS

PLANT OFFICE

35 EMPLOYEES

8 HRS SHIFT
ONE SHIFT

15 gal/person/day

525 gal/DAY USAGE

757.5

1000 gal TANK MINIMUM

PERCOLATION TESTS

10 MIN/INCH

1	328
16	525.0
	48
	45
	32
	130
	128

328 gpt Required

16" BACKHOSE

1.5
200
3.000



INDIVIDUAL LIQUID WASTE DISPOSAL SYSTEM
REGISTRATION APPLICATION

I. GENERAL INFORMATION

Name of Owner GIANT REF. INC. Telephone 602-274-5584
 Mailing Address BOX 338 BLOOMFIELD, N. MEX. Zip 87413
 Contractor GIANT REF. INC. Telephone 632-3306
 Mailing Address BOX 338 BLOOMFIELD, N. MEX.
 Type of Establishment (individual home, trailer park, church, restaurant, other) R.F. FINERY
 Quantity of Liquid Waste (number of bedrooms or flow in gallons per day) 450 GALS PER DAY.
 Water Supply (community system, private well, other) COMMUNITY SYSTEM, LEE ACRES WATER.
 Application for Registration (proposed individual system or modification of an existing system?) PROPOSED SYSTEM
 General Location and Directions to the Site BLOOMFIELD HWY 5 MI EAST OF
ETOH KINGTON

II. SOIL AND TERRAIN CHARACTERISTICS FOR ABSORPTION FIELD USE

Soil Depth in Feet (Do you have six feet of soil before you hit bedrock or an impermeable layer?) NO
 Soil Texture (Is the upper six feet of soil generally gravel, sand, silt or clay?) GRAVEL
 Percolation Rate in Minutes Per Inch (The percolation rate may be estimated from soil maps. A percolation test may be necessary when soil maps are unavailable or when data indicates severe limitations to the use of absorption fields.) EST 4
 Depth to Seasonal High Water Table in Feet (This depth may be estimated from soil maps. A measurement taken from a nearby well may be necessary when soil maps are unavailable.) > 12
 Slope of the Ground (What is the greatest verticle drop in feet per 100 feet horizontal distance at the site for the absorption field?) 6" TO 100'
 Flooding Potential (Has the site for the absorption field been flooded in the last twenty-five years?) NO

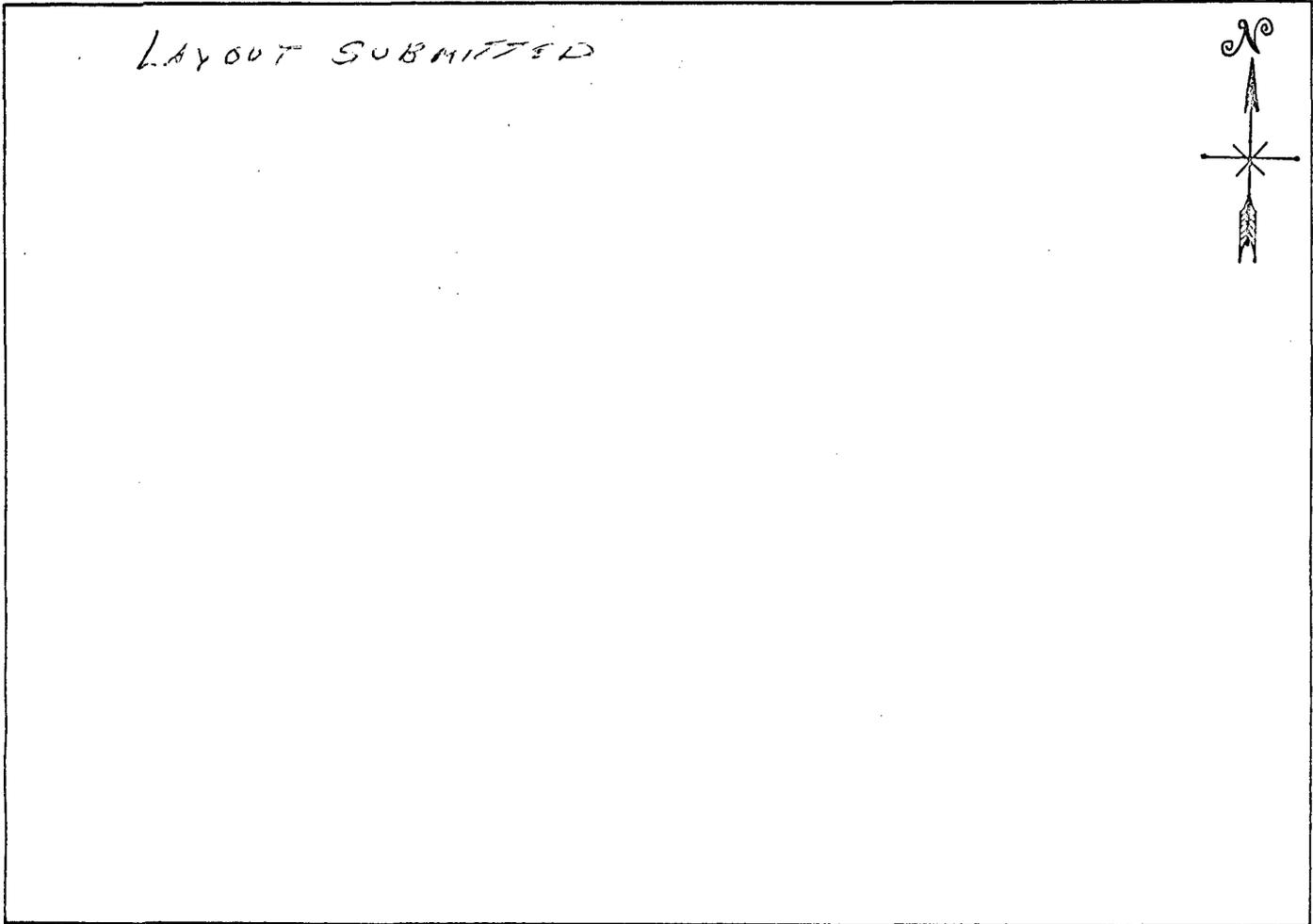
III. INDIVIDUAL SYSTEM DESIGN

Type of Individual System (septic tank, aerobic, privy, other) SEPTIC TANK
 Tank Capacity in Gallons 1900 GALS.
 Manufacturer of the Tank SELF
 Tank Certification (New Mexico Mechanical Board or National Sanitation Foundation?) _____
 Absorption Trench Size in Feet (length and width) 100' LONG X 1' WIDE 2 TRENCHES
 Absorption Trench Depth in Inches 66"
 Depth of Gravel in Trench in Inches 12" TOP 6" OTHER DIPS

IV. LAYOUT OF THE SYSTEM

Sketch the layout of the proposed system and the following landmarks within 200 feet:

1. Proposed or existing buildings, water wells and liquid waste disposal systems;
2. Lakes, reservoirs, streams, arroyos, other watercourses and expected direction of ground water flow; and
3. Dimensions of the parcel of land where the system is to be installed or modified.



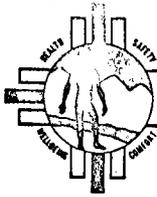
V. REGISTRATION CERTIFICATION

The foregoing information is submitted to the field office of the Environmental Improvement Agency as required by Section 102, Subsection B of the Liquid Waste Disposal Regulations adopted by the Environmental Improvement Board (September 14, 1973). This information is correct and true to the best of my knowledge. I understand that the issuing of the registration certificate does not relieve me from the responsibility of complying with all applicable provisions of the Liquid Waste Disposal Regulations.

Signed: _____ Date: _____
Owner or Contractor

This application has been received by the Environmental Improvement Agency, and a registration certificate is hereby issued. It appears that the proposed individual system will (MEET – NOT MEET) the requirements of Section 103 of the Liquid Waste Disposal Regulations for the following reasons: None

Signed: [Signature] Date: _____
Environmentalist or Engineer



INDIVIDUAL LIQUID WASTE DISPOSAL SYSTEM
REGISTRATION APPLICATION

I. GENERAL INFORMATION

Name of Owner GIANT REF. INC. Telephone 632-3306
Mailing Address Box 338 Bloomfield, N. Mex.
Contractor GIANT REF. INC. Telephone 632-3306
Mailing Address Box 338 Bloomfield, N. Mex.
Type of Establishment (individual home, trailer park, church, restaurant, other) OFFICE
Quantity of Liquid Waste (number of bedrooms or flow in gallons per day) 525 Gals. Per day
Water Supply (community system, private well, other) LEE ACRES WATER ASSOC.
Application for Registration (proposed individual system or modification of an existing system?) NEW SYSTEM
General Location and Directions to the Site Bloomfield Hwy. 5 mi. East
of Farming Road

II. SOIL AND TERRAIN CHARACTERISTICS FOR ABSORPTION FIELD USE

Soil Depth in Feet (Do you have six feet of soil before you hit bedrock or an impermeable layer?) > 6
Soil Texture (Is the upper six feet of soil generally gravel, sand, silt or clay?) SANDY
Percolation Rate in Minutes Per Inch (The percolation rate may be estimated from soil maps. A percolation test may be necessary when soil maps are unavailable or when data indicates severe limitations to the use of absorption fields.) _____
Depth to Seasonal High Water Table in Feet (This depth may be estimated from soil maps. A measurement taken from a nearby well may be necessary when soil maps are unavailable.) 7' 12"
Slope of the Ground (What is the greatest verticle drop in feet per 100 feet horizontal distance at the site for the absorption field?) 0 - 8%
Flooding Potential (Has the site for the absorption field been flooded in the last twenty-five years?) NO

III. INDIVIDUAL SYSTEM DESIGN

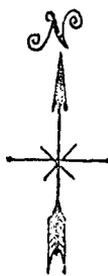
Type of Individual System (septic tank, aerobic, privy, other) SEPTIC TANK SYSTEM
Tank Capacity in Gallons 1000 gal. MINIMUM
Manufacturer of the Tank ABC
Tank Certification (New Mexico Mechanical Board or National Sanitation Foundation?) NEW MEXICO MECHANICAL BOARD
Absorption Trench Size in Feet (length and width) 3' x 4' 6"
Absorption Trench Depth in Inches 10"
Depth of Gravel in Trench in Inches 12" TOTAL 6" GRAVEL

IV. LAYOUT OF THE SYSTEM

Sketch the layout of the proposed system and the following landmarks within 200 feet:

1. Proposed or existing buildings, water wells and liquid waste disposal systems;
2. Lakes, reservoirs, streams, arroyos, other watercourses and expected direction of ground water flow; and
3. Dimensions of the parcel of land where the system is to be installed or modified.

LAYOUT SUBMITTED



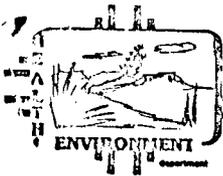
V. REGISTRATION CERTIFICATION

The foregoing information is submitted to the field office of the Environmental Improvement Agency as required by Section 102, Subsection B of the Liquid Waste Disposal Regulations adopted by the Environmental Improvement Board (September 14, 1973). This information is correct and true to the best of my knowledge. I understand that the issuing of the registration certificate does not relieve me from the responsibility of complying with all applicable provisions of the Liquid Waste Disposal Regulations.

Signed: _____ Date: _____
Owner or Contractor

This application has been received by the Environmental Improvement Agency, and a registration certificate is hereby issued. It appears that the proposed individual system will (MEET – NOT MEET) the requirements of Section 103 of the Liquid Waste Disposal Regulations for the following reasons: _____

Signed: *[Signature]* Date: 4-26-78
Environmentalist or Engineer



STATE OF NEW MEXICO

ENVIRONMENT

INDIVIDUAL LIQUID WASTE DISPOSAL SYSTEM REGISTRATION APPLICATION

ENVIRONMENTAL IMPROVEMENT DIVISION

I. GENERAL INFORMATION

Name of Owner Hart's Refinery Telephone _____
 Mailing Address Bloomfield Highway Farmington
 Contractor A. B. C. Concrete Telephone 325-8289
 Mailing Address 205 E Elm

Type of Establishment (individual home, trailer park, church, restaurant, other) industrial
 Quantity of Liquid Waste (number of bedrooms or flow in gallons per day) 2 stools 1 urinal 6 lav. 4 showers
 Water Supply (community system, private well, other) city
 Application for Registration (proposed individual system or modification of an existing system?) new
 General Location and Directions to the Site Hart's Refinery Plant 6 miles from Farmington on Bloomfield Highway

II. SOIL AND TERRAIN CHARACTERISTICS FOR ABSORPTION FIELD USE

Soil Depth in Feet (Do you have six feet of soil before you hit bedrock or an impermeable layer?) yes
 Soil Texture (Is the upper six feet of soil generally gravel, sand, silt or clay?) no
 Percolation Rate in Minutes Per Inch (The percolation rate may be estimated from soil maps. A percolation test may be necessary when soil maps are unavailable or when data indicates severe limitations to the use of absorption fields.) 1 per 8 in
 Depth to Seasonal High Water Table in Feet (This depth may be estimated from soil maps. A measurement taken from a nearby well may be necessary when soil maps are unavailable.) greater than 20'
 Slope of the Ground (What is the greatest vertical drop in feet per 100 feet horizontal distance at the site for the absorption field?) no slope
 Flooding Potential (Has the site for the absorption field been flooded in the last twenty-five years?) no

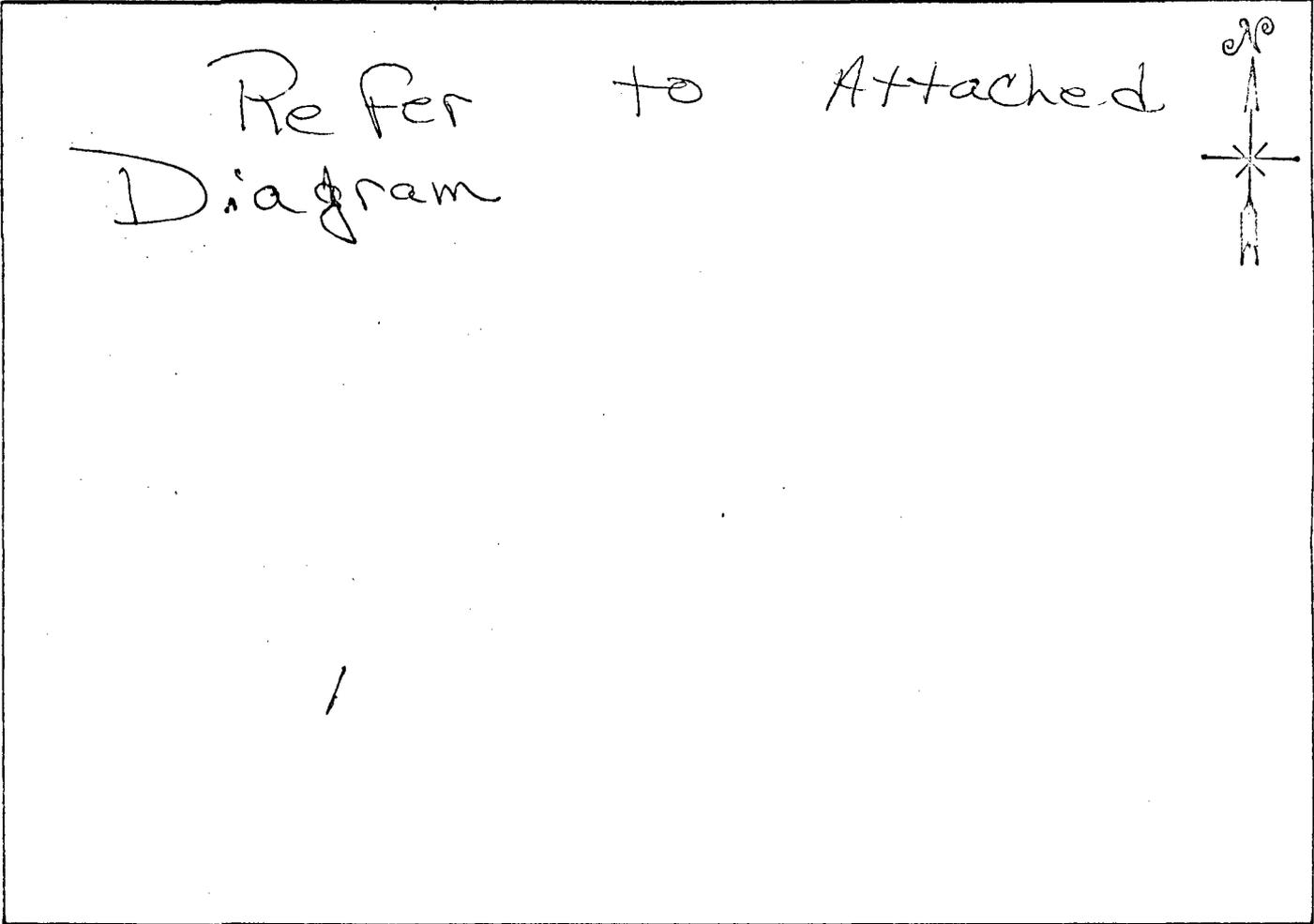
III. INDIVIDUAL SYSTEM DESIGN

Type of Individual System (septic tank, aerobic, privy, other) septic tank
 Tank Capacity in Gallons 1250 gal
 Manufacturer of the Tank A. B. C. Concrete
 Tank Certification (New Mexico Mechanical Board or National Sanitation Foundation?) _____
 Absorption Trench Size in Feet (length and width) 6 30 x 7 ft
 Absorption Trench Depth in Inches 8'
 Depth of Gravel in Trench in Inches 36"

IV. LAYOUT OF THE SYSTEM

Sketch the layout of the proposed system and the following landmarks within 200 feet:

- 1. Proposed or existing buildings, water wells and liquid waste disposal systems;
- 2. Lakes, reservoirs, streams, arroyos, other watercourses and expected direction of ground water flow; and
- 3. Dimensions of the parcel of land where the system is to be installed or modified.



V. REGISTRATION CERTIFICATION

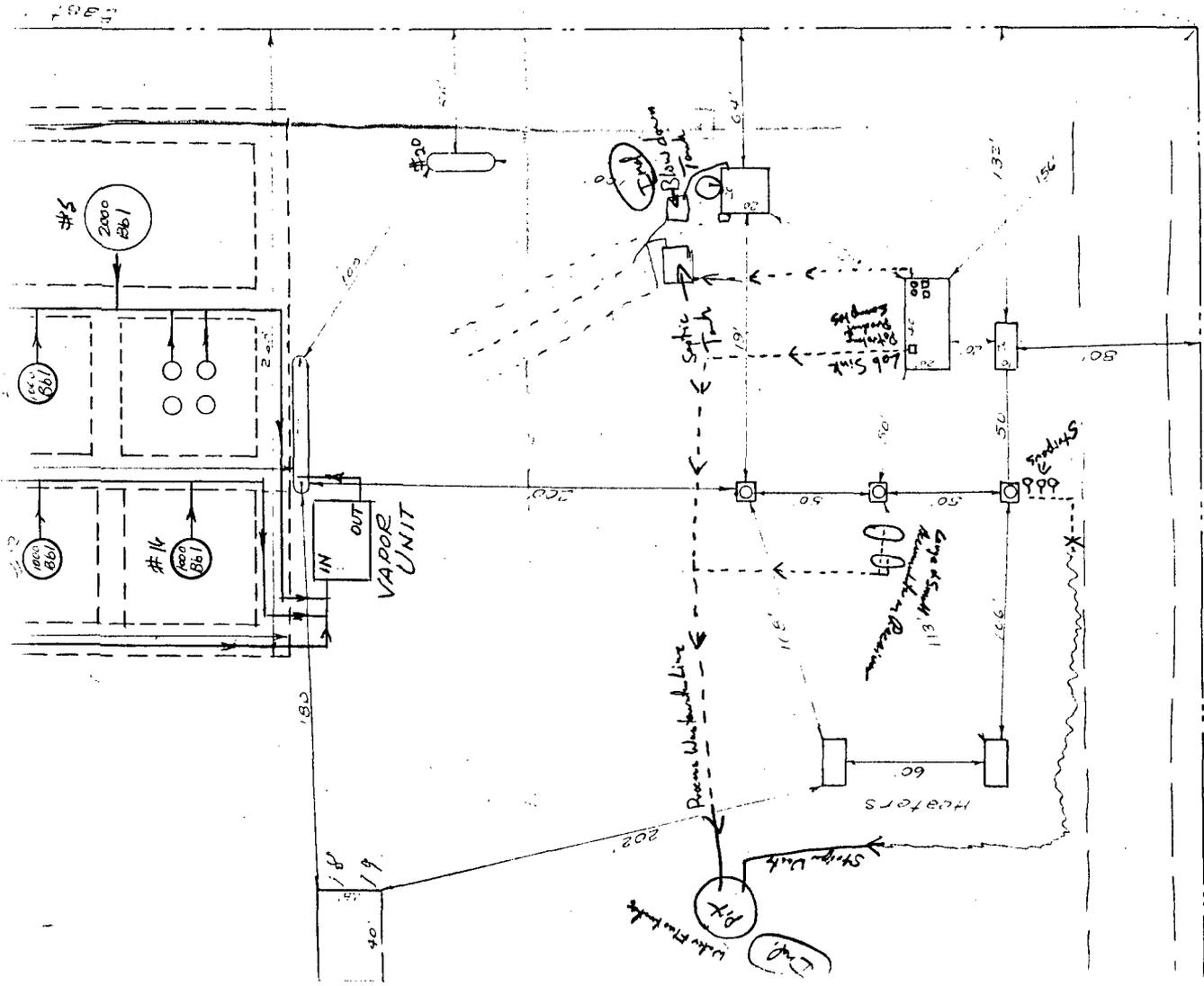
The foregoing information is submitted to the field office of the Environmental Improvement Division as required by Section 102, Subsection B of the Liquid Waste Disposal Regulations adopted by the Environmental Improvement Board (September 14, 1973). This information is correct and true to the best of my knowledge. I understand that the issuing of the registration certificate does not relieve me from the responsibility of complying with all applicable provisions of the Liquid Waste Disposal Regulations.

Signed: Doug Murray Date: 6-20-79
Owner or Contractor

This application has been received by the Environmental Improvement Division, and a registration certificate is hereby issued. It appears that the proposed individual system will (MEET) NOT MEET the requirements of Section 103 of the Liquid Waste Disposal Regulations for the following reasons:

the soil appears suitable for septic-tank/
absorption field

Signed: James King Date: 6-20-79
Environmentalist or Engineer

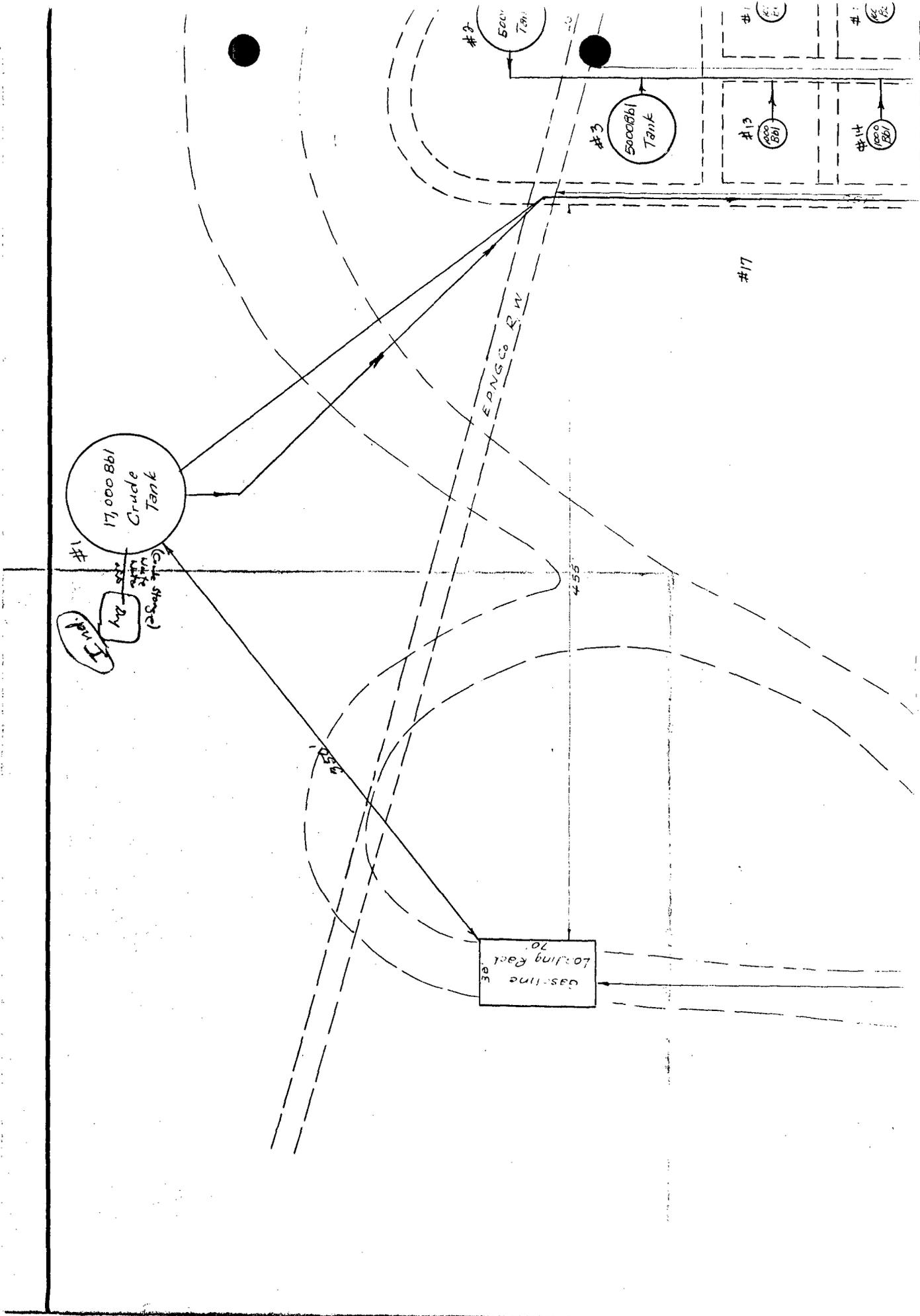


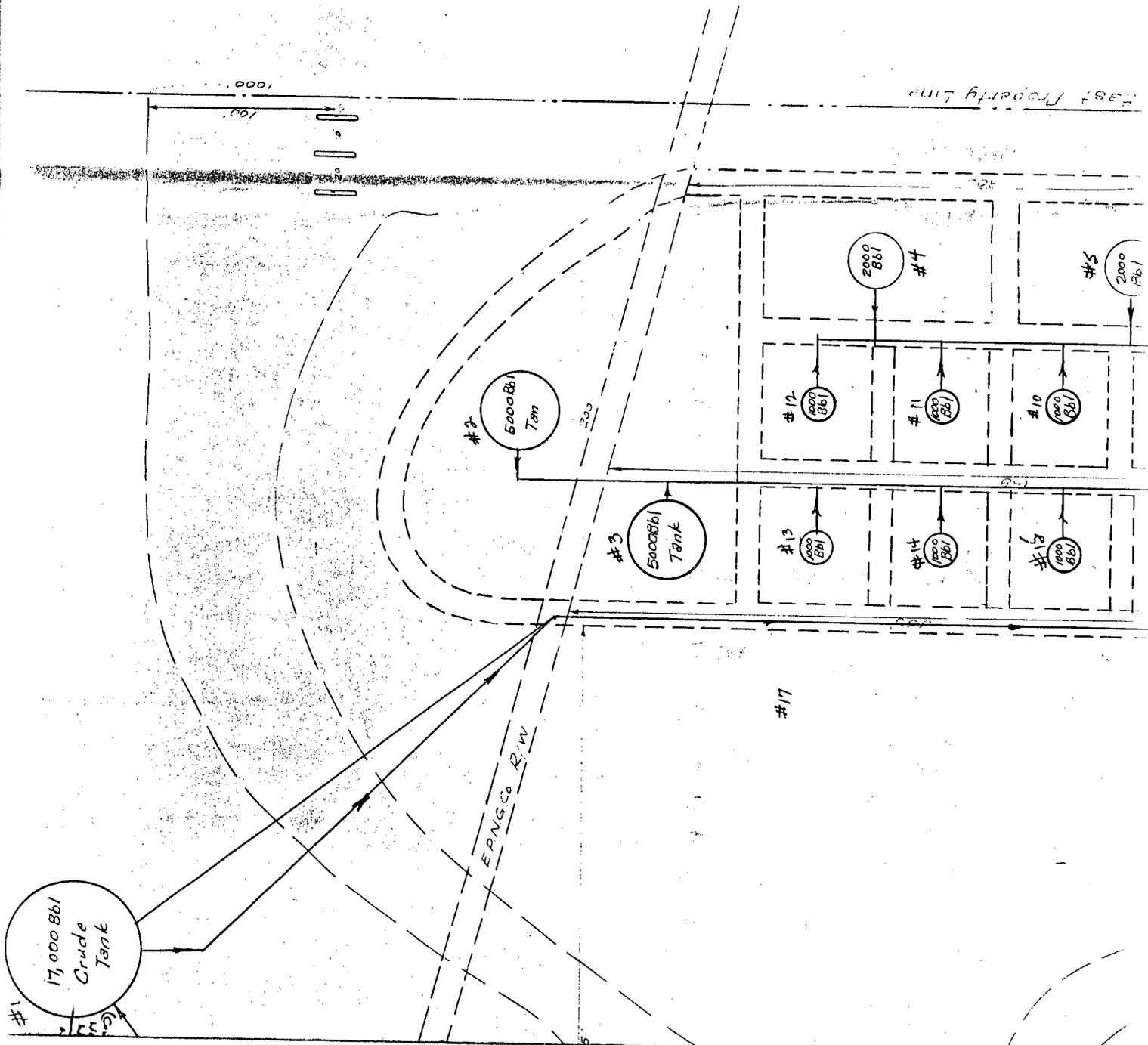
Revised Notes added 1/20/75 R. [Signature]

GIANT INDUSTRIES INCORP.
REFINERY PLOT PLAN

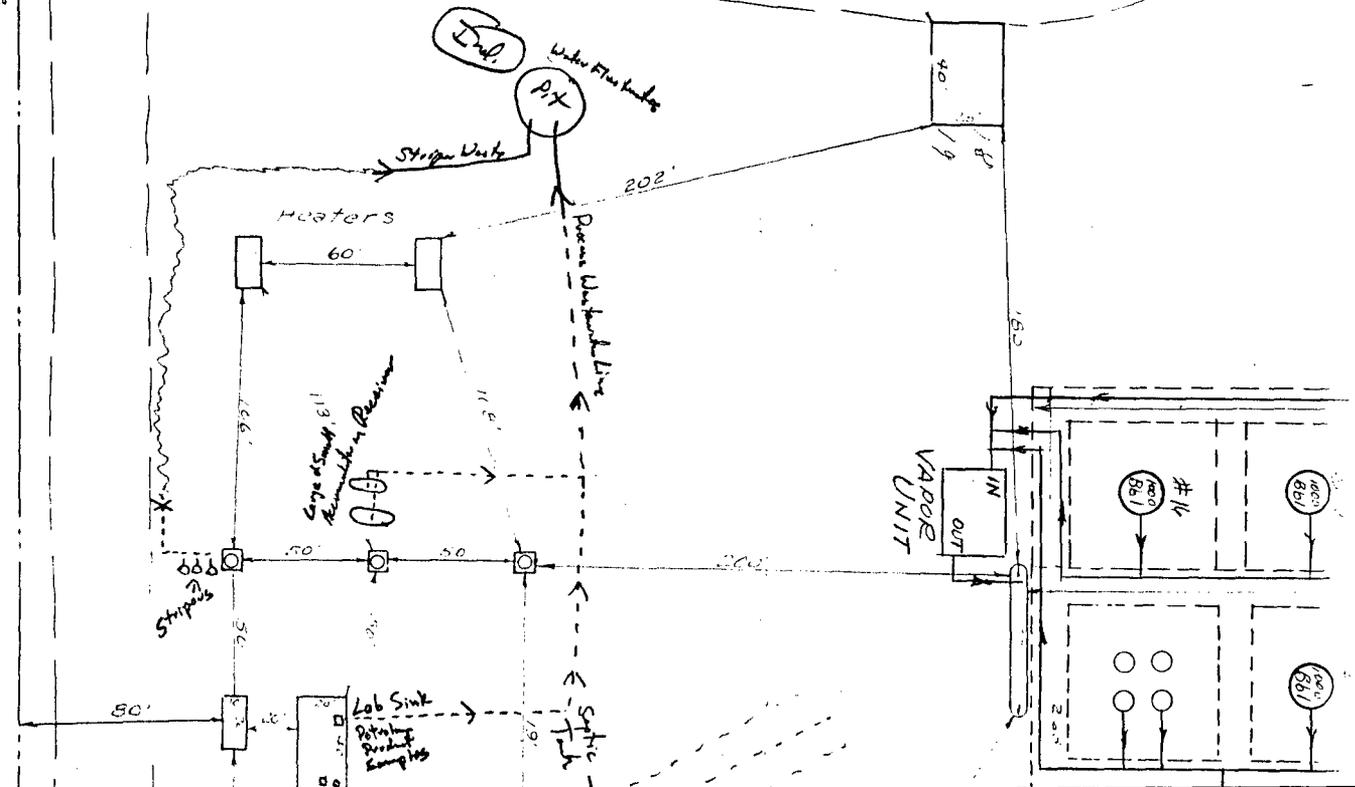
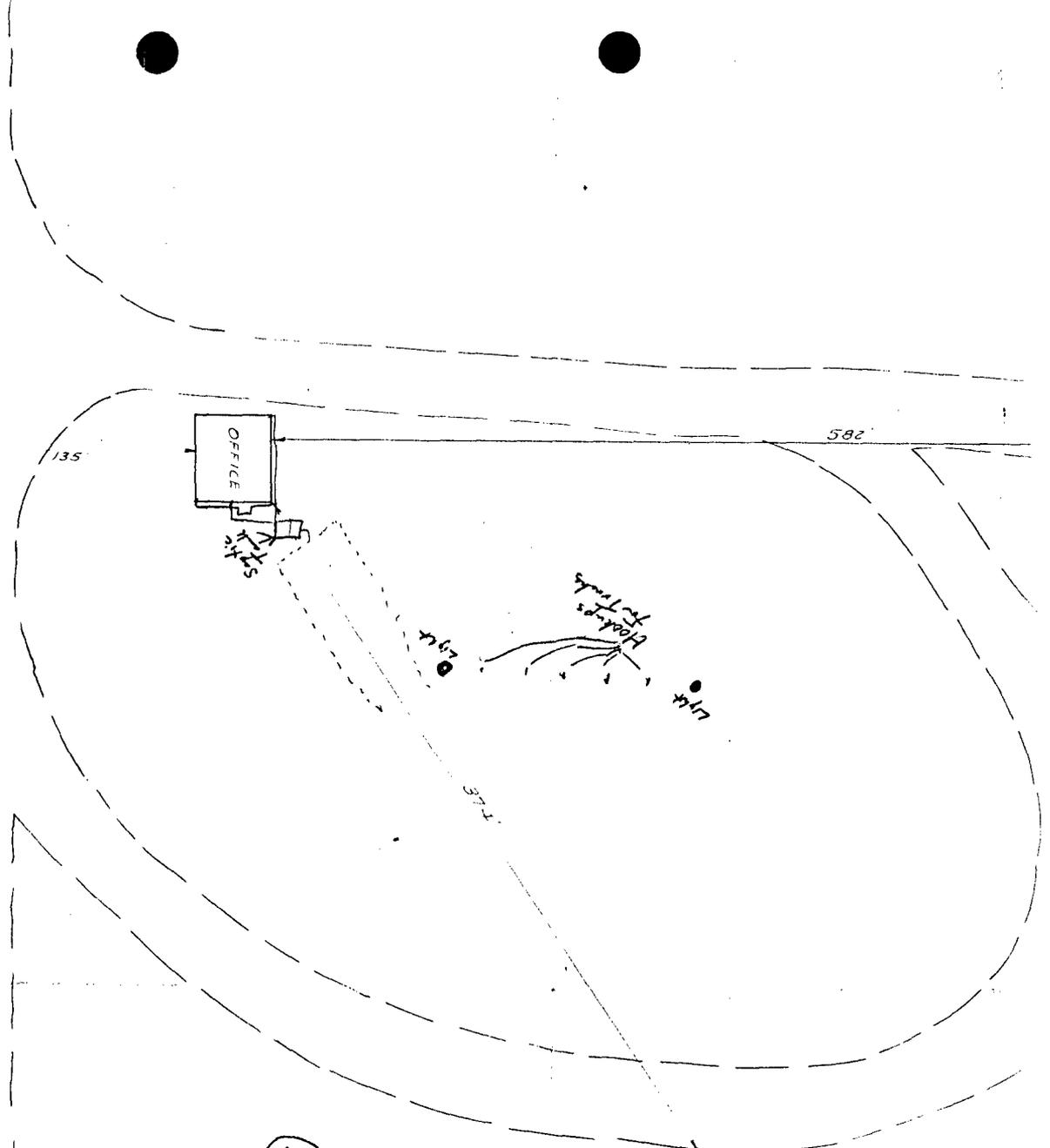
BLOOMFIELD HIGHWAY US 64
San Juan Co., New Mexico

Scale: 1" = 50' Design by CAPM March 1974





South Property Line





DANIEL B. STEPHENS & ASSOCIATES, INC.

CONSULTANTS IN GROUND-WATER HYDROLOGY

SOCORRO, NEW MEXICO

FINAL DATA REPORT
ON
LABORATORY ANALYSES
OF
SOIL HYDRAULIC PROPERTIES

PREPARED FOR

RECEIVED

MAY 29 1990

OIL CONSERVATION DIV.
SANTA FE

GEOSCIENCE CONSULTANTS, LTD.

ALBUQUERQUE, NEW MEXICO

DECEMBER, 1986



DANIEL B. STEPHENS & ASSOCIATES, INC.
CONSULTANTS IN GROUND-WATER HYDROLOGY

• GROUND-WATER CONTAMINATION • UNSATURATED ZONE INVESTIGATIONS • WATER SUPPLY DEVELOPMENT •

December 9, 1986

Mr. Randall T. Hicks
Vice President
GEOSCIENCE CONSULTANTS, LTD.
500 Cooper Avenue N.W., Suite 325
Albuquerque, New Mexico 87102

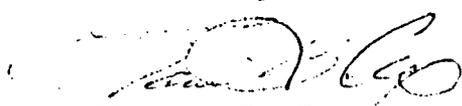
Dear Mr. Hicks:

Please find enclosed the final data report on the five soil analyses. This report constitutes completion of the analyses requested in your written communication of October 27, 1986.

We have reviewed the data available for each sample, and we believe the parameters are generally reasonable and representative for the soil samples. However, Daniel B. Stephens & Associates, Inc. cannot verify that samples are representative of the soils from which they were collected, and we do not assume any responsibility for interpretations or analyses based on this data.

We are very grateful to provide this service to GEOSCIENCE CONSULTANTS, LTD. Please do not hesitate to call us if you have any questions.

Sincerely Yours,



Warren B. Cox
Laboratory Manager

WBC:bdf
Enclosure

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INTRODUCTION

INTRODUCTION

Daniel B. Stephens & Associates, Inc. was requested to perform the following tasks as outlined in written communication from GEOSCIENCE CONSULTANTS, LTD. on October 27, 1986 and personal communication from Mr. Randall Hicks on November 17, 1986.

Task #1. Conduct laboratory analyses of five (5) soil samples, to include analyses as outlined below for each sample:

<u>DEPTH</u>	<u>SAMPLE NUMBER</u>	<u>ANALYSIS TO BE PERFORMED</u>
12.5'	GC1	Initial moisture content, unsaturated hydraulic conductivity.
29.5'	GC2	Initial moisture content.
37'	GC3	Initial moisture content.
39'	GC4 (Sandstone)	Initial moisture content, unsaturated hydraulic conductivity.
39'	GC5 (Mudstone)	Initial moisture content, unsaturated hydraulic conductivity.

Task # 2. Determine, if possible, the horizontal saturated hydraulic conductivity of the sandstone sample, from 39 feet.

In execution of the foregoing request, Daniel B. Stephens & Associates, Inc. has performed the following work as summarized below and in Table 1.

Task #1. Laboratory analyses of the five (5) soil samples were completed. The method of Mualem (1978) was chosen for determin-



ing unsaturated hydraulic conductivity, as agreed upon by Mr. Randall Hicks (Personal communication, November 17, 1986). The three parameter fit of the Mualem model was applied to moisture retention-pressure head characteristics of samples GC1, GC4, and GC5 which were obtained by the hanging column and pressure plate methods. The parameters of fit alpha (α), n and residual moisture content, were used by the model to calculate relative unsaturated hydraulic conductivity, as described in Appendix B, Principles and Methods. Saturated hydraulic conductivity was determined for samples GC1, GC4 and GC5, as part of the determination of unsaturated hydraulic conductivity. Graphical representation of the data generated by the model is presented for unsaturated hydraulic conductivity.

Task #2. Horizontal saturated hydraulic conductivity of sample GC4 (Sandstone) could not be measured because there was insufficient soil core for analysis.

Included in this data report are summary tables, graphs, and raw laboratory data. The Appendices describe basic principles of the analyses, methods of calculation, sample preparation, and a chemical analysis of the water used in the laboratory. All calculation results are expressed in metric units according to Table 2, except for sample depths which were reported to us in length units of feet.



Table 1. Summary of Tests

Sample No.	GC1	GC2	GC3	GC4	GC5
Test					
Saturated Hydraulic Conductivity	X			X	X
Unsaturated Hydraulic Conductivity	X			X	X
Moisture Retention	X			X	X
Initial Moisture Content	X	X	X	X	X

Note: GC4 represents the sandstone sample, GC5 represents the mudstone sample.



Table 2. Unit Conventions

Hydraulic Conductivity: cm/sec

Moisture Content: % volume

Bulk Density: g/cc

Porosity: Dimensionless

Note: Unless otherwise stated, lengths are in units of centimeters, and masses are in units of grams.



SATURATED HYDRAULIC CONDUCTIVITY

Table 3. Summary of Saturated Hydraulic Conductivity Test Results

<u>Sample No.</u>	<u>K (cm/sec)</u>	
GC1	1.1×10^{-4}	
GC4	3.1×10^{-5}	(Sandstone)
GC5	9.3×10^{-6}	(Mudstone)



FALLING HEAD TEST DATA

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GCI RING NO: H21 DEPTH: 12.5'TYPE OF WATER USED: TapLENGTH OF SAMPLE: 1.9 (cm) RADIUS OF SAMPLE: 2.5 (cm)CROSS SECTIONAL AREA OF SAMPLE: 19.63 (cm²)CROSS SECTIONAL AREA OF STANDPIPE: 20.428 (cm²)BEGINNING: Stand Pipe #5

DATE	TIME	TEMP (°C)	RESERVOIR HEAD (cm)	SAMPLE HEAD (cm)	ΔH_1 (cm)
11/13	0900	18.5	-41	-17.8	-23.2
11/13	1845	18.5	-41	-14.2	-26.8

ENDING:

DATE	TIME	TEMP (°C)	RESERVOIR HEAD (cm)	SAMPLE HEAD (cm)	ΔH_2 (cm)
11/13	1837	18.5	-41	-27.9	-13.1
11/14	0818	18.5	-41	-32.5	- 8.5

ELAPSED TIME = 1st run = 34.620 (sec) 2nd run = 48,780 (sec)VISCOSITY CORRECTION = 1.038 (both runs)

RUN NO. _____ OF _____ RUNS

CALCULATIONS: 1st run, K sat = 8.7×10^{-5} cm/sec
 2nd run, K sat = 12.5×10^{-5} cm/sec

K (SAT) = 1.1×10^{-4} cm/sec = arithmetic average

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: W. CoxCALCULATIONS MADE BY: W. CoxCHECKED BY: L. Williamson

FALLING HEAD TEST DATA

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC4 (Sandstone) RING NO: 21C DEPTH: 39'TYPE OF WATER USED: TapLENGTH OF SAMPLE: 5.1 (cm) RADIUS OF SAMPLE: 2.5 (cm)CROSS SECTIONAL AREA OF SAMPLE: 19.63 (cm²)CROSS SECTIONAL AREA OF STANDPIPE: 20.428 (cm²)

BEGINNING: Standpipe #4

DATE	TIME	TEMP (°C)	RESERVOIR HEAD (cm)	SAMPLE HEAD (cm)	ΔH_1 (cm)
11/13	0900	17.0	-41.5	-10.2	-31.3
11/13	1839	19.0	-41.5	-14.9	-26.6

ENDING:

DATE	TIME	TEMP (°C)	RESERVOIR HEAD (cm)	SAMPLE HEAD (cm)	ΔH_2 (cm)
11/13	1839	19.0	-41.5	-14.9	-26.6
11/14	0828	19.0	-41.5	-22.1	-19.4

ELAPSED TIME = 1st run = 34,740 (sec) 2nd run = 49,740 (sec)VISCOSITY CORRECTION = 1st run = 1.051 2nd run = 1.025RUN NO. OF RUNS

CALCULATIONS: 1st run, $K_{sat} = 2.6 \times 10^{-5}$ cm/sec
 2nd run, $K_{sat} = 3.5 \times 10^{-5}$ cm/sec

K (SAT) = 3.1×10^{-5} cm/sec = arithmetic average

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: W. CoxCALCULATIONS MADE BY: W. CoxCHECKED BY: L. Williamson

FALLING HEAD TEST DATA

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC5 (Mudstone) RING NO: H14 DEPTH: 39'TYPE OF WATER USED: TapLENGTH OF SAMPLE: 5.1 (cm) RADIUS OF SAMPLE: 2.5 (cm)CROSS SECTIONAL AREA OF SAMPLE: 19.63 (cm²)CROSS SECTIONAL AREA OF STANDPIPE: 20.428 (cm²)

BEGINNING: Standpipe #3

DATE	TIME	TEMP (°C)	RESERVOIR HEAD (cm)	SAMPLE HEAD (cm)	ΔH_1 (cm)
11/13	0900	18.5	-39.0	-16.3	-22.7
11/13	1841	19.0	-39.0	-17.5	-21.5

ENDING:

DATE	TIME	TEMP (°C)	RESERVOIR HEAD (cm)	SAMPLE HEAD (cm)	ΔH_2 (cm)
11/13	1841	19.0	-39.0	-17.5	-21.5
11/14	0829	19.0	-39.0	-19.4	-19.6

ELAPSED TIME = 1st run = 34.860 (sec) 2nd run = 49,680 (sec)VISCOSITY CORRECTION = 1st run = 1.031 2nd run = 1.025

RUN NO. _____ OF _____ RUNS

CALCULATIONS: 1st run, $K_{sat} = 8.5 \times 10^{-6}$ cm/sec
 2nd run, $K_{sat} = 10.1 \times 10^{-6}$ cm/sec

K (SAT) = 9.3×10^{-6} cm/sec = arithmetic average

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: W. CoxCALCULATIONS MADE BY: L. WilliamsonCHECKED BY: W. Cox

MOISTURE RETENTION

Table 4. Summary of Moisture Retention-Pressure Head Test Results

<u>Sample No.</u>	<u>Pressure Head (cm of water)</u>	<u>Moisture Content (% volume)</u>
GC1	0.0	39.2
	- 15.8	37.7
	- 37.3	33.2
	- 74.6	29.2
	-105.0	28.1
	-125.0	27.4
	-176.7	26.3
GC4 (Sandstone)	0.0	36.6
	- 24.7	33.4
	- 73.4	30.0
	-102.8	29.8
	-130.4	29.1
	-173.8	28.7
	-202.5	28.7
	-1020.0	19.3
GC5 (Mudstone)	0.0	43.8
	- 28.8	43.2
	-101.0	40.8
	-128.7	40.7
	-156.4	39.7
	-200.8	39.2
	-1020.0	29.4



MOISTURE RETENTION DATA - HANGING COLUMN
(PORE SIZE DISTRIBUTION)

JOB NAME: Geoscience Consultants

JOB NUMBER: 86-1-020

SAMPLE NUMBER: GC1 RING NO.: 1121

DEPTH: 12.5' SAMPLE VOLUME: 96.19 (cc)

WEIGHT AT 0 CM TENSION W/CAP AND RING (SATURATED): 287.1 (g)

TARE WEIGHT, RING: 89.6 (g) TARE WEIGHT, CAP: 8.2 (g)

DRY WEIGHT OF SAMPLE: 151.6 (g)

SATURATED MOISTURE CONTENT: 39.2 (% vol)

INITIAL VOLUME OF WATER IN SAMPLE: 37.7 (cc)

	SUCTION (cm)	BURET VOLUME (cc)	VOLUME CHANGE (cc)	VOLUME CHANGES (cc)	MOISTURE CONTENT (%VOL)
DRYING	0.0	45.2	0.0	0.0	39.2
	15.8	43.8	1.4	1.4	37.7
	37.3	39.4	4.4	5.8	33.2
	74.6	35.6	3.8	9.6	29.2
	105.0	34.5	1.1	10.7	28.1
	125.0	33.9	0.6	11.3	27.4
	176.7	32.8	1.1	12.4	26.3
WETTING					

* NOTE: Tension is measured from center of sample to bottom of meniscus

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: L. Williamson

CALCULATIONS MADE BY: W. Cox

CHECKED BY: L. Williamson



MOISTURE RETENTION DATA - HANGING COLUMN
(PORE SIZE DISTRIBUTION)

JOB NAME: Geoscience Consultants

JOB NUMBER: 86-L-020

SAMPLE NUMBER: GC4 (Sandstone) RING NO.: 21C

DEPTH: 39' SAMPLE VOLUME: 100.0 (cc)

WEIGHT AT 0 CM TENSION W/CAP AND RING (SATURATED): 311.5 (g)

TARE WEIGHT, RING: 100.3 (g) TARE WEIGHT, CAP: 7.7 (g)

DRY WEIGHT OF SAMPLE: 166.9 (g)

SATURATED MOISTURE CONTENT: 36.6 (% vol)

INITIAL VOLUME OF WATER IN SAMPLE: 36.6 (cc)

	SUCTION (cm)	BURET VOLUME (cc)	VOLUME CHANGE (cc)	Σ VOLUME CHANGES (cc)	MOISTURE CONTENT (%VOL)
DRYING	0.0	49.4	0.0	0.0	36.6
	24.7	46.2	3.2	3.2	33.4
	73.4	42.8	3.4	6.6	30.0
	102.8	42.6	0.2	6.8	29.8
	130.4	41.9	0.7	7.5	29.1
	173.8	41.5	0.4	7.9	28.7
	202.5	41.5	0.0	7.9	28.7
WETTING					

* NOTE: Tension is measured from center of sample to bottom of meniscus

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: L. Williamson

CALCULATIONS MADE BY: W. Cox

CHECKED BY: L. Williamson



MOISTURE RETENTION DATA - PRESSURE PLATE
(PORE SIZE DISTRIBUTION)

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC4 (Sandstone) RING NO.: 21CDEPTH = 39' SAMPLE VOLUME: 100.0 (cc)WEIGHT AT 0 CM TENSION W/CAP AND RING (SATURATED) = 311.5 (g)TARE WEIGHT, RING = 100.3 (g) TARE WEIGHT, CAP = 7.7 (g)DRY WEIGHT OF SAMPLE = 166.9 (g)SATURATED MOISTURE CONTENT = 36.6 (% vol)INITIAL VOLUME OF WATER IN SAMPLE = 36.6 (cc)WEIGHT FROM HANGING COLUMN, W/O CAP = 301.0 (g)FINAL TENSION ON HANGING COLUMN = 202.5 (cm)

DATE	TIME	PRESSURE (BAR)	WEIGHT, WITH Ring(g) + Rubber Ring	CHANGE IN WEIGHT(g) Into P.P.	Σ WEIGHT CHANGES (g)	MOISTURE CONTENT %VOL
11/24	1330	0		Into P.P.		
11/25	2220	1	291.6	9.4	17.3	19.3

COMMENTS: Rubber Ring Mass = 5.19 g

LABORATORY ANALYSES PERFORMED BY: L. WilliamsonCALCULATION MADE BY: W. CoxCHECKED BY: L. Williamson

**MOISTURE RETENTION DATA - HANGING COLUMN
(PORE SIZE DISTRIBUTION)**

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC5 (Mudstone) RING NO.: H14DEPTH: 39' SAMPLE VOLUME: 100.0 (cc)WEIGHT AT 0 CM TENSION W/CAP AND RING (SATURATED): 309.7 (g)TARE WEIGHT, RING: 93.0 (g) TARE WEIGHT, CAP: 7.5 (g)DRY WEIGHT OF SAMPLE: 165.4 (g)SATURATED MOISTURE CONTENT: 43.8 (% vol)INITIAL VOLUME OF WATER IN SAMPLE: 43.8 (cc)

	SUCTION (cm)	BURET VOLUME (cc)	VOLUME CHANGE (cc)	VOLUME CHANGES (cc)	MOISTURE CONTENT (%VOL)
DRYING	0.0	47.6	0.0	0.0	43.8
	28.8	47.0	0.6	0.6	43.2
	101.0	44.6	2.4	3.0	40.8
	128.7	44.5	0.1	3.1	40.7
	156.4	43.5	1.0	4.1	39.7
	200.8	43.0	0.5	4.6	39.2
WETTING					

* NOTE: Tension is measured from center of sample to bottom of meniscus

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: L. WilliamsonCALCULATIONS MADE BY: L. WilliamsonCHECKED BY: W. Cox

MOISTURE RETENTION DATA - PRESSURE PLATE
(PORE SIZE DISTRIBUTION)

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC5 RING NO.: H14DEPTH = 39' SAMPLE VOLUME: 100.0 (cc)WEIGHT AT 0 CM TENSION W/CAP AND RING (SATURATED) = 309.7 (g)TARE WEIGHT, RING = 93.0 (g) TARE WEIGHT, CAP = 7.5 (g)DRY WEIGHT OF SAMPLE = 165.4 (g)SATURATED MOISTURE CONTENT = 43.8 (% vol)INITIAL VOLUME OF WATER IN SAMPLE = 43.8 (cc)WEIGHT FROM HANGING COLUMN, W/O CAP = 297.7 (g)FINAL TENSION ON HANGING COLUMN = 200.8 (cm)

DATE	TIME	PRESSURE (BAR)	WEIGHT, WITH RING (g)	CHANGE IN WEIGHT (g)	Σ WEIGHT CHANGES (g)	MOISTURE CONTENT %VOL
11/23	1340	0		Into P.P.		
11/24	2215	1	292.9	9.9	14.4	29.4

COMMENTS: Weights Include Rubber Ring = 5.1 gramLABORATORY ANALYSES PERFORMED BY: W. CoxCALCULATION MADE BY: L. WilliamsonCHECKED BY: W. Cox

INITIAL MOISTURE CONTENT



Table 5. Summary of Initial Moisture Content Test Results

<u>Sample No.</u>	<u>Initial Moisture Content (% volume)</u>	<u>Comments</u>
GC1	11.2	
GC2	29.4	The sample, upon arrival at the laboratory, gave off strong smell of hydrocarbons. The sample was air dried in a well ventilated area for 3 days before oven drying. In evaluating the initial moisture content result, the density of the pore fluid initially present in the sample should be taken into account. For the laboratory result presented here, pore fluid density is taken to be 1 gram per cubic centimeter
GC3	28.0	
GC4 (Sandstone)	16.5	
GC5 (Mudstone)	24.1	



DATA FOR INITIAL MOISTURE CONTENT,
BULK DENSITY AND POROSITY

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC1RING NO.: H21 DEPTH: 12.5' (cm,m)TARE WEIGHT, RING = 89.6 (g) PAN NUMBER: 41TARE WEIGHT, CAP = 8.2 (g) TARE WEIGHT, PAN= Tared Off (g)FIELD WEIGHT OF SAMPLE W/CAP AND RING = 260.2 (g)VOLUME OF SAMPLE = 96.19 (cc)DATE AND TIME INTO/~~XXXX~~OF OVEN: 11/23/86 1930DATE AND TIME ~~XXXX~~/OUT OF OVEN: 11/25/86 2220
(MILITARY TIME)DRY WEIGHT OF SAMPLE = 151.6 (g)DRY BULK DENSITY = 1.58 (g/cc)PARTICLE DENSITY = 2.65 (g/cc)METHOD: X ASSUME $\rho_s = 2.65$ g/cm PYCNOMETER (SEE SEPARATE DATA SHEET)CALCULATED POROSITY = 40.4 (% VOL)INITIAL MOISTURE CONTENT = 11.2 (% VOL)

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: L. WilliamsonCALCULATIONS MADE BY: W. CoxCHECKED BY : L. Williamson

DATA FOR INITIAL MOISTURE CONTENT,
BULK DENSITY AND POROSITY

JOB NAME: Geoscience Consultants

JOB NUMBER: 86-L-02()

SAMPLE NUMBER: GC2

RING NO.: N/A DEPTH: 29.5'

TARE WEIGHT, RING = N/A (g) PAN NUMBER: 40

TARE WEIGHT, CAP = N/A (g) TARE WEIGHT, PAN = Tared Off (g)

FIELD WEIGHT OF SAMPLE (Soil Only) = 209.0 (g)

VOLUME OF SAMPLE = 100 (cc)

DATE AND TIME INTO/~~XXXX~~ Air Dry: 11/10/86 1840

DATE AND TIME INTO/~~XXXX~~ OF OVEN: 11/13/86 1920

DATE AND TIME INTO/OUT OF OVEN: 11/16/86 1810

DRY WEIGHT OF SAMPLE = 179.6 (g)

DRY BULK DENSITY = 1.80 (g/cc)

PARTICLE DENSITY = 2.65 (g/cc)

METHOD: ASSUME $\rho_s = 2.65$ g/cm³
 PYCNOMETER (SEE SEPARATE DATA SHEET)

CALCULATED POROSITY = 32.1 (% VOL)

INITIAL MOISTURE CONTENT = 29.4 (% VOL)

COMMENTS: Sample had to be air dried for 3 days before oven drying due to high hydrocarbon content.

LABORATORY ANALYSES PERFORMED BY: W. Cox

CALCULATIONS MADE BY: L. Williamson

CHECKED BY : W. Cox



DATA FOR INITIAL MOISTURE CONTENT,
BULK DENSITY AND POROSITY

JOB NAME: Geoscience Consultants

JOB NUMBER: 86-L-020

SAMPLE NUMBER: GC3

RING NO.: N/A

DEPTH: 37'

TARE WEIGHT, RING = N/A (g) PAN NUMBER: 18

TARE WEIGHT, CAP = N/A (g) TARE WEIGHT, PAN = Tared Off (g)

FIELD WEIGHT OF SAMPLE (Soil Only) = 215.6 (g)

VOLUME OF SAMPLE = 100.0 (cc)

DATE AND TIME INTO/~~OUT~~ OF OVEN: 11/10/86 1830

DATE AND TIME ~~INTO~~/OUT OF OVEN: 11/13/86 1935
(MILITARY TIME)

DRY WEIGHT OF SAMPLE = 187.6 (g)

DRY BULK DENSITY = 1.88 (g/cc)

PARTICLE DENSITY = 2.65 (g/cc)

METHOD: X ASSUME $\rho_s = 2.65$ g/cm

 PYCNOMETER (SEE SEPARATE DATA SHEET)

CALCULATED POROSITY = 29.1 (% VOL)

INITIAL MOISTURE CONTENT = 28.0 (% VOL)

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: W. Cox

CALCULATIONS MADE BY: W. Cox

CHECKED BY : L. Williamson



DATA FOR INITIAL MOISTURE CONTENT,
BULK DENSITY AND POROSITY

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC4 (Sandstone)RING NO.: 21C DEPTH: 39'TARE WEIGHT, RING = 100.3 (g) PAN NUMBER: 16TARE WEIGHT, CAP = 7.7 (g) TARE WEIGHT, PAN = Tared Off (g)FIELD WEIGHT OF SAMPLE W/CAP AND RING = 291.4 (g)VOLUME OF SAMPLE = 100.0 (cc)DATE AND TIME INTO/~~EXIT~~ OF OVEN: 11/25/86 2240DATE AND TIME INTO/OUT OF OVEN: 11/28/86 2115
(MILITARY TIME)DRY WEIGHT OF SAMPLE = 166.9 (g)DRY BULK DENSITY = 1.67 (g/cc)PARTICLE DENSITY = 2.65 (g/cc)METHOD: X ASSUME $\rho_s = 2.65$ g/cm PYCNOMETER (SEE SEPARATE DATA SHEET)CALCULATED POROSITY = 37.0 (% VOL)INITIAL MOISTURE CONTENT = 16.5 (% VOL)

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: W. CoxCALCULATIONS MADE BY: W. CoxCHECKED BY : L. Williamson

DATA FOR INITIAL MOISTURE CONTENT,
BULK DENSITY AND POROSITY

JOB NAME: Geoscience ConsultantsJOB NUMBER: 86-L-020SAMPLE NUMBER: GC5 (Mudstone)RING NO.: H14DEPTH: 39'TARE WEIGHT, RING = 93.0 (g) PAN NUMBER: 30TARE WEIGHT, CAP = 7.5 (g) TARE WEIGHT, PAN = Tared Off (g)FIELD WEIGHT OF SAMPLE W/CAP AND RING = 290.0 (g)VOLUME OF SAMPLE = 100.0 (cc)DATE AND TIME INTO/~~OUT~~ OF OVEN: 11/25/86 2245DATE AND TIME ~~INTO~~/OUT OF OVEN: 11/28/86 2110
(MILITARY TIME)DRY WEIGHT OF SAMPLE = 165.4 (g)DRY BULK DENSITY = 1.65 (g/cc)PARTICLE DENSITY = 2.65 (g/cc)METHOD: x ASSUME $\rho_s = 2.65$ g/cm PYCNOMETER (SEE SEPARATE DATA SHEET)CALCULATED POROSITY = 37.7 (% VOL)INITIAL MOISTURE CONTENT = 24.1 (% VOL)

COMMENTS:

LABORATORY ANALYSES PERFORMED BY: W. CoxCALCULATIONS MADE BY: W. CoxCHECKED BY : L. Williamson

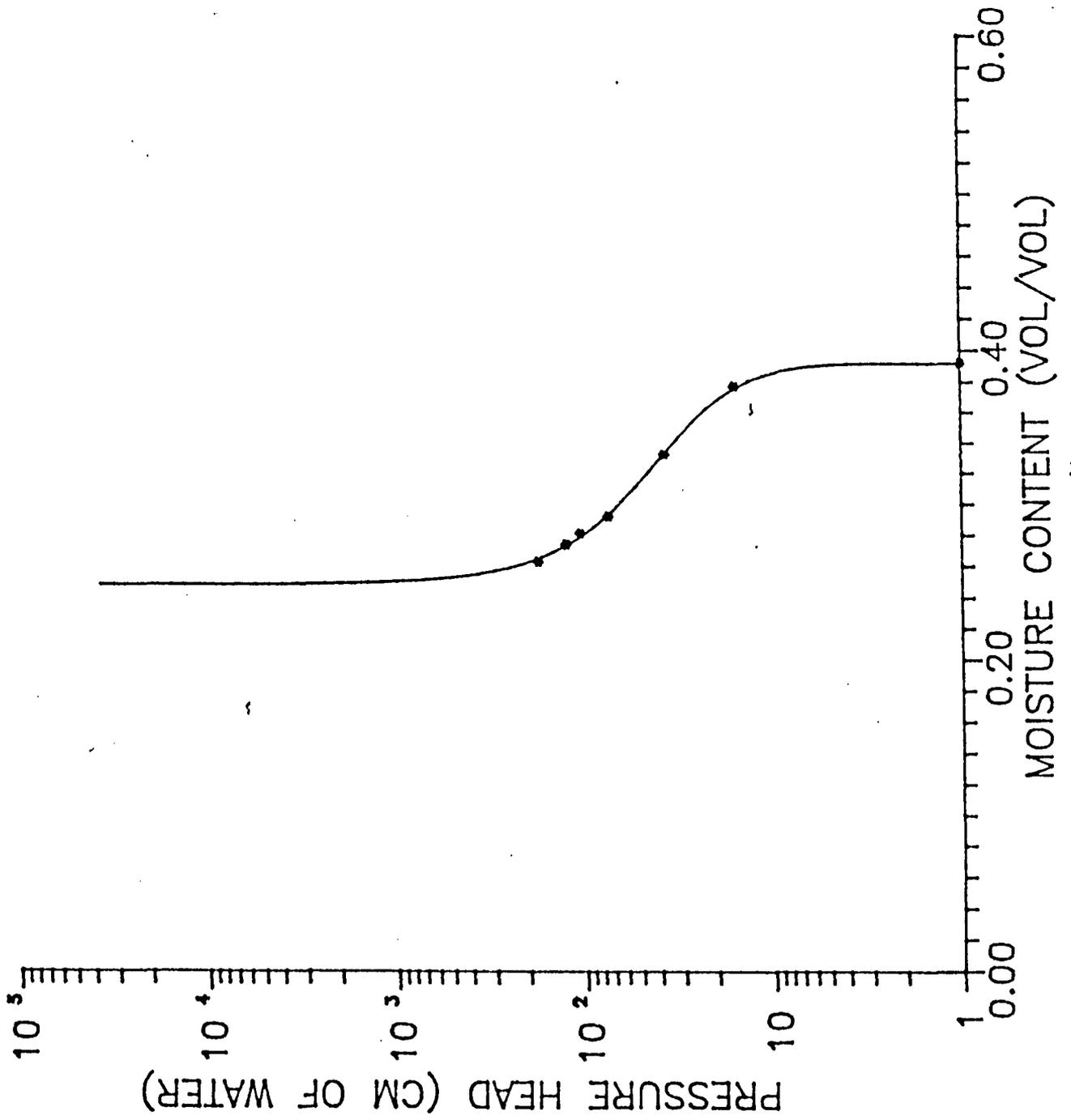
UNSATURATED HYDRAULIC CONDUCTIVITY

Table 6. Summary of Parameters in Mualem Model for Unsaturated Hydraulic Conductivity

<u>Sample No.</u>	<u>Alpha</u>	<u>N</u>	<u>Saturated Moisture Content (fixed)</u>	<u>Residual Moisture Content (fitted)*</u>
GC1	0.03341	2.19880	0.392	0.24776
GC4 (Sandstone)	0.02080	1.19595	0.366	0.00008
GC5 (Mudstone)	0.00426	1.25027	0.438	0.00001

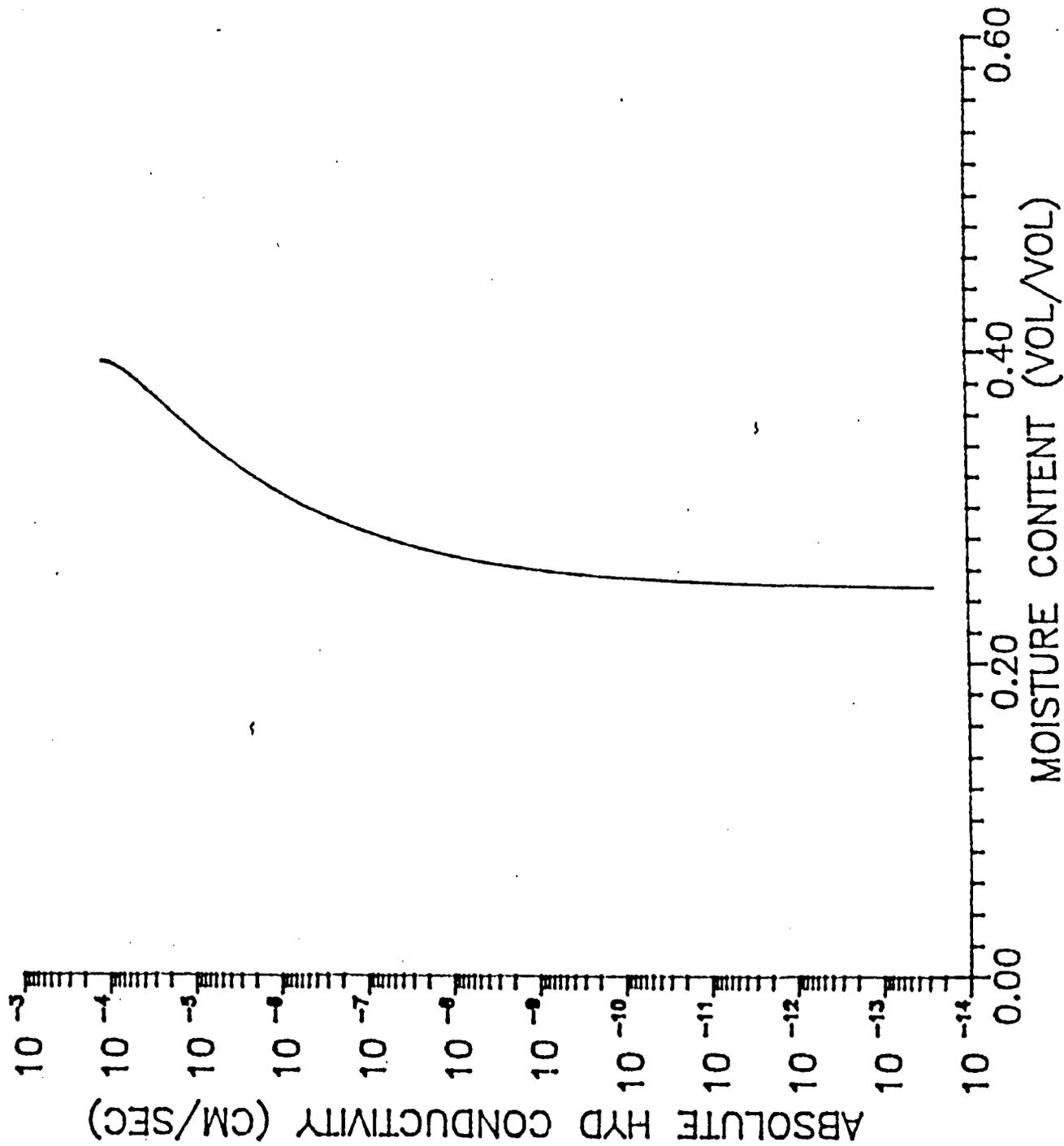
* Note: Residual moisture content is a parameter obtained by a regression analysis, rather than by measurement. Moisture content at -15 bars is approximately 12 and 15% for samples GC4 (Sandstone) and GC5 (Mudstone), respectively.





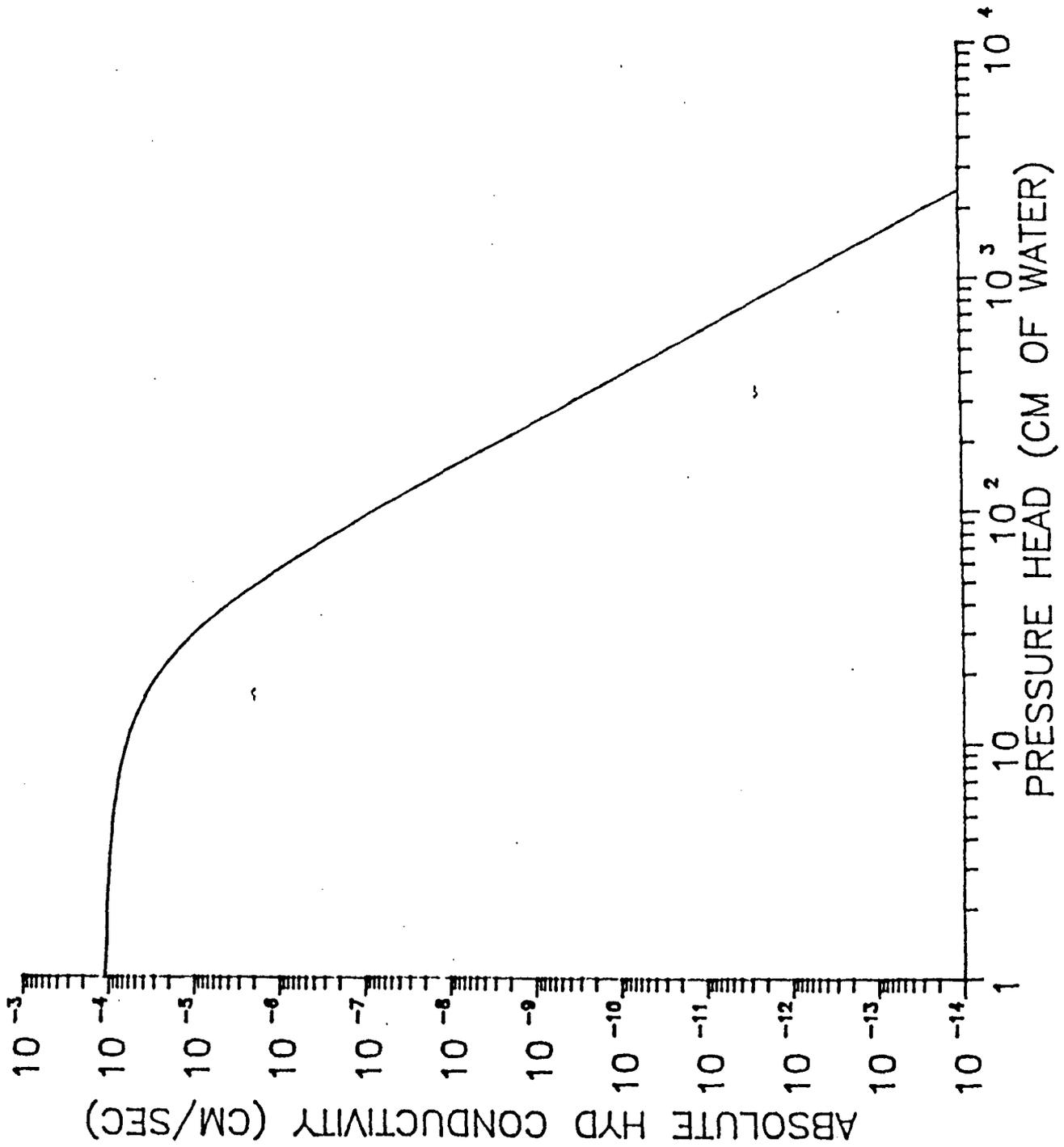
Sample No. GCI (12.5')





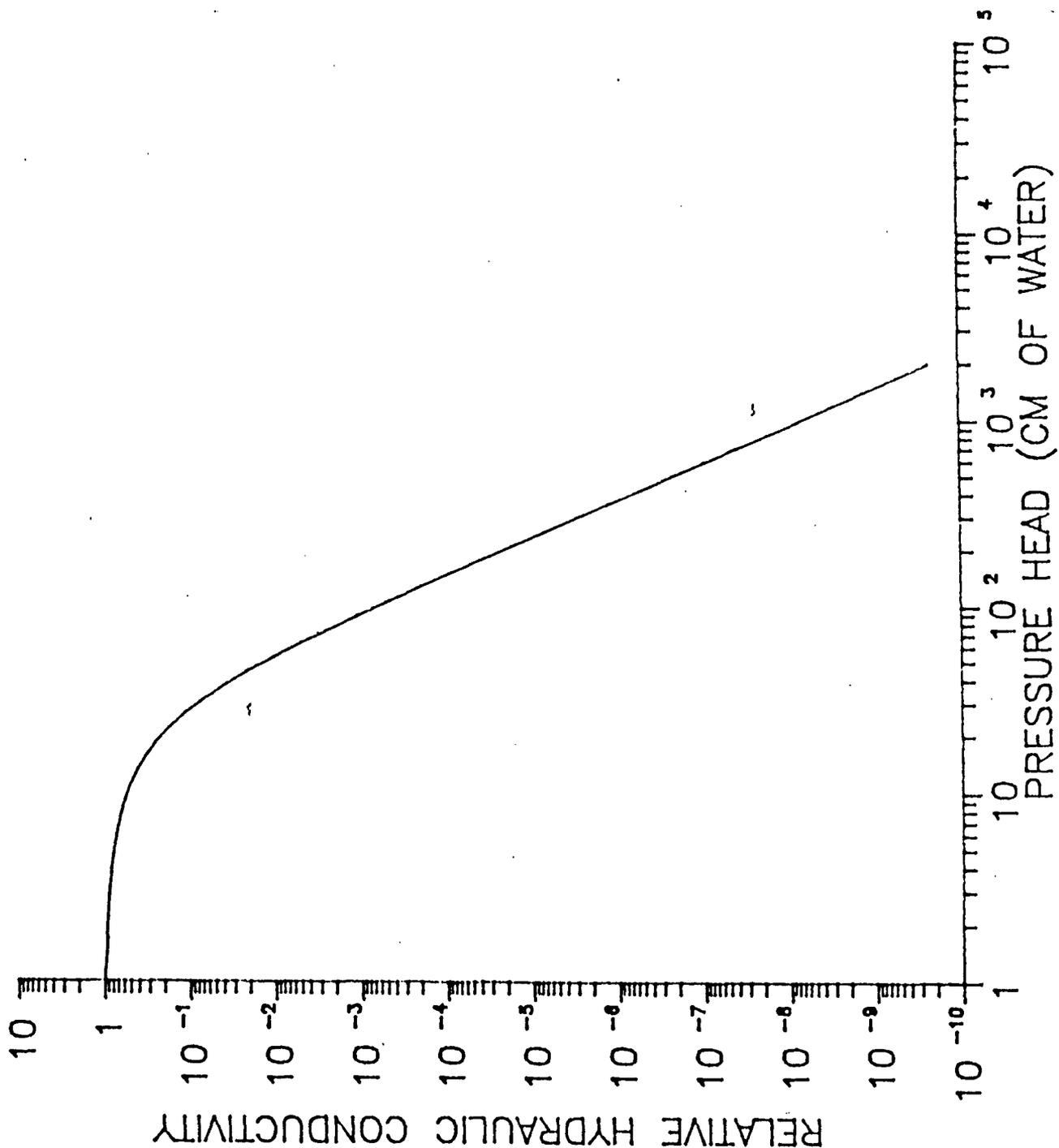
Sample No. GCI (12.5')





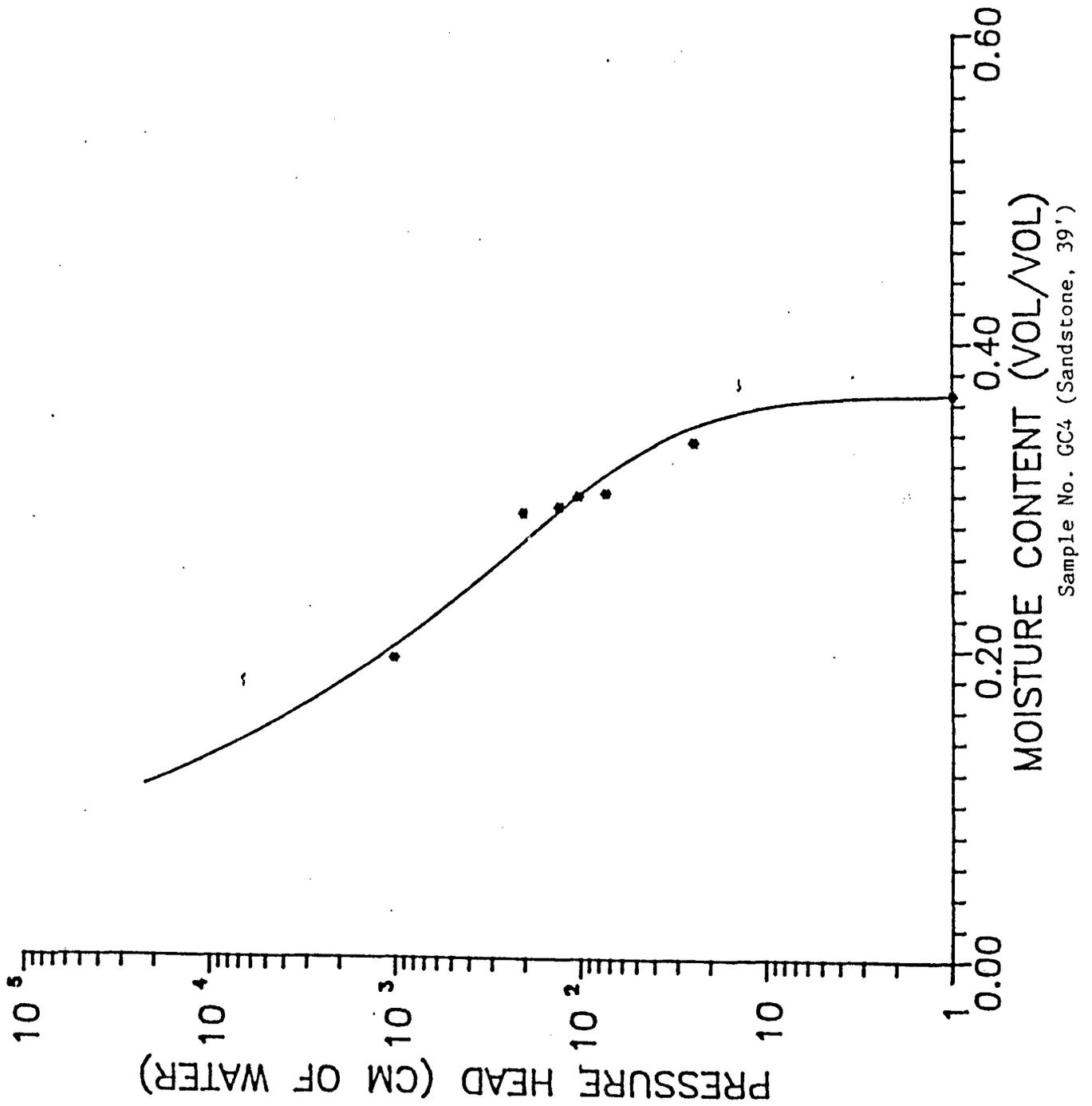
Sample No. GCI (12.5')

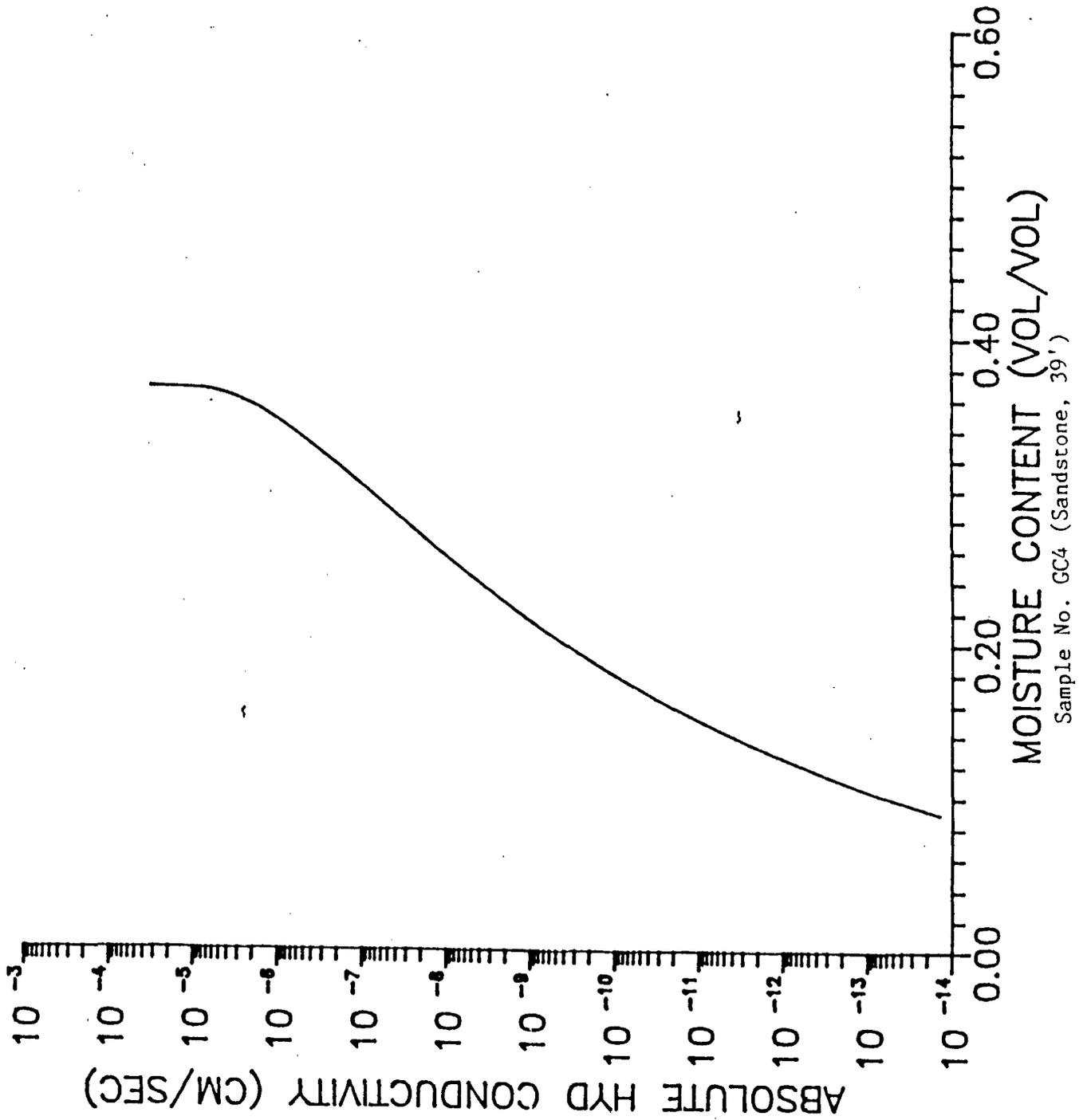


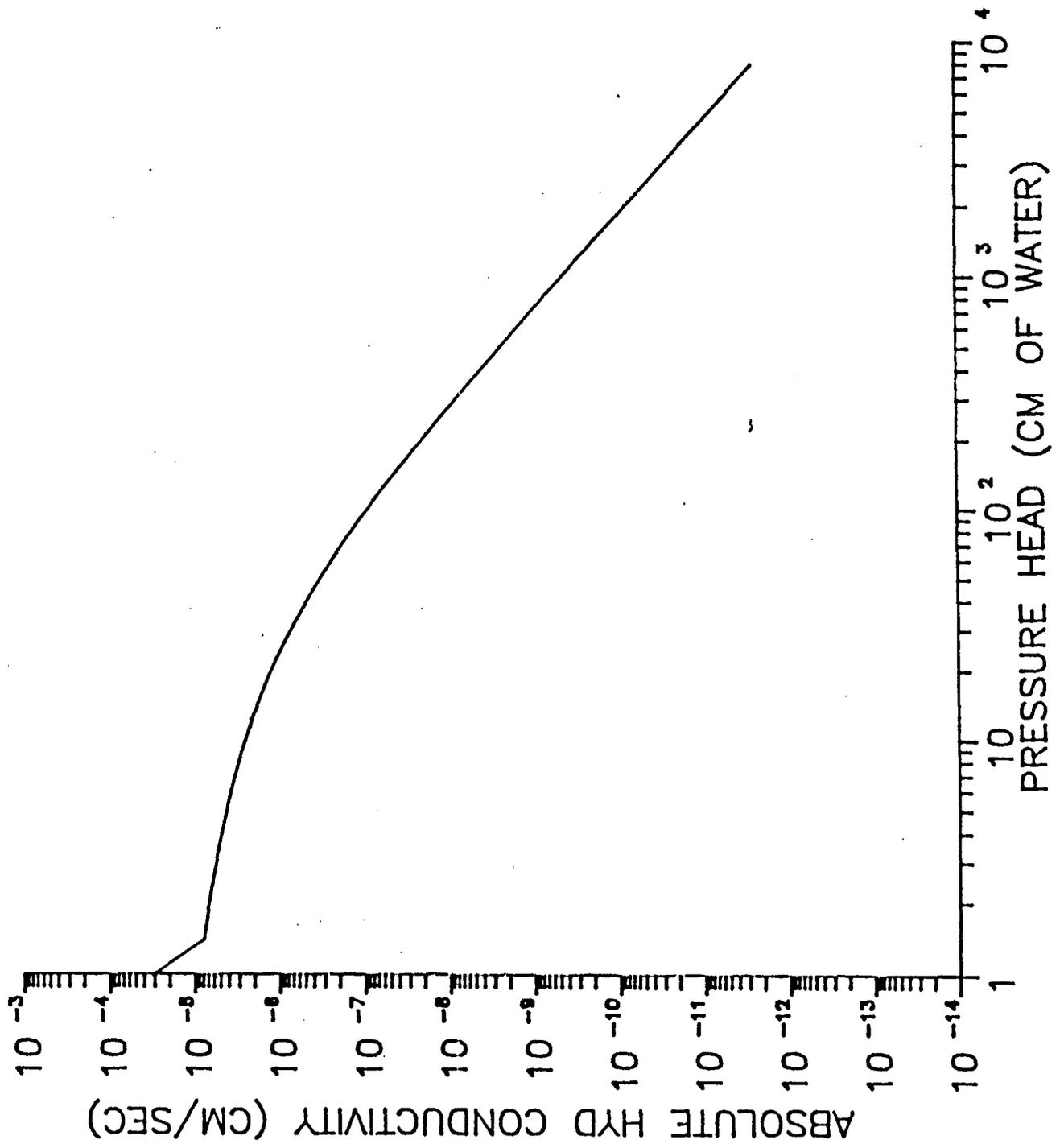


Sample No. GCI (12.5')



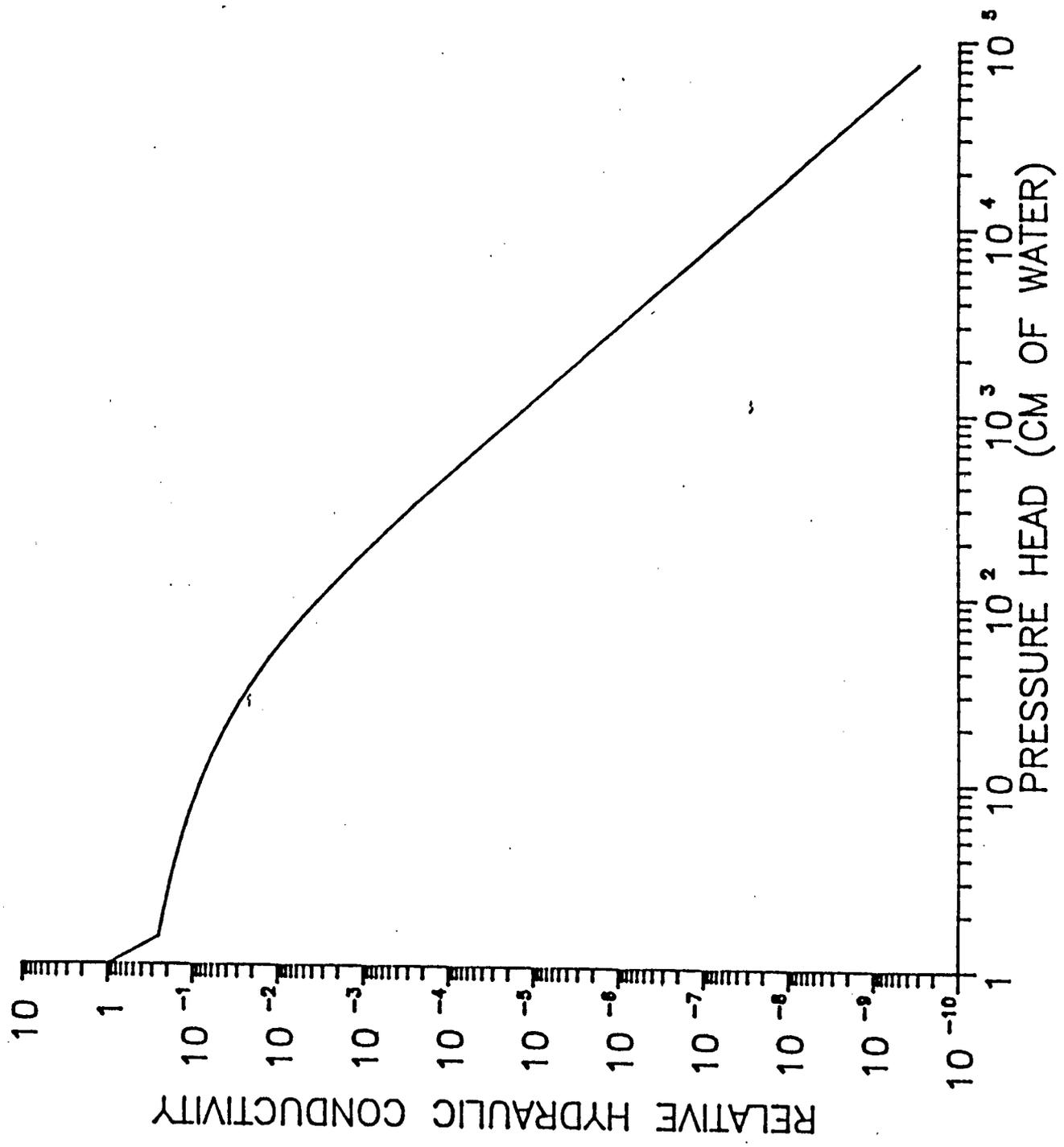






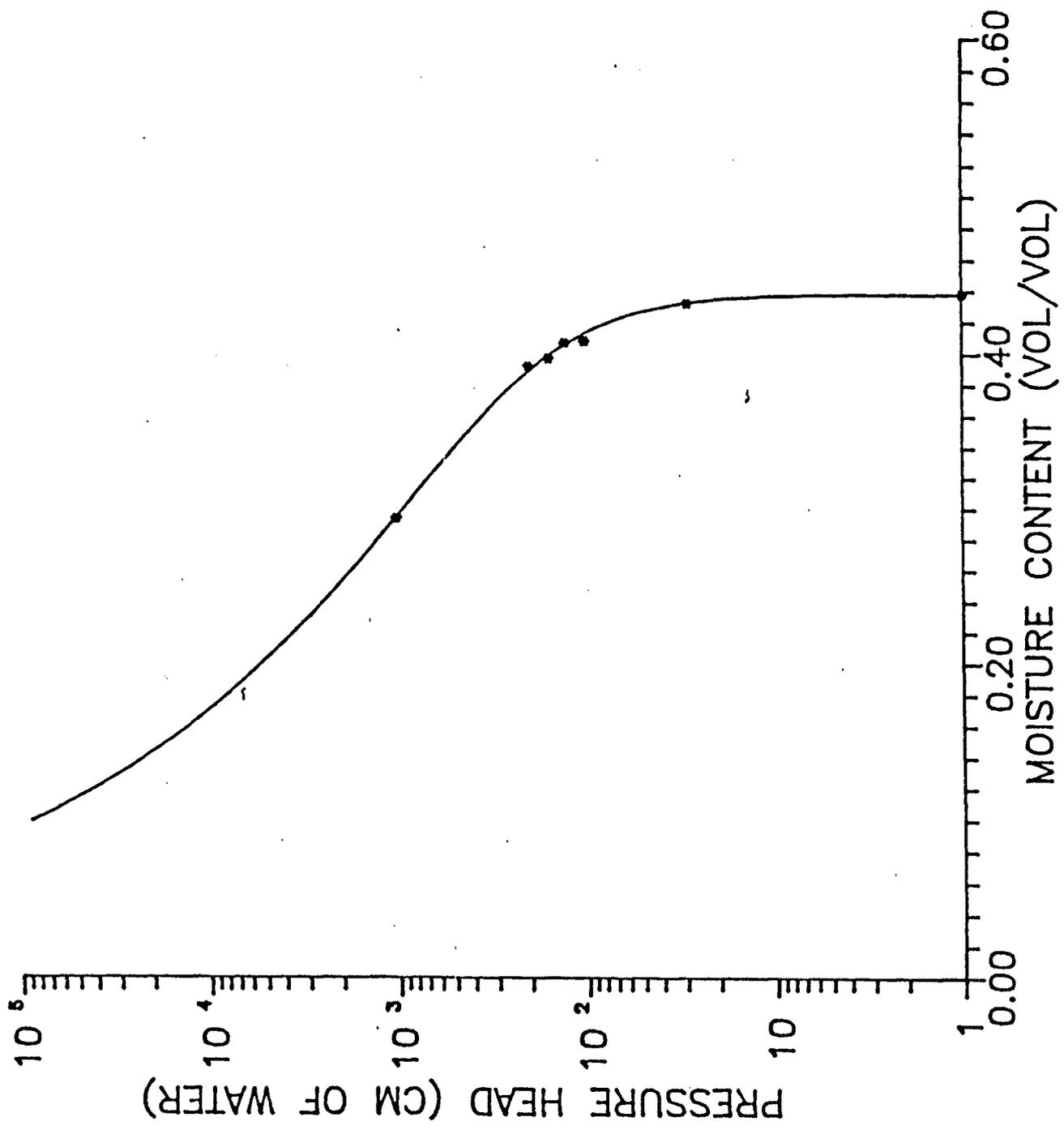
Sample No. GC4 (Sandstone, 39')



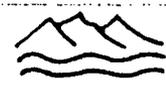


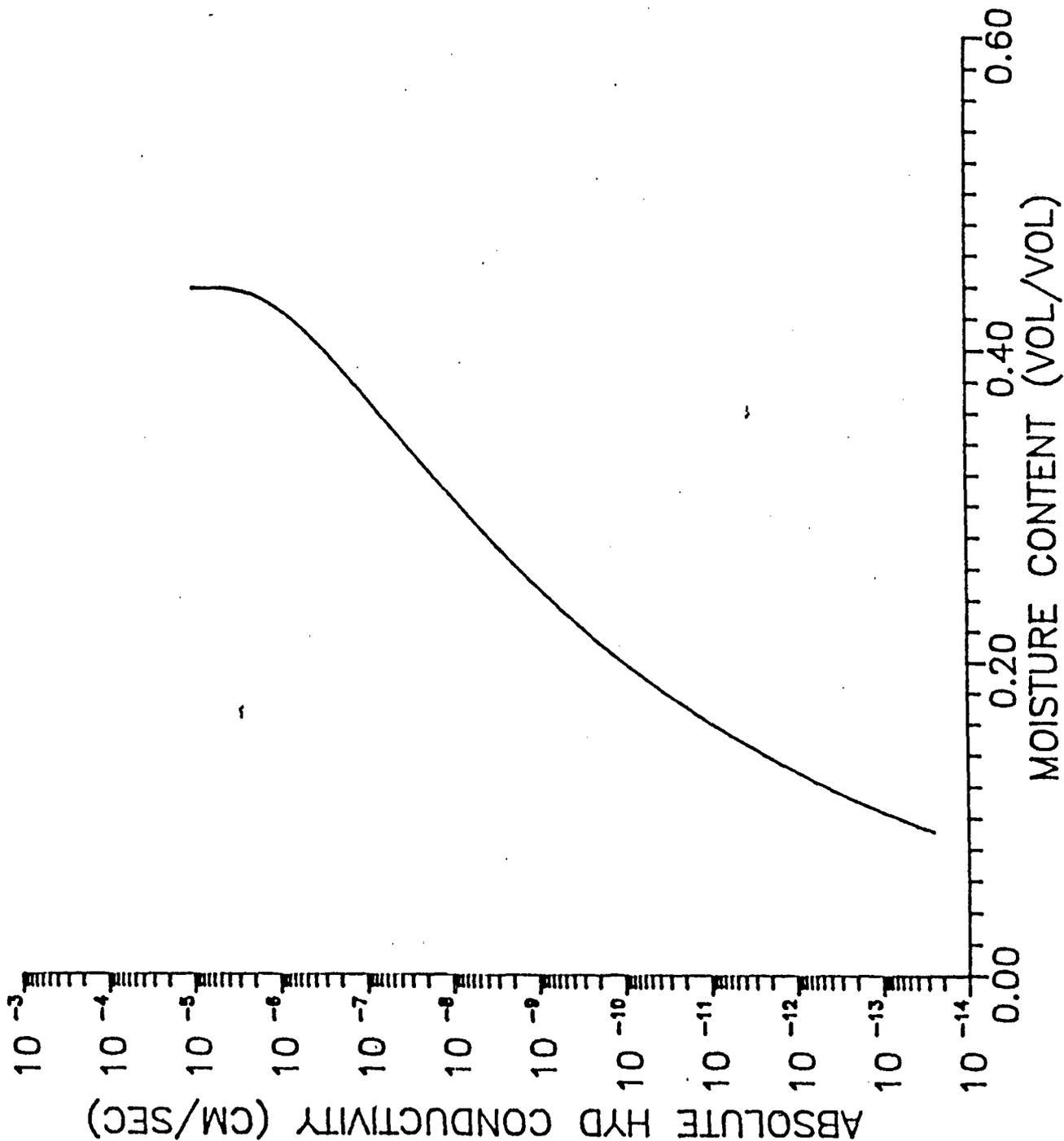
Sample No. GC4 (Sandstone, 39')





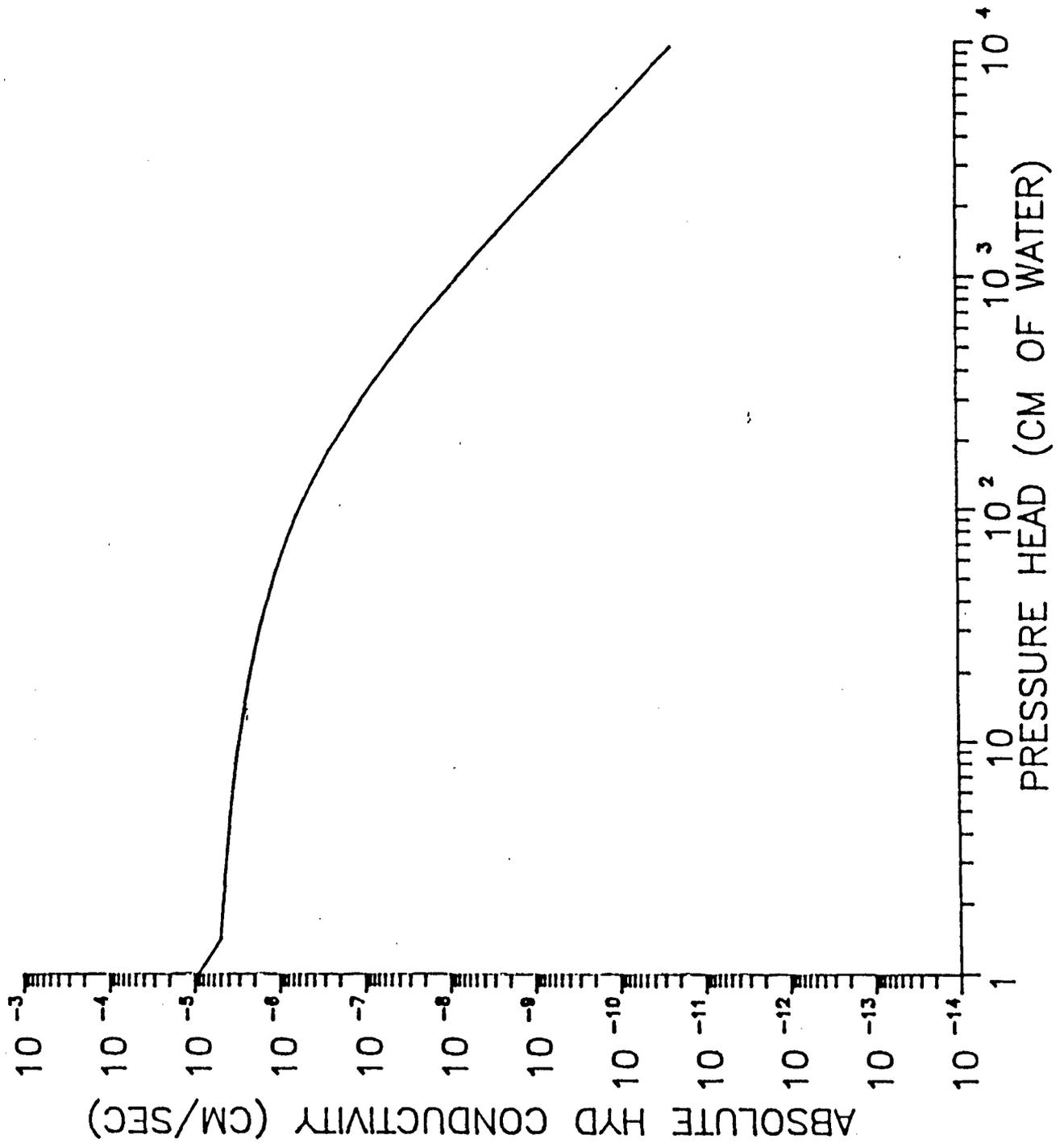
Sample No. GC5 (Mudstone, 39')





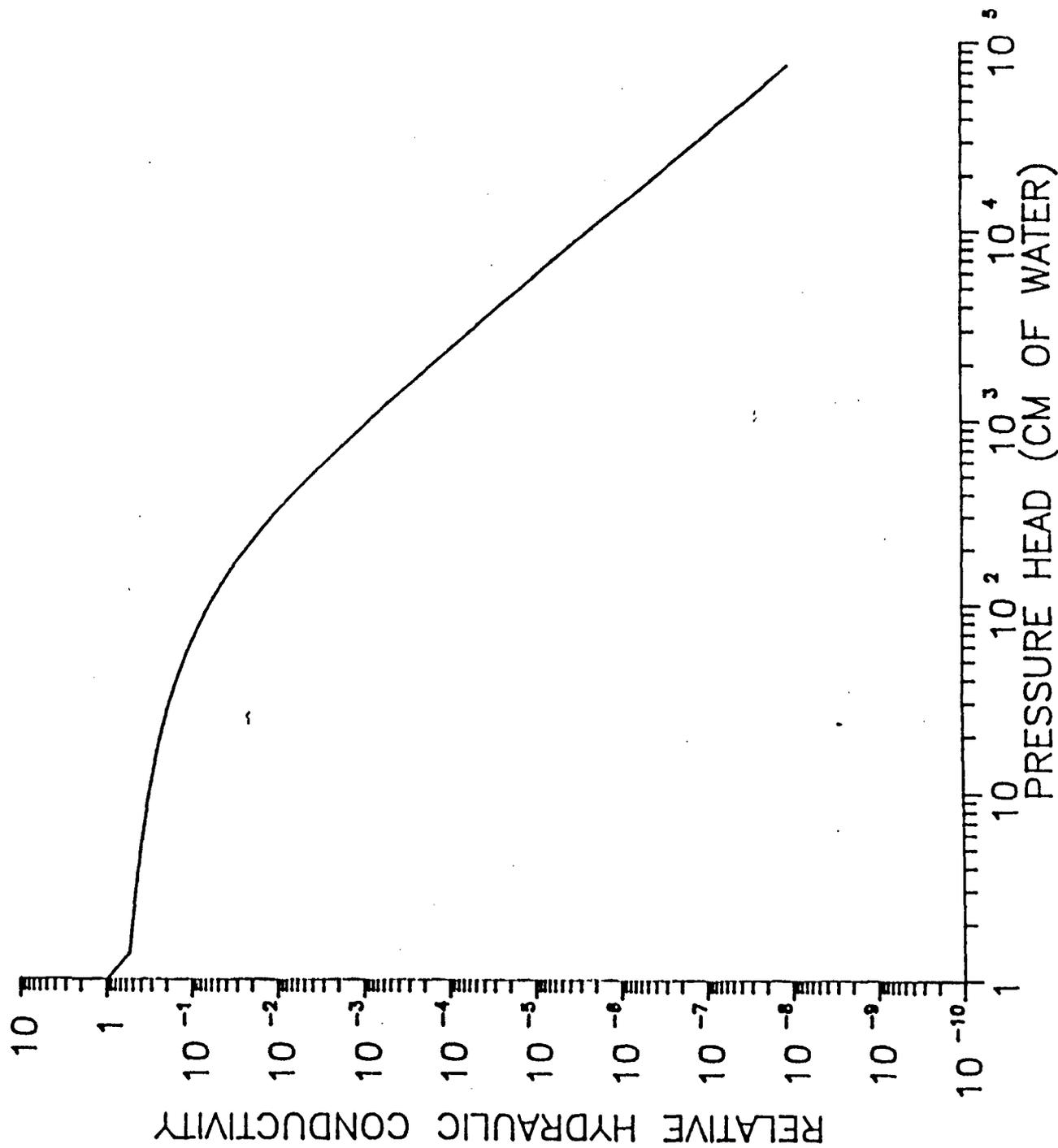
Sample No. GC5 (Mudstone, 39')





Sample No. GC5 (Mudstone, 39')





APPENDIX A
SAMPLE PREPARATION

SAMPLE PREPARATION

Sample No.

Preparation Performed

GC1

Soil arrived at the laboratory loose in a plastic bag. To achieve a bulk density representative of the field bulk density of the soil, the one piece of the sample that was not broken was carved into a cubic shape 2cm x 2cm x 1.66cm. The mass of this soil cube was determined as well as the volume calculated. A 100cc sample ring was then hand packed to this density (g/cc).

GC2

Soil arrived at the laboratory loose in a plastic bag. The sample had a strong odor of hydrocarbons, and appeared to be close to saturation with the pore fluid present. Only a small portion of the sample was still intact. To achieve a bulk density of the soil, the procedure outlined for sample GC1 was employed. After preparation, the soil sample was removed from the 100cc sample ring and placed in an aluminum pan to air dry.



Sample No.

Preparation Performed (Continued)

GC3

Soil arrived at the laboratory in a plastic-bag. The soil was in the form of a cylindrical core, and appeared to be intact. A 100 cc sample ring was slowly pushed over the end of the soil core until the sample ring had been filled. The soil core was then trimmed at both ends flush with the sample ring. The sample was then removed from the ring and placed in an aluminum pan for oven drying.

GC4 (Sandstone)

Soil arrived at the laboratory in a plastic bag. The soil was in the form of a cylindrical core. Some vertical fractures were present in the clay portion of the core which comprised one end of the core. The other end of the soil core consisted of what appeared to be a well cemented sandstone. There appeared to be a thin layer of organics separating the two portions of the core. The sandstone portion of the core was separated from the clay portion. A 100cc sample ring



SAMPLE PREPARATION

<u>Sample No.</u>	<u>Preparation Performed (Continued)</u>
GC4	was slowly pushed over the soil core as the core was carved to a diameter just greater than the sample ring using an exacto knife.
GC5 (Mudstone)	Sample preparation was performed as outlined for sample GC4.



APPENDIX B
PRINCIPLES AND METHODS

SATURATED HYDRAULIC CONDUCTIVITY

Method

The saturated hydraulic conductivity of a soil sample can be measured in two types of laboratory apparatus: a constant head permeameter or a falling head permeameter.

Constant head. The hydraulic conductivity K is defined here as the ratio of q , the volume flux of water passing through a unit cross sectional area of soil per unit time, and $(\Delta h/L)$ gradient of hydraulic head in the direction of flow, corrected to 20°C:

$$K = (q/[\Delta h/L])(V_T/V_{20}) \quad (1)$$

where $V_{20,T}$ is the kinematic viscosity at 20 °C and observed temperature, T .

A soil sample of length, L , and cross-sectional area, A , is placed in a sample holder which prevents any loss of soil or change in volume and establishes laminar unidirectional flow through the sample. A constant head differential, Δh , is then set up across the sample and maintained. Periodic readings of volumetric outflow are taken until stable values for conductivity, K are obtained. Temperature of the fluid is measured with a thermometer. Figure B-1 is a diagram of the apparatus used. A constant head system is best suited to samples with conductivities greater than 10^{-4} cm/sec.



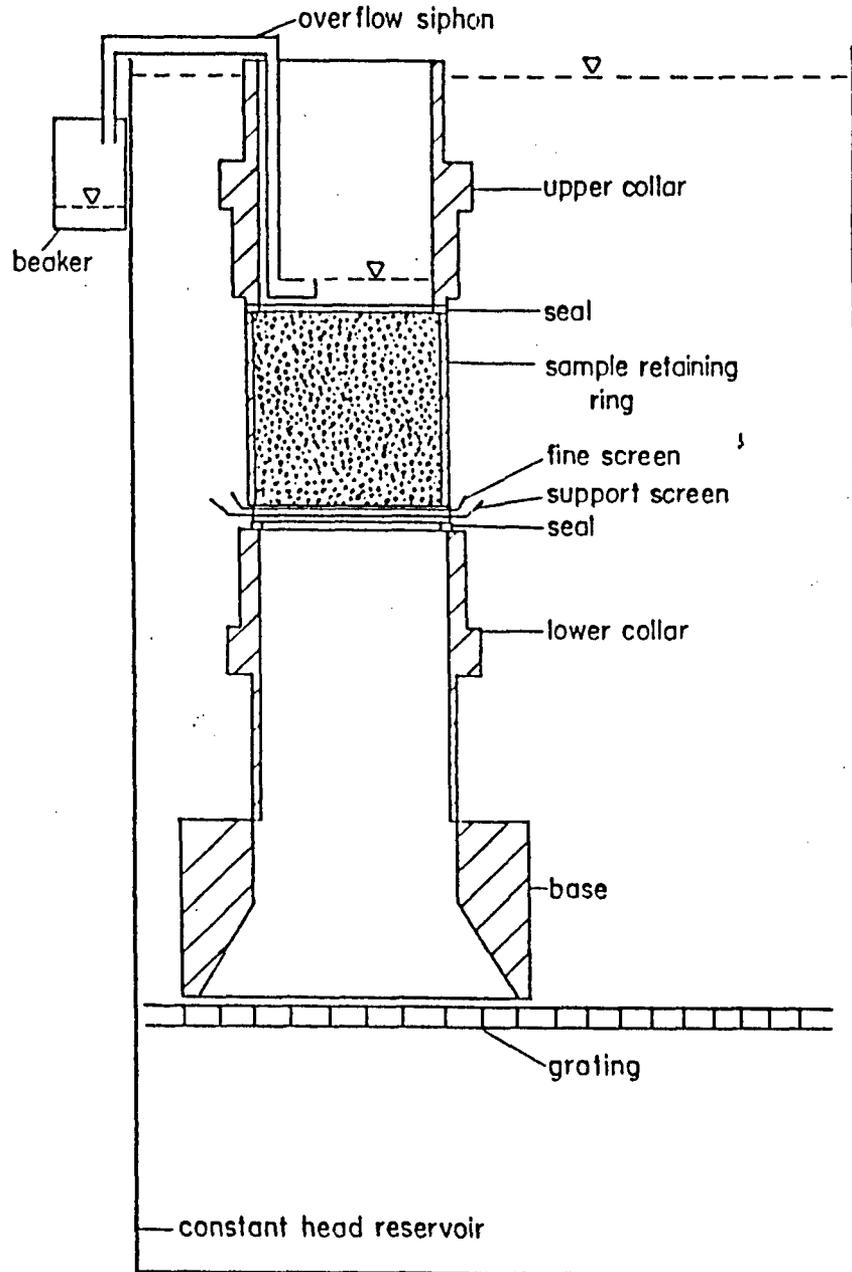


Figure B-1. Constant Head Permeameter



Falling head. A soil sample of length L and cross sectional area, A, is placed in a sample holder which has a standpipe with cross-sectional area, a. A head of H_1 , is established in the standpipe above the sample, then the water level is allowed to fall to H_2 in time t. Figure B-2 is a diagram of the apparatus used. A falling head system is best suited to samples with conductivities less than 10^{-4} cm/sec. The hydraulic conductivity, is then defined as:

$$K = (a \times L/A \times t) \ln (H_1/H_2) (V_T/V_{20}) \quad (2)$$

Procedures:

Constant head. Cylinders containing the soil sample are covered on both ends with loose fitting caps and placed in a shallow pan containing de-aired water. The samples are allowed to wet slowly from below for 24 hours. The samples are removed from the pan, and two screens are placed over one end; a very stiff one of coarse mesh for support and a fine one of either 80 to 100 mesh to prevent any sample from being washed out. The cylinder, with screens attached, is then clamped into the sample retainer and placed in the permeameter. The level of the water in the permeameter reservoir is then slowly raised over a period of hours. When the level in the reservoir reaches to within a few centimeters above the top of the sample, a siphon is placed in the sample retainer assembly to remove water from above



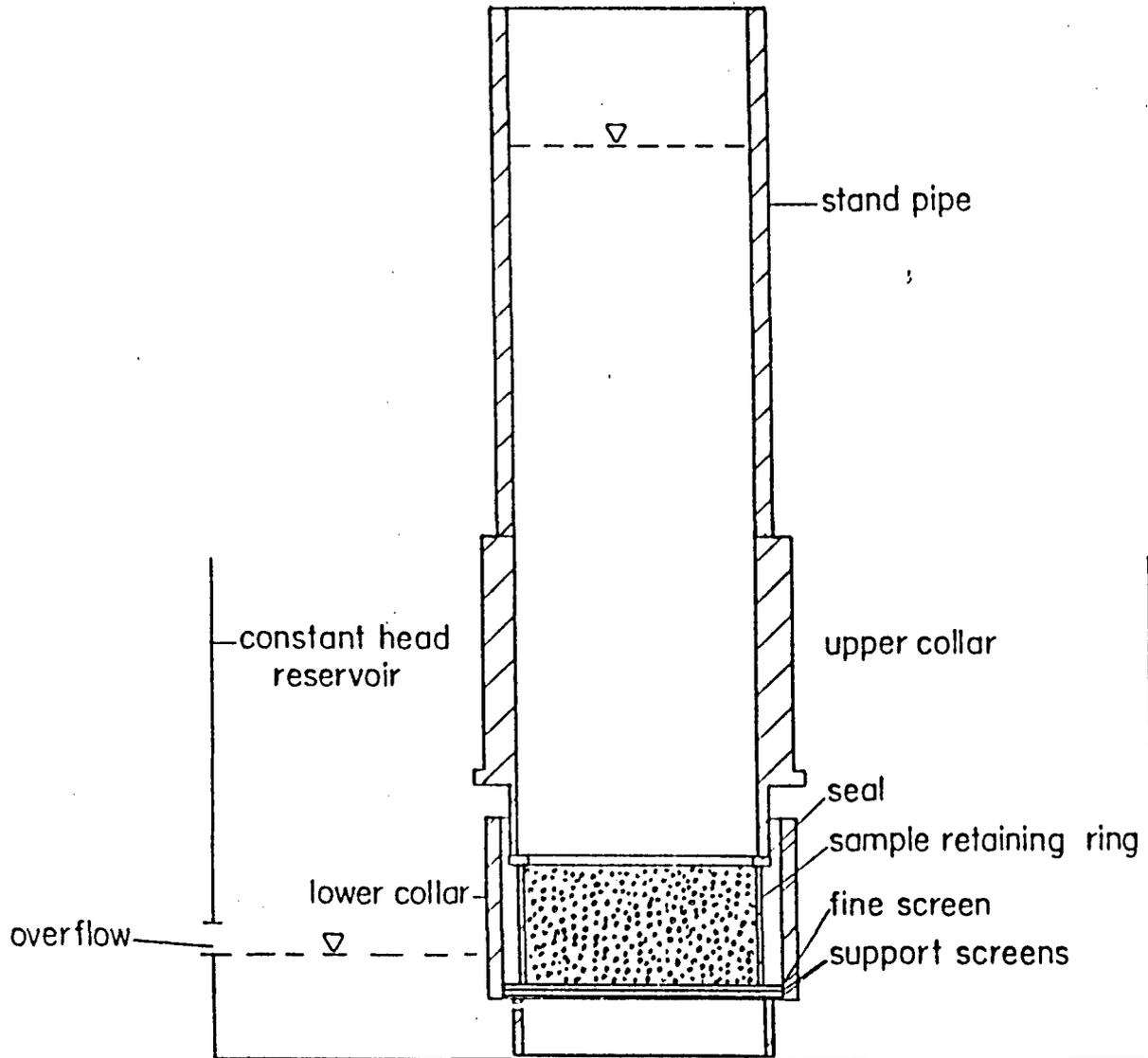


Figure B-2. Falling Head Permeameter



the sample. Water flows upward through the sample due to the hydraulic head difference across the sample. Periodic measurements of discharge and the head difference across the sample are made, and the hydraulic conductivity is calculated. A correction to 20 C is then applied for differences in kinematic viscosity. Measurement continues until the calculated hydraulic conductivity value stabilizes.

Falling head. Saturation of the sample is obtained by the same procedures described under constant head test. Screens are also attached as outlined under constant head test. The ring with screens is then placed in the falling head sample retainer and set in a constant head reservoir. Water is added to the standpipe and the difference between the water level in the standpipe and that in the constant head reservoir are recorded over time. The water level in the standpipe is allowed to fall, while the fluid level in the lower level is constant. After a period of time the difference in water levels between that in the standpipe and that in the constant head reservoir are measured and the elapsed time noted. Correction is applied for kinematic viscosity.

Calculations:

Experimental values are substituted into the appropriate equation as outlined under methods.



MOISTURE RETENTION - HANGING COLUMN

(PORE SIZE DISTRIBUTION)

Principle

Use of pore size distribution as a soil characteristic is based upon acceptance of the capillary model. This model is described by:

$$h' = 2 \cos \gamma / \rho g \quad (3)$$

where h' is the height to which a liquid will rise in a clean capillary tube of radius r , γ is the surface tension of the liquid, ρ is its density, and g is acceleration due to gravity. If water is extracted from an initially saturated sample of soil by a tension equal to h' , the volume of water extracted is equal to the volume of pores having an effective radius greater than the radius, r . As the tension applied to the sample increases, additional water drains from progressively smaller pores.

Method

The key component of the apparatus for measuring the retention of moisture at different pressure heads or pore size distribution is a fritted glass porous plate that conducts water, but when wet the plate is impermeable to air. The fritted glass



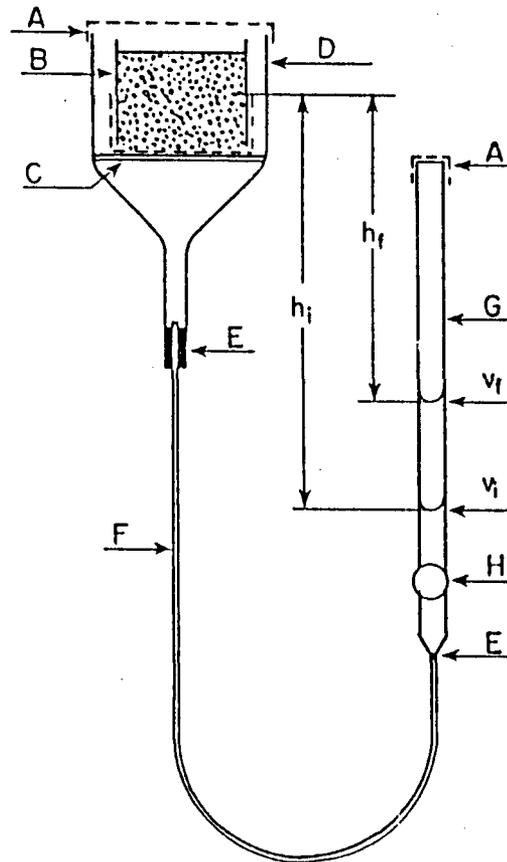
plates have an air-entry pressure of about 300 to 400 cm of water. These plates are affixed in a glass funnel which is connected to a buret with stopcock by means of flexible tubing. A diagram of the apparatus is shown in Figure 3. A soil sample is placed on the plate and tension, h' is applied to the sample by positioning the fluid level in the buret at different levels below the center of the sample. Water flows out of the sample into the buret until equilibrium is achieved. The tension is again increased or decreased to obtain another state of equilibrium between moisture held by capillary forces in the sample and the applied tension.

Laboratory Procedure

Air is first removed from the porous plate by allowing de-aired water to pass continuously through it for 24 hours. The funnel with porous plate and the buret are supported on vertical rods by means of clamps. A saturated sample within its sample ring is then placed on the porous plate, making certain that good hydraulic contact is established between the soil particles and the plate. With the stopcock of the buret closed, the initial level of the water in the buret is recorded.

The buret is then lowered a small increment to about 10 to 15 cm below the center of the soil sample. When the stopcock is opened, the soil may begin to desaturate, and the drainage will flow into the buret. When drainage has ceased, the stopcock is





- | | | | |
|---|--|-------|--|
| A | Aluminum foil covers | F | Flexible tubing |
| B | Sample in cylinder | G | Burette, least division not more than 0.1% sample volume |
| C | Fritted glass porous plate (part of D) | H | Stopcock of burette |
| D | Büchner funnel with porous plate | h_i | cm of water suction, initial |
| E | Joints must be secure | h_f | cm of water suction, final |
| | | v_i | Burette reading, initial |
| | | v_f | Burette reading, final |

Figure B-3. Hanging Column Apparatus



closed and we record the water level in the vuret and the vertical distance from the bottom of the meniscus of the water in the buret to the middle of the soil sample. The procedure is repeated in a stepwise manner until the maximum tension desired is reached. A reversal of the process is used to gather data on the wetting behavior of the sample.

Calculation

Saturated moisture content , θ_{sat} , (volume percent) is determined as follows:

$$\theta_{sat} = [M_{sat} - M_{dry}] / [V_T \times \rho_w] \times 100 \quad (\% \text{ vol}) \quad (4)$$

where M_{sat} = mass of sample saturated, M_{dry} = mass of sample, oven dried to a constant weight, V_T = volume of the sample, ρ_w = density of the water at temp when saturated mass was determined. The quantity $[M_{sat} - M_{dry}] / \rho_w$ is the volume, in cubic centimeters, of water initially contained in the sample volume. The drainage is subtracted from the initial volume of water and then divided by the sample volume to arrive at the moisture content in percent volume at the given value of tension.

$$[V_i - V_D] / V_T \times 100 = \theta_{h'} \quad (\% \text{ vol}) \quad (5)$$

where V = volume of water initial, V_D = cumulative volume drained from sample, V_T = volume of sample, $\theta_{h'}$ = moisture content at the tension value h' . This gives then a paired set of values of tension, or pressure head, versus volumetric moisture content.



MOISTURE RETENTION - PRESSURE PLATE

Principle

The operation of the pressure plate moisture extractor requires maintaining a pressure difference between the liquid phase of the water in the soil and water on the opposite side of a porous plate which supports the soil sample. The sample and porous plate are sealed in a rigid container so that positive gas pressure applied above the plate causes flow to occur across the plate (Figure B-4). The porous ceramic plate is supported by a fine mesh screen which also provides a passage way for the extracted solution. The water beneath the plate is open to the atmosphere through the outflow tube. The illustration in Figure B-5 shows a magnified view of soil particles in contact with the plate inside the pressure plate extractor during an extraction run.

As soon as air pressure inside the chamber is raised above atmospheric pressure, the higher pressure inside the chamber forces excess water through the microscopic pores in the plate. Air, however, will not flow through the pores of the plate, because the plate remains saturated due to its high air-entry pressure. When the pressure in the chamber increases, water leaves the sample until the tension of the water



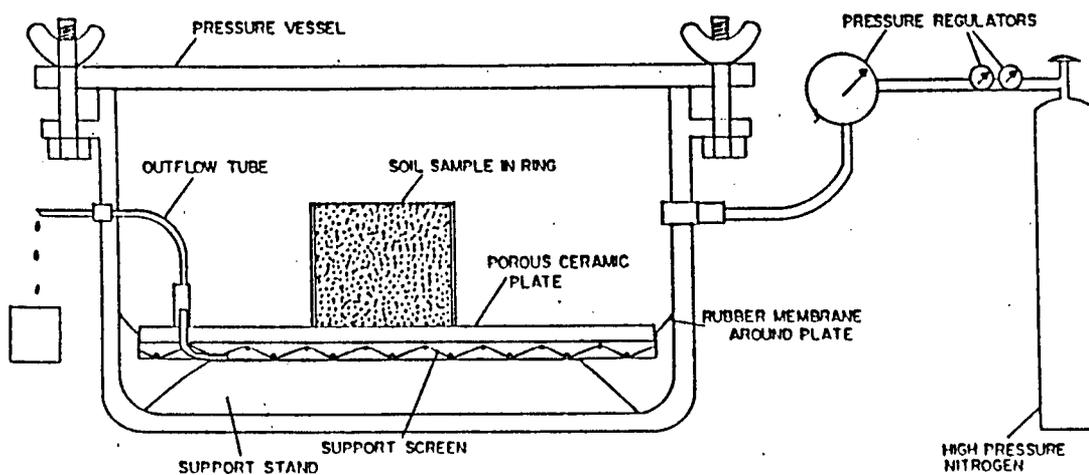


Figure B-4. Pressure Plate Extractor



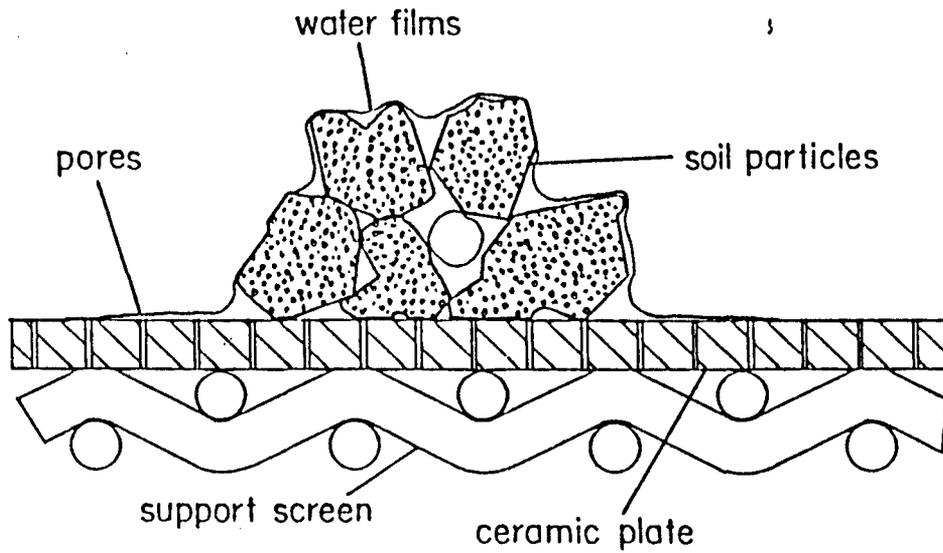


Figure B-5. Magnified View of Soil Particles



due to capillary and adsorptive forces is in equilibrium with the applied pressure.

Method

Moisture retention is obtained using a pressure plate extractor (Soil Moisture Inc., Santa Barbara, CA, Model 1500), with 1, 3 and 15 bar ceramic plates. Pressure is provided by high pressure nitrogen from cylinders.

Laboratory Procedure

The porous ceramic plate is placed in a shallow pan with deaired distilled water and allowed to stand overnight. The plate is then removed from the pan and placed in the extractor. De-aired distilled water is poured over the plate to the limit allowed by the rubber skirt, which generally just submerges the plate. The pressure plate is sealed and pressure brought to 50% of the plates maximum rated pressure. This pressure is maintained until outflow ceases. The extractor is opened and any excess water around the plate is removed.

The soil samples in their sample rings are then placed on the plate, making certain good hydraulic contact is established. The extractor is then sealed and the pressure brought to the level desired. The pressure is maintained until outflow ceases. The extractor is then opened and the samples weighed quickly on ~~an electronic top-loading balance. Subsequently, the samples are~~



returned to the extractor, and the pressure is increased to the next increment.

Calculations

The decrease in mass of water in the sample during a period of applied pressure is converted to an equivalent decrease in volume of water according to:

$$V_w = \Delta m / \rho_T \quad (\text{cc}) \quad (6)$$

where Δm = change in mass of soil sample (g), ρ_T = density of water at temperature of experiment (g/cc), V_w = equivalent volume of water (cc).

Volumes of water calculated from equation 6 are then used to determine the moisture content at that pressure:

$$\theta_p = (V_i - \Sigma \Delta V_w) / V_T \times 100 \quad (\% \text{ vol}) \quad (7)$$

where θ_p = moisture content at pressure p (% vol), V_i = initial volume of water in sample (cc), $\Sigma \Delta V_w$ = cumulative water volume change (cc), V_T = total volume of the sample (cc).



INITIAL MOISTURE CONTENT

Method

Core method, with oven drying.

Laboratory Procedure

The field weight of the soil sample is determined as soon as possible after the sample is removed from the packing container. The tare of the ring which holds the sample, as well as the mass of the caps for the ends of the ring, are determined. The volume of soil in the sample ring is also calculated. After all specified analyses have been performed on the sample, the sample is removed from its ring and spread in an aluminum pan. When necessary, soil aggregates are broken up by mortar and pestal. Care is taken not to change the natural particle size distribution. The sample is placed in a convection oven at 110° C for at least 24 hours until dried to a constant weight.

Calculations

The initial moisture content is determined on a percent volume basis according to:

$$\theta_i = [M_i - M_f] / [V_T \times \rho] \times 100 \quad (\%vol) \quad (8)$$

where θ_i = initial moisture content (% vol), M_i = initial mass of soil only (g), M_f = final mass of soil only (g), V_T = total



volume of sample (cc), ρ = density of pore fluid in the soil when initial mass was determined (g/cc). The density of the pore fluid initially present in the sample is assumed to be 1.0 g/cc.



BULK DENSITY

Method

Core method, with oven drying.

Laboratory Procedure

The volume of the soil sample is determined from sample geometry measurements, and the sample is dried in the oven at 110 C until no additional mass loss occurs.

Calculations

$$\rho_b = M_D / V_T \quad (\text{g/cc}) \quad (9)$$

where ρ_b = dry bulk density (g/cc), M_D = mass of oven dried soil sample (g), V_T = total volume of soil sample (cc).



POROSITY

Method

Calculated from bulk density and measured or assumed values of particle density.

Laboratory Procedure

Bulk density, ρ_b , is determined by oven drying, as described in the section outlining the bulk density determination. For this series of analyses particle density, ρ_s , is assumed to be 2.65 g/cc.

Calculation

$$n = [1 - (\rho_b / \rho_s)] \times 100 \quad (\text{percent}) \quad (10)$$



UNSATURATED HYDRAULIC CONDUCTIVITY

Method

Mualem (1976) described the theoretical basis for a procedure used to estimate unsaturated hydraulic conductivity from the soil-water release curve according to the following equations;

$$K_r = S_e^{\frac{1}{2}} \left[\int_0^{S_e} 1/h(x) dx / \int_0^1 1/h(x) dx \right]^2, \quad (11)$$

where K_r = relative hydraulic conductivity, $h = h(S_e)$ is the negative pressure head, given here as a function of dimensionless moisture content:

$$S_e = \frac{\theta - \theta_r}{\theta_s - \theta_r} \quad (12)$$

where subscripts s and r indicate saturated and residual values of the soil moisture (θ). The expression relating dimensionless moisture content to the pressure head, and thus the soil moisture release curve is given by:

$$S_e = [1/1 + (\alpha h)^n]^{-m} \quad m = 1 + 1/n \quad (13)$$

where α , n , and m are obtained by a non-linear least squares numerical procedure applied to measured moisture retention data using the technique developed by Van Genuchten (1978).

Laboratory procedure

The data input to the computer model of Van Genuchten (1978)



consists of the saturated moisture content, residual moisture content and values of observed pressure head versus moisture content. The residual moisture content is taken to be the moisture content at -15 bars. The paired values of observed pressure head and moisture content are obtained as described under the procedures for determining moisture retention by the hanging column and pressure plate methods. Saturated moisture content is determined through gravimetric measurements and sample geometry.

References

Mualem, Y., 1976, A New Model for Predicating the Hydraulic Conductivity of Unsaturated Porous Media, Water Resources Research, vol. 12, no. 3, p. 513-522.

Van Genuchten, R., 1978, Calculating the Unsaturated Hydraulic Conductivity With a New Closed-Form Analytical Model, Research Report No. 78-WR-08, Princeton University, Department of Civil Engineering, September 1978, 65pp.



APPENDIX C
CHEMICAL ANALYSIS OF WATER

TAP WATER CHEMICAL ANALYSIS

<u>ANIONS:</u>	<u>PPM</u>
CARBONATE, CO_3^-	0
BICARBONATE, HCO_3^-	202
CHLORIDE, Cl^-	40
SULFATE, $\text{SO}_4^{=}$	109
NITRATE, NO_3^-	2.44
FLUORIDE, F^-	0.69

CATIONS:

SODIUM, Na^+	62.0
POTASSIUM, K^+	1.5
MAGNESIUM, Mg^{++}	10
CALCIUM, Ca^{++}	61

TOTAL EPM ANIONS = 6.784

TOTAL EPM CATIONS = 6.602

% ERROR = 2.72

pH = 7.6

HARDNESS = 194 ppm, CaCO_3

APPROXIMATE TDS = 455 ppm

CONDUCTIVITY = 650 mmhos



MONTGOMERY & ANDREWS

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November 21, 1985

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REPLY TO SANTA FE OFFICE

Mr. Richard L. Stamets, Director
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Giant Industries Farmington Refinery

Dear Dick:

Several days ago Dave Boyer spoke to me about the seep which had been discovered at the now closed Giant Refinery in Farmington. The seep appears to contain some hydrocarbon products and is presently being analyzed from samples taken by both the Environmental Improvement Division and Giant.

This letter is to inform you that Giant is presently in the process of developing a plan and design to contain and remove the seeping material, as well as a plan to eliminate the suspected source of that seep.

Our initial investigation indicates that the seep is probably caused by the flow from a septic tank leach field through an abandoned burn pit. The water flowing through the leach field is apparently picking up some materials remaining in the burn pit which, subsequent to its abandonment, has been covered.

Although we have no reason to suspect that the compounds found in the seep would have any likelihood of reaching ground water and raising the level of any constituent above the Water Quality Control Commission standards, we are nonetheless making plans to take appropriate steps to alleviate this condition.

Mr. Richard L. Stamets, Director
November 21, 1985
Page 2

As soon as the environmental engineering work is completed, I will suggest to Giant that we meet with you to inform you of our plans with regard to this matter. If I can be of any assistance, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read 'W. Perry Pearce', written in dark ink.

W. Perry Pearce

WPP:dml

cc: Carlos A. Guerra, Esq.
Alberto Gutierrez



TONEY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION



1935 - 1985

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October 18, 1985

Mr. Carlos A. Guerra
General Counsel
Giant Industries, Inc.
7227 North 16th Street
Phoenix, Arizona 85020

Re: Electromagnetic Survey -
Vicinity of Giant Refinery

Dear Mr. Guerra:

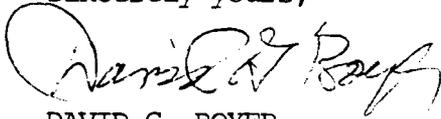
This letter is in reply to Mr. W. Perry Pearce's letter of October 16, 1985, (copy attached). That letter references our forthcoming electromagnetic survey at the San Juan County Landfill at Lee Acres adjacent to the Giant Refinery. The area in the vicinity of the landfill is shown on the attached map.

The survey will be made using a variable depth, portable electromagnetic induction instrument. No staking or burying of probes is involved. The equipment is hand-carried back and forth across the arroyo in a traverse pattern. The traverse spacing can be changed if more detailed resolution is desired. The area within the refinery property to be examined is outlined in yellow on the map. To the best of my knowledge it is outside of any facility loading or processing area. Based on the arroyo configuration, we do not anticipate that access to loading or processing areas will be necessary. The survey will be carried out by myself, and Dennis McQuillan of the New Mexico Environmental Improvement Division with the assistance of one or two other OCD or EID staff persons as their schedule permits.

The survey is expected to begin on Wednesday, October 23rd, and may last through Friday, October 25th. Prior to entering upon Giant property, we will announce ourselves at the gate and contact the designated Giant employees. If requested, upon completion of the survey we will furnish copies of field notes and survey results.

Your cooperation in this matter is appreciated. If you have any questions, please contact me at 827-5812, or Dennis McQuillan at 827-2918.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "David G. Boyer".

DAVID G. BOYER
Geologist
Environmental Bureau Chief

Encs.

cc: R. L. Stamets, OCD
Dennis McQuillan, EID
W. Perry Pearce, Montgomery & Andrews
Alberto Gutierrez, Geoscience Consultants

ED D. COFFEY

GIANT

GIANT

GIANT STORAGE

SAN JUAN
COUNTY LANDFILL

22

27

21

28

BARBRA TAYLOR
BK 796 PG 418

B L M

FARMINGTON SCHOOL
DISTRICT NO. 5
BK. 464 PG. 164

north

Date	Revision	Approved

CROUCH MESA COUNTY ROAD

SAN JUAN COUNTY
NEW MEXICO

Drawn By: P.B.	Date: 3-31-81
Scale: 1" = 400'	Project No: S-B4-CX



LAWRENCE A. BREWER & ASSOCIATES, INC.
CONSULTING ENGINEERS
FARMINGTON NEW MEXICO

MONTGOMERY & ANDREWS

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Ann M. Maloney
Deborah J. Van Vleck

October 16, 1985

HAND-DELIVERED

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REPLY TO SANTA FE OFFICE

Mr. David Boyer
New Mexico Oil Conservation
Division
Post Office Box 2088
Santa Fe, New Mexico 87504-2088

Re: Electromagnetic Survey

Dear Dave:

Thank you for your call of last week informing us that you were going to be in the area of the Giant Refinery doing electromagnetic surveys related to the Lee acres spill with some individuals from the Environmental Improvement Division. As you are aware, Giant is very interested in this area and is concerned that the Lee acres facility may be spreading a plume of contamination in the vicinity of and under the Giant Refinery.

For this reason, Giant is very interested in the results of this survey and will do everything it can to be of assistance to you in this effort.

In this regard, we would appreciate receiving prior to your visit to the site a written statement from you indicating what is proposed, who is expected to participate in your field work and some idea of the amount of access to Giant property that will be requested.

With regard to your actual visit to the site, we request that you contact either Mr. Bob Ullo or Ms. Sharon Kennedy at the refinery facility so that they can assist you in any way possible.

Mr. David Boyer
October 16, 1985
Page 2

Thank you for your help with this matter. I would appreciate your addressing your letter to Carlos Guerra at Giant and providing carbon copies to Alberto Gutierrez at Geoscience and me.

Thanks for your help.

Sincerely,

A handwritten signature in cursive script, appearing to read "Perry", with a long horizontal flourish extending to the right.

W. Perry Pearce

WPP:ls



GIANT REFINING COMPANY

P.O. Box 256 • Farmington, New Mexico 87401 • (505) 632-3306

April 26, 1979

Mr. A. R. Kendrick
District Supervisor
Oil Conservation Division
State of New Mexico
Energy and Minerals Department
1000 Rio Brazos Road
Aztec, New Mexico 87410

Dear Mr. Kendrick,

Pursuant to our conversation during your recent visit to our refinery, attached please find sketch of our waste water disposal system.

Should you need further information, please advise.

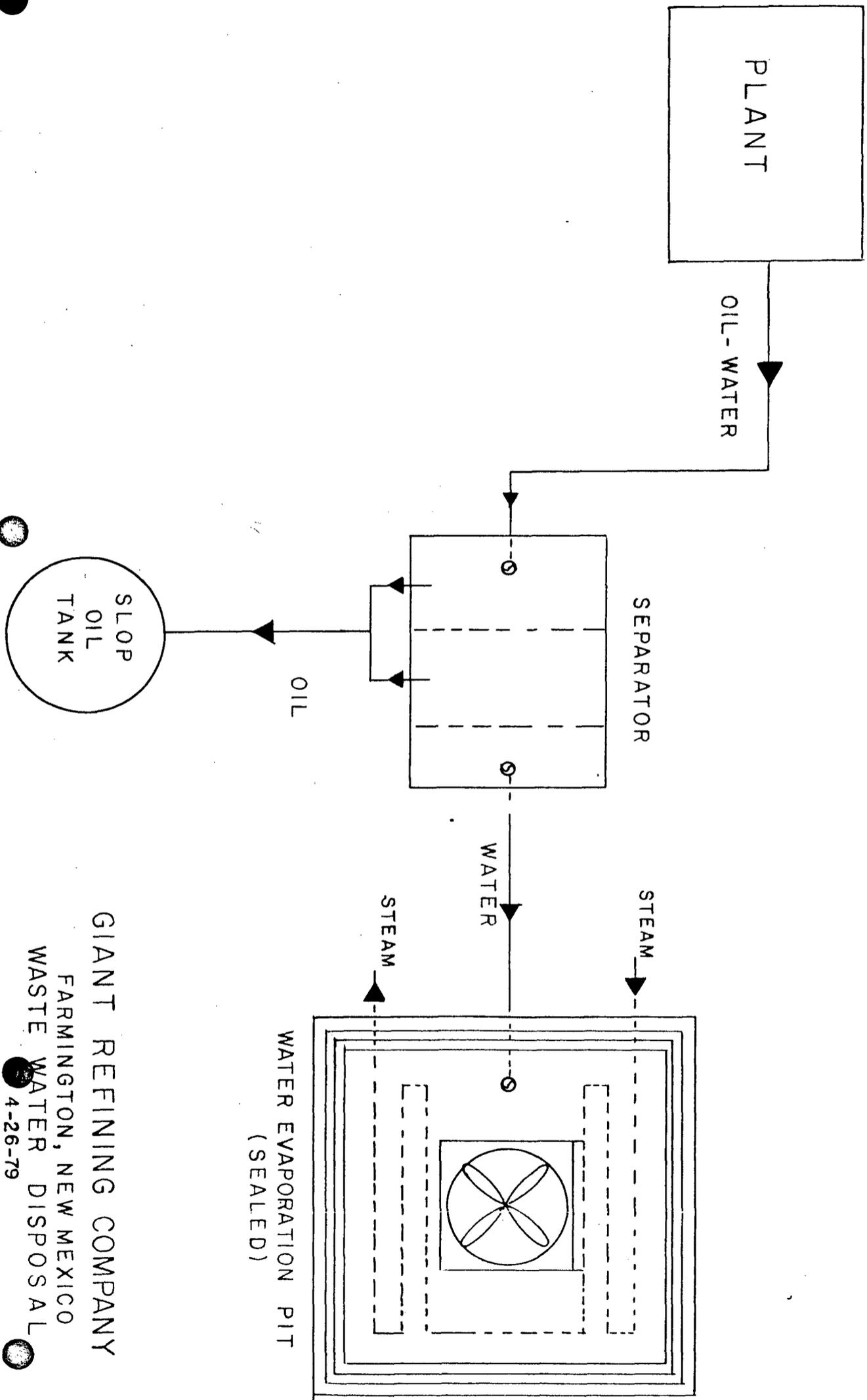
Sincerely,

A. H. Morris
Refinery Manager

AHM/dm

*no OK file
5/10/79*





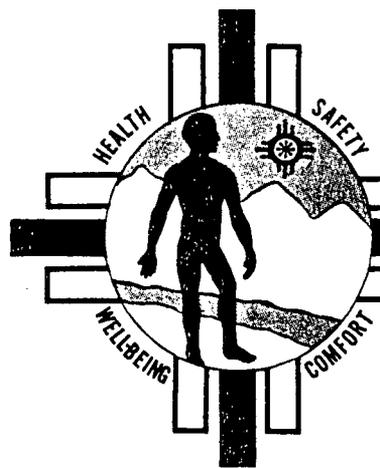
GIANT REFINING COMPANY

FARMINGTON, NEW MEXICO
 WASTE WATER DISPOSAL

4-26-79

~~File 11-18~~

11.03.A.05



STATE OF NEW MEXICO

Environmental Improvement Agency

San Juan County Office
724 West Animas Street
Farmington, New Mexico 87401

July 11, 1977

Mr. Carl Shook
Superintendent of Operations
Shell Oil Ciniza Refinery
Star Route #3, Box 7
Gallup, New Mexico 87301

Dear Mr. Shook:

As spokesman for the group of environmentalists that toured your facility on July 8, 1977, I would like to extend to you and your staff our sincere appreciation. The tour was most educational, and you and your staff were most helpful.

If our Agency can be of assistance to you at any time, please do not hesitate to let us know. Thanks again for the courtesies shown us during our visit.

Sincerely,

Richard Mitzelfelt
Environmental Supervisor

RM:jp
cc: Dan Vigil, Acting Envr. Manager
Julie Orr, Envr.
File