STATEMENT OF BASIS
Sandalwood Exploration, L.P.
SL 18209 Well No. 2, Main Pass Block 6 Production Facility
LPDES Permit No. LA0121975
AI No. 132676

For the Issuance of Territorial Subcategory of the Oil and Gas Extraction Point Source Category LPDES Water Discharge Permits.

THE PERMITTEES ARE: **Sandalwood Exploration, L.P. - SL 18209 Well No. 2, Main Pass Block 6 Production Facility** involved with the exploration, development, and production of oil and gas within territorial subcategory locations of the State of Louisiana.

ISSUING OFFICE: Louisiana Department of Environmental Quality (LDEQ)
Office of Environmental Services
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

PREPARED BY: Ms. Valerie Powe

DATE PREPARED: January 10, 2006

1. PERMIT STATUS

A. Reason For Permit Action:
First time issuance of a Louisiana Pollutant Discharge Elimination System (LPDES) permit for a 5-year term.

B. NPDES permit effective date: N/A
NPDES permit expiration date: N/A
EPA has not retained enforcement authority.

C. LPDES permit: N/A
LPDES permit effective date: N/A
LPDES permit expiration date: N/A

D. Date Application Received: November 15, 2005

2. FACILITY INFORMATION

A. FACILITY TYPE/ACTIVITY - Oil and Gas Exploration, Development, and Production Operations

Sandalwood Exploration, L.P. - SL 18209 Well No. 2, Main Pass Block 6 Production Facility is an oil and gas exploration, development, and production facility.

B. FEE RATE

1. Fee Rating Facility Type: minor
2. Complexity Type: III, BPJ from 20 points to 10 points to be closer to the fee for coverage under the general permit, LAG260000
3. Wastewater Type: III
4. SIC Code: 1311

C. LOCATIONS - SL 18209 Well No. 2, Main Pass Block 6 Production Facility, approximately 66.7 miles east of Chalmette, Louisiana, St. Bernard Parish

Latitude: 29° 40' 04.6" Longitude: 88° 53' 59"

3. OUTFALL INFORMATION

See Appendix A.

4. RECEIVING WATER

Stream – Gulf of Mexico

Basin and Segment – Lake Pontchartrain River Basin, 042209

Designated Uses -
a. primary contact recreation
b. secondary contact recreation
c. fish and wildlife propagation
d. oyster propagation

5. PROPOSED EFFLUENT LIMITS

See Appendix A.

6. COMPLIANCE HISTORY/COMMENTS

A file review disclosed that no actions have been issued to Sandalwood Exploration, L.P. - SL 18209 Well No. 2, Main Pass Block 6 Production Facility.

7. 303(d)/TMDL WATERBODIES

Subsegment 42209, Gulf of Mexico, is listed on LDEQ's Final 2004 303(d) List as impaired for mercury and total fecal coliform. To date several TMDLs have been developed for discharges of mercury into gulf waters of the state of Louisiana. Specifically, it is stated that there is no available data indicating mercury concentrations would be expected in discharges from oil and gas operations. It is noted that spent drilling muds from these wells do posses reasonable potential to cause or contribute to violations of the water quality standard for mercury, resulting in the introduction of mercury into the food chain; however LDEQ prohibits the discharge of spent drilling muds into waters of the state of Louisiana. Because LDEQ has taken steps to prevent the discharge of mercury at levels above water quality standards by eliminating the discharge of drilling muds and given that current TMDLs attribute no indication that mercury is discharged from oil and gas operations, mercury requirements will not be placed in this permit.

8. ENDANGERED SPECIES

The receiving waterbody, Subsegment 042209 of the Lake Pontchartrain River Basin Basin is not listed in Section II.2 of the Implementation Strategy as requiring consultation with the U.S. Fish and Wildlife Service (FWS). This strategy was submitted with a letter dated September 29, 2004 from Watson (FWS) to Gautreaux (LDEQ). Therefore, in accordance with the Memorandum of Understanding between the LDEQ and the FWS, no further informal (Section 7, Endangered Species Act) consultation is required. It was determined that the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat.

9. HISTORIC SITES

The LDEQ shall notify the LSHPO of the receipt of individual permit applications for proposed facilities when associated oil or gas related activities are to be planned on inland wetlands areas.

10. TENTATIVE DETERMINATION

On the basis of preliminary staff review, the Department of Environmental Quality has made a tentative determination to issue a permit for discharges described in the proposed effluent attachment.

11. PUBLIC NOTICES

Upon publication of the public notice, a public comment period shall begin on the date of publication and last for at least 30 days thereafter. During this period, any interested persons may submit written comments on the proposed issuance of LPDES individual permits and may request a public hearing to clarify issues involved. This Office's address is on the first page of the statement of basis. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

Public notice published in:

The local newspaper of general circulation and

The Office of Environmental Services Public Notice Mailing List.

Rationale for Sandalwood Exploration, L.P., SL 18209 Well No. 2, Main Pass Block 6 Production Facility

Outfall locations will vary from site to site. See Appendix A for pollutant type, limitations and monitoring frequencies.

Limits Justification and References

Limits are based upon 40 CFR 435 Subpart A - Territorial Subcategory, Final NPDES General Permit for the Territorial Waters of Louisiana (LAG260000), Louisiana Water Discharge Permit System individual permits, and Best Professional Judgment.

Storm Water Pollution Prevention Plan (SWP3) Requirement

In accordance with LAC 33:IX.2511.C.1.c, the operator must prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) if there has been a release of reportable quantity of oil or hazardous substance in stormwater at the facility since November 16, 1987. Reportable Quantity spill is defined at 40 CFR 110.3 as discharges of oil that "Cause a film or sheen upon or discoloration of the surface of the water."

The SWP3 shall be prepared, implemented, and maintained within six (6) months of the effective date of the final permit. The plan should identify potential sources of storm water pollution and ensure the implementation of practices to prevent and reduce pollutants in storm water discharges associated with industrial activity at the facility (see STORMWATER DISCHARGES in Part II of the Draft Permit)

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APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Discharges that are situated within the territorial subcategory of the Oil and Gas Extraction Point Source Category shall be limited and monitored by the permittee as specified below. Notification concerning intent to discharge must be submitted to this Office and the nearest Regional Office listed in Part II, Section R prior to commencement of drilling or workover operations or sanitary waste discharges from production operations.

Discharge Type	Effluent Characteristic	Discharge Limitations Units (Specify)	Monitoring Requirements Measurement Frequency	Sample Type
Drill Cuttings and Adhering Drilling Fluids	NO DISCHARGE			
Batch or Bulk Drilling Fluids	NO DISCHARGE			
Treated Wastewater from Drill Cuttings/ Drilling Fluids Dewatering Operations	NO DISCHARGE			
Produced Sand	NO DISCHARGE			
Well Completion, Treatment, and Workover Fluids (Outfall 001)	Free Oil[2]	No Discharge	1/day	Grab
	Oil and Grease	42 mg/L daily max	1/month	Grab
		29 mg/L mo avg	1/month	Grab
	Priority Pollutants[10]	NO DISCHARGE		
	Flow	Report (GPD)	1/month	Estimate
Produced Water (Outfall 002)	Volume	Report (bbls/day) mo avg	1/month	Estimate
	Oil and Grease[11]	42 mg/L daily max	1/month	Grab
		29 mg/L mo avg	1/month	Grab
	Thallium[12]	Footnote 12	Footnote 13	Grab
	Benzene[12]	Footnote 12	Footnote 13	Grab
	Lead[12]	Footnote 12	Footnote 13	Grab
	Total Phenols[12]	Footnote 12	Footnote 13	Grab
	Toxicity[12]	Footnote 12	Footnote 13	Grab
	Radium 226 and 228	Report	Footnote 13	Grab
Sanitary Waste (Outfall 003)	Floating Solids[3]	No Discharge	1/day	Observe
	BOD_5	45 mg/L weekly avg	1/6 months	Grab
	Total Residual Chlorine[15]	1 mg/L minimum	1/month	Grab
	TSS	45 mg/L weekly avg	1/6 months	Grab
	pH	6.0 standard units minimum 9.0 standard units maximum	1/6 months	Grab
	Flow	Report (GPD) mo avg	1/month	Estimate
Domestic Waste[4] (Outfall 004)	Floating Solids[3] and Visible Foam	No Discharge	1/day	Observe
Source Water and Source Sand (Outfall 005)	Free Oil[1]	No Discharge	1/day	Observe
	Flow	Report (GPD) mo avg	1/month	Estimate
Miscellaneous Discharges of Chemically Treated Seawater and Freshwater (Outfall 006)	Volume	Report (bbls/day) mo avg	1/month	Estimate
	Treatment Chemicals	See Footnote 14		
	Free Oil[1, 17]	No Discharge	1/day	Observe
	Toxicity	Footnote 16	Footnote 16	Grab

These discharges include: excess seawater which permits the continuous operation of fire control and utility lift pumps, excess seawater from pressure maintenance and secondary recovery projects, water released during training of personnel in fire protection, seawater used to pressure test new piping and new pipelines, ballast water, non-contact cooling water, and desalinization unit discharge.

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Deck Drainage (Outfall 007)	Free Oil[1]	No Discharge	1/day	Observe
	Flow	Report (GPD) mo avg	1/month	Estimate
Hydrostatic Test Water[6] (Outfall 008)	Flow	Report (GPD)	1/discharge	Estimate
	Total Suspended Solids[7]	90 mg/L net	1/discharge	Grab
	Total Organic Carbon[8]	50 mg/L daily maximum	1/discharge	Grab
	Oil and Grease	15 mg/L daily maximum	1/discharge	Grab
	Benzene[8]	50 µg/L daily maximum	1/discharge	Grab
	Total BTEX[8, 9]	250 µg/L daily maximum	1/discharge	Grab
	Lead[8]	50 µg/L daily maximum	1/discharge	Grab
	pH	6.0 standard units minimum 9.0 standard units maximum	1/discharge	Grab
Miscellaneous Discharges (Outfall 009)	Free Oil[1, 17]	No Discharge	1/day	Observe
	Flow	Report (GPD) mo avg	1/month	Estimate
	Floating Solids [3]	No Discharge	1/day	Observe
	Visible Foam	No Discharge	1/day	Observe

Miscellaneous Discharges include: Non-stormwater Discharges[5]; Boiler Blowdown; Desalinization Unit Blowdown; Diatomaceous Earth Filter Media; Mud, Cuttings and Cement at the Seafloor; Non-Contact Cooling Water; Blow-out Preventer Control Fluid; Uncontaminated Bilge Water; Uncontaminated Ballast Water; Uncontaminated Ambient Water; Uncontaminated Seawater and Excess Cement Slurry.

Samples taken in compliance with the monitoring requirements specified in this permit shall be taken at a location, which is representative of the discharge prior to mixing with receiving waters.

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

In addition all discharges are subject to the following limitations:

A. There shall be no discharge of free oil or other materials, which would result in the formation of a visible sheen. There shall be no discharge of any oily sludge or of any materials, which would result in the formation of long-term bottom deposits of slime or sludge. There shall be no discharge of any substance which would result in the formation of distinctly visible floating solids, foam, or scum, in other than trace amounts.

B. There shall be no discharge of toxic materials in quantities such as to cause acute toxicity to aquatic organisms.

C. There shall be no discharge of halogenated phenol compounds.

D. The discharge of surfactants, dispersants, and detergents used to wash working areas shall be minimized except as necessary to comply with applicable State and Federal safety requirements. This restriction applies to tank cleaning and other operations which do not directly involve the safety of workers.

E. If requested, the permittee shall provide the Administrative Authority with a sample of any waste in a manner specified by the Agency.

F. Discharges of well completion, treatment and workover fluids shall be considered produced water for monitoring purposes when commingled with produced water.

G. Permittees wishing to increase mixing for produced water discharges may use a horizontal diffuser, multiple port discharges, or add seawater as described in Footnote 11 below.

H. The discharge of produced water is prohibited onto any intermittently exposed sediment surface within the boundaries of any state or Federal wildlife management area, refuge, or park or into any water body determined to be special ecological significance, within 1,300 feet of an active oyster lease, live natural oyster or other molluscan reef, designated oyster seed bed; or sea grass bed, or which facilitates the incorporation of significant quantities of hydrocarbons or radio nuclides into sediment or biota. Uncontaminated seawater, uncontaminated freshwater, source water and source sand, uncontaminated bilge water, and uncontaminated ballast water may be discharged from platforms that are on automatic purge systems without monitoring for free oil when the facilities are not manned. Additionally, discharges at the sea floor of: muds and cuttings prior to installation of the marine riser, cement, and blowout preventer fluid may be discharged without monitoring with the static sheen test when conditions make observation of a sheen on the surface of the receiving water impossible.

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Footnotes:

1. No discharge of Free Oil as determined by the visual sheen method on the surface of the receiving water. Monitoring shall be performed once per day, during conditions when observation of a visual sheen on the surface of the receiving water is possible in the vicinity of the discharge and when the facility is manned. The number of days that a visual sheen is observed must be recorded.

2. No discharge of Free Oil as determined by the static sheen test method once per day when discharging and the facility is manned. The number of days that a sheen is observed must be recorded.

3. No discharge of Floating Solids as determined by observations made once per day, during daylight in the vicinity of sanitary waste outfalls, following either the morning or midday meal and at the time during maximum estimated discharge.

4. No discharge of "garbage" including food wastes, incineration ash, and clinkers. Neither fish nor fish debris from cleaning stations nor graywater is considered garbage.

5. The following non-stormwater discharges may be authorized by this permit provided the non-stormwater component of the discharge is in compliance with Part III, Section D.9 of this permit: discharges from fire fighting activities; fire hydrant flushings; potable water sources including waterline flushings; drinking fountain water, irrigation drainage; lawn watering; routine external building washdown that does not use detergents or other compounds; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; compressor condensate; uncontaminated springs; uncontaminated ground water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

6. Additives such as corrosion inhibitors, bactericides, and dyes may not be added to the test water without prior approval. Toxicity data for each additive must be submitted prior to approval.

7. Background concentration of Total Suspended Solids (TSS) will be allowed in the discharge if the effluent is being returned to the same waterbody. In these cases, the permit limitations will be 90 mg/L plus the concentration of TSS in the intake water. The TSS concentration of the intake water shall be reported on the DMR along with the concentration of TSS in the effluent.

8. Total Organic Carbon (TOC) shall be measured on discharges from pipes, pipelines, and/or tanks, which have previously been in service – i.e., those which are not new. Benzene, Total BTEX, and Lead shall be measured on discharges from pipes, pipelines and/or tanks that have been used for the storage or transportation of liquid or gaseous petroleum hydrocarbons. Accordingly, Flow, TSS, Oil & Grease, and pH are the only limitations and testing requirements for new pipes pipelines, and/or tanks.

9. BTEX shall be measured as the sum of benzene, ethyl benzene, toluene, and total xylene (including ortho-, meta-, and para-xylene) as quantified by EPA methods 602, 624, 1624, or most recently approved method.

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

10. No discharge of priority pollutants except in trace amounts, unless authorized through a permitted outfall. Information on the specific chemical composition of any additives containing priority pollutants shall be recorded and shall be retained for a period of at least three years as required by Part III.C.3 of this permit. Note: If materials added downhole as well treatment, completion, or workover fluids contain no priority pollutants, the discharge is assumed not to contain priority pollutants except in trace amounts. Sampling and analysis of these parameters is not required. A list of priority pollutants is provided below.

NONCONVENTIONAL
Phenolics, Total Recoverable (4AAP)
Chlorine (Total Residual)
3-Chlorophenol
4-Chlorophenol
2, 3-Dichlorophenol
2, 5-Dichlorophenol
2, 6-Dichlorophenol
3, 4-Dichlorophenol
2, 4, 5-TP (Silvex)
2, 4-D

METALS AND CYANIDE
Antimony (Total)
Arsenic (Total)
Beryllium (Total)
Cadmium (Total)
Chromium (Total)
Chromium (3+)
Chromium (6+)
Copper (Total)
Lead (Total)
Mercury (Total)
Molybdenum (Total)
Nickel (Total) Freshwater
Nickel (Total) Marine
Selenium (Total)
Silver (Total)
Thallium (Total)
Zinc (Total)
Cyanide (Total)

DIOXIN
2, 3, 7, 8-TCDD

VOLATILE COMPOUNDS
Acrolein
Acrylonitrile
Benzene
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

VOLATILE COMPOUNDS continued
2-Chloroethylvinylether
Chloroform
Dichlorobromomethane
1, 1-Dichloroethane
1, 2-Dichloroethane
1, 1-Dichloroethylene
1, 2-Dichloropropane
1, 3-Dichloropropylene
Ethylbenzene
Methyl Bromide [Bromomethane]
Methyl Chloride [Chloromethane]
Methylene Chloride
1, 1, 2, 2-Tetrachloroethane
Tetrachloroethylene
Toluene
1, 2-trans-Dichloroethylene
1, 1, 1-Trichloroethane
1, 1, 2-Trichloroethane
Trichloroethylene
Vinyl Chloride

ACID COMPOUNDS
2-Chlorophenol
2, 4-Dichlorophenol
2, 4-Dimethylphenol
4, 6-Dinitro-o-Cresol [2-Methyl-4, 6-Dinitrophenol]
2, 4-Dinitrophenol
2-Nitrophenol
4-Nitrophenol
p-Chloro-m-Cresol [4-Chloro-3-Methylphenol]
Pentachlorophenol
Phenol
2, 4, 6-Trichlorophenol

BASE/NEUTRAL COMPOUNDS
Acenaphthene
Acenaphthylene
Anthracene
Benzidine
Benzo (a) anthracene
Benzo (a) pyrene
3, 4-Benzofluoranthene
Benzo (ghi) perylene
Benzo (k) fluoranthene
Bis (2-chloroethoxy) Methane
Bis (2-chloroethyl) Ether
Bis (2-chloroisopropyl) Ether
Bis (2-ethylhexyl) Phthalate
4-Bromophenyl Phenyl Ether
Butylbenzyl Phthalate
2-Chloronapthalene

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

BASE/NEUTRAL COMPOUNDS continued

4-Chlorophenyl Phenyl Ether
Chrysene
Dibenzo (a, h) anthracene
1, 2-Dichlorobenzene
1, 3-Dichlorobenzene
1, 4-Dichlorobenzene
3, 3'-Dichlorobenzidine
Diethyl Phthalate
Dimethyl Phthalate
Di-n-Butyl Phthalate
2, 4-Dinitrotoluene
2, 6-Dinitrotoluene
Di-n-octyl Phthalate
1, 2-Diphenylhydrazine
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1, 2, 3-cd) pyrene [2, 3-o-Phenylene Pyrene]
Isophorone
Naphthalene
Nitrobenzene
n-Nitrosodimethylamine
n-Nitrosodi-n-Propylamine
n-Nitrosodiphenylamine
Phenanthrene
Pyrene
1, 2, 4-Trichlorobenzene

PESTICIDES

Aldrin
Alpha-BHC
Beta-BHC
Gamma-BHC [Lindane]
Delta-BHC
Chlordane
4, 4'-DDT
4, 4'-DDE [p,p-DDX]
4, 4'-DDD [p, p-TDE]
Dieldrin
Alpha-Endosulfan
Beta-Endosulfan
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Heptachlor
Heptachlor Epoxide [BHC-Hexachlorocyclohexane]
PCB-1242
PCB-1254
PCB-1221

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

PESTICIDES continued
PCB-1232
PCB-1248
PCB-1260
PCB-1016
Toxaphene

11. Samples shall be collected prior to the addition of any seawater to the produced water waste stream.

12. DISCHARGE LIMITATIONS

7-day Chronic Toxicity. Produced water discharges must show no observed effect for the survival endpoint portion of the test on a 7-day average minimum and monthly average minimum basis as measured by the 7-day chronic toxicity test. The 7-day average minimum and monthly average minimum No Observable Effect Concentration (NOEC) must be equal to or greater than the critical dilution concentration specified in Tables 1A – 1E below. The critical dilution shall be determined using Table 1 of this permit and is based on the discharge rate most recently reported on the Discharge Monitoring Report (DMR), discharge pipe diameter, and water depth between the discharge pipe and the seafloor, or between the surface and the seafloor if the discharge is made above the water's surface. Facilities, which have not previously reported produced water flow on the DMR, shall use the most recent monthly average flow for determining the critical dilution from Table 1 below. The monthly average minimum NOEC value is defined as the arithmetic average of all 7-day average NOEC values determined during the month. See Part II, Section M of this permit.

Benzene, Lead, Phenol, and Thallium. The required limitations shall be calculated from the critical dilution obtained from Table 1, as follows:

Benzene†: Daily Max. = (220.8 μg/l / Critical Dilution) * 100
Monthly Avg. = (93 μg/l / Critical Dilution) * 100

Lead†: Daily Max. = (36.7 μg/l / Critical Dilution) * 100
Monthly Avg. = (15.5 μg/l / Critical Dilution) * 100

Phenol†: Daily Max. = (478 μg/l / Critical Dilution) * 100
Monthly Avg. = (201 μg/l / Critical Dilution) * 100

Thallium†: Daily Max. = (19.6 μg/l / Critical Dilution) * 100
Monthly Avg. = (8.3 μg/l / Critical Dilution) * 100

† If any individual analytical test result is less than the minimum quantification level listed below, a value of zero (0) may be used for that individual result for DMR calculations and reporting requirements:

Benzene - 10 μg/L
Lead (Total) - 5 μg/L
Total Phenol (4AAP Method) - 5 μg/L
Thallium (Total) - 10 μg/L

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Methods to Increase Dilution for Compliance with Limits for Toxicity and Benzene, Lead, Thallium, and Phenol. Permittee wishing to increase mixing may use a horizontal diffuser, multiple port discharges, or add seawater as follows:

Permittee using a horizontal diffuser shall install the diffuser designed using CORMIX2 version 4.2 GT or newer. Both the numeric water quality-based limits and the critical dilution for chronic toxicity testing shall be based on the modeled dilution for the diffuser. The following input parameters shall be used in modeling the critical dilution:

Density Gradient = 0.182 sigma-t/m
Ambient seawater density at diffuser depth = 1017 kg/m^3
Produced water density = 1070 kg/m^3
Current speed = 10 cm/sec.

When the water at the discharge site is of sufficient depth that the plume does not impinge the bottom, the Brooks equation shall be applied to the CORMIX2 results as follows:

1. Calculate the near field dilution factor (S) at the end of the impingement region, collapsed plume width (H), and downstream distance where the impingement region ends (x) using the CORMIX2 model.

2. Using the input conditions cited above and calculated factors from Step 1, above; calculate the far field dilution factor, C_i/C, using the Brooks equation:

$$\frac{C_i}{C} = \left\{ erf\left[\left(\frac{1.5}{\left(1+8AH^{\frac{4}{3}}\frac{t}{H^2}\right)^3 - 1}\right)^{\frac{1}{2}}\right]\right\}^{-1}$$

where: C_i = concentration at end of impingement
C = concentration at edge of 100 m mixing zone
H = collapsed plume width, in meters
A = 4/3 power law dispersion parameter = 0.000453 m$^{2/3}$/sec
t = travel time from end of impingement to 100 m = (100m – x)/u
u = current speed
x = downstream distance where impingement region ends (from step 1, above)
erf = the error function

3. The total dilution at the 100 m mixing zone is defined as the product of the near-field dilution factor, S, found in Step 1 and the far-field dilution factor, C_i/C, calculated in Step 2.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Permittee shall state the calculated critical dilution corresponding to that diffuser on the annual Discharge Monitoring Report (DMR) with a certification that the diffuser is installed. The CORMIX2 model runs shall be retained by the permittee as part of its LPDES records.

Permittee using vertically aligned multiple discharge ports shall provide vertical separation between ports (See Table 2 - Minimum Vertical Port Separation Distance to Avoid Interference). When multiple discharge ports are installed, the depth difference between the discharge port closest to the sea floor and the sea floor shall be the depth difference used to determine the critical dilution from Table 1 of this permit. The critical dilution value shall be based on the port flow rate (total flow rate divided by the number of discharge ports) and based on the diameter of the discharge port (or smallest discharge port if they are of different styles).

When seawater is added to the produced water waste stream prior to discharge, the total produced water flow, including the added seawater, shall be used in determining the critical dilution. (See Tables 1A - 1E).

13. MONITORING FREQUENCY

Toxicity. The required frequency of toxicity testing shall be determined from using the critical dilutions obtained from Table 1 based on the water depth, discharge rate, and pipe diameter, as follows:

Toxicity Limit (Critical Dilution)	Monitoring Frequency[‡]
< 1%	1 per year
≥ 1 and < 2.25%	1 per quarter
≥ 2.25 %	1 per month

Benzene, Lead, Phenol, and Thallium. The required monitoring frequency shall be determined from the limits calculated from Footnote 12 as follows:

Parameter	Monthly Avg. Limit (µg/l)	Monitoring Frequency[‡]
Thallium	> 1,044	1 per quarter
	≤ 1,044 and > 490	1 per month
	≤ 490	1 per 2 weeks
Benzene	> 12,600	1 per quarter
	≤ 12,600 and > 5,900	1 per month
	≤ 5,900	1 per 2 weeks
Lead	> 65,000	1 per quarter
	≤ 65,000 and > 30,600	1 per month
	≤ 30,600	1 per 2 weeks
Total Phenol	> 26,400	1 per quarter
	≤ 26,400 and > 12,400	1 per month
	≤ 12,400	1 per 2 weeks

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Radioactivity. Produced water shall be monitored for Radium 226 and Radium 228. The required monitoring frequency shall be determined using the critical dilutions obtained from Table 1 based on the water depth, discharge rate, and pipe diameter as also required for the toxicity limits as follows:

Critical Dilution	Monitoring Frequency‡
< 1%	1 per year
≥ 1 and < 2.25%	1 per quarter
≥ 2.25 %	1 per month

‡ Samples of these parameters shall be collected after addition of any substances, including seawater that is added prior to discharge. Samples for monitoring produced water toxicity shall be representative of produced water discharges when scale inhibitors, corrosion inhibitors, biocides, paraffin inhibitors, well completion fluids, work over fluids, and/or well treatment fluids are used in operations.

For permittee required to monitor once per quarter or once per month as stated above for benzene, lead, total phenol or thallium, the monitoring frequency shall increase to once per two weeks for any of these parameters when the discharge has been found to exceed a limit for that parameter. For permittee required to monitor once per year or once per quarter as stated above for toxicity, the monitoring frequency shall increase to once per month when the discharge has been found to exceed limits for toxicity. When the permittee has monitored radioactivity for one continuous year the required monitoring frequency shall be reduced to once per year.

If permittee has been compliant for one full year (12 consecutive months) the required testing and monitoring frequencies shall be reduced for the following limits as follows: benzene, lead, total phenol or thallium, to once per quarter for the parameter(s) in compliance as long as the discharge remains in compliance and toxicity, to once per year and radioactivity, to once per year.
If the operator adds a diffuser, multiple discharge ports, or seawater to increase dilution to ensure compliance with the limits as described above, the operator may decrease the monitoring frequency to once per quarter for benzene, lead, total phenol or thallium, and once per year for toxicity after they have taken the action to increase dilution and have demonstrated compliance with the limits for three consecutive months.

14. The concentration of treatment chemicals in the discharge shall not exceed the most stringent of the following three constraints: 1) the maximum concentrations and any other conditions specified in the EPA product registration labeling if the chemical is an EPA registered product; 2) the maximum manufacturer's recommended concentration; and 3) 500 mg/L.

15. Total Residual Chlorine limitation shall be a minimum of 1 mg/L and maintained as close to this concentration as possible. If chlorination is not chosen as a disinfection method, the discharge must meet a fecal coliform limitation of 43 colonies/100 mL weekly average. If chlorination is chosen as a disinfection method, see Part II, Section F.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

16. The 48-hour minimum and monthly average minimum No Observervable Effect Concentration (NOEC) must be equal to or greater than the critical dilution concentration specified in Table 3 below. Critical dilution shall be determined and is based on the discharge rate, discharge pipe diameter and water depth between the discharge pipe and the bottom. The monthly average minimum NOEC value is defined as the arithmetic average of all 48-hour average NOEC values determined during month.

    The required frequency of testing for continuous discharges shall be determined as follows:

Discharge Rate	Toxicity Testing Frequency
0 - 499 bbl/day	1/year
500 - 4,599 bbl/day	1/quarter
4,600 bbl/day and above	1/month

    Intermittent or batch discharges shall be monitored once per discharge but are required to be monitored no more frequently than the corresponding frequencies shown above for continuous discharges.

    Samples shall be collected after addition of any added substances including seawater that is added prior to discharge and before the flow is split for multiple discharge ports. Samples also shall be representative of the discharge. Methods to increase dilution previously described for produced water in Footnote 12, also apply to seawater and freshwater discharges which have been chemically treated. If the permittee has been compliant with the toxicity limit for one full year (12 consecutive months) for a continuous discharge of chemically treated seawater or freshwater, the required testing frequency shall be reduced to once per year for that discharge.

17. Discharges are limited to those times that a visual sheen observation is possible unless the operator uses the static sheen method.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1: Produced Water Critical Dilutions

TABLE 1A: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor 2 Meters and Less

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.26	0.26	0.26	0.11	0.1	0.09
501 to 1,000	0.66	0.66	0.66	0.66	0.66	0.66
1,001 to 2,000	1.44	1.44	1.44	1.44	1.44	1.44
2,001 to 3,000	2.63	2.2	2.2	2.2	2.2	2.2
3,001 to 4,000	4.2	3.0	3.0	3.0	3.0	3.0
4,001 to 5,000	5.6	3.6	3.6	3.6	3.6	3.6
5,001 to 7,500	7.6	6.4	5.3	5.3	5.3	5.3
7,501 to 10,000	8.8	9.4	6.8	6.8	6.8	6.8
10,001 to 15,000	10.5	12.25	10.8	9.1	9.1	9.1
15,001 to 20,000	11.5	13.6	14.8	10.9	10.9	10.1
20,001 to 35,000	13.0	15.6	17.4	18.7	15.4	14.4
35,001 to 50,000	13.7	16.5	18.5	20.0	21.1	16.6
50,001 to 75,000	16.7	17.3	19.5	21.0	22.25	19.0

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1B: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 2 Meters to 4 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.1	0.1	0.1	0.1	0.1	0.1
501 to 1,000	0.2	0.2	0.2	0.2	0.2	0.2
1,001 to 2,000	0.36	0.36	0.36	0.36	0.36	0.36
2,001 to 3,000	0.74	0.65	0.65	0.65	0.65	0.65
3,001 to 4,000	1.1	0.86	0.86	0.86	0.86	0.86
4,001 to 5,000	1.55	1.05	1.05	1.05	1.05	1.05
5,001 to 7,500	3.0	1.74	1.5	1.5	1.5	1.5
7,501 to 10,000	4.6	2.6	2.0	2.0	2.0	2.0
10,001 to 15,000	5.8	4.9	3.2	2.8	2.8	2.8
15,001 to 20,000	6.2	7.6	5.0	3.6	3.5	3.5
20,001 to 35,000	6.7	8.8	9.8	7.5	5.9	5.6
35,001 to 50,000	7.0	9.2	11.0	11.2	8.9	6.9
50,001 to 75,000	7.15	9.5	11.4	13.0	13.5	8.5

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1C: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 4 Meters to 6 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.04	0.04	0.04	0.04	0.04	0.04
501 to 1,000	0.09	0.09	0.09	0.09	0.09	0.09
1,001 to 2,000	0.17	0.17	0.17	0.17	0.17	0.17
2,001 to 3,000	0.26	0.24	0.24	0.24	0.24	0.24
3,001 to 4,000	0.37	0.31	0.31	0.31	0.31	0.31
4,001 to 5,000	0.6	0.5	0.5	0.5	0.5	0.5
5,001 to 7,500	1.14	0.8	0.7	0.7	0.7	0.7
7,501 to 10,000	1.8	1.1	0.9	0.9	0.9	0.9
10,001 to 15,000	3.5	2.0	1.4	1.3	1.3	1.3
15,001 to 20,000	4.3	3.1	2.1	1.7	1.7	1.7
20,001 to 35,000	4.6	6.2	4.8	3.6	2.8	2.7
35,001 to 50,000	4.8	6.5	7.2	5.7	4.6	3.6
50,001 to 75,000	4.9	6.6	8.2	8.8	7.3	4.8

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1D: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 6 Meters to 9 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.04	0.04	0.04	0.04	0.04	0.04
501 to 1,000	0.06	0.06	0.06	0.06	0.06	0.06
1,001 to 2,000	0.1	0.1	0.1	0.1	0.1	0.1
2,001 to 3,000	0.15	0.14	0.14	0.14	0.14	0.14
3,001 to 4,000	0.21	0.18	0.18	0.18	0.18	0.18
4,001 to 5,000	0.27	0.22	0.22	0.22	0.22	0.22
5,001 to 7,500	0.6	0.43	0.41	0.41	0.41	0.41
7,501 to 10,000	0.9	0.62	0.53	0.53	0.53	0.55
10,001 to 15,000	1.8	1.1	0.83	0.76	0.76	0.76
15,001 to 20,000	2.8	1.6	1.2	1.0	1.0	1.0
20,001 to 35,000	3.6	3.7	2.6	2.0	1.7	1.6
35,001 to 50,000	3.7	5.0	4.3	3.3	2.6	2.2
50,000 to 75,000	3.7	5.1	6.4	5.4	4.4	3.1

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1E: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 9 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.04	0.04	0.04	0.04	0.04	0.04
501 to 1,000	0.06	0.06	0.06	0.06	0.06	0.06
1,001 to 2,000	0.09	0.09	0.09	0.09	0.09	0.09
2,001 to 3,000	0.11	0.1	0.1	0.1	0.1	0.1
3,001 to 4,000	0.13	0.12	0.12	0.12	0.12	0.12
4,001 to 5,000	0.15	0.13	0.13	0.13	0.13	0.13
5,001 to 7,500	0.22	0.18	0.18	0.18	0.18	0.18
7,501 to 10,000	0.42	0.32	0.3	0.3	0.3	0.3
10,001 to 15,000	0.8	0.53	0.44	0.42	0.42	0.42
15,001 to 20,000	1.3	0.8	0.62	0.54	0.54	0.54
20,001 to 35,000	2.7	1.8	1.3	1.0	0.9	0.9
35,001 to 50,000	2.7	3.0	2.2	1.7	1.4	1.2
50,001 to 75,000	2.8	3.9	3.7	3.0	2.4	1.7

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 2: Minimum Vertical Port Separation Distance to Avoid Interference

Port Flow Rate (bbl/day)	Minimum Separation Distance (m)
0 - 500	2.2
501 - 1000	2.7
1001 - 2000	4.7
2001 - 5000	4.8
5001 and Greater	6.6

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 3: Critical Dilution (Percent Effluent) for Toxicity Limitations for Seawater and Freshwater to which Treatment Chemicals Have Been Added

Depth Difference (meters)	Discharge Rate (bbl/day)	Pipe Diameter (inches)			
		>0" to 2"	>2" to 4"	>4" to 6"	>6
0 to 3	0 to 1000	11.4	5.1	5.1	6.3
	1001 to 10, 000	38	53	62	67
	Greater than 10,000	49	66	74	77
>3 to 5	0 to 1000	4.0	4.8	6.6	6.2
	1001 to 10, 000	16.1	25	30	23
	Greater than 10,000	23.6	33.3	39	49
>5 to 7	0 to 1000	4.0	4.8	5.6	6.2
	1001 to 10, 000	12.8	21	18.1	18.8
	Greater than 10,000	16.7	25.4	31.2	34.4
Greater than 7	0 to 1000	4.0	4.8	5.6	6.2
	1001 to 10, 000	9.8	16.3	18.1	18.8
	Greater than 10,000	12.4	18.8	25.2	26.3

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Discharges that are situated within the territorial subcategory of the Oil and Gas Extraction Point Source Category shall be limited and monitored by the permittee as specified below. Notification concerning intent to discharge must be submitted to this Office and the nearest Regional Office listed in Part II, Section R prior to commencement of drilling or workover operations or sanitary waste discharges from production operations.

Discharge Type	Effluent Characteristic	Discharge Limitations Units (Specify)	Monitoring Requirements Measurement Frequency	Sample Type
Drill Cuttings and Adhering Drilling Fluids	NO DISCHARGE			
Batch or Bulk Drilling Fluids	NO DISCHARGE			
Treated Wastewater from Drill Cuttings/ Drilling Fluids Dewatering Operations	NO DISCHARGE			
Produced Sand	NO DISCHARGE			
Well Completion, Treatment, and Workover Fluids (Outfall 001)	Free Oil[2]	No Discharge	1/day	Grab
	Oil and Grease	42 mg/L daily max	1/month	Grab
		29 mg/L mo avg	1/month	Grab
	Priority Pollutants[10]	NO DISCHARGE		
	Flow	Report (GPD)	1/month	Estimate
Produced Water (Outfall 002)	Volume	Report (bbls/day) mo avg	1/month	Estimate
	Oil and Grease[11]	42 mg/L daily max	1/month	Grab
		29 mg/L mo avg	1/month	Grab
	Thallium[12]	Footnote 12	Footnote 13	Grab
	Benzene[12]	Footnote 12	Footnote 13	Grab
	Lead[12]	Footnote 12	Footnote 13	Grab
	Total Phenols[12]	Footnote 12	Footnote 13	Grab
	Toxicity[12]	Footnote 12	Footnote 13	Grab
	Radium 226 and 228	Report	Footnote 13	Grab
Sanitary Waste (Outfall 003)	Floating Solids[3]	No Discharge	1/day	Observe
	BOD_5	45 mg/L weekly avg	1/6 months	Grab
	Total Residual Chlorine[15]	1 mg/L minimum	1/month	Grab
	TSS	45 mg/L weekly avg	1/6 months	Grab
	pH	6.0 standard units minimum 9.0 standard units maximum	1/6 months	Grab
	Flow	Report (GPD) mo avg	1/month	Estimate
Domestic Waste[4] (Outfall 004)	Floating Solids[3] and Visible Foam	No Discharge	1/day	Observe
Source Water and Source Sand (Outfall 005)	Free Oil[1]	No Discharge	1/day	Observe
	Flow	Report (GPD) mo avg	1/month	Estimate
Miscellaneous Discharges of Chemically Treated Seawater and Freshwater (Outfall 006)	Volume	Report (bbls/day) mo avg	1/month	Estimate
	Treatment Chemicals	See Footnote 14		
	Free Oil[1, 17]	No Discharge	1/day	Observe
	Toxicity	Footnote 16	Footnote 16	Grab

These discharges include: excess seawater which permits the continuous operation of fire control and utility lift pumps, excess seawater from pressure maintenance and secondary recovery projects, water released during training of personnel in fire protection, seawater used to pressure test new piping and new pipelines, ballast water, non-contact cooling water, and desalinization unit discharge.

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EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Deck Drainage (Outfall 007)	Free Oil[1]	No Discharge	1/day	Observe
	Flow	Report (GPD) mo avg	1/month	Estimate
Hydrostatic Test Water[6] (Outfall 008)	Flow	Report (GPD)	1/discharge	Estimate
	Total Suspended Solids[7]	90 mg/L net	1/discharge	Grab
	Total Organic Carbon[8]	50 mg/L daily maximum	1/discharge	Grab
	Oil and Grease	15 mg/L daily maximum	1/discharge	Grab
	Benzene[8]	50 µg/L daily maximum	1/discharge	Grab
	Total BTEX[8, 9]	250 µg/L daily maximum	1/discharge	Grab
	Lead[8]	50 µg/L daily maximum	1/discharge	Grab
	pH	6.0 standard units minimum 9.0 standard units maximum	1/discharge	Grab
Miscellaneous Discharges (Outfall 009)	Free Oil[1, 17]	No Discharge	1/day	Observe
	Flow	Report (GPD) mo avg	1/month	Estimate
	Floating Solids [3]	No Discharge	1/day	Observe
	Visible Foam	No Discharge	1/day	Observe

Miscellaneous Discharges include: Non-stormwater Discharges[5]; Boiler Blowdown; Desalinization Unit Blowdown; Diatomaceous Earth Filter Media; Mud, Cuttings and Cement at the Seafloor; Non-Contact Cooling Water; Blow-out Preventer Control Fluid; Uncontaminated Bilge Water; Uncontaminated Ballast Water; Uncontaminated Ambient Water; Uncontaminated Seawater and Excess Cement Slurry.

Samples taken in compliance with the monitoring requirements specified in this permit shall be taken at a location, which is representative of the discharge prior to mixing with receiving waters.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

In addition all discharges are subject to the following limitations:

A. There shall be no discharge of free oil or other materials, which would result in the formation of a visible sheen. There shall be no discharge of any oily sludge or of any materials, which would result in the formation of long-term bottom deposits of slime or sludge. There shall be no discharge of any substance which would result in the formation of distinctly visible floating solids, foam, or scum, in other than trace amounts.

B. There shall be no discharge of toxic materials in quantities such as to cause acute toxicity to aquatic organisms.

C. There shall be no discharge of halogenated phenol compounds.

D. The discharge of surfactants, dispersants, and detergents used to wash working areas shall be minimized except as necessary to comply with applicable State and Federal safety requirements. This restriction applies to tank cleaning and other operations which do not directly involve the safety of workers.

E. If requested, the permittee shall provide the Administrative Authority with a sample of any waste in a manner specified by the Agency.

F. Discharges of well completion, treatment and workover fluids shall be considered produced water for monitoring purposes when commingled with produced water.

G. Permittees wishing to increase mixing for produced water discharges may use a horizontal diffuser, multiple port discharges, or add seawater as described in Footnote 11 below.

H. The discharge of produced water is prohibited onto any intermittently exposed sediment surface within the boundaries of any state or Federal wildlife management area, refuge, or park or into any water body determined to be special ecological significance, within 1,300 feet of an active oyster lease, live natural oyster or other molluscan reef, designated oyster seed bed; or sea grass bed, or which facilitates the incorporation of significant quantities of hydrocarbons or radio nuclides into sediment or biota. Uncontaminated seawater, uncontaminated freshwater, source water and source sand, uncontaminated bilge water, and uncontaminated ballast water may be discharged from platforms that are on automatic purge systems without monitoring for free oil when the facilities are not manned. Additionally, discharges at the sea floor of: muds and cuttings prior to installation of the marine riser, cement, and blowout preventer fluid may be discharged without monitoring with the static sheen test when conditions make observation of a sheen on the surface of the receiving water impossible.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Footnotes:

1. No discharge of Free Oil as determined by the visual sheen method on the surface of the receiving water. Monitoring shall be performed once per day, during conditions when observation of a visual sheen on the surface of the receiving water is possible in the vicinity of the discharge and when the facility is manned. The number of days that a visual sheen is observed must be recorded.

2. No discharge of Free Oil as determined by the static sheen test method once per day when discharging and the facility is manned. The number of days that a sheen is observed must be recorded.

3. No discharge of Floating Solids as determined by observations made once per day, during daylight in the vicinity of sanitary waste outfalls, following either the morning or midday meal and at the time during maximum estimated discharge.

4. No discharge of "garbage" including food wastes, incineration ash, and clinkers. Neither fish nor fish debris from cleaning stations nor graywater is considered garbage.

5. The following non-stormwater discharges may be authorized by this permit provided the non-stormwater component of the discharge is in compliance with Part III, Section D.9 of this permit: discharges from fire fighting activities; fire hydrant flushings; potable water sources including waterline flushings; drinking fountain water, irrigation drainage; lawn watering; routine external building washdown that does not use detergents or other compounds; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; compressor condensate; uncontaminated springs; uncontaminated ground water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

6. Additives such as corrosion inhibitors, bactericides, and dyes may not be added to the test water without prior approval. Toxicity data for each additive must be submitted prior to approval.

7. Background concentration of Total Suspended Solids (TSS) will be allowed in the discharge if the effluent is being returned to the same waterbody. In these cases, the permit limitations will be 90 mg/L plus the concentration of TSS in the intake water. The TSS concentration of the intake water shall be reported on the DMR along with the concentration of TSS in the effluent.

8. Total Organic Carbon (TOC) shall be measured on discharges from pipes, pipelines, and/or tanks, which have previously been in service – i.e., those which are not new. Benzene, Total BTEX, and Lead shall be measured on discharges from pipes, pipelines and/or tanks that have been used for the storage or transportation of liquid or gaseous petroleum hydrocarbons. Accordingly, Flow, TSS, Oil & Grease, and pH are the only limitations and testing requirements for new pipes pipelines, and/or tanks.

9. BTEX shall be measured as the sum of benzene, ethyl benzene, toluene, and total xylene (including ortho-, meta-, and para-xylene) as quantified by EPA methods 602, 624, 1624, or most recently approved method.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

10. No discharge of priority pollutants except in trace amounts, unless authorized through a permitted outfall. Information on the specific chemical composition of any additives containing priority pollutants shall be recorded and shall be retained for a period of at least three years as required by Part III.C.3 of this permit. Note: If materials added downhole as well treatment, completion, or workover fluids contain no priority pollutants, the discharge is assumed not to contain priority pollutants except in trace amounts. Sampling and analysis of these parameters is not required. A list of priority pollutants is provided below.

NONCONVENTIONAL
Phenolics, Total Recoverable (4AAP)
Chlorine (Total Residual)
3-Chlorophenol
4-Chlorophenol
2, 3-Dichlorophenol
2, 5-Dichlorophenol
2, 6-Dichlorophenol
3, 4-Dichlorophenol
2, 4, 5-TP (Silvex)
2, 4-D

METALS AND CYANIDE
Antimony (Total)
Arsenic (Total)
Beryllium (Total)
Cadmium (Total)
Chromium (Total)
Chromium (3+)
Chromium (6+)
Copper (Total)
Lead (Total)
Mercury (Total)
Molybdenum (Total)
Nickel (Total) Freshwater
Nickel (Total) Marine
Selenium (Total)
Silver (Total)
Thallium (Total)
Zinc (Total)
Cyanide (Total)

DIOXIN
2, 3, 7, 8-TCDD

VOLATILE COMPOUNDS
Acrolein
Acrylonitrile
Benzene
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

VOLATILE COMPOUNDS continued
2-Chloroethylvinylether
Chloroform
Dichlorobromomethane
1, 1-Dichloroethane
1, 2-Dichloroethane
1, 1-Dichloroethylene
1, 2-Dichloropropane
1, 3-Dichloropropylene
Ethylbenzene
Methyl Bromide [Bromomethane]
Methyl Chloride [Chloromethane]
Methylene Chloride
1, 1, 2, 2-Tetrachloroethane
Tetrachloroethylene
Toluene
1, 2-trans-Dichloroethylene
1, 1, 1-Trichloroethane
1, 1, 2-Trichloroethane
Trichloroethylene
Vinyl Chloride

ACID COMPOUNDS
2-Chlorophenol
2, 4-Dichlorophenol
2, 4-Dimethylphenol
4, 6-Dinitro-o-Cresol [2-Methyl-4, 6-Dinitrophenol]
2, 4-Dinitrophenol
2-Nitrophenol
4-Nitrophenol
p-Chloro-m-Cresol [4-Chloro-3-Methylphenol]
Pentachlorophenol
Phenol
2, 4, 6-Trichlorophenol

BASE/NEUTRAL COMPOUNDS
Acenaphthene
Acenaphthylene
Anthracene
Benzidine
Benzo (a) anthracene
Benzo (a) pyrene
3, 4-Benzofluoranthene
Benzo (ghi) perylene
Benzo (k) fluoranthene
Bis (2-chloroethoxy) Methane
Bis (2-chloroethyl) Ether
Bis (2-chloroisopropyl) Ether
Bis (2-ethylhexyl) Phthalate
4-Bromophenyl Phenyl Ether
Butylbenzyl Phthalate
2-Chloronapthalene

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

BASE/NEUTRAL COMPOUNDS continued
4-Chlorophenyl Phenyl Ether
Chrysene
Dibenzo (a, h) anthracene
1, 2-Dichlorobenzene
1, 3-Dichlorobenzene
1, 4-Dichlorobenzene
3, 3'-Dichlorobenzidine
Diethyl Phthalate
Dimethyl Phthalate
Di-n-Butyl Phthalate
2, 4-Dinitrotoluene
2, 6-Dinitrotoluene
Di-n-octyl Phthalate
1, 2-Diphenylhydrazine
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1, 2, 3-cd) pyrene [2, 3-o-Phenylene Pyrene]
Isophorone
Naphthalene
Nitrobenzene
n-Nitrosodimethylamine
n-Nitrosodi-n-Propylamine
n-Nitrosodiphenylamine
Phenanthrene
Pyrene
1, 2, 4-Trichlorobenzene

PESTICIDES
Aldrin
Alpha-BHC
Beta-BHC
Gamma-BHC [Lindane]
Delta-BHC
Chlordane
4, 4'-DDT
4, 4'-DDE [p,p-DDX]
4, 4'-DDD [p, p-TDE]
Dieldrin
Alpha-Endosulfan
Beta-Endosulfan
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Heptachlor
Heptachlor Epoxide [BHC-Hexachlorocyclohexane]
PCB-1242
PCB-1254
PCB-1221

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

PESTICIDES continued
PCB-1232
PCB-1248
PCB-1260
PCB-1016
Toxaphene

11. Samples shall be collected prior to the addition of any seawater to the produced water waste stream.

12. DISCHARGE LIMITATIONS

7-day Chronic Toxicity. Produced water discharges must show no observed effect for the survival endpoint portion of the test on a 7-day average minimum and monthly average minimum basis as measured by the 7-day chronic toxicity test. The 7-day average minimum and monthly average minimum No Observable Effect Concentration (NOEC) must be equal to or greater than the critical dilution concentration specified in Tables 1A – 1E below. The critical dilution shall be determined using Table 1 of this permit and is based on the discharge rate most recently reported on the Discharge Monitoring Report (DMR), discharge pipe diameter, and water depth between the discharge pipe and the seafloor, or between the surface and the seafloor if the discharge is made above the water's surface. Facilities, which have not previously reported produced water flow on the DMR, shall use the most recent monthly average flow for determining the critical dilution from Table 1 below. The monthly average minimum NOEC value is defined as the arithmetic average of all 7-day average NOEC values determined during the month. See Part II, Section M of this permit.

Benzene, Lead, Phenol, and Thallium. The required limitations shall be calculated from the critical dilution obtained from Table 1, as follows:

Benzene†: Daily Max. = (220.8 μg/l / Critical Dilution) * 100
Monthly Avg. = (93 μg/l / Critical Dilution) * 100

Lead†: Daily Max. = (36.7 μg/l / Critical Dilution) * 100
Monthly Avg. = (15.5 μg/l / Critical Dilution) * 100

Phenol†: Daily Max. = (478 μg/l / Critical Dilution) * 100
Monthly Avg. = (201 μg/l / Critical Dilution) * 100

Thallium†: Daily Max. = (19.6 μg/l / Critical Dilution) * 100
Monthly Avg. = (8.3 μg/l / Critical Dilution) * 100

† If any individual analytical test result is less than the minimum quantification level listed below, a value of zero (0) may be used for that individual result for DMR calculations and reporting requirements:

Benzene - 10 μg/L
Lead (Total) - 5 μg/L
Total Phenol (4AAP Method) - 5 μg/L
Thallium (Total) - 10 μg/L

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Methods to Increase Dilution for Compliance with Limits for Toxicity and Benzene, Lead, Thallium, and Phenol. Permittee wishing to increase mixing may use a horizontal diffuser, multiple port discharges, or add seawater as follows:

Permittee using a horizontal diffuser shall install the diffuser designed using CORMIX2 version 4.2 GT or newer. Both the numeric water quality-based limits and the critical dilution for chronic toxicity testing shall be based on the modeled dilution for the diffuser. The following input parameters shall be used in modeling the critical dilution:

Density Gradient = 0.182 sigma-t/m
Ambient seawater density at diffuser depth = 1017 kg/m^3
Produced water density = 1070 kg/m^3
Current speed = 10 cm/sec.

When the water at the discharge site is of sufficient depth that the plume does not impinge the bottom, the Brooks equation shall be applied to the CORMIX2 results as follows:

1. Calculate the near field dilution factor (S) at the end of the impingement region, collapsed plume width (H), and downstream distance where the impingement region ends (x) using the CORMIX2 model.

2. Using the input conditions cited above and calculated factors from Step 1, above; calculate the far field dilution factor, C_i/C, using the Brooks equation:

$$\frac{C_i}{C} = \left\{ erf\left[\left(\frac{1.5}{\left(1+8AH^{\frac{4}{3}}\frac{t}{H^2}\right)^3 - 1}\right)^{\frac{1}{2}}\right]\right\}^{-1}$$

where: C_i = concentration at end of impingement
C = concentration at edge of 100 m mixing zone
H = collapsed plume width, in meters
A = 4/3 power law dispersion parameter = 0.000453 m$^{2/3}$/sec
t = travel time from end of impingement to 100 m = (100m – x)/u
u = current speed
x = downstream distance where impingement region ends (from step 1, above)
erf = the error function

3. The total dilution at the 100 m mixing zone is defined as the product of the near-field dilution factor, S, found in Step 1 and the far-field dilution factor, C_i/C, calculated in Step 2.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Permittee shall state the calculated critical dilution corresponding to that diffuser on the annual Discharge Monitoring Report (DMR) with a certification that the diffuser is installed. The CORMIX2 model runs shall be retained by the permittee as part of its LPDES records.

Permittee using vertically aligned multiple discharge ports shall provide vertical separation between ports (See Table 2 - Minimum Vertical Port Separation Distance to Avoid Interference). When multiple discharge ports are installed, the depth difference between the discharge port closest to the sea floor and the sea floor shall be the depth difference used to determine the critical dilution from Table 1 of this permit. The critical dilution value shall be based on the port flow rate (total flow rate divided by the number of discharge ports) and based on the diameter of the discharge port (or smallest discharge port if they are of different styles).

When seawater is added to the produced water waste stream prior to discharge, the total produced water flow, including the added seawater, shall be used in determining the critical dilution. (See Tables 1A - 1E).

13. MONITORING FREQUENCY

Toxicity. The required frequency of toxicity testing shall be determined from using the critical dilutions obtained from Table 1 based on the water depth, discharge rate, and pipe diameter, as follows:

Toxicity Limit (Critical Dilution)	Monitoring Frequency[‡]
< 1%	1 per year
≥ 1 and < 2.25%	1 per quarter
≥ 2.25 %	1 per month

Benzene, Lead, Phenol, and Thallium. The required monitoring frequency shall be determined from the limits calculated from Footnote 12 as follows:

Parameter	Monthly Avg. Limit (µg/l)	Monitoring Frequency[‡]
Thallium	> 1,044	1 per quarter
	≤ 1,044 and > 490	1 per month
	≤ 490	1 per 2 weeks
Benzene	> 12,600	1 per quarter
	≤ 12,600 and > 5,900	1 per month
	≤ 5,900	1 per 2 weeks
Lead	> 65,000	1 per quarter
	≤ 65,000 and > 30,600	1 per month
	≤ 30,600	1 per 2 weeks
Total Phenol	> 26,400	1 per quarter
	≤ 26,400 and > 12,400	1 per month
	≤ 12,400	1 per 2 weeks

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Radioactivity. Produced water shall be monitored for Radium 226 and Radium 228. The required monitoring frequency shall be determined using the critical dilutions obtained from Table 1 based on the water depth, discharge rate, and pipe diameter as also required for the toxicity limits as follows:

Critical Dilution	Monitoring Frequency‡
< 1%	1 per year
≥ 1 and < 2.25%	1 per quarter
≥ 2.25 %	1 per month

‡ Samples of these parameters shall be collected after addition of any substances, including seawater that is added prior to discharge. Samples for monitoring produced water toxicity shall be representative of produced water discharges when scale inhibitors, corrosion inhibitors, biocides, paraffin inhibitors, well completion fluids, work over fluids, and/or well treatment fluids are used in operations.

For permittee required to monitor once per quarter or once per month as stated above for benzene, lead, total phenol or thallium, the monitoring frequency shall increase to once per two weeks for any of these parameters when the discharge has been found to exceed a limit for that parameter. For permittee required to monitor once per year or once per quarter as stated above for toxicity, the monitoring frequency shall increase to once per month when the discharge has been found to exceed limits for toxicity. When the permittee has monitored radioactivity for one continuous year the required monitoring frequency shall be reduced to once per year.

If permittee has been compliant for one full year (12 consecutive months) the required testing and monitoring frequencies shall be reduced for the following limits as follows: benzene, lead, total phenol or thallium, to once per quarter for the parameter(s) in compliance as long as the discharge remains in compliance and toxicity, to once per year and radioactivity, to once per year.
If the operator adds a diffuser, multiple discharge ports, or seawater to increase dilution to ensure compliance with the limits as described above, the operator may decrease the monitoring frequency to once per quarter for benzene, lead, total phenol or thallium, and once per year for toxicity after they have taken the action to increase dilution and have demonstrated compliance with the limits for three consecutive months.

14. The concentration of treatment chemicals in the discharge shall not exceed the most stringent of the following three constraints: 1) the maximum concentrations and any other conditions specified in the EPA product registration labeling if the chemical is an EPA registered product; 2) the maximum manufacturer's recommended concentration; and 3) 500 mg/L.

15. Total Residual Chlorine limitation shall be a minimum of 1 mg/L and maintained as close to this concentration as possible. If chlorination is not chosen as a disinfection method, the discharge must meet a fecal coliform limitation of 43 colonies/100 mL weekly average. If chlorination is chosen as a disinfection method, see Part II, Section F.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

16. The 48-hour minimum and monthly average minimum No Observervable Effect Concentration (NOEC) must be equal to or greater than the critical dilution concentration specified in Table 3 below. Critical dilution shall be determined and is based on the discharge rate, discharge pipe diameter and water depth between the discharge pipe and the bottom. The monthly average minimum NOEC value is defined as the arithmetic average of all 48-hour average NOEC values determined during month.

    The required frequency of testing for continuous discharges shall be determined as follows:

Discharge Rate	Toxicity Testing Frequency
0 - 499 bbl/day	1/year
500 - 4,599 bbl/day	1/quarter
4,600 bbl/day and above	1/month

    Intermittent or batch discharges shall be monitored once per discharge but are required to be monitored no more frequently than the corresponding frequencies shown above for continuous discharges.

    Samples shall be collected after addition of any added substances including seawater that is added prior to discharge and before the flow is split for multiple discharge ports. Samples also shall be representative of the discharge. Methods to increase dilution previously described for produced water in Footnote 12, also apply to seawater and freshwater discharges which have been chemically treated. If the permittee has been compliant with the toxicity limit for one full year (12 consecutive months) for a continuous discharge of chemically treated seawater or freshwater, the required testing frequency shall be reduced to once per year for that discharge.

17. Discharges are limited to those times that a visual sheen observation is possible unless the operator uses the static sheen method.

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1: Produced Water Critical Dilutions

TABLE 1A: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor 2 Meters and Less

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.26	0.26	0.26	0.11	0.1	0.09
501 to 1,000	0.66	0.66	0.66	0.66	0.66	0.66
1,001 to 2,000	1.44	1.44	1.44	1.44	1.44	1.44
2,001 to 3,000	2.63	2.2	2.2	2.2	2.2	2.2
3,001 to 4,000	4.2	3.0	3.0	3.0	3.0	3.0
4,001 to 5,000	5.6	3.6	3.6	3.6	3.6	3.6
5,001 to 7,500	7.6	6.4	5.3	5.3	5.3	5.3
7,501 to 10,000	8.8	9.4	6.8	6.8	6.8	6.8
10,001 to 15,000	10.5	12.25	10.8	9.1	9.1	9.1
15,001 to 20,000	11.5	13.6	14.8	10.9	10.9	10.1
20,001 to 35,000	13.0	15.6	17.4	18.7	15.4	14.4
35,001 to 50,000	13.7	16.5	18.5	20.0	21.1	16.6
50,001 to 75,000	16.7	17.3	19.5	21.0	22.25	19.0

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1B: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 2 Meters to 4 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.1	0.1	0.1	0.1	0.1	0.1
501 to 1,000	0.2	0.2	0.2	0.2	0.2	0.2
1,001 to 2,000	0.36	0.36	0.36	0.36	0.36	0.36
2,001 to 3,000	0.74	0.65	0.65	0.65	0.65	0.65
3,001 to 4,000	1.1	0.86	0.86	0.86	0.86	0.86
4,001 to 5,000	1.55	1.05	1.05	1.05	1.05	1.05
5,001 to 7,500	3.0	1.74	1.5	1.5	1.5	1.5
7,501 to 10,000	4.6	2.6	2.0	2.0	2.0	2.0
10,001 to 15,000	5.8	4.9	3.2	2.8	2.8	2.8
15,001 to 20,000	6.2	7.6	5.0	3.6	3.5	3.5
20,001 to 35,000	6.7	8.8	9.8	7.5	5.9	5.6
35,001 to 50,000	7.0	9.2	11.0	11.2	8.9	6.9
50,001 to 75,000	7.15	9.5	11.4	13.0	13.5	8.5

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1C: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 4 Meters to 6 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.04	0.04	0.04	0.04	0.04	0.04
501 to 1,000	0.09	0.09	0.09	0.09	0.09	0.09
1,001 to 2,000	0.17	0.17	0.17	0.17	0.17	0.17
2,001 to 3,000	0.26	0.24	0.24	0.24	0.24	0.24
3,001 to 4,000	0.37	0.31	0.31	0.31	0.31	0.31
4,001 to 5,000	0.6	0.5	0.5	0.5	0.5	0.5
5,001 to 7,500	1.14	0.8	0.7	0.7	0.7	0.7
7,501 to 10,000	1.8	1.1	0.9	0.9	0.9	0.9
10,001 to 15,000	3.5	2.0	1.4	1.3	1.3	1.3
15,001 to 20,000	4.3	3.1	2.1	1.7	1.7	1.7
20,001 to 35,000	4.6	6.2	4.8	3.6	2.8	2.7
35,001 to 50,000	4.8	6.5	7.2	5.7	4.6	3.6
50,001 to 75,000	4.9	6.6	8.2	8.8	7.3	4.8

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1D: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 6 Meters to 9 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.04	0.04	0.04	0.04	0.04	0.04
501 to 1,000	0.06	0.06	0.06	0.06	0.06	0.06
1,001 to 2,000	0.1	0.1	0.1	0.1	0.1	0.1
2,001 to 3,000	0.15	0.14	0.14	0.14	0.14	0.14
3,001 to 4,000	0.21	0.18	0.18	0.18	0.18	0.18
4,001 to 5,000	0.27	0.22	0.22	0.22	0.22	0.22
5,001 to 7,500	0.6	0.43	0.41	0.41	0.41	0.41
7,501 to 10,000	0.9	0.62	0.53	0.53	0.53	0.55
10,001 to 15,000	1.8	1.1	0.83	0.76	0.76	0.76
15,001 to 20,000	2.8	1.6	1.2	1.0	1.0	1.0
20,001 to 35,000	3.6	3.7	2.6	2.0	1.7	1.6
35,001 to 50,000	3.7	5.0	4.3	3.3	2.6	2.2
50,000 to 75,000	3.7	5.1	6.4	5.4	4.4	3.1

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 1E: Critical Dilution (Percent Effluent) Depth Difference between the Discharge Pipe and the Sea Floor Greater than 9 Meters

Discharge Rate (bbl/day)	Pipe Diameter (inches)					
	> 0" to < 5"	≥ 5" to < 7"	≥ 7" to < 9"	≥ 9" to < 11"	≥ 11" to < 15"	≥ 15"
≤ 500	0.04	0.04	0.04	0.04	0.04	0.04
501 to 1,000	0.06	0.06	0.06	0.06	0.06	0.06
1,001 to 2,000	0.09	0.09	0.09	0.09	0.09	0.09
2,001 to 3,000	0.11	0.1	0.1	0.1	0.1	0.1
3,001 to 4,000	0.13	0.12	0.12	0.12	0.12	0.12
4,001 to 5,000	0.15	0.13	0.13	0.13	0.13	0.13
5,001 to 7,500	0.22	0.18	0.18	0.18	0.18	0.18
7,501 to 10,000	0.42	0.32	0.3	0.3	0.3	0.3
10,001 to 15,000	0.8	0.53	0.44	0.42	0.42	0.42
15,001 to 20,000	1.3	0.8	0.62	0.54	0.54	0.54
20,001 to 35,000	2.7	1.8	1.3	1.0	0.9	0.9
35,001 to 50,000	2.7	3.0	2.2	1.7	1.4	1.2
50,001 to 75,000	2.8	3.9	3.7	3.0	2.4	1.7

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 2: Minimum Vertical Port Separation Distance to Avoid Interference

Port Flow Rate (bbl/day)	Minimum Separation Distance (m)
0 - 500	2.2
501 - 1000	2.7
1001 - 2000	4.7
2001 - 5000	4.8
5001 and Greater	6.6

APPENDIX A

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

TABLE 3: Critical Dilution (Percent Effluent) for Toxicity Limitations for Seawater and Freshwater to which Treatment Chemicals Have Been Added

Depth Difference (meters)	Discharge Rate (bbl/day)	Pipe Diameter (inches)			
		>0" to 2"	>2" to 4"	>4" to 6"	>6
0 to 3	0 to 1000	11.4	5.1	5.1	6.3
	1001 to 10, 000	38	53	62	67
	Greater than 10,000	49	66	74	77
>3 to 5	0 to 1000	4.0	4.8	6.6	6.2
	1001 to 10, 000	16.1	25	30	23
	Greater than 10,000	23.6	33.3	39	49
>5 to 7	0 to 1000	4.0	4.8	5.6	6.2
	1001 to 10, 000	12.8	21	18.1	18.8
	Greater than 10,000	16.7	25.4	31.2	34.4
Greater than 7	0 to 1000	4.0	4.8	5.6	6.2
	1001 to 10, 000	9.8	16.3	18.1	18.8
	Greater than 10,000	12.4	18.8	25.2	26.3