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WORK PLANS

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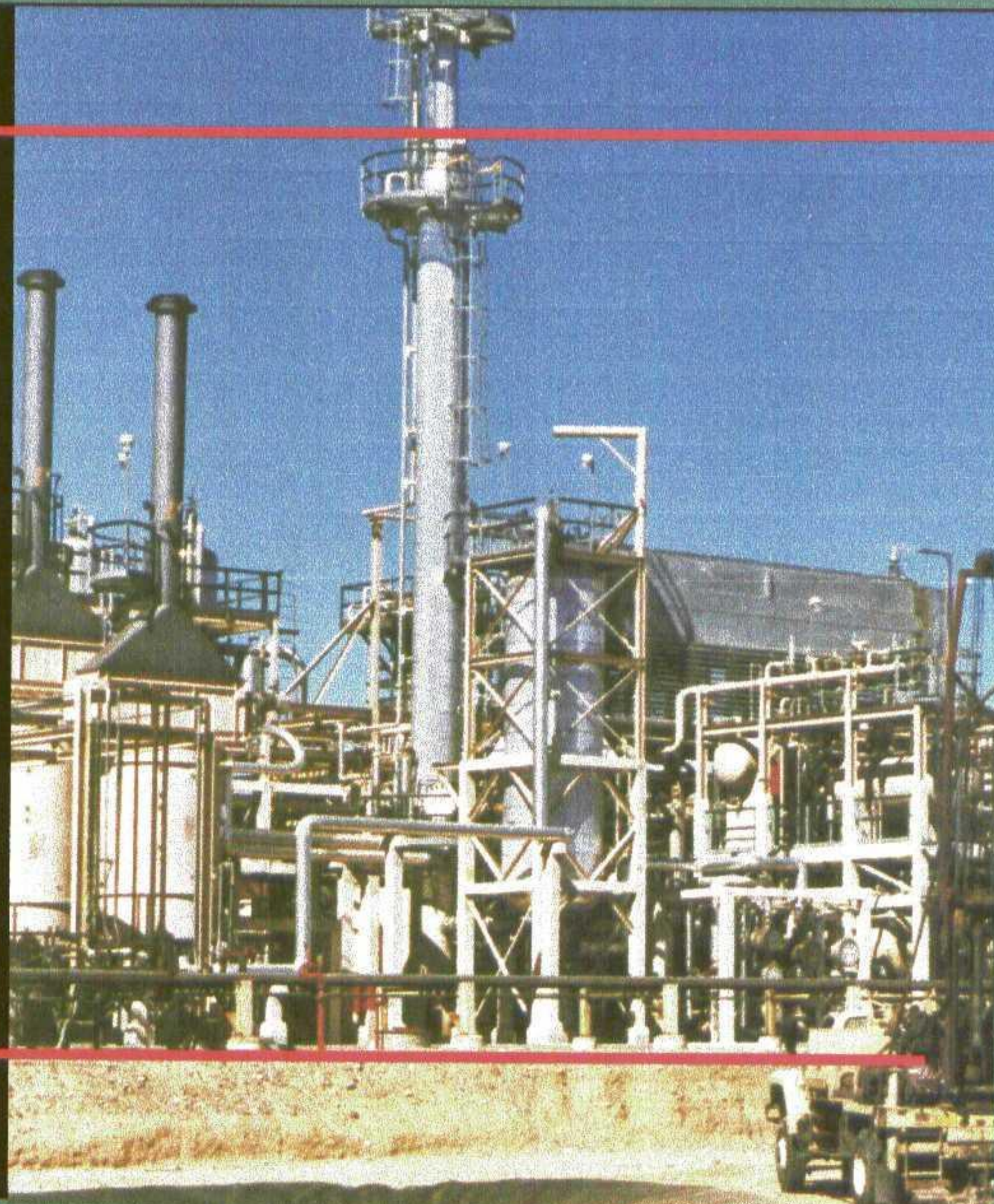
WORK PLANS

July 5, 1999
Revised March 10, 2000

VOLUME I:
DISCHARGE PLAN APPLICATION, WASTE AND WASTEWATER MANAGEMENT



GIANT BLOOMFIELD REFINERY
Bloomfield, New Mexico

R.T. HICKS CONSULTANTS, LTD.

4665 INDIAN SCHOOL NE, SUITE 106, ALBUQUERQUE, NM 87110

July 5, 1999
Revised March 10, 2000

Volume I:
Discharge Plan Application
Waste and Wastewater Management

GIANT BLOOMFIELD REFINERY

Prepared for:

Giant Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

R.T. HICKS CONSULTANTS, LTD.
4665 INDIAN SCHOOL NE, SUITE 106, ALBUQUERQUE, NM 87110

Revised Discharge Permit Application
Volume I

July 6, 1999

Revised March 10, 2000

San Juan Refining Company
Giant Industries Arizona, Inc.
Bloomfield Refinery – Bloomfield, NM

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Barry Holman, Environmental Manager
Chad King, Operations Manager

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R.T. HICKS CONSULTANTS, LTD.
4665 INDIAN SCHOOL NE, SUITE 106, ALBUQUERQUE, NM 87110

ITEM 1 - *Type of Operation*

The San Juan Refining Company-Bloomfield facility is a petroleum refinery.

ITEM 2 - *Name of Operator or Legally Responsible Party and Local Representative*

San Juan Refining Company, P.O. Box 159, Bloomfield, NM 87413

John Stokes, Refinery Manager	(505) 632-8013
Barry Holman, Environmental Manager	(505) 632-8013
Chad King, Operations Manager	(505) 632-8013

ITEM 3 - *Location of the Discharge Plan Facility*

Bloomfield, New Mexico is a town of 3000 residents located in the Four Corners Region of northern New Mexico (Plate 1). The San Juan Refining Company (SJRC) – Bloomfield Refinery is located at #50 County Road 4990 (Sullivan Road), immediately south of Bloomfield in San Juan County (Plate 2). The site is located on a bluff approximately 100 feet above the south side of the San Juan River, a perennial river that flows to the west. On the bluff and between the river and the process area of the facility is the Hammond Ditch, a man-made channel for irrigation water supply that borders all but the southern portion of the site. Plate 2 shows the approximate property boundaries. Bordering the facility is a combination of federal and private properties (Plate 3). The topography of the site is generally flat with low-lying areas to the east of the process area (Plate 2).

The legal description of the site is 286.93 acres, more or less, being that portion of the NW ¼ NE ¼ and the S ½ NE ¼ and the N ½ NW ¼ SW ¼ and the SE ¼ NW ¼ SW ¼ and the NE ¼ SW ¼ of Section 26, Township 29 North, Range 11 West, San Juan County, New Mexico.

ITEM 4 - *Landowners*

San Juan Refining Company (SJRC/Giant) owns the facility site.

ITEM 5 - *Facility Description*

San Juan Refining Company – Bloomfield is a petroleum refinery with a nominal crude capacity of 18,000 barrels per calendar day. Processing units include crude desalting, crude distillation, catalytic hydrotreating, catalytic reforming, fluidized catalytic cracking (FCC), catalytic polymerization (Cat/Poly), diesel hydrodesulfurization (HDS), gas concentration and treating, and sulfur recovery (SRU). For a history of Refinery improvements and modifications, see Appendix A. Crude supplies arrive by pipeline and tank trucks. SJRC operates a loading terminal where refined products are loaded into tank trucks. Plate 4 shows the site plan.

ITEM 6 - *Materials Stored or Used at the Facility: Type of Container, Estimated Volume, and Location.*

Table 1 contains the Refinery Chemical Inventory. It lists all chemicals stored at the Refinery, estimated storage volume, storage container type, and location.

ITEM 7 - *Sources and Quantities of Effluent and Waste Solids Generated at the Facility*

A. Types of Effluent, Estimated Quantities, Types and Volumes of Additives

Wastewater sources from the process and other areas are commingled at an API separator. These sources, with quality, quantity, and additive information, are:

1. Separators, Scrubbers, and Slug Catchers

The refining process units generate a wastewater stream to the API Separator of approximately 45,240 GPD with an estimated total dissolved solids (TDS) of 873 mg/l. The crude desalter generates the majority of this wastewater (30,240 GPD). Steam and other water vapor losses to the atmosphere from these process units total 194,400 GPD. See Plate 5 for a flow diagram of the Refinery's wastewater system. Table 2 also presents this water balance.

The SRU uses several proprietary chemicals, primarily iron chelates and sulfur conditioning agents in aqueous solutions, as the active ingredients required to remove sulfur from the refinery fuel and diesel HDS gases. (See Table 1 for stored volumes.) A belt filter press recovers these chemicals from the produced sulfur and recycles them back to the SRU process.

Curbed concrete slabs equipped with drains route storm water runoff and wash water from the process area to the API Separator. Storm water runoff from the process units is about 2,300 GPD and wash water is about 9,240 GPD.

The oily water process sewer piping system is of welded construction of standard weight A53 grade B carbon steel, coated with 50 -mil protective tape. Collection headers are 14", 12", and 10" diameters. Collection branches are 8", 6", and 4" diameters equipped with "P" traps at drain inlets. The pipe wall thickness varies up to 3/8" for 14" pipe. The "P" trap drains route stormwater to the API Separator. In addition, area drains are located in critical peripheral areas outside the curbed process slabs to collect and direct all potentially oily wastewater to the API Separator.

The sewer boxes are constructed of reinforced concrete with sealed covers and vents. The entire process sewer collection system empties to the API Separator. See Part C below for the approximate chemistry of the API Separator stream.

2. Boilers, Waste Heat Recovery Units, Cogeneration Facilities, and Cooling Towers/Fans.

The boilers generate approximately 91,080 GPD of steam from softened water and some recycled condensate. The blowdown, 21,600 GPD with a TDS of 2,042 mg/l, flows to the API Separator.

The water softening unit treats filtered, raw water for feed to the boilers. It handles approximately 104,040 GPD of filtered water with a TDS content of 240 mg/l. The Refinery utilizes approximately 600 pounds per day of sodium chloride for softening. The softeners require periodic regeneration resulting in a 5,760 GPD discharge of high salt (10,445 mg/l TDS) brine to the API Separator. Softened water, 98,200 GPD with a TDS of 340 mg/l, flows to the boilers.

Typically, 18 quarts per day of the Nalco product Transport Plus 7200 are used to inhibit scale formation in the boilers. This product is an aqueous solution of an acrylamide/acrylate polymer and carboxylate. Four quarts per day of Nalco's Eliminox O_2 Scavenger, an aqueous solution of amines and carbohydrazides, minimizes acid formation from excess oxygen. The Nalco product, Tri-Act 1802 Corrosion Inhibitor, an aqueous solution of amines, is added (seven quarts per day) to the steam system as a corrosion inhibitor and neutralizer of carbolic acid. Table 1 details the storage of these additives.

Approximately 236,160 GPD of filtered water with a TDS of 240 mg/l flow to the two cooling towers. The blow down volume from the cooling towers is approximately 41,760 GPD of water with a TDS of 2,290 mg/l. About 194,400 GPD are lost through evaporation. The wastewater from the cooling towers flows to the API Separator.

The cooling towers receive four quarts per day of the Nalco product, 71-D5+ Antifoam, a blend of fatty acids, polyglycols, polyglycol ester, and oxyalkylate in kerosene and mineral oil, as a defoamer. They use three quarts per day of Nalco's 7344 Chlorine Stabilizer, an aqueous solution of sodium hydroxide, sulfamate, carboxylate, and polyglycol as a biological dispersant. Six gallons per day of Nalco's 7356 Corrosion Inhibitor, an aqueous solution of phosphoric acid and zinc chloride, inhibit the formation of scale and corrosion in the cooling system. The Nalco product, 8302 Dispersant, an aqueous solution of a substituted carboxylate, a substituted triazole, an acrylate polymer, and sodium hydroxide, is used (four gallons per day) as a dispersant to keep calcium phosphate scale from forming. About 37 pounds per day of gaseous chlorine is fed to the cooling towers as a biocide. Sulfuric acid is added (eight gallons per day) for pH control. Again, Table 1 details the storage of these chemicals.

3. Wash down/Steam out effluent from process and storage equipment internals and externals.

Concrete slabs with drains routed to the API Separator or to a product recovery tank capture washdown and any spills from the truck loading area. Truck compartments are periodically cleaned with steam or by rinsing with product. The hydrocarbons are recovered in the API Separator and the effluent is routed through the API into the wastewater treatment and disposal system.

4. Solvent/degreaser use

Item 4 lists the solvents used at the Refinery. All solvents are consumed in use; therefore, they do not contribute to the wastewater at the Refinery.

5. Spent acids or caustics

An annual volume of 1000 tons of spent caustic flows to the API Separator. When possible, the spent caustic is sent to the Stone Container Company pulp plant located in Snowflake, Arizona for use in their process.

Approximately 59 tons per year of spent phosphoric acid from the Cat/Poly unit is shipped to a fertilizer plant (Evergreen Resources, Soda Springs, ID) for incorporation into their fertilizer products.

6. Used engine coolants (i.e. antifreeze)

Mesa Environmental of Albuquerque, New Mexico collects the 27 gallons of antifreeze used by the Refinery each year. A 55 gallon drum located on a curbed concrete pad in the warehouse yard receives the used antifreeze.

7. Used lubrication and motor oils

A small tank located on a curbed concrete pad collects the waste lubrication, motor, and hydraulic oils for subsequent offsite disposal. Mesa Environmental of Albuquerque, New Mexico trucks the approximate 500 gallons per year of used oil for disposal.

8. Used process filters

A dumpster at the bundle cleaning pad collects approximately 12 cubic yards per year of dry process filters. Waste Management of Four Corners, Inc., disposes of these as a special waste at the regional landfill in Bloomfield, New Mexico.

9. Solids and sludges from tanks (provide description of materials)

Tank cleaning occurs on a 5-10 year rotating schedule. SJRC's maintenance crew maintains a record of the tank cleaning schedule that is available on request. Solids are collected in roll-offs and disposed of off-site by contracting companies. Duratherm, Inc. and Eltrex, Inc., both located in Houston, Texas, have collected the sludge for disposal within the past several years.

Heat exchanger cleaning generates approximately one ton of sludge per year. SJRC generally hires a contractor to wash the heat exchanger bundles. Heat exchanger cleaning takes place on an average cycle of once every four years in a concrete bay located at the east end of the auxiliary warehouse. The contractors use non-hazardous materials such as steam, water, and biodegradable soap or chemicals compatible with the refining processes. A portable sump collects the sludges and liquids. A vacuum truck removes the liquids and empties them into the API Separator.

The most recent crude tank cleaning, which occurred in1999, generated approximately 34 tons of sludge that was disposed of by Duratherm, Inc.

10. Paint wastes

Romic Inc. of Chandler, Arizona or other certified disposal firms will be used to dispose of any unused, solvent-based paint wastes that may be generated.

11. Sewage

Domestic sewage is disposed of via septic tanks and leach fields in accordance with New Mexico Environment Department regulations. It is not commingled with other refinery effluent. Three septic tank systems exist on the site; one located under the control room has been operating for 30 years; the other two systems, located under the Refinery offices, are less than three years old.

12. Laboratory wastes

Laboratory wastes not otherwise recycled or shipped for offsite disposal drain to the API Separator. Appendix B contains the laboratory's chemical inventory.

13. Other Liquid Wastes

The Refinery generates no other waste liquids except wastewater.

14. Other Solid Wastes

Sulfur, FCC fines, spent catalyst, and trash are the other solid wastes generated at the Refinery. The Hydrodesulfurization Unit (HDS) produces 180 tons per year of solid sulfur. SJRC sells some of this to local farmers for use as a soil conditioner; the remainder goes to an onsite landfill located in the northeastern corner of the property. The landfill is periodically covered with soil.

The Fluidized Catalytic Cracking (FCC) Unit generates 50 tons per year of fine-grained particles or fines. Approximately one ton per week is deposited in the onsite landfill and covered with soil.

Akzo Chemical Company of Houston, Texas collects the spent FCC catalyst, approximately 100 tons per year, for off-site disposal. American Catalyst Company of Houma, Louisiana or other catalyst disposal/recycling firms collect the spent hydrotreating catalyst, 21,500 lbs. from the HDS reactor, 4175 lbs. from the Reformer. A fertilizer company in Soda Springs, Idaho buys the 158,000 lbs. of spent, phosphoric acid-containing catalyst used each year in the Catalytic Polymerization Unit.

Waste Management of Four Corners, Inc. collects an average of three dumpsters full of solid waste per week for offsite disposal.

B. Quality Characteristics - TDS, Major Cations, Hydrocarbon Analysis, Toxics, Types of Samples, and Sources of Variability

Section C below presents the chemistry of the waste stream from the Aeration Lagoons and Evaporation Ponds. We have assumed that the chemistry of all other effluent sources listed above is typical for each type of waste.

C. Commingled Waste Streams

The Refinery combines the wastewater streams discussed above and feeds them to the API Separator. The API Separator effluent wastewater flows to the Aeration Lagoons (formally known as the Oily Water Ponds) for aeration and biological treatment. From the Aeration Lagoons, the wastewater stream flows to two, double-lined, 5-acre evaporation ponds. From the Evaporation Ponds, the wastewater flows to its final disposal site, a Class 1 underground injection well. The injection well follows specific operational requirements separate from this discharge plan.

Inter-Mountain Laboratories, Inc. of Farmington, NM conducted chemical analyses of the various waste streams. Appendix C contains copies of these chemical analyses. Table 3 presents the BTEX analysis of the influent and effluent from the Aeration Lagoons. Table 4 presents the hazardous characterization of the effluent from the Lagoons. Table 5 shows the chemistry of the effluent from the north, double-lined Evaporation Pond. Table 6 lists the dissolved metal concentrations in the effluent from the north, double-lined Evaporation Pond.

ITEM 8 - *Collection/Storage/Disposal Procedures*

A. Tank Storage

Plate 4 shows the location of storage tanks. Tanks 1 through 45 are aboveground, non-pressurized steel tanks. Tanks B1-B23 are pressurized bullet tanks. Table 7 lists the tank contents and their volumes. Tank dikes designed to contain at least 130% of the tank volume in case of a spill protect all tanks. Any spilled material will be recovered by vacuum truck or be pumped to the API Separator or directly to a process tank.

Storm water that collects inside the tank dikes may also flow to sumps in the tank farm. Refinery personnel monitor these sumps and empty them to the API Separator by vacuum truck or direct pumping as needed.

The Refinery has no underground storage tanks. In addition to the tanks identified in Table 7, an unleaded gasoline tank (2,500 gallons) is in the warehouse yard protected with a concrete slab and retaining walls. A 300-barrel diesel tank located just west of the auxiliary warehouse is protected within a concrete containment basin. Two small vessels for sulfuric acid storage are located on curbed concrete at each of the cooling towers. These are labeled V501 and V511.

Vessels V705, V706, V707, located on curbed concrete at the truck terminal, store product additives.

A few day-tanks, needed periodically for in-plant equipment operations (e.g., diesel fuel for pumps), are stored on a curbed, concrete pad when not in use.

B. Underground Piping

1. Process Piping

Underground process piping that contains refinery crude, products, and intermediates has been minimized and is generally limited to the incoming crude oil pipeline. Appendix D contains the San Juan Pipeline Spill Response Guide. In addition to the incoming crude pipeline, the Refinery uses approximately 100 feet of buried crude charge piping in the Crude Unit and some underground piping for tank dike crossings and road crossings. The major road crossing is from the Refinery to the truck loading terminal. Table 8 lists the installation dates of all underground pipes at the facility.

2. Process Water System Piping

Underground piping for process-related water and wastewater does not contact oil streams. These underground pipes transport filtered water, steam, cooling tower water, and blowdown from the boilers and the cooling towers. The facility's main cooling water pipes were replaced in 1993.

C. Chemical Storage

Chemical and drum storage areas are paved and curbed. Any drainage is contained on the pads or directed to refinery sewers as appropriate. Additional information about chemical storage is available in Table 1.

D. Aeration Lagoons (formerly "Oily Water Treatment Ponds")

Immediately downstream of the API are lined lagoons identified as Aeration Lagoons 1, 2, and 3. An earthen dike separates Lagoon 1 from Lagoons 2 and 3. A concrete wall separates Lagoon 2 from Lagoon 3. All three Aeration Lagoons are constructed primarily below grade.

In 1994, the Aeration Lagoon liners were upgraded. The existing liner system, consisting of a 100-mil high-density polyethylene (HDPE) flexible membrane liner (FML) underlain by a leak detection system and a 33% bentonite-amended soil liner, remained in place. Two additional HDPE FMLs were added over the existing liner along with two additional leak detection layers for a total of one primary and two secondary leak detection layers in the retrofitted impoundments.

E. Evaporation Ponds

Treated wastewater is pumped to one of two double-lined evaporation ponds installed in accordance with the "Guidelines for the Design and Construction of Lined Evaporation Pits" as published by the New Mexico Oil Conservation Division (NMOCD). Each of these ponds has a 5 acre surface area and a 25 acre-foot capacity. They are equipped with two 60-mil HDPE FMLs and a leak detection system. The first pond was installed in December 1989 and the second was installed in September 1990. Each pond provides approximately 12.5 gpm net evaporation per year in addition to wastewater storage prior to injection. Treated wastewater is pumped to the ponds and then to the injection well.

F. Injection Well

A Class 1 injection well was constructed in 1995 according to NMOCD regulations. The well demonstrated the ability to handle the quantity of wastewater requiring disposal (at least 55 gpm on an annual basis) and operates under Discharge Permit Number GW-130. The well is located 2442 feet from the south line and 1250 feet the east line of Section 27, Township 29N, Range 11W, NMPM San Juan County, New Mexico. The nonhazardous wastewater stream is injected into portions of the Cliff House and Upper Menefee Formations (3276 to 3514 feet deep).

ITEM 9 - *Proposed Modifications*

No modifications to the Refinery are being proposed at this time.

ITEM 10 - *Inspection, Maintenance, and Reporting*

A. Notification of Fire, Breaks, Spills, Leaks, & Blowouts

The procedures of Rule 116 in the NMOCD Regulations will be followed in reporting fires, breaks, spills, leaks, and blowouts within the facility. Major events require immediate notification to the District OCD Supervisor and a follow up report due within ten days of the event. Major events include breaks, spills or leaks of 25 or more barrels of crude, intermediates, petroleum products, salt water, effluent wastewater, acids, caustics, solvents, or other chemicals. Minor events of five barrels or more but less than 25 barrels of the above materials will be reported within ten days of the incident.

B. Pond Liner Leak Detection Systems

The leak detection systems for the two evaporation ponds are inspected on a periodic basis. Records of the inspections are maintained at the Refinery. Any leaks in excess of expected rates will be reported to the NMOCD.

The leak detection systems for the Aeration Lagoons are inspected regularly. Inspection records are maintained at the Refinery.

C. Groundwater Remedial Action

The Refinery is actively abating the shallow, perched groundwater underlying the facility. Volume II of the Discharge Plan contains the groundwater monitoring and recovery information in the form of a Groundwater Abatement Plan.

D. Tank Berms

All tanks are protected by tank dikes designed to contain the contents of the tank in case of a spill. Any spilled material will be recovered by vacuum truck or pumped to the API Separator or directly to a process tank.

E. Process Inspection

Process piping is monitored on an on-going basis for visual evidence of leaks. The Cat/Poly and HDS units as well as most equipment in light hydrocarbon liquid service in other units are inspected regularly by an outside contractor for VOC emission compliance. Drains are inspected weekly for proper water seals and condition. Records of these inspections are maintained at the Refinery.

F. Tank Inspections

A tank inspection program is utilized to ensure the integrity of the tanks. Periodically, all storage tanks are emptied, inspected, and repaired. The inspection includes vacuum testing of the floor weld seams. Records of tank emptying and testing are maintained at the Refinery.

G. Corrosion Protection

An electrical corrosion protection system designed to minimize corrosion of tank bottoms and underground piping has been in service since May 1989. The system is checked periodically to verify its proper operation.

ITEM 11 - *Spill/Leak Prevention and Reporting Procedures (Contingency Plans)*

Bloomfield Refinery's Spill Prevention Control and Countermeasures plan appears in Appendix D.

As a petroleum refining facility, Bloomfield handles large amounts of potentially hazardous crude oil, product intermediates, hydrocarbon products, gases, and other chemicals. Because of the hazard potential, particularly from fire, the facility has extensive safety training and well-defined procedures for routine jobs and emergencies. Written safety procedures include an Emergency Plan, Safe Work Permits, Eye Protection, Safety Hats, Electrical Lock-outs, Opening and Isolating Equipment, Smoking Areas, Fire and Safety Permits, Firewatches, Respiratory Equipment, Entering Vessels and Other Confined Spaces, Inspection and Maintenance of Safety Equipment, Employee Injury or Illness Procedures, and Excavation Procedures. These documents are available at the facility for review.

Appendix D contains a copy of the Response Plan (Oil Pollution Act of 1990 and Clean Water Act) for spills that might affect waterways, the Storm Water Pollution Prevention Plan (SWPPP), and the OSHA Process Safety Management (PSM) Plan.

ITEM 12 - *Site Characteristics*

See the Groundwater Abatement Plan and the Final Site Investigation in Volume II of the Discharge Plan.

ITEM 13 - *Other Compliance Information*

A closure plan is not necessary at this time. Giant does not plan to close the Refinery during the time period of this Discharge Plan and the Refinery will likely continue operating for many years into the future. During that time, SJRC may modify its refining process. New unit operations may be added and others eliminated. A detailed closure plan will be submitted when such a document becomes relevant and meaningful. However, when the Refinery plans to close an individual unit operation, such as the raw water ponds, Giant will submit to NMOCD a detailed closure plan for that unit at least 120 days prior to the anticipated closure date.

Upon approval of the Groundwater Abatement Plan, SJRC will submit a closure plan for the existing monitor wells.

Table 2: Water balance of wastewater at the Refinery.

Process Unit	Volume of wastewater (GPD)
Crude Desalter	30,240
Boiler Blowdown	21,600
Cooling Tower Blowdown	41,760
Softeners	5,760
Wash Water	9,420
Storm Water	2,300
Ground Water	7,200
API Separator Effluent	118,100

Table 3: Comparison of influent and effluent from the Aeration Lagoons. Values shown are a typical analysis of a grab sample. Note: API Separator effluent flows directly to the Aeration Lagoons.

	Concentration in API Separator Effluent (ppm)	Concentration in Aeration Lagoon Effluent (ppm)
Benzene	9	0.0003
Toluene	14	<0.0002
Ethyl Benzene	1	<0.0002
Xylene	5	0.01

Table 4: Chemistry of effluent from the Aeration Lagoons. Values shown are average values of grab samples. Toxicity Characteristic Leaching Procedure (TCLP) results. Note: ND = not detected at stated detection limit.

Variable	NMWQCC Limit (mg/L)	Detection Limit (mg/L)	Results (mg/L)
Arsenic	0.1	0.1	ND
Barium	1.0	0.5	0.5
Cadmium	0.01	0.005	ND
Chromium	0.05	0.01	0.01
Lead	0.05	0.2	ND
Mercury	0.002	0.001	ND
Selenium	10.0	0.1	ND
Silver	0.05	0.01	ND
1,1-Dichloroethene	0.005	0.02	ND
1,2-Dichloroethane	0.01	0.02	ND
1,4-Dichlorobenzene	7.5	0.02	ND
2-Butanone	200	0.1	ND
2,4-Dinitrotoluene	0.13	0.02	ND
2,4,5-Trichlorophenol	400	0.02	ND
2,4,6-Trichlorophenol	2.0	0.02	ND
Benzene	0.01	0.02	ND
Carbon Tetrachloride	0.5	0.02	ND
Chlorobenzene	100	0.02	ND
Chloroform	0.1	0.02	ND
Hexachlorobenzene	0.13	0.02	ND
Hexachloroethane	3.0	0.02	ND
Hexachloro-1,3-butadiene	0.5	0.02	ND
Nitrobenzene	2.0	0.02	ND
m,p-Cresol	200	0.02	ND
o-Cresol	200	0.02	ND
Pentachlorophenol	100	0.02	ND
Pyridine	5.0	0.2	ND
1,1,2,2-Tetrachloroethylene	0.02	0.02	ND
1,1,2-Trichloroethylene	0.1	0.02	ND
Vinyl Chloride	0.001	0.02	ND

Table 5. Chemistry of effluent from the north, double-lined Evaporation Pond. Values shown are a typical analysis.

Variable	Detection Limit (mg/L)	Result (mg/l)
Ammonia		7.13
Chloride		5,890
Fluoride		1.38
Nitrate, Nitrite	0.02	ND
Phenols	0.01	ND
Sulfate		1,740
Sulfide as H_2S		30.5
Total cyanide	0.01	ND
Total Dissolved Solids		13,600
Total Kjeldahl Nitrogen		0.13
Total Suspended Solids		26

Table 6. Dissolved metals in effluent from the north, double-lined Evaporation Pond. Values shown are the results of a typical analysis.

Metal	Detection Limit (mg/L)	Result (mg/L)
Aluminum	0.1	0.1
Arsenic	0.005	ND
Barium	0.5	ND
Boron	0.01	1.61
Cadmium	0.002	ND
Chromium	0.02	0.05
Cobalt	0.01	ND
Copper	0.01	0.16
Iron	0.05	0.05
Lead	0.02	ND
Manganese	0.02	0.28
Molybdenum	0.02	0.02
Nickel	0.01	0.01
Selenium	0.005	0.005
Silver	0.01	ND

Table 7: Tank Contents and Volumes

Tank No.	Date Installed	Material Stored	Capacity (bbl)	Diameter (ft)	Vapor Space (ft)	Turnovers per yr
1	1/60	Filtered water	1,500	21	-	-
2	1/78	Filtered water	67,000	100	-	-
3	9/66	JP-4 sales	10,000	41	21	25
4	9/66	JP-4 sales	10,000	41	21	25
5	9/66	Hi Reformate	10,000	41	20	22
8	12/87	Crude slop	500	12	12.5	42
9	12/87	Crude slop	500	12	12.5	42
11	12/82	Low Reformate	55,000	100	20	22
12	12/82	Cat/Poly gas	55,000	100	20	32
13	9/87	Unleaded sales	30,303	67	24	25
14	9/87	Unleaded sales	30,097	67	24	25
17	2/61	Cat feed	40,000	84	20	57
18	1/74	#1 Diesel sales	55,000	100	20	2
19	1/75	#2 Diesel sales	36,000	81	20	34
20	1/76	FCC slop	5,000	38	12	1
21	1/76	Refinery slop	3,000	30	12	1
22	1/80	Sales Rack slop	1,500	30	6	1
23	1/62	Base gasoline	40,000	85	20	20
24	1/77	Naphtha	10,000	54		
25	1/77	Naphtha	10,000	54		
26	12/67	Jet A sales	4,000	34	12	9
27	1/67	Heavy Burner Fuel Sales	10,000	42	20	13
28	4/69	Crude	80,000	110	24	35
29	1/74	#2 diesel sales	17,000	64	17	34
30	174	Premium blend	17,000	64	17	29
31	8/77	Crude	110,000	140	·20	35
32	4/88	Premium unleaded	20,000	60	20	20
35	4/88	Unleaded	55,000	100	20	27
36	4/88	Gasoline blend	55,000	100	20	20
37	7/88	Isomerate	10,000	42	0	37
41	1/79	Crude	700	20	6	17
42	1/79	Crude	700	20	6	17
43	1/79	Water/crude	600	20	5	8
44	1/88	Ethanol	2,000	25	12	6
45	1/94	MTBE	5,000	35	0	37
B-12	1/60	Natural Gas	692	6	N/A	
B-13	1/60	Butane	500	5	N/A	
B-14	1/60	Butane	500	5	N/A	
B-15	1/60	Propane	714	7.14	N/A	

B-16	1/78	Propane	714	7.14	N/A	
B-17	1/78	Poly feed	714	7.14	N/A	
B-18	1/78	Poly feed	714	7.14	N/A	
B-19	1/78	Poly feed	714	7.14	N/A	
B-20	1/78	Butane	714	7.14	N/A	
B-21	10/83	Butane	714	7.14	N/A	
B-22	4/88	Saturate LPG	714	7.14	N/A	
B-23	4/88	Saturate LPG	714	7.14	N/A	

Table 8: Installation Dates of Underground Piping

Description	Date Installed
Sewers	
FCC, Gas Con and Treater	6/78
Cat/Poly	4/88
Crude	11/88
Reformer	11/88
HDS, SRU	12/93
Road Crossing to Sales Rack	
Initial Installation	6/78
JP-4	9/87
Cat/Poly Tank 32	4/88
Jet A	2/89
Naphtha Sales	1/75
Miscellaneous	
Crude Unloading Road Crossing to Tank 28	1/77
At Sales Terminals	1/78
Crude Line to Pipe Rack (100 feet)	4/89
Groundwater Recovery	9/88
Sour Water Transfer Lines	6/78
Transfer Lines to Spray Evaporation	6/82
Crude Line (LACT Unit to Pipe Rack)	1/78
Poly Gas Transfer (Cat Poly to Rack Road Crossing)	4/88
JP-4 Sales (Cat/Poly to Rack Road Crossing)	4/88
API Tank Transfer (Cat/Poly to Rack Road Crossing)	4/88
Poly LPG Make (Cat Poly to Rack Road Crossing)	4/88
Poly Gas Slop (Cat Poly to Rack Road Crossing)	4/88
Poly Feed Line (Cat Poly to Rack Road Crossing)	4/88
Slop Transfer Line (Cat Poly to Rack Road Crossing)	4/88
Tank 17 Burner Fuel Sales	1/78
Gas Oil Receiving	1/78
Diesel (To/from HDS to Rack Road Crossing)	12/93

HISTORY OF FACILITY MODIFICATIONS AND IMPROVEMENTS

Previous Owner's Activities

Local entrepreneur, Kimball Campbell, constructed the crude topping unit that eventually became the GRC facility in the late 1950s. O. L. Garretson bought the facility in the early 1960s, renamed it Plateau, Inc., and sold it in 1964 to Suburban Propane of New Jersey.

Operationally, the facility has steadily evolved through a series of improvements, modifications, and expansions. Suburban upgraded the facility in 1966, increasing the Crude Unit throughput to 4,100 bpcd and adding a 1,850 bpcd Reformer and Naphtha Hydrotreater. In 1975, the Crude Unit was expanded to 8,400 bpcd.

In 1979, the Crude Unit was expanded again to 16,800 bpcd (later demonstrated to have a hydraulic capacity in excess of 18,000 bpcd). A Fluidized Catalytic Cracker (FCC) with a nominal capacity of 6,000 bpcd, an Unsaturated Gas Plant, and a Treater Unit were also added at that time. The capacity of the Reformer/Hydrotreater was increased to 2,250 bpcd. The FCC was upgraded in 1982 to conform to state and federal air quality standards.

Bloomfield Refining Activities

Bloomfield Refining Company (BRC) acquired the facility from Suburban Propane (Plateau) on October 31, 1984. BRC made many improvements to facility operations and equipment. These improvements are summarized below.

1986

Relocated the spent caustic tank onto a concrete pad with concrete retaining walls.

1987

Upgraded the Reformer and increased its capacity to 3,600 bpcd, modified the Laboratory and Treater Unit, and increased tank storage capacity.

Cleaned up the north and south bone yards.

Decommissioned and dismantled old tanks 6 and 7.

Relocated the API recovered oil tanks 8 and 9 to concrete pads with concrete retaining walls.

Established a systematic inspection, maintenance, and repair program for tanks.

1988

Added a 2,000 bpcd Catalytic Polymerization Unit. Removed the facility's two underground storage tanks and replaced them with aboveground storage tanks.

Completed installing the cathodic protection system for the tank farm and underground piping.

Rebuilt the process area sewer system and added curbed, concrete paving to the unpaved process areas.

1989

Increased Reformer throughput to 4,000 bpcd.

Activated the groundwater hydrocarbon recovery system.

Installed a concrete pad with curbing between tanks 3 and 4.

Constructed the first double-lined Evaporation Pond as part of discharge plan improvements.

1990

Constructed the second double-lined Evaporation Pond as part of discharge plan improvements.

Constructed a drum storage shed and converted to bulk chemical usage where possible in order to minimize the use of drummed chemicals.

1991

Revamped the burner fuel sales rack with concrete paving and curbing.

Submitted the permit application for a Class 1 disposal well.

Upgraded the groundwater hydrocarbon recovery system.

1992

Submitted an air quality permit application proposing the installation of a Diesel Hydrodesulfurization (HDS) Unit and a Sulfur Recovery Unit (SRU) to comply with new EPA low-sulfur diesel regulations and to decrease air emissions.

1993

Began a program under a consent agreement with the US EPA to conduct interim measures (IM), a RCRA facility investigation (RFI), and a corrective measures study (CMS) addressing groundwater contamination.

Replaced portions of the underground cooling water piping.

Added concrete paving around the API Separator.

Added process units: HDS unit (2,000 bpcd) and SRU.

Improved (eliminated) storm water runoff to the north.

1994
Completed the Class 1 injection well.

Retrofitted the Aeration Lagoons with two additional liners.

Installed a floating cover for the API Separator.

Closed the clay-lined evaporation ponds and spray evaporation area.

Giant Activities

In 1995, San Juan Refining Company, a wholly owned subsidiary of Giant Industries Arizona, Inc., purchased the Bloomfield Refinery from BRC.

1995
Improved the diking south of the Refinery to further reduce storm water runoff.

Began implementation of additional corrective measures for groundwater cleanup as determined from the CMS.

1998
Converted the former evaporation ponds on the east side of the Refinery to raw water storage ponds.

1999
Installed sheet piling and a bentonite slurry wall adjacent to the San Juan River, north of the process units, in order to intercept a small hydrocarbon seep that had been detected in the area.