Prepared for:
Texas Offshore Port System

Exhibit O
USEPA NPDES Permit Application

November 2008
Document No.: 12174-006

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

For Approved. OMB No. 2040-0086. Approval expires 5-31-92

FORM **1** **GENERAL**	**U.S. ENVIRONMENTAL PROTECTION AGENCY** **GENERAL INFORMATION** ***Consolidated Permits Program*** ***(Read the "General Instructions" before starting.)***	**I. EPA I.D. NUMBER**

S		T/A	C
F			D
1	2 13	14	15

LABEL ITEMS		GENERAL INSTRUCTIONS
I. EPA I.D. NUMBER **III. FACILITY NAME** **V. FACILITY MAILING LIST** **VI. FACILITY LOCATION**	**PLEASE PLACE LABEL IN THIS SPACE**	If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area*(s)* below. If the label is complete and correct, you need not complete Items I, III, V, and VI*(except VI-B which must be completed regardless)*. Complete all items if no label has been proved. Refer to the instructions for detailed item descriptions and for the legal authorization under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental from listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	MARK "X"			SPECIFIC QUESTIONS	MARK "X"		
	YES	NO	FORM ATTACHED		YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.?** (FORM 2A)	☐ 16	☒ 17	☐ 18	B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.?** (FORM 2B)	☐ 19	☒ 20	☐ 21
C. Is this facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	☐ 22	☒ 23	☐ 24	D. Is this proposal facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.?** (FORM 2D)	☒ 25	☐ 26	☐ 27
E. Does or will this facility treat, store, or dispose of **hazardous wastes?** (FORM 3)	☐ 28	☒ 29	☐ 30	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	☐ 31	☒ 32	☐ 33
G. Do you or will you inject at this facility any produced water other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	☐ 34	☒ 35	☐ 36	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	☐ 37	☒ 38	☐ 39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area?** (FORM 5)	☐ 40	☒ 41	☐ 42	J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment are?** (FORM 5)	☒ 43	☐ 44	☐ 45

III. NAME OF FACILITY

C	SKIP	
1		***Texas Offshore Port System***
15	16-29	30 69

IV. FACILITY CONTACT

C	A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*		
2	***Dennis Jahde, Director, Vice President, Offshore Engineering, Enterprise Products Partners, L.P.***	***713***	***381***	***7950***
15	16 45	46 48	49 51	52 55

V. FACILITY MAILING ADDRESS

C	A. STREET OR P.O. BOX
3	***1100 Louisiana Street***
15	16 45

C	B. CITY OR TOWN	C. STATE	D. ZIP CODE
4	***Houston***	***TX***	***77002-5227***
15	16 40	41 42	47 51

VI. FACILITY LOCATION

C	A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER
5	***Gulf of Mexico, MMS Block GA A56***
15	16 45

B. COUNTY NAME
NA
46 70

C	C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE
6	***NA***	***NA***	***NA***	***NA***
15	16 40	41 42	47 51	52 54

CONTINUED ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST		B. SECOND	
C 7 **4491**	*(specify)* ***Marine Cargo Handling***	7 7 **4612**	*(specify)* ***Crude Petroleum Pipelines***
C. THIRD		D. FOURTH	
C 7 **1623**	*(specify)* ***Pipeline Construction***	7 7	*(specify)*

VIII. OPERATOR INFORMATION

A. NAME

C 8 ***Enterprise Field Services,LLC***

B. Is the name listed in Item VIII-A also the owner? ☒ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other," specify.)*

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

P *(specify)*

D. PHONE *(area code & no.)* C A ***713*** ***381*** ***7950***

E. STREET OR PO BOX

P.O Box 4324

F. CITY OR TOWN	G. STATE	H. ZIP CODE
C B ***Houston***	***TX***	***77210-4324***

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	D. PSD *(Air Emissions from Proposed Sources)*		
C T I 9 N ***NA***	C T I 9 P ***NA***		
B. UIC *(Underground Injection of Fluids*	E. OTHER *(specify)*	*(Specify)* **Planned facility has no existing permits**	
C T I 9 U ***NA***	C T I 9 ***NA***		
C. RCRA *(Hazardous Wastes)*	E. OTHER *(specify)*	*(Specify)*	
C T I 9 R ***NA***	C T I 9 ***NA***		

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements. **[See Project Narrative]**

XII. NATURE OF BUSINESS *(provide a brief description)*

The Texas Offshore Port System is a planned crude oil offloading deepwater port (DWP) to be located in the Gulf of Mexico (GOM), south of Freeport, Texas. The DWP will serve as an offshore crude oil receiving terminal and transmission facility. An average of 1,000,000 to 1,200,000 barrels of oil per day will be offloaded at a new Offshore Terminal and will be delivered to a new onshore Crude Terminal (to be located in Texas City, TX) via a new offshore subsea pipeline and onshore pipeline.

The DWP's Offshore Terminal will consist of two Single Point Mooring buoys (SPMs), a booster pumping platform and adjacent quarters/control platform, a series of subsea crude oil transmission pipelines, and a subsea fuel gas pipeline. The Offshore Terminal will be located in MMS block GA A56, approximately 30 miles south of Freeport. Crude oil will be pumped from the Offshore Terminal to an onshore landfall in Freeport via a subsea pipeline and will continue from Freeport to the new onshore Texas City Crude Terminal via an onshore pipeline and associated onshore intermediate booster pumping station.

Hydrostatic pressure testing of the Project's offshore pipelines will result in a series of discharges to Federal waters. These hydrostatic test water discharges are anticipated to take place during the 4th quarter of 2010. When the DWP commences operations (anticipated 1st quarter 2011), there will be a series of operational discharges from its booster pumping platform and adjacent quarters/control platform. This NPDES application addresses both construction and operational discharges to federal waters in the vicinity of these platforms.

XIII. CERTIFICATION *(see instructions)*

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

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
James Lytal, Vice President ***Texas Offshore Port System***		12/5/08

COMMENTS FOR OFFICIAL USE ONLY

C C

EPA FORM 3510-1 (8-90)

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST			B. SECOND		
C 7 15	***4491*** 16 17	*(specify)* ***Marine Cargo Handling***	7 7 15	***4612*** 16 19	*(specify)* ***Crude Petroleum Pipelines***
C. THIRD			**D. FOURTH**		
C 7 15	***1623*** 16 17	*(specify)* ***Pipeline Construction***	7 7 15	 16 19	*(specify)*

VIII. OPERATOR INFORMATION

A. NAME		B. Is the name listed in Item VIII-A also the owner?
C 8 18	***Enterprise Field Services*** 19 55	☒ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other," specify.)*

F = FEDERAL S = STATE P = PRIVATE	M = PUBLIC *(other than federal or state)* O = OTHER *(specify)*	***P*** 56	*(specify)*

D. PHONE *(area code & no.)*

C A 15	***713*** 16 18	***381*** 19 21	***7950*** 22 25

E. STREET OR PO BOX

1100 Louisiana Street

26 55

F. CITY OR TOWN		G. STATE	H. ZIP CODE
C B 15	***Houston*** 16 40	***TX*** 42 42	***77002-5227*** 47 51

IX. INDIAN LAND

Is the facility located on Indian lands?

☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*		D. PSD *(Air Emissions from Proposed Sources)*		
C T I 9 N 15 16 17	***NA*** 18 30	C T 8 9 P 15 16 17	***NA*** 18 30	
B. UIC *(Underground Injection of Fluids*		**E. OTHER** *(specify)*		*(Specify)*
C T I 9 U 15 16 17	***NA*** 18 30	C T 8 9 15 16 17	***NA*** 18 30	**Planned facility has no existing permits**
C. RCRA *(Hazardous Wastes)*		**E. OTHER** *(specify)*		*(Specify)*
C T I 9 R 15 16 17	***NA*** 18 30	C T 8 9 15 16 17	***NA*** 18 30	

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements. **[See Project Narrative]**

XII. NATURE OF BUSINESS *(provide a brief description)*

The Texas Offshore Port System is a planned crude oil offloading deepwater port (DWP) to be located in the Gulf of Mexico (GOM), south of Freeport, Texas. The DWP will serve as an offshore crude oil receiving terminal and transmission facility. An average of 1,000,000 to 1,200,000 barrels of oil per day will be offloaded at a new Offshore Terminal and will be delivered to a new onshore Crude Terminal (to be located in Texas City, TX) via a new offshore subsea pipeline and onshore pipeline.

The DWP's Offshore Terminal will consist of two Single Point Mooring buoys (SPMs), a booster pumping platform and adjacent quarters/control platform, a series of subsea crude oil transmission pipelines, and a subsea fuel gas pipeline. The Offshore Terminal will be located in MMS block GA A56, approximately 30 miles south of Freeport. Crude oil will be pumped from the Offshore Terminal to an onshore landfall in Freeport via a subsea pipeline and will continue from Freeport to the new onshore Texas City Crude Terminal via an onshore pipeline and associated onshore intermediate booster pumping station.

Hydrostatic pressure testing of the Project's offshore pipelines will result in a series of discharges to Federal waters. These hydrostatic test water discharges are anticipated to take place during the 4th quarter of 2010. When the DWP commences operations (anticipated 1st quarter 2011), there will be a series of operational discharges from its booster pumping platform and adjacent quarters/control platform. This NPDES application addresses both construction and operational discharges to federal waters in the vicinity of these platforms.

XIII. CERTIFICATION *(see instructions)*

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

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
Dennis Jahde, Director, Vice President, Offshore Engineering, Enterprise Products Partners, L.P.		

COMMENTS FOR OFFICIAL USE ONLY

C C 15	 16 55

Please type or print in the unshaded areas only	EPA ID Number *(Copy from Item 1 of Form 1)*	*Form Approved* *OMB No. 2040-0086* *Approval expires 7-31-88*

Form
2D
NPDES

New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For this outfall, list the latitude and longitude, and name of the receiving water(s)

Outfall Number *(list)*	Latitude			Longitude			Receiving Water *(name)*
	Deg	Min	Sec	Deg	Min	Sec	
001	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***
002	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***
003	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***
004	***28***	***28***	***37.2N***	***95***	***04***	***20.9W***	***Gulf of Mexico, MMS Block GA A56***
005	***28***	***28***	***37.2N***	***95***	***04***	***20.9W***	***Gulf of Mexico, MMS Block GA A56***
006	***28***	***28***	***37.2N***	***95***	***04***	***20.9W***	***Gulf of Mexico, MMS Block GA A56***
007	***28***	***28***	***37.2N***	***95***	***04***	***20.9W***	***Gulf of Mexico, MMS Block GA A56***
008	***28***	***28***	***37.2N***	***95***	***04***	***20.9W***	***Gulf of Mexico, MMS Block GA A56***
009	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***
010	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***
011	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***
012	***28***	***28***	***39.6N***	***95***	***04***	***23.5W***	***Gulf of Mexico, MMS Block GA A56***

II. Discharge Date *(When do you expect to begin discharging?))*

Operational discharges 001 through 008 – Q1 2011; Construction phase discharges 009 through 012 – Q4 2010

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) all operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) the average flow contributed by each operation; and (3) the treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow *(list)*	2. Average Flow *(include units)*	3. Treatment *(Description of list Codes from Table 2D-1)*
001	***Pumping Platform – gray water (sinks)***	***450 gpd***	***4-B***
002	***Pumping Platform – black water (toilet)***	***300 gpd***	***1-L, 4-B***
003	***Pumping Platform – stormwater***	***83,800 gpd (max.)***	***o/w separator, 4-B***
004	***Quarters/Control Platform – gray water (sinks, showers)***	***2,400 gpd***	***4-B***
005	***Quarters/Control Platform – black water (toilets)***	***400 gpd***	***1-T, 3-B, 1-U, 2-F, 4-B***
006	***Quarters/Control Platform – seawater + watermaker reject***	***144,000 gpd***	***4-B***
007	***Quarters/Control Platform – stormwater***	***16,800 gpd (max.)***	***o/w separator, 4-B***
008	***Quarters/Control Platform – fire water pump test discharge***	***360,000 gal. over 2 hrs. once each month***	***4-B***
009	***Offshore Pipeline (42-in.) – hydrostatic test water discharge***	***13.3 million gal. over 57 hrs. (3,900 gpm)***	***4-A***
010	***SPM 1 Offloading Pipelines (42-in.) – hydrostatic test water discharge***	***610,000 gal. over 3 hrs. (3,900 gpm)***	***4-A***
011	***SPM 2 Offloading Pipelines (42-in.) – hydrostatic test water discharge***	***610,000 gal. over 3 hrs. (3,900 gpm)***	***4-A***
012	***Fuel Gas Pipeline (8-in.) – hydrostatic test water discharge***	***550,000 gal. over 57 hrs. (160 gpm)***	***4-A***

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Item III-A be intermittent or seasonal?

☒ Yes *(complete the following table)* ☐ No *(go to Item IV)*

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week *(specify average)*	b. Months Per Year *(specify) average)*	a. Maximum Daily Flow Rate *(in mgd)*	b. Maximum Total Volume *(specify with units)*	c. Duration *(in days)*
008 (firewater pump testing discharge, 2 hrs. per month at 3,000 gpm)	***2 hrs./month***	***12***	***4,32 mgd (3,000 gpm)***	***360,000 gals. (2 hrs at 3,000 gpm)***	***2 hrs./day 12 times per year***
009 Offshore Pipeline (42-inch O.D.) hydrostatic test water discharge – 13.3 mil. gal. at 3,900 gpm)	***one time discharge***	***one time discharge***	***5.62 mgd (3,900 gpm)***	***13.3 million gallons***	***2.4 days (57 hrs.)***
010 SPM 1 Offloading Pipelines (42-inch O.D.) hydrostatic test water discharge – 610,000 gal. at 3,900 gpm)	***one time discharge***	***one time discharge***	***5.62 mgd (3,900 gpm)***	***610,000 gallons***	***0.1 days (3 hrs.)***
011 SPM 2 Offloading Pipelines (42-inch O.D.) hydrostatic test water discharge – 610,000 gal. at 3,900 gpm)	***one time discharge***	***one time discharge***	***5.62 mgd (3,900 gpm)***	***610,000 gallons***	***0.1 days (3 hrs.)***
012 Fuel Gas Pipeline (8-inch I.D.) hydrostatic test discharge – 550,000 gal. at 160 gpm	***one time discharge***	***one time discharge***	***0.23 mgd (160 gpm)***	***550,000 gallons***	***2.4 days (57 hrs.)***

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not designed), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	a. Quantity Per Day	b. Units of Measure	c. Operation, Product, Material, etc *(specify)*
NA	***NA***	***NA***	***NA***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***001 (Pump. Plat. gray water)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***160 mg/l***	***80 mg/l***	***4- best professional judgment***
COD	***380 mg/l***	***180 mg/l***	***4- best professional judgment***
TOC	***80 mg/l***	***40 mg/l***	***4- best professional judgment***
TSS	***110 mg/l***	***50 mg/l***	***4- best professional judgment***
Flow	***600 gpd***	***450 gpd***	***4- best professional judgment Based on 30 gal. per person per day w/ 20 (max.) and 15 (avg.) workers***
Ammonia (as N)	***5 mg/l***	***1 mg/l***	***4- best professional judgment***
Temperature (winter)	***70 ºF***	***65 ºF***	***4- best professional judgment*** ***Based on max. and avg. winter seawater temperatures of 65 ºF and 60 ºF.***
Temperature (summer)	***95 ºF***	***90 ºF***	***4- best professional judgment*** ***Based on max. and avg. summer seawater temperatures of 90 ºF and 85 ºF.***
pH	***7.2***	***6.7***	***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***002 (Pump. Plat. black water)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***220 mg/l***	***110 mg/l***	***4- best professional judgment***
COD	***500 mg/l***	***250 mg/l***	***4- best professional judgment***
TOC	***160 mg/l***	***80 mg/l***	***4- best professional judgment***
TSS	***220 mg/l***	***100 mg/l***	***4- best professional judgment***
Flow	***400 gpd***	***300 gpd***	***4- best professional judgment*** ***Based on 20 gal. per person per day w/ 20 (max.) and 15 (avg.) workers***
Ammonia (as N)	***25 mg/l***	***12 mg/l***	***4- best professional judgment***
Temperature (winter)	***70 ºF***	***65 ºF***	***4- best professional judgment*** ***Based on max. and avg. winter seawater temperatures of 65 ºF and 60 ºF.***
Temperature (summer)	***95 ºF***	***90 ºF***	***4- best professional judgment*** ***Based on max. and avg. summer seawater temperatures of 90 ºF and 85 ºF.***
pH	***7.5***	***7.0***	***4- best professional judgment***
Fecal coliform	***100,000 MPN/100 ml***	***10,000 MPN/100 ml***	***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***003 (Pump. Plat. stormwater)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***20 mg/l***	***10 mg/l***	***4- best professional judgment***
COD	***30 mg/l***	***20 mg/l***	***4- best professional judgment***
TOC	***30 mg/l***	***20 mg/l***	***4- best professional judgment***
TSS	***40 mg/l***	***30 mg/l***	***4- best professional judgment***
Flow	***83,800 gpd***	***2,700 gpd***	***4- best professional judgment*** ***Max. based on 4-in. precip. over 24-hrs.*** ***Avg. based on 47.4 in/yr avg. precip.***
Ammonia (as N)	***0.3 mg/l***	***0.1 mg/l***	***4- best professional judgment***
Temperature (winter)	***70 ºF***	***65 ºF***	***4- best professional judgment*** ***Based on max. and avg. winter seawater temperatures of 65 ºF and 60 ºF.***
Temperature (summer)	***95 ºF***	***90 ºF***	***4- best professional judgment*** ***Based on max. and avg. summer seawater temperatures of 90 ºF and 85 ºF.***
pH	***7.0 s.u.***	***6.5 s.u.***	***4- best professional judgment***
Oil and grease	***<24 mg/l***	***4 mg/l***	***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***004 (Quart./Contr. Plat. gray water)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***160 mg/l***	***80 mg/l***	***4- best professional judgment***
COD	***380 mg/l***	***180 mg/l***	***4- best professional judgment***
TOC	***80 mg/l***	***40 mg/l***	***4- best professional judgment***
TSS	***110 mg/l***	***50 mg/l***	***4- best professional judgment***
Flow	***3,200 gpd***	***2,400 gpd***	***4- best professional judgment*** ***Based on 80 gal. per person per day w/ 40 (max.) and 30 (avg.) workers***
Ammonia (as N)	***5 mg/l***	***1 mg/l***	***4- best professional judgment***
Temperature (winter)	***70 ºF***	***65 ºF***	***4- best professional judgment***
Temperature (summer)	***95 ºF***	***90 ºF***	***4- best professional judgment***
pH	***7.2***	***6.7***	***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***005 (Quart./Contr. Plat. black water)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***50 mg/l***	***25 mg/l***	***4- best professional judgment***
COD	***100 mg/l***	***50 mg/l***	***4- best professional judgment***
TOC	***150 mg/l***	***50 mg/l***	***4- best professional judgment***
TSS	***<150 mg/l***	***60 mg/l***	***4- best professional judgment***
Flow	***800 gpd***	***600 gpd***	***4- best professional judgment*** ***Based on 20 gal. per person per day w/ 40 (max.) and 30 (avg.) workers***
Ammonia (as N)	***20 mg/l***	***10 mg/l***	***4- best professional judgment***
Temperature (winter)	***70 ºF***	***65 ºF***	***4- best professional judgment*** ***Based on max. and avg. winter seawater temperatures of 65 ºF and 60 ºF.***
Temperature (summer)	***95 ºF***	***90 ºF***	***4- best professional judgment*** ***Based on max. and avg. summer seawater temperatures of 90 ºF and 85 ºF.***
pH	***7.5 s.u.***	***7.0 s.u.***	***4- best professional judgment***
Fecal coliform	***<200 MPN/100 ml***	***100 MPN/100 ml***	***4- best professional judgment***
Total residual chlorine	***5 mg/l***	***1 mg/l***	***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***006 (Q/C seawater + watermaker)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***	***	**** approx. same as seawater (4- best professional judgment)***
COD	***	***	**** approx. same as seawater (4- best professional judgment)***
TOC	***	***	**** approx. same as seawater (4- best professional judgment)***
TSS	***	***	**** approx. same as seawater (4- best professional judgment)***
Flow	***0.144 mgd***	***0.144 mgd***	***4- best professional judgment***
Ammonia (as N)	***	***	**** approx. same as seawater (4- best professional judgment)***
Temperature (winter)	***	***	**** approx. same as seawater (4- best professional judgment)***
Temperature (summer)	***	***	**** approx. same as seawater (4- best professional judgment)***
pH	***	***	**** approx. same as seawater (4- best professional judgment)***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***007 (Quart./Contr. Plat. stormwater)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***20 mg/l***	***10 mg/l***	***4- best professional judgment***
COD	***30 mg/l***	***20 mg/l***	***4- best professional judgment***
TOC	***30 mg/l***	***20 mg/l***	***4- best professional judgment***
TSS	***40 mg/l***	***30 mg/l***	***4- best professional judgment***
Flow	***16,800 gpd***	***500 gpd***	***4- best professional judgment*** ***Max. based on 4-in. precip. over 24-hrs.*** ***Avg. based on 47.4 in/yr avg. precip.***
Ammonia (as N)	***0.3 mg/l***	***0.1 mg/l***	***4- best professional judgment***
Temperature (winter)	***70 ºF***	***65 ºF***	***4- best professional judgment*** ***Based on max. and avg. winter seawater temperatures of 65 ºF and 60 ºF.***
Temperature (summer)	***95 ºF***	***90 ºF***	***4- best professional judgment*** ***Based on max. and avg. summer seawater temperatures of 90 ºF and 85 ºF.***
pH	***7.0 s.u.***	***6.5 s.u.***	***4- best professional judgment***
Oil and Grease	***<24 mg/l***	***4 mg/l***	***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***008 (Q/C fire water pump test disch)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
COD	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
TOC	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
TSS	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
Flow	***0.36 mgd (3,000 gpm x 2 hr. duration)***	***0.012 mgd (total annual/ 365 days)***	***4- best professional judgment.*** ***(2 hrs, at 3,000 gpm once each month)***
Ammonia (as N)	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
Temperature (winter)	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
Temperature (summer)	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***
pH	*****	*****	**** approx. same as seawater source*** ***4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***009 (Offshore Pipe. hydrotest disch)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***	***	**** approx. same as seawater source 4- best professional judgment***
COD	***	***	**** approx. same as seawater source 4- best professional judgment***
TOC	***	***	**** approx. same as seawater source 4- best professional judgment***
TSS	***	***	**** approx. same as seawater source 4- best professional judgment***
Flow	***5.62 mgd***	***5.62 mgd***	***4- best professional judgment based on 3,900 gpm discharge rate, estimated duration 57 hrs.***
Ammonia (as N)	***	***	**** approx. same as seawater source 4- best professional judgment***
Temperature (winter)	***	***	**** approx. same as seawater source 4- best professional judgment***
Temperature (summer)	***	***	**** approx. same as seawater source 4- best professional judgment***
pH	***	***	**** approx. same as seawater source 4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***010 (SPM1 Offload. hydrotest disch)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	*	*	**** approx. same as seawater source 4- best professional judgment***
COD	*	*	**** approx. same as seawater source 4- best professional judgment***
TOC	*	*	**** approx. same as seawater source 4- best professional judgment***
TSS	*	*	**** approx. same as seawater source 4- best professional judgment***
Flow	***5.62 mgd***	***5.62 mgd***	***4- best professional judgment based on 3,900 gpm discharge rate, estimated duration 3 hrs.***
Ammonia (as N)	*	*	**** approx. same as seawater source 4- best professional judgment***
Temperature (winter)	*	*	**** approx. same as seawater source 4- best professional judgment***
Temperature (summer)	*	*	**** approx. same as seawater source 4- best professional judgment***
pH	*	*	**** approx. same as seawater source 4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***011 (SPM2 Offload. hydrotest disch)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	***	***	**** approx. same as seawater source 4- best professional judgment***
COD	***	***	**** approx. same as seawater source 4- best professional judgment***
TOC	***	***	**** approx. same as seawater source 4- best professional judgment***
TSS	***	***	**** approx. same as seawater source 4- best professional judgment***
Flow	***5.62 mgd***	***5.62 mgd***	***4- best professional judgment based on 3,900 gpm discharge rate, estimated duration 3 hrs.***
Ammonia (as N)	***	***	**** approx. same as seawater source 4- best professional judgment***
Temperature (winter)	***	***	**** approx. same as seawater source 4- best professional judgment***
Temperature (summer)	***	***	**** approx. same as seawater source 4- best professional judgment***
pH	***	***	**** approx. same as seawater source 4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	Outfall Number ***012 (Fuel Gas Pipe hydrotest disch.)***

V. Effluent Characteristics

A and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instruction for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See Table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	*****	*****	**** approx. same as seawater source 4- best professional judgment***
COD	*****	*****	**** approx. same as seawater source 4- best professional judgment***
TOC	*****	*****	**** approx. same as seawater source 4- best professional judgment***
TSS	*****	*****	**** approx. same as seawater source 4- best professional judgment***
Flow	***0.23 mgd***	***0.23 mgd***	***4- best professional judgment based on 160 gpm discharge rate, estimated duration 57 hrs.***
Ammonia (as N)	*****	*****	**** approx. same as seawater source 4- best professional judgment***
Temperature (winter)	*****	*****	**** approx. same as seawater source 4- best professional judgment***
Temperature (summer)	*****	*****	**** approx. same as seawater source 4- best professional judgment***
pH	*****	*****	**** approx. same as seawater source 4- best professional judgment***

CONTINUED FROM THE FRONT	EPA ID Number *(cop from Item 1 of Form 1)*	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
None	

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☒ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
Louisiana Offshore Oil Port	***Gulf of Mexico, 18 miles south of Leeville and Grand Isle, Louisiana – Grand Isle Area Block 59*** ***(NPDES LA0049492)***

EPA ID Number *(cop from Item 1 of Form 1)*

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

See the attached Project Narrative

VIII. Certification

I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title *(type or print)* ***Dennis Jahde, Director, VP, Offshore Engineering, Enterprise Products Partners, L.P.***	B. Phone No. ***(713) 381-7950***
C. Signature	D. Date Signed 12/5/2008

Contents

USEPA Form 1

USEPA Form 2D

List of Appendices

List of Tables

List of Figures

Acronyms and Abbreviations

BNL	bottom nepheloid layer
BOPD	barrels of oil per day
BOPH	barrels of oil per hour
BR 538	Brazos Area Block 538
CALM	Catenary anchor leg mooring
cm/s	centimeters per second
DO	dissolved oxygen
DOT	U.S. Department of Transportation
DWP	Deepwater Port
EIS	Environmental Impact Statement
ft	feet
FGP	Fuel Gas Pipeline
FVS	Freeport Valve Site
GA A56	Galveston Area Block A56
gal	gallons
GMFMC	Gulf of Mexico Fishery Management Council
GOM	Gulf of Mexico
gpd	gallons per day
gpm	gallons per minute
HDD	horizontal directional drill
H_{max}	maximum wave height
H_s	significant wave height
ID	inside diameter
IMO	International Maritime Organization

km	kilometers
LATEX	Louisiana-Texas (referring to a shelf water study program)
m	meters
m^3	cubic meters
MAOP	Maximum Allowable Operating Pressure
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
MCC	Main Control Center
µg/l	micrograms per liter
MG	million gallons
mg/l	milligrams per liter
MHHW	mean higher-high water
MHW	mean high water
MHWM	mean high water mark
MLLW	mean lower-low water
MLW	mean low water
Mmole	millimole
MSD	Marine Sanitation Device
msl	mean sea level
MMS	Minerals Management Service
NDBC	National Data Buoy Center
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OD	outside diameter
PAH	Polycyclic Aromatic Hydrocarbon
PCV	pressure control valve

PLEM	pipeline end manifold
PP	Pumping Platform (referring to Platform GA A56-A)
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
psi	pounds per square inch
psig	pounds per square inch gauge
QP	Quarters/Control Platform (referring to Platform GA A56-B)
SNL	surface nepheloid layer
SPM	Single Point Mooring Buoy
the Project	Texas Offshore Port System Project
TOPS	Texas Offshore Port System
ULCC	Ultra Large Crude Carrier
U.S.	United States
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
VLCC	Very Large Crude Carrier

1.0 Overview of Project

1.1 Project Location

Texas Offshore Port System (TOPS) intends to construct, own, and operate a new crude oil deepwater port (DWP) in Federal waters of the United States (U.S.) Gulf of Mexico (GOM) approximately 30 statute miles (approximately 48 kilometers [km]) south of Freeport, Texas. Figure 1.1-1 provides an overview of the proposed project location.

Figure 1.1-1 Facility Location

The Texas Offshore Port System Project (the TOPS Project or the Project) consists of the construction and operation of the proposed DWP, which will serve as an offshore crude oil receiving terminal and transmission facility. An average of up to 1,700,000 barrels of oil per day (BOPD) will be offloaded at a new terminal located in Minerals Management Service (MMS) lease block Galveston Area A56 (GA A56), and will be delivered via a new pipeline that will terminate at a newly constructed crude oil storage tank farm to be located in Texas City, Texas.

The 120.0-foot (or 36.6-meter [m]) mean sea level (msl) water depth in the vicinity of the Project's Offshore Terminal will allow for the direct unloading of larger, deeper draft Ultra Large Crude Carriers (ULCCs) and Very Large Crude Carriers (VLCCs).

1.2 Project Components and Description

A series of Figures provide details of the Project's components, location and appearance:

- Figure 1.2-1 provides a map showing the location of the Offshore Terminal and its associated crude oil and fuel gas pipelines;
- Figure 1.2-2 provides a visual depiction of the project;
- Figure 1.2-3 provides a field layout drawing of the Offshore Terminal; and
- Figure 1.2-4 provides an elevation view of the west face of the Offshore Terminal's Pumping Platform (PP) and Quarters/Control Platform (QP).

Figure 1.2-1 General Project Location Map

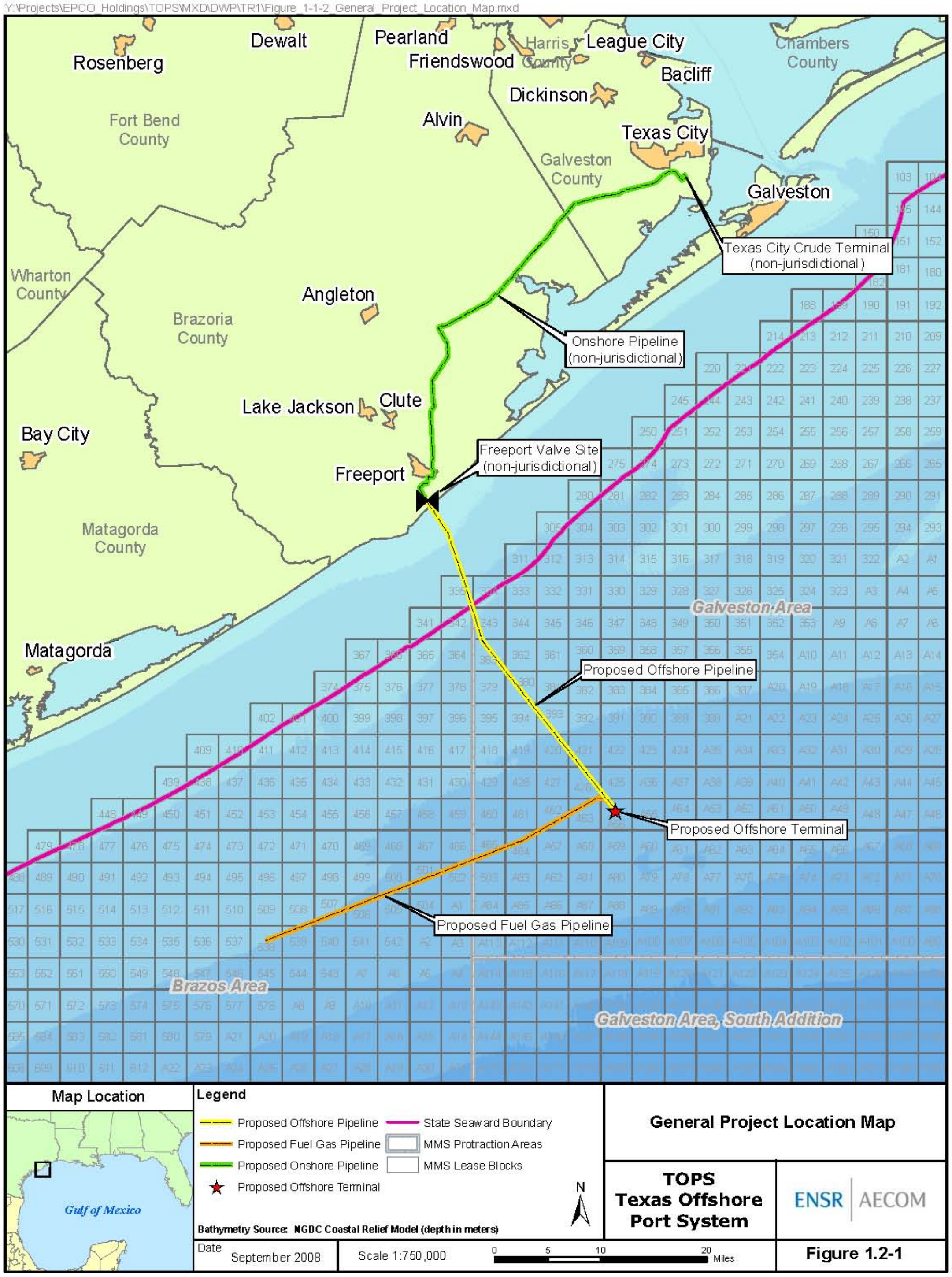


Figure 1.2-2 Visual Depiction of Offshore Terminal

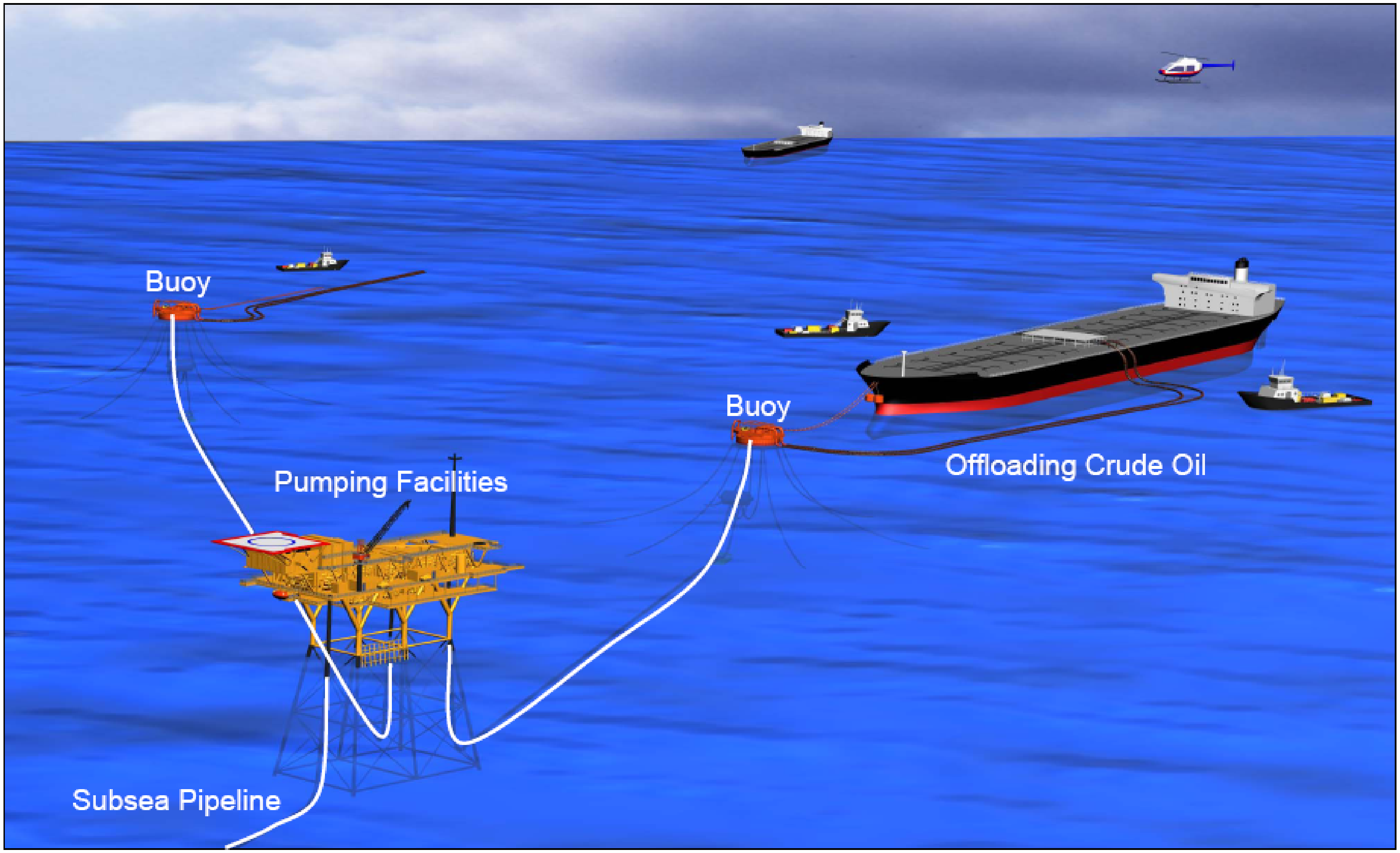


Figure 1.2-3 Offshore Terminal Field Layout Drawing

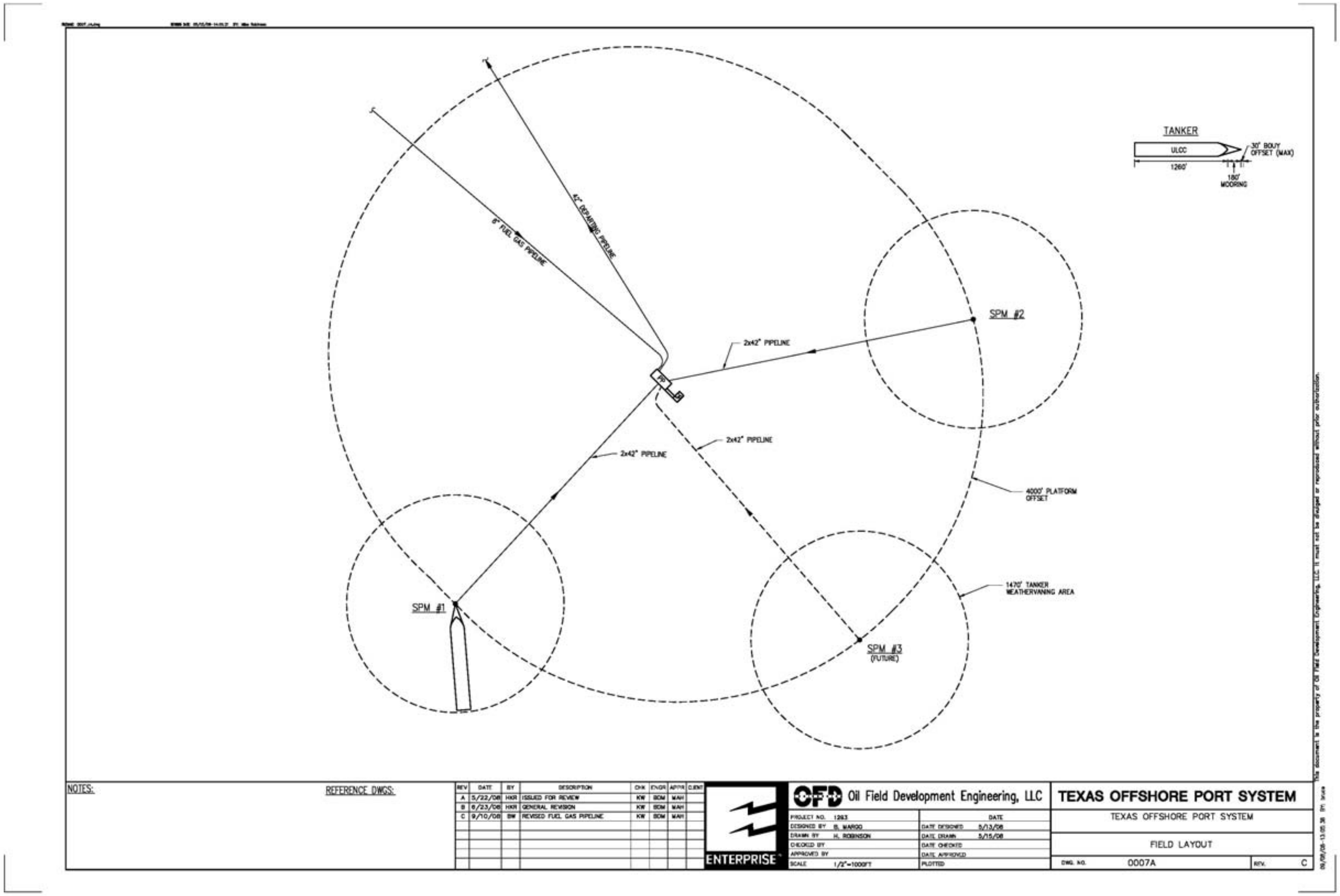
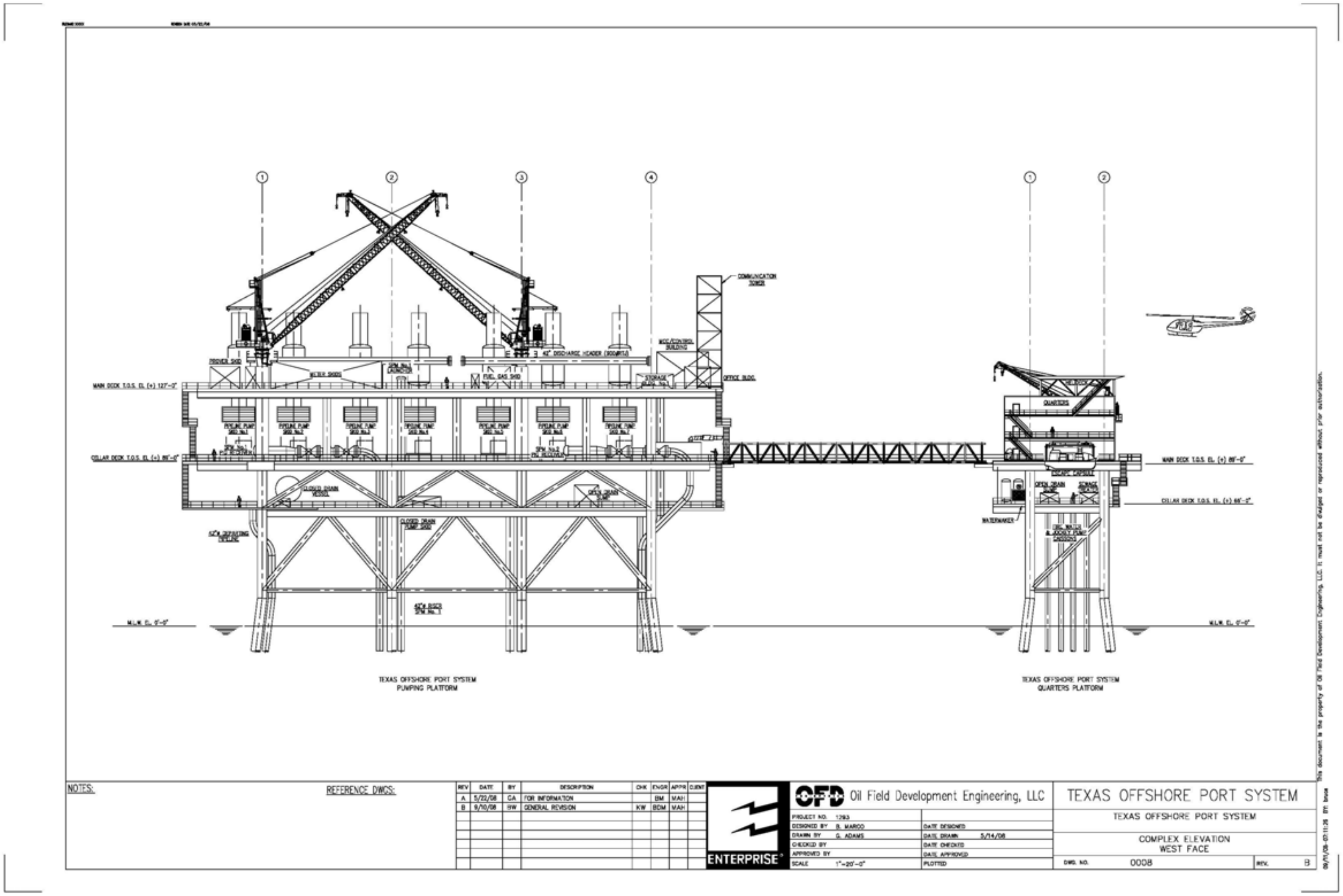


Figure 1.2-4 Offshore Terminal Platforms – Elevation View - West Face



The Project will include the following major components:

The Offshore Terminal - An offshore DWP terminal consisting of:

- Two Single Point Mooring Buoys (SPMs), each with two 24-inch inside diameter (ID) loading hoses (each hose approximately 1,120 feet [341 m] in length) - to be located in MMS Block GA A56. Local water depth in the vicinity of the SPMs is approximately 120.0 feet (36.6 m). SPM buoys will be surface Catenary Anchor Leg Mooring (CALM) buoys, anchored to the seafloor by a series of anchor chains. Each SPM will have two 24-inch ID, flexible floating loading hoses, with each hose approximately 1,120 feet (341 m) in length.

  A crude carrier vessel moored at a given SPM, with the help of an assist boat, will retrieve the SPM's two loading hoses, bring them onboard, attach them to vessel discharge manifold, and initiate pumping of crude oil from the carrier to the SPM. Crude oil will be routed from each SPM buoy to a subsea PLEM via two 24-inch ID subsea hoses. From the PLEM, oil will flow through two parallel 4,000 feet (1,219 m) long 42-inch OD Offloading Pipelines to PP GA A56-A.

- A Future Third SPM – also to be located in the MMS Block GA A56; it is anticipated that SPM No. 3 would be constructed and placed into operation within 24 to 36 months after the startup of the DWP. While this possible third SPM is shown on certain drawings, the construction of SPM No. 3 and its associated Offloading Pipelines (and any associated hydrostatic test water discharges) are not part of this current NPDES permit application.

- Offloading Pipelines from SPMs to the new Pumping Platform. As noted above twin 42-inch outside diameter (OD) offloading pipelines running in parallel from each PLEM to the new Pumping Platform. The twin Offloading Pipelines will be each be approximately 4,000 feet (1,219 m) in length.

  Construction phase hydrostatic test water discharges from these twin 42-inch Offloading Pipelines, which will occur at the Pumping Platform, represent Outfall 010 (for SPM No. 1) and Outfall 011 (for SPM No. 2) in this NPDES permit application.

- Pumping Platform (PP) GA A56-A - metering and booster pumping platform that will receive crude oil from SPMs, boost the pressure, meter the flow and route the crude oil into the Offshore Pipeline and towards shore at a pumping rates ranging from 50,000 to 100,000 barrels of oil per hour (BPH). The Pumping Platform will include metering equipment, seven turbine-driven booster pumps, power generating equipment, and other crude oil transmission system related equipment. Crude oil arriving from the SPMs will be boosted to higher pressure (1,950 pounds per square inch gauge [psig] discharge pressure) to achieve a flow rate of up to 100,000 BPH into the departing Offshore Pipeline. Flow will be metered downstream of the booster pumps. The PP will be bridge connected via a 15.0 feet (4.6 m) wide by 150.0 feet (45.7 m) long bridge to the new QP GA A56-B.

  Operations phase NPDES discharges from the operational Pumping Platform will include gray water discharges from sinks (Outfall 001), black water (sanitary) discharges from the platform's toilet (Outfall 002), and intermittent stormwater discharges from platform decks via the open drain system (Outfall 003).

- Quarters/Control Platform (QP) GA A56-B - quarters and controls platform (bridge connected to PP GA A56-A) containing equipment controls, personnel quarters and other related facilities. QP GA A56-B will include a 40-man living quarters, a control room, helicopter deck pad, and survival craft vessel. The platform also will have firewater pumps, fire jockey pumps, and potable water treatment and storage systems, and will provide firewater and potable water across the bridge to PP GA A56-A.

Operations phase NPDES discharges from the operational Quarters/Control Platform will include gray water discharges from sinks and showers (Outfall 004), black water discharges from the platform's toilet facilities via the sewage treater unit (Outfall 005), combined seawater and watermaker reject water discharges form the fire water jockey pump and watermaker system (Outfall 006), intermittent stormwater discharges from platform decks via the open drain system (Outfall 007), and intermittent discharges of seawater associated with monthly testing of the platform's fire water pumps (Outfall 008).

- ♦ Offshore Pipeline – a 42-inch OD crude oil transmission pipeline to be installed from PP GA A56-A to a newly constructed onshore Freeport Valve Site (FVS) station in Freeport, Texas. The Offshore Pipeline length from the PP to the FVS will be approximately 34.86 miles (56.10 km). The Offshore Pipeline length from the PP to the mean high water mark (MHWM) will be approximately 34.18 miles (55.00 km).

  The construction phase hydrostatic test water discharge from this 42-inch Offshore Pipeline, which will occur at the Pumping Platform, represents Outfall 009 in this NPDES permit application.

- ♦ Fuel Gas Pipeline (FGP) - an $8^5/_8$-inch OD fuel gas pipeline, running from PP GA A56-A to gas pipeline systems located to the west-southwest at the Williams platform in MMS lease block Brazos Area 538 (BR 538). The fuel gas will be used to power PP GA A56-A turbine pumps and power generators. The FGP length from the PP to the Williams platform will be approximately 36.28 miles (58.39 km).

  The construction phase hydrostatic test water discharge from this $8^5/_8$-inch Fuel Gas Pipeline, which will occur at the Pumping Platform, represents Outfall 012 in this NPDES permit application.

The DWP has been designed to offload crude oil from crude oil carriers at the Offshore Terminal and pump the crude oil to storage tanks located at a newly constructed onshore Texas City Crude Terminal. As a separate project, pipelines will be constructed to all for the export of the crude oil from the Texas City Crude Terminal to local Port Arthur and Texas City area refineries. Pumping equipment on the crude carriers will offload the crude oil to the Offshore Terminal. Booster pumping equipment on the Pumping Platform will pump the oil to onshore facilities via a 42-inch OD pipeline. The design pumping rate of the booster pumping equipment will be 100,000 BPH.

The design capacity of the proposed Project will be approximately 1,800,000 BOPD. The average throughput on an annual basis is expected to be 1,175,000 BOPD during Year 1 increasing to 1,700,000 BOPD by Year 5.

1.3 Overview of Discharges Addressed in this NPDES Application

This NPDES application addresses two sets of discharges: operations phase discharges from Offshore Terminal Pumping Platform (PP GA A56-A) and Quarters/Control Platform (QP GA A56-B) and construction phase discharges of pipeline hydrostatic test water, which will also occur in the vicinity of PP GA A56-A. This section provides an overview level description of the discharges. More detailed information is provided in Section 3.0 of this narrative.

1.3.1 Platform Operations Phase Discharges

The Pumping Platform and the Quarters/Control Platform will each have a series of discharges. These discharges will occur by means over vertically downward oriented discharge pipes will extend down from the platforms to a depth of approximately 10 feet (3 m) below the water surface. Discharges will include gray water discharges (from sinks and showers), black water (sanitary) discharge from toilets, a discharge from a watermaker freshwater treatment system (combined with excess water from a firewater system jockey pump system), intermittent (once per month for 2 hours) discharges from fire water system pump testing, and intermittent discharges of stormwater from the platform decks. The specific operations phase platform discharges and estimated discharge rates are provided in USEPA Form 2D and listed below:

- Outfall 001 – PP GA A56-A – Gray water (untreated) – 450 gpd average/ 600 gpd maximum;
- Outfall 002 – PP GA A56-A – Black water (macerated) – 300 gpd average/ 400 gpd maximum;
- Outfall 003 – PP GA A56-A – Stormwater (open drain system oil/water separator) – 83,300 gpd maximum based on 4-inches precipitation over 24 hours;
- Outfall 004 – QP GA A56-B – Gray water (untreated) – 2.400 gpd average/ 3,200 gpd maximum;
- Outfall 005 – QP GA A56-B – Black water (from sewage treater unit) – 600 gpd average/ 800 gpd maximum;
- Outfall 006 – QP GA A56-B – Reject water from watermaker (filter backwash and reverse osmosis reject) combined with excess seawater from fire water jockey pumps – 144,000 gpd average; approximately 18 percent from watermaker and 82 percent from jockey pump;
- Outfall 007 – QP GA A56-B – Stormwater (open drain system oil/water separator) – 16,800 gpd maximum based on 4-inches precipitation over 24 hours;
- Outfall 008 – QP GA A56-B – Fire water system pump test discharge (test conducted for 2 hours at 3,000 gpm once each month) – 0.36 mgd (3,000 gpm) maximum for 2 hour period once each month;

1.3.2 Construction Phase Pipeline Hydrostatic Test Water Discharges

Hydrostatic pressure testing will be conducted on the Project's oil transmission pipelines (Offloading Pipelines and Offshore Pipeline) and fuel gas supply pipeline during the construction phase of the project, just prior to commissioning of the Offshore Terminal. The Offloading Pipelines (twin, 4,000 foot [1,219 m] 42-inch OD pipelines running from the PLEM serving SPM No.1 to PP GA A56-A and a similar pair running from SPM No. 2 to PP GA A56-A) and the Offshore Pipeline (34.86 mile [56.10 km] 42-inch OD pipeline running from PP GA A56-A to the onshore Freeport Valve Site (FVS) will be laid wet (i.e., filled with seawater as they are laid) and hydrostatic testing will be conducted using this same seawater. The Fuel Gas Pipeline (36.28 miles [58.39 km] an $8^5/_8$-inch OD pipeline, running from PP GA A56-A to a platform in MMS block BR 538) will be laid dry, but will be filled with seawater prior to hydrostatic testing. Seawater used to fill all of the pipelines will be filtered to prevent large solids, debris, and sediment from entering the pipes.

Upon completion of hydrostatic tests, the various pipeline segments will be dewatered. During the dewatering process, discharges of seawater from the pipelines will be allowed to cascade over the side of the platform cellar deck of PP GA A56-A, providing aeration as the discharge drops to the water surface below. The specific construction phase pipeline hydrostatic test water discharges and estimated discharge rates are provided in USEPA Form 2D and listed below:

- Outfall 009 – Offshore Pipeline hydrostatic test water discharge – 5.62 mgd (3,900 gpm) over a 57-hour period; total discharge 13.3 million gallons;

- Outfall 010 – SPM No. 1 Offloading Pipelines hydrostatic test water discharge – 5.62 mgd (3,900 gpm) over a 3-hour period; total discharge 610,000 gallons;

- Outfall 011 – SPM No. 1 Offloading Pipelines hydrostatic test water discharge – 5.62 mgd (3,900 gpm) over a 3-hour period; total discharge 610,000 gallons;

- Outfall 012 – Fuel Gas Pipeline hydrostatic test water discharge – 0.23 mgd (160 gpm) over a 57-hour period; total discharge 550,000 gallons;

2.0 Characteristics of the Existing Environment

As shown previously in Figure 1.2-2 , the Project's Offshore Terminal will be located in the Gulf of Mexico in MMS lease Block GA A56, approximate 30 miles (48 km) south of Freeport, Texas. Local water depth in the vicinity of the Offshore Terminal is approximately 120 feet (36.6 m). A detailed description of the existing physical/chemical ocean environment in the vicinity of the Offshore Terminal is provided in Topic Report 2, "Water Use and Quality", of the Project's Deepwater Port application to the U.S. Coast Guard. This section provides a summary overview of the information.

2.1 Currents

Currents over the inner Louisiana–Texas shelf (e.g., in the vicinity of much of the proposed Project) are mainly driven by wind stress and, to a lesser degree, buoyancy affects associated with freshwater discharges from the Mississippi and Atchafalaya rivers and other smaller tributaries to the Gulf. Generally, currents in the vicinity of a majority of the proposed Project components are predominantly alongshore and follow a bimodal pattern with upcoast (west to east) current flows typically occurring during the summer months (mid-June through late-August) and downcoast (east to west) current flows typically occurring during the non-summer months.

An extensive evaluation of currents on the Louisiana–Texas shelf was conducted in the early 1990s on behalf of the U.S. Department of the Interior's MMS by researchers from Texas A&M University (MMS 1998a). As a component of this "LATEX A" study program, a series of 32 multi-depth current moorings were established on the shelf. In addition to current meters, the types of equipment deployed on some of these moorings included wave gauges, temperature sensors, conductivity sensors, and inverted echo sounders. The equipment was deployed for a 32-month period, from April 1992 to December 1994. Figure 2.2-1 presents the LATEX A monitoring locations and other current, wave, tidal and water quality monitoring locations in the Project area.

From a regional perspective, current data collected during this study confirmed the bi-modal current flow scenario of upcoast alongshore summer currents and downcoast alongshore non-summer currents in the inner shelf area, with less of a bi-modal influence present further offshore. Applied to the TOPS Project, this current data indicates that current velocities in the vicinity of the proposed SPMs, platforms, and along the pipeline route can be expected to be in the general range 10 to 25 cm/s in the mid to upper-portion of the water column and in the general range of 2 to 10 cm/s near the sea floor. Predominant current direction is anticipated to be alongshore, generally from east to west during the non-summer months and generally from west to east during the summer months.

2.2 Waves

Waves are generated as a result of wind interaction with the water surface. Wave height and direction are also affected by variations in seafloor morphology. As waves enter shallow water, shoaling effects tend to increase wave height. The direction in which waves travel tends to bend toward the coast. As a result, wave crests become more parallel to the shoreline (refraction). As waves approach shore, shoaling and wavelength modifications overcome dissipation effects and cause wave height to increase and waves to steepen. Eventually wave steepness causes the wave to become more unstable and break, dissipating wave energy.

Metocean evaluations have recently been prepared for the TOPS Project. One component of these evaluations was the development of wave height hindcast data for two locations one in the vicinity of the proposed DWP and one in shallower water along the proposed Offshore Pipeline route.

Figure 2.2-1 Historic Water Quality and Current Monitoring Locations

Y:\Projects\EPCO_Holdings\TOPS\MXD\DWP\TR2\Figure_2-2-1_Historic_Water_Quality_and_Current_Monitoring_Locations.mxd

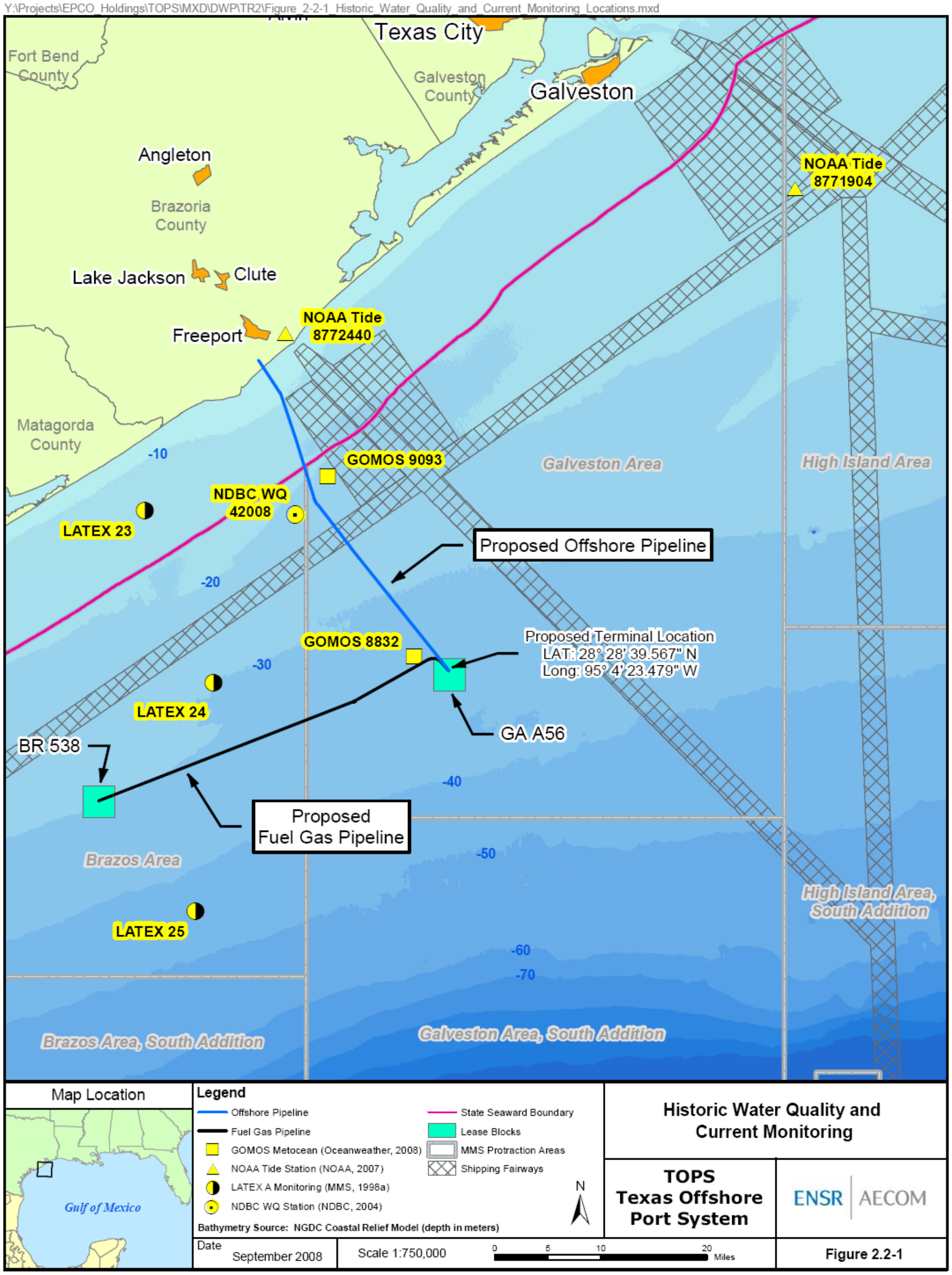


Table 2.2-1 and Table 2.2-2 provide significant wave height (H_s) and maximum wave height (H_{max}) hindcasts (tropical extremes) in the vicinity of the proposed DWP and along the proposed Offshore Pipeline route. Significant wave height is defined as the average height (trough to crest) of the highest one-third of the waves in at a given location. The representative shallow water location used for wave hindcast predictions was GOMOS grid point 9093, which is located in the northern section of Block GA 343 (28.75º N, 95.25º W) in a local water depth of 62 feet (19 m). This grid point is located approximately 1.0 mile (1.6 km) east of the proposed Offshore Pipeline route and approximately 12 miles (19 km) offshore. The representative DWP location used for wave hindcast predictions was GOMOS grid point 8832, which is located in the southern section of Block GA 425 (28.5º N, 95.125º W) in a local water depth of 100 feet (30.5 m). This grid point is located approximately 3.5 miles (5.6 km) north of the proposed Pumping Platform.

These hindcasts were developed to coincide with a 106-year period of record (1900 to 2005). The dominant wave direction at both locations is toward the northwest, with minor seasonal shifts towards the north-northwest and west-northwest.

Table 2.2-1 Wave Height Hindcasts (Tropical Extremes) Along Offshore Pipeline Route

Wave Heights	Return Period		
	1-year	10-year	100-year
H_s	7.2 ft (2.2 m)	16.7 ft (5.1 m)	26.6 ft (8.1 m)
H_{max}	14.4 ft (4.4 m)	30.8 ft (9.4 m)	45.3 ft (13.8 m)

Wave heights estimated at GOMOS grid point 9093 – located in MMS Block GA 343, 62 foot local water depth.

Table 2.2-2 Wave Height Hindcasts (Tropical Extremes) in the Vicinity of the DWP

Wave Heights	Return Period		
	1-year	10-year	100-year
H_s	8.2 ft (2.5 m)	20.0 ft (6.1 m)	30.8 ft (9.4 m)
H_{max}	16.4 ft (5.0 m)	36.7 ft (11.2 m)	53.1 ft (16.2 m)

Wave heights estimated at GOMOS grid point 8832 – located in MMS Block GA 425, 100 foot local water depth.

2.3 Tides

Site specific tidal data is not available in the immediate vicinity of the Project's offshore structures. In general, tidal conditions along the GOM coast of west Louisiana and east Texas involve a mixed tidal regime which varies between a semi-diurnal to diurnal pattern.

Table 2.3-1 presents offshore tide data collected at two historic National Oceanic and Atmospheric Administration (NOAA) tide stations (NOAA 2008). The U.S. Coast Guard Freeport station is a shoreline tide gauge located near Quintana Beach, immediately adjacent to the Freeport Entrance Channel. The "Galveston Offshore, TX" station (ID 8771904) was a tide gauge located in MMS High Island Area Block 208 (local water depth approximately 54 feet) from August 19, 1995 to August 10, 1998. This tide station was located approximately 21 miles southeast of the inlet to Galveston Bay.

The data from these two tidal stations indicate a typical mean tidal range of approximately 1.4 feet (0.4 m), with a maximum tidal range of approximately 1.8 to 2.2 feet (0.5 to 0.7 m). Actual tides observed in the immediate vicinity of the Project's SPMs, platforms and pipelines would vary, but might be expected to fall within the general ranges noted above.

Table 2.3-1 Normal Tidal Water Levels in the General Vicinity of the Proposed Project

Description	USCG Freeport, Freeport Entrance Channel Tidal Water Level (Station 8772447)	Galveston Offshore Tidal Water Level (Station 8771904)
Mean Higher-High Water (MHHW)	0.81 ft (0.25 m)	0.95 ft (0.29 m)
Mean High Water (MHW)	0.67 ft (0.20 m)	0.74 ft (0.23 m)
Mean Sea Level (MSL)	0.0 ft	0.0 ft
Mean Low Water (MLW)	-0.68 ft (-0.21m)	-0.69 ft (-0.21m)
Mean Lower Low Water (MLLW)	-0.95 ft (-0.29 m)	-1.20 ft (-0.37 m)

Source: NOAA, 2008

2.4 Water Quality

The Louisiana–Texas shelf "LATEX A" study (MMS 1998a), in addition to the collection of ocean current data, also involved collection of data related to seawater temperature, salinity, light transmission, dissolved oxygen (DO), nutrients, suspended particle mass, and pigments. The Louisiana–Texas shelf "LATEX B" study (MMS 1998b) provided additional data related to water quality on the shelf. These studies serve as the primary source of information for the water quality discussion that follows.

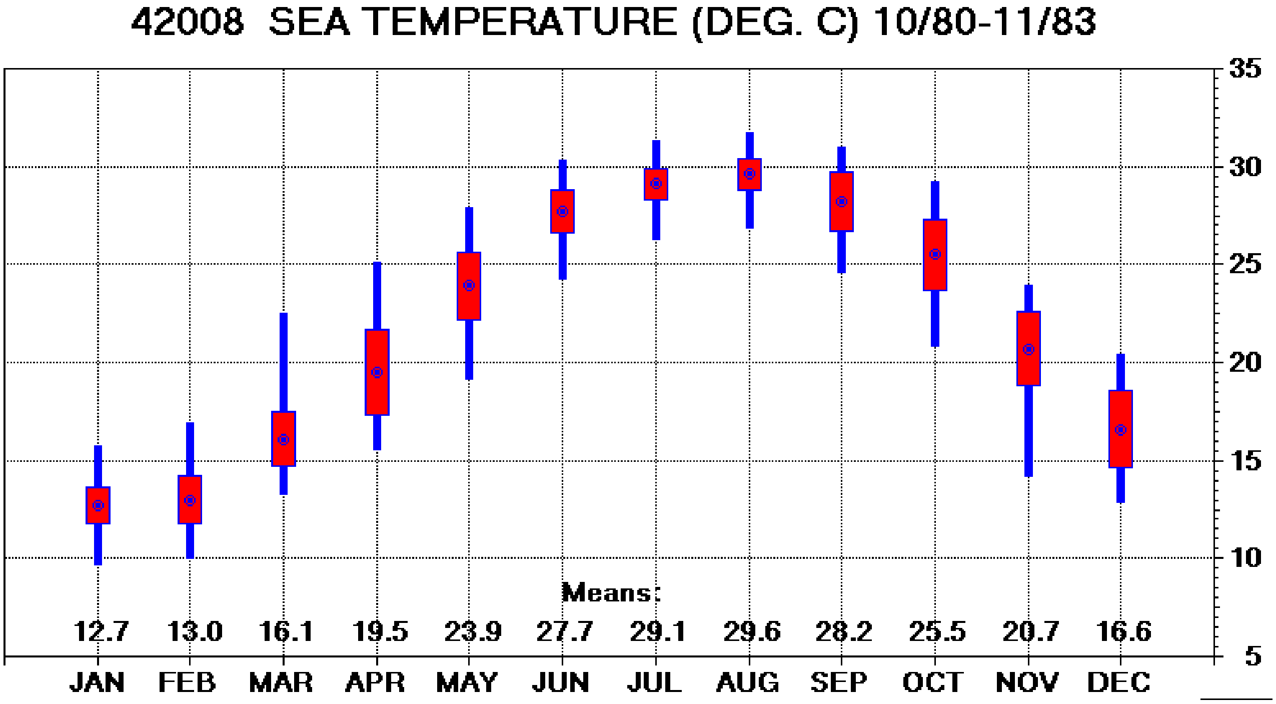
2.4.1 Temperature

Representative seawater temperature data is available in the general vicinity of the proposed Project. These data include surface water data collected at a NOAA buoy (Station 42008) and multi-depth seawater temperature data collected at the three LATEX A study current moorings described previously in Table 2.2-1 (LATEX A Stations 23, 24, and 25). Each of these historic monitoring locations was shown previously on Figure 2.2-1.

NOAA's National Data Buoy Center (NDBC) operated a Coastal-Marine Automated Network monitoring station (Station 42008 – 28.7° N, 95.3° W) in the early 1980's at an offshore location (water depth 70 feet) south of Freeport, Texas. The site of this historic monitoring location is approximately 2 miles west of the Project's proposed offshore pipeline and approximately 21 miles (34 km) northwest of the of the Project's proposed Pumping Platform GA A56-A. Figure 2.4-1 is a box and whisker chart of hourly surface seawater measurements recorded at this location over a 3-year period (October 1980 to November 1983) (NDBC 2008). The red boxes represent values from the 25 percent quartile (bottom of the box) to the 75 percent quartile (top of the box) with the median of the observed temperature data as a circle located toward the center of the box. The whiskers extend to both the maximum and minimum observed values.

Mean surface seawater temperatures over this period of record at Station 42008 ranged from approximately 55°F (12.7°C) in January to 85°F (29.6°C) in August. The minimum observed surface temperature was approximately 48°F (9°C) and the maximum observed surface temperature was approximately 90°F (32°C). While this data set was collected in shallower waters than those present in much of the Project area, it provides a general overview of seawater surface temperatures in the general region.

Figure 2.4-1 Box and Whisker Chart of Seawater Surface Temperature at NOAA NDBC Buoy Station 42008 (10/1980 to 11/1983)



In comparing data collected as part of the LATEX A study to that above, the upper water column seawater temperature data from the northern LATEX A station (Station 23) were found to be consistent with the NOAA buoy data. Monthly average near surface temperatures are in the range of 58º to 62ºF (14º to 17ºC) in the winter, 63º to 75ºF (17º to 24ºC) in the spring, 80º to 85ºF (27º to 30ºC) in the summer, and 70º to 84ºF (21º to 29ºC) in the fall. The upper water column seawater temperature at the offshore LATEX A station (Station 24) exhibits somewhat higher winter and spring surface water temperatures (on the order of 1º to 4ºF) than those observed at monitoring station closer to the shore. These higher temperatures can likely be attributed to a combination of the warming affect of eddies associated with the Loop Current at the offshore station (transporting warmer waters up from the south) and the cooling affect of freshwater contributions in the nearshore areas. This Station 24 data is likely representative of conditions in the vicinity of the proposed Offshore Terminal.

Seawater temperature data indicate that thermal stratification occurs during the summer months, with warmer less dense waters in the upper section of the water column and cooler water in the lower portion. A similar, but less significant, stratification appears to establish during the winter months, with cooler waters near the surface and warmer waters at depth. Temperatures tend to be relatively uniform across the water column during the spring and fall months.

2.4.2 Salinity/Conductivity

On the inner Louisiana–Texas shelf, salinity levels are affected both by the seasonal inflow of lower salinity freshwater from the Mississippi and Atchafalaya rivers and other smaller tributaries to the Gulf and by the bimodal current pattern of primarily downcoast (east to west) current flows during the non-summer months and upcoast current flows during the summer months. Downcoast non-summer current flows transport lower salinity freshwater discharges along the shelf, reducing salinities in surface waters in the vicinity of the Project. Upcoast summer current flows transport higher salinity water from the Texas shelf over the Project area, increasing salinity.

Seawater salinity data were collected at LATEX A Stations 23, 24 and 25 from April 1992 to December 1994. Salinity data for shallow water Station 23, indicate that lower salinity values typically appear nearer to shore and in the surface layer of the water column. Upper water column salinity levels were lowest during the winter and spring months (in the 27 to 30 ppt range), likely due to a combination of the downcoast non-summer currents present on the inner shelf and freshwater inflows due to spring runoff. Summer and fall month near surface salinities were higher, in the 30 to 36 ppt range.

Upper water column salinity data collected at the most offshore of the three stations (Station 25) indicated near surface water salinities that were apparently less affected by coastal current and/or freshwater inflow phenomena, with salinities generally in the 32 to 35 ppt range. At the two stations located further offshore (Station 24 and 25), salinity measurements were taken at multiple depths. Data indicated varying degrees of salinity stratification, with stratification somewhat more prevalent at the station closest to shore (Station 24) than at the more offshore station. In general, salinity was found to increase with depth. Upper water column salinities in the offshore area were generally in the 32 to 35 ppt range and salinities at depth (between 82 and 95 feet beneath the water surface) were generally in the 34 to 36 ppt range.

As a general trend, it can be expected that for the proposed TOPS Project, seawater salinity values will be highest offshore and at depth and lower closer to shore and in shallower waters. A typical mid-depth salinity value in the vicinity of the Project's offshore platforms would be in the range of 33 to 35 ppt, with summer month salinities and near surface salinities somewhat lower (30 to 33 ppt). Salinity values in the shallower waters of the shelf (e.g., along the shallow water northern portions of the offshore pipeline segment) typically would be lower (28 to 33 ppt) and much more variable due to seasonally varying coastal current patterns and freshwater inflows.

2.4.3 Dissolved Oxygen

Dissolved oxygen (DO) concentrations in GOM waters vary according to the location (coastal areas or. open waters), water depth, diurnal fluctuations, as well as the particular water mass within the Gulf. DO values in the GOM average about 6.5 parts per million (ppm), with values averaging about 5.0 ppm during the summer months (Barnard and Froelich 1981). DO values in the mixed layer (surface layer above the thermocline) average about 4.6 ppm, but this value varies seasonally, being particularly low during the summer months. DO also decreases as water depth increases through the mixed layer of GOM waters (MMS 1990).

Surface water DO levels are highest from February to July with the peak levels in April–May, coinciding with maximum Mississippi River flow (GMFMC 1998). However, the bottom layer of the Gulf can exhibit an oxygen deficiency throughout the year. Oxygen levels in bottom waters decrease by 0.7 ppm per month from January to the lowest value in July (GMFMC 1998).

DO concentrations of less than 2 mg/l characterize areas of hypoxic conditions. In the GOM, hypoxia results from the stratification of marine waters due to freshwater inflow from the Mississippi and

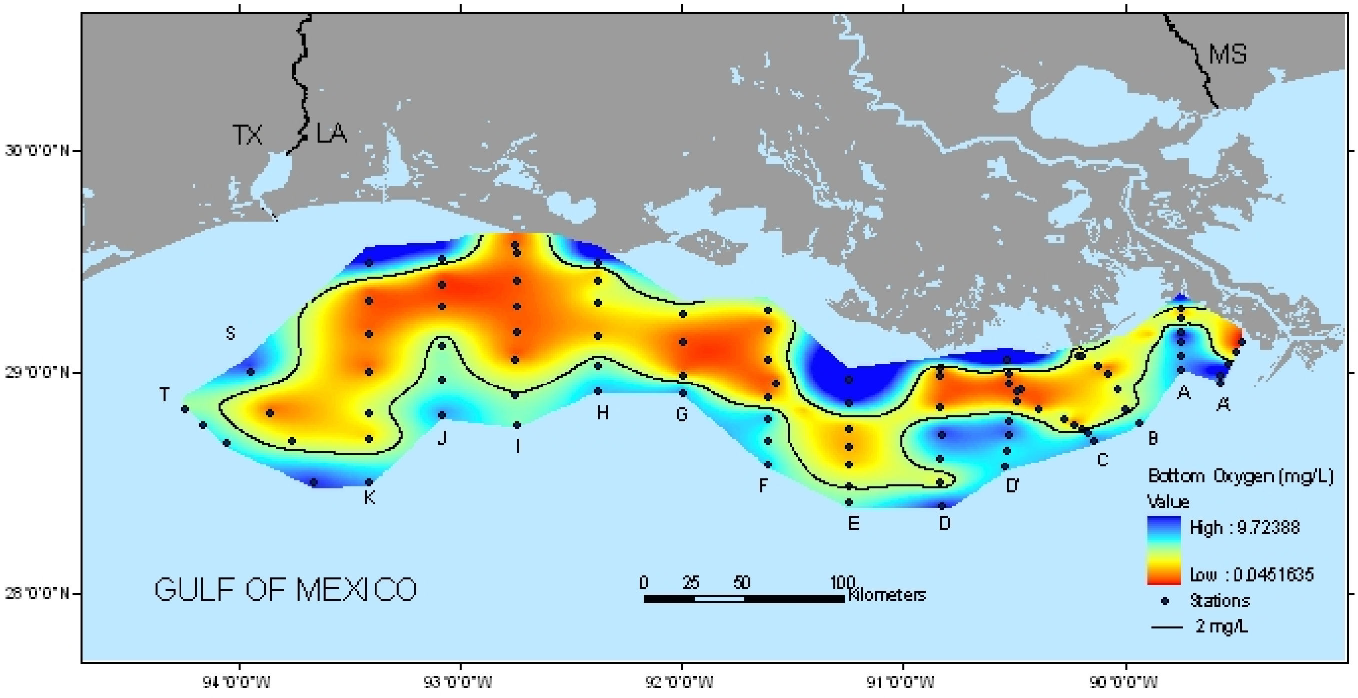
Atchafalaya rivers and the decomposition of organic matter stimulated by the nutrients contained in these discharges. Hypoxic conditions in the GOM typically occur from the spring through late summer. The combination of high volume freshwater discharge, wind mixing, regional circulation patterns, and summer warming controls the strength of the stratification that occurs in the Gulf and the degree and areal extent of the resulting hypoxic conditions (Rabalais et al. 2002).

The location of proposed TOPS Project platforms and pipelines is west of the typical westernmost extent of the hypoxic zone associated with Mississippi and Atchafalaya River discharges. Figure 2.4-2 shows a plot of the extent of hypoxia observed along the Louisiana–Texas shelf during the summer of 2007 (LUMCON 2007). As shown in the figure, the western edge of the bottom hypoxic zone terminates just east of Galveston Bay. While areas east of this western limit could occasionally be expected to experience periods of reduces dissolved oxygen levels, hypoxic conditions are not likely in the Project area (south of Freeport).

It can be expected that DO concentrations in the Project area would generally be in the 5 to 6 ppm range in the upper to mid-water column and somewhat less (in the 4 to 5 ppm range) near the sea floor. While bottom water reduced DO concentrations could potentially develop during the summer months under certain conditions, historically the hypoxic zone has not extended this far to the west.

Figure 2.4-2 Bottom Water Dissolved Oxygen Concentrations – July 21-28, 2007

Source: LUMCON 2007



2.4.4 Turbidity

The transport of suspended sediment along the Louisiana–Texas shelf is determined largely by shelf circulation patterns. Most of the suspended sediments (consisting of sand, silt and clay-sized particles) on the shelf are associated with turbidity plumes resulting from discharges from the Mississippi and Atchafalaya rivers. These plumes are transported by wind-driven currents in a downcoast direction during the non-summer months and in an upcoast direction during the summer months. As a result, the TOPS Project area tends to have lower turbidity during the summer months (due both to upcoast currents and lower river discharge rates) and higher turbidity levels during the non-summer months (MMS 1998a).

Sediment plumes from the coastal river systems first enter the GOM as low-density, freshwater surficial turbidity plumes. The sediment load is initially concentrated in this turbid surface layer that is referred to as the surface nepheloid layer (SNL). As the plume is transported into the Gulf, sediments eventually settle out of the surface plume and deposit to the seafloor. Waves and currents resuspend and transport this sediment along the seafloor. This can create a turbid layer that travels just above the seafloor that is referred to as the bottom nepheloid layer (BNL). The BNL is a significant source of sediment transport since particle concentrations in the BNL can exceed twice the concentrations of that of the SNL (MMS 1998a).

As a component of the LATEX A study, hydrographic surveys using a light transmissometer were performed in 1992, 1993, and 1994 to evaluate suspended sediment levels along the Louisiana–Texas shelf. Particle Beam Attenuation Coefficients (PBAC) were calculated from light transmission data. PBAC values were then converted to estimated suspended particulate matter concentrations based on field-data verified correlation coefficients. The LATEX A report used the suspended particulate matter estimates to develop contour graphs of suspended particulate matter concentrations (mg/l) on the shelf during the various cruises. Vertical profiles of the transmission data also allowed for an estimation of the percentage of the total sediment mass in the water column that was contained in the BNL.

Interpretation of suspended particulate matter estimates from the LATEX A study indicate that there is seasonal and interannual variability in suspended sediment concentrations along the shelf in the general Project area. Suspended particulate matter concentrations appear to be greater during the spring and fall months than during the summer month (winter data was not available in the Project area). A significant portion of the sediment load tends to be contained within the BNL during the spring months. This trend is likely due to the strong downcoast currents and high freshwater inflow that typically occur during the spring months. As expected, suspended particulate matter concentrations were found to be much lower farther offshore than closer to shore. Suspended particulate matter concentrations (and turbidity) would be expected to continue to decrease as the offshore distance (and water depth) increased.

The data from the LATEX A study is not at a sufficient level of detail to allow for a well-defined characterization of anticipated ambient turbidity levels in the immediate vicinity of the Project. Although there is significant variability, it appears that the bottom nepheloid layer could extend as far south as Block GA A56. It would be expected that the SNL, if it were to exist to any meaningful degree this far west of the Mississippi and Atchafalaya rivers, would be limited to shallow waters well north of the platform. The LATEX A data does not support a prediction of “expected” turbidity values in the Project area.

2.4.5 Trace Elements

Trace elements are natural components of marine waters and sediments, and many metals are required for healthy growth of organisms. However, human activities can increase the concentration of metals in the environment, which can be toxic to organisms (MMS 2001). A study conducted on the Mississippi River Plume found that the traces of cadmium (0.02 parts per billion [ppb]), copper (0.5 ppb), and nickel (0.5 ppb) were highest closest to shore. Furthermore, with a reduction in oxygen, metals are released from existing sediments, thereby creating a greater metal concentration in the water column (MMS 2001).

Sediment and water quality sampling conducted as part of a Mississippi and Atchafalaya rivers coastal plume study (referred to as the "LATEX B" study), provided a general characterization of trace element concentrations coastal areas of Louisiana–Texas shelf (MMS 1998b). This study involved the performance of multiple marine surveys (cruises) from 1992 to 1994 along the inner portion of the Louisiana–Texas shelf from Grande Isle, Louisiana, in the east to Corpus Christi, Texas, in the west.

Concentrations of trace metals in the shelf region ranged from a few ppb for elements like cadmium (Cd) and palladium (Pd) to ppm concentrations for barium (Ba) and strontium (Sr). Although most of the trace elements were found to be distributed relatively uniformly about the coast regions, elements such as copper (Cu), cadmium (Cd), lead (Pb) and barium (Ba) showed a consistent tendency to exhibit higher concentrations near shore than at off-shore stations. Barium and cadmium showed the highest levels just off the mouths of the Atchafalaya, Sabine, and Calcasieu estuaries.

Since the Project area is well removed from Mississippi–Atchafalaya River discharge areas, trace element concentrations would be expected to be typical of those of seawater and generally unaffected by human activities.

2.4.6 Contaminants

GOM marine waters can be heavily impacted by point and nonpoint source discharges. Petrochemical plants and petroleum refineries constitute the major point source discharges along the Gulf Coast. Coastal runoff, riverine input, and to a lesser extent discharges from offshore activities, such as oil and gas development and marine transportation also contribute to the degradation of water quality in the shelf area. Rivers draining into the Gulf, particularly the Mississippi River, carry large volumes of contaminants from agricultural and industrial activities, as well as municipal discharges (MMS 1996).

Offshore activities including oil and gas development and marine transportation discharge some form of treated wastewater into the Gulf and have resulted in accidental spills of both oil and other chemicals. Floating debris, hypoxic conditions, and toxic and pathogen contamination are the most apparent offshore water quality problems within the GOM (MMS 2001). However, as noted previously, hypoxic conditions are expected to occur very infrequently in the Project area.

Water quality sampling conducted as part of the LATEX B study (MMS 1998b, as described above under the trace elements discussion) provided a general characterization of contaminant concentrations in the coastal areas of the Louisiana–Texas shelf. Analysis of dissolved phase contaminants on the nearshore shelf indicated detectable concentrations of polycyclic aromatic hydrocarbons (PAHs), with naphthalene being the predominant parameter with a mean concentration of 142 micrograms per liter (µg/l) in the samples collected across the shelf. Herbicides (e.g., atrazine and cyanazine), pesticides (e.g., chlordane and dieldrin), and polychlorinated biphenyls also were detected at trace levels (nanograms per liter) in the dissolved phase.

As the primary source of contaminants is contributions from fresh water flows (e.g., runoff), contaminant concentrations were highest nearshore and decreased offshore and were inversely proportional to water salinity. For similar reasons, dissolved contaminant concentrations generally were greater at the surface than at the bottom of the water column. A similar trend can be expected in the Project area, with contaminant concentrations (to the degree that they exist) generally higher nearshore than offshore and generally higher in the upper water column than at depth.

2.4.7 Nutrients

Nutrient levels and their distribution play a critical role in the aquatic ecosystem of the inner Louisiana–Texas shelf and the greater GOM. Excess nutrient loadings from coastal river systems can result in noxious algae blooms, which can contribute to oxygen depletion, fish kills, and an overall deterioration of the commercial, recreational, and aesthetic value of the marine resources.

Nutrient data was collected on the Louisiana–Texas shelf in the vicinity of the proposed Project during the LATEX A program's hydrographic cruises conducted in the spring, summer and fall of 1992, 1993, and 1994 (MMS 1998a). Data collected and discussed in the LATEX A report included the most significant nutrients on the shelf: nitrate, phosphate and silicate. The LATEX A report computed seasonal average mass loadings of each of the three parameters over a series of 30 minute longitude by 30 minute latitude "boxes" (each "box" approximately 2,728 km^2 in area) over the shelf.

Table 2.4-1 presents the average mass values for the 16.4-foot (5-m) deep surface layer of a "box" located in the vicinity of proposed offshore Pumping Platform GA A56-A (Box 14) and a box located closer to shore (Box 17), selected to generally represent conditions along the offshore pipeline route. The proposed offshore platform is located approximately at the northern limit of Box 14 (the northern limit of Box 14 is latitude 28.5º N). The LATEX study did not provide data for a box immediately north of Box 14, so the Box 17 data provided is for a box located closer to shore, but east of the proposed offshore pipeline route (Box 17 is due south Galveston whereas Box 14 is due south of Freeport). Molar mass values have been converted to concentration values based on molar weights of 62, 95, and 92 grams/mole for nitrate, phosphate and silicate, respectively, and a volume of water calculated as 2,728 km^2 surface area times 5 m in depth.

Table 2.4-1 Average Nutrient Mass/Concentrations in the Vicinity of the Proposed Project

Parameter	Average for "May" Cruises (1992, 1993, 1994)		Average for "August" Cruises (1992, 1993, 1994)		Average for "November" Cruises (1992, 1993, 1994)	
	Mass (Mmoles)	Conc. (µg/l)	Mass (Mmoles)	Conc. (µg/l)	Mass (Mmoles)	Conc. (µg/l)
Vicinity of Proposed Platform GA A56-A						
Nitrate	4.0	18.2	3.0	13.6	1.0	4.5
Phosphate	0.6	2.7	0.6	2.7	0.8	3.6
Silicate	30	136	40	182	50	227
Approximately Representative of Along Offshore Pipeline Route						
Nitrate	15.0	68.2	1.0	4.5	1.0	4.5
Phosphate	0.7	3.2	0.6	2.7	1.9	8.6
Silicate	90	409	50	227	60	272

Concentrations calculated based on molar weights of 62, 95, and 92 g/mole for nitrate, phosphate and silicate, respectively.
Source: MMS 1998a (LATEX A study).

As an overall spatial pattern (and as demonstrated in Table 2.4-1), the LATEX A study found that nutrient masses/concentrations were greatest closer to shore and were reduced offshore. This can be attributed to the fact that freshwater discharges are the primary sources of nutrients in the GOM. Nutrient concentrations also tended to be greater in the central and eastern portion of the study area than in the west due to the relative proximity of the nutrient rich Mississippi and Atchafalaya River discharges.

As shown in Table 2.4-1, nitrate mass/concentrations peak during the spring. This can be attributed to a combination of the elevated Mississippi and Atchafalaya River discharge rates that typically occur during the spring months and the downcoast current pattern that tends to transport the nutrient rich plumes to the west. Nitrate mass/concentration during the summer is reduced due to a decrease in freshwater discharges and the upcoast current pattern that tends to keep the nutrient rich waters from reaching the Project area.

Phosphate and silicate concentrations did not appear to change significantly during the year at the offshore location, with a slight increasing trend from the spring to summer to fall, In shallower waters, Phosphate concentrations appeared to be highest during the fall, whereas silicate concentrations tended to be highest in the spring. Phosphate and silicate concentrations were somewhat greater nearshore as compared to offshore, likely due to the increased influence of freshwater flows in the shallower water environment.

3.0 Offshore Terminal Water Intake and Discharge

3.1 Operational Phase Water Use and Discharge

3.1.1 Fresh Water Supply and Domestic Water Discharges

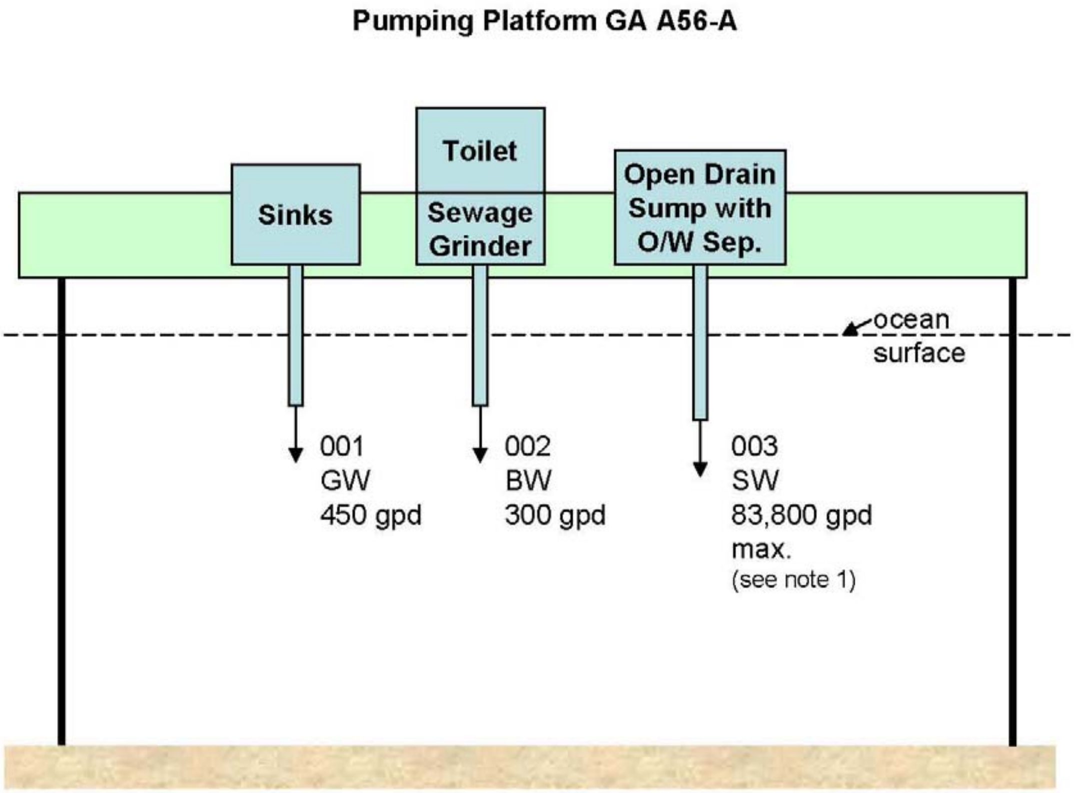
Figure 3.1-1 and Figure 3.1-2 provide operational phase water balance diagrams for PP GA A56-A and QP GA A56-B, respectively. Water use and discharge in support of the operation of the proposed offshore platforms will be associated primarily with support of the work crews that will be working and living on the platforms. It is anticipated that an average of 30 and as many as 40 workers will be stationed at QP GA A56-B and an average of 20 and as many as 30 workers will be at work on PP GA A56-A at any one time. A supply of fresh water will be required to meet the domestic water demand of the crew and for general use as washwater on the platforms. A reverse osmosis (RO) based watermaker unit will be installed on QP GA A56-B to meet the fresh water demand of both platforms.

Fresh water demand for the platforms is estimated to be approximately 3,000 gallons per day and the watermaker unit will be sized with an overall capacity of 5,000 gallons per day. Approximately 20 gallons per minute of seawater (diverted from the platform's jockey water pump system, described later) will be routed to the watermaker system where it will be filtered, pressurized and routed through reverse osmosis system. This treatment process will produce approximately 2 gpm of potable water, which will be routed to a 15,000 gallon potable water storage tank. The remaining approximately 18 gpm of water, consisting of RO reject water and filter backwash, will be combined with the jockey pump discharge water. The combined 100 gpm flow will be discharged overboard via a vertically downward oriented submerged discharge pipe (Outfall 006) located beneath QP GA A56-B at a discharge depth of 10 feet (3 m) below the water surface. The water quality of the combined Oufall 006 100 gpm discharge will approximately the same as that of ambient seawater, with a minor (approximately 2 percent) increase in salinity and negligible solids content associated with filter backwash. This effluent will rapidly mix with surrounding seawater, resulting in negligible short term adverse impacts on local water quality.

QP GA A56-B will have multiple toilets, showers and sinks in support of the living quarters. The water from all sinks and showers is considered "gray" water and will be routed directly overboard via a vertically downward oriented submerged discharge pipe (Outfall 004). The estimated gray water flow rate from the quarters/control platform is 2,400 gpd average and 3,200 gpd maximum. The quality of gray water can be variable. The estimated values provided in USEPA Form 2D are based on best professional judgment. This small quantity flow is expected to rapidly mix with surrounding seawater, resulting in negligible short term adverse impacts on local water quality.

The black water discharge from the multiple toilets located on QP GA A56-B will receive treatment in a sewage treater unit prior to discharge. The sewage treater will be a unit designed to meet the requirements of a USCG/IMO certified Type II Marine Sanitation Device (MSD) and will provide for aeration, clarification, and disinfection of the black water flow prior to discharge. The sewage treater unit proposed for this platform will be a "50 man" sewage treater with a 1,000 gpd capacity (e.g., a "Red Fox" RF-1000-C or similar unit; see representative information provided in Appendix 1). The estimated treated black water discharge rate from QP GA A56-B will be approximately 600 gpd average and 800 gpd maximum. Treated black water will be discharged overboard via a vertically downward oriented submerged discharge pipe (Outfall 005) located beneath QP GA A56-B at a discharge depth of 10 feet (3 m) below the water surface.

Figure 3.1-1 Water Balance Diagram – Pumping Platform GA A56-A

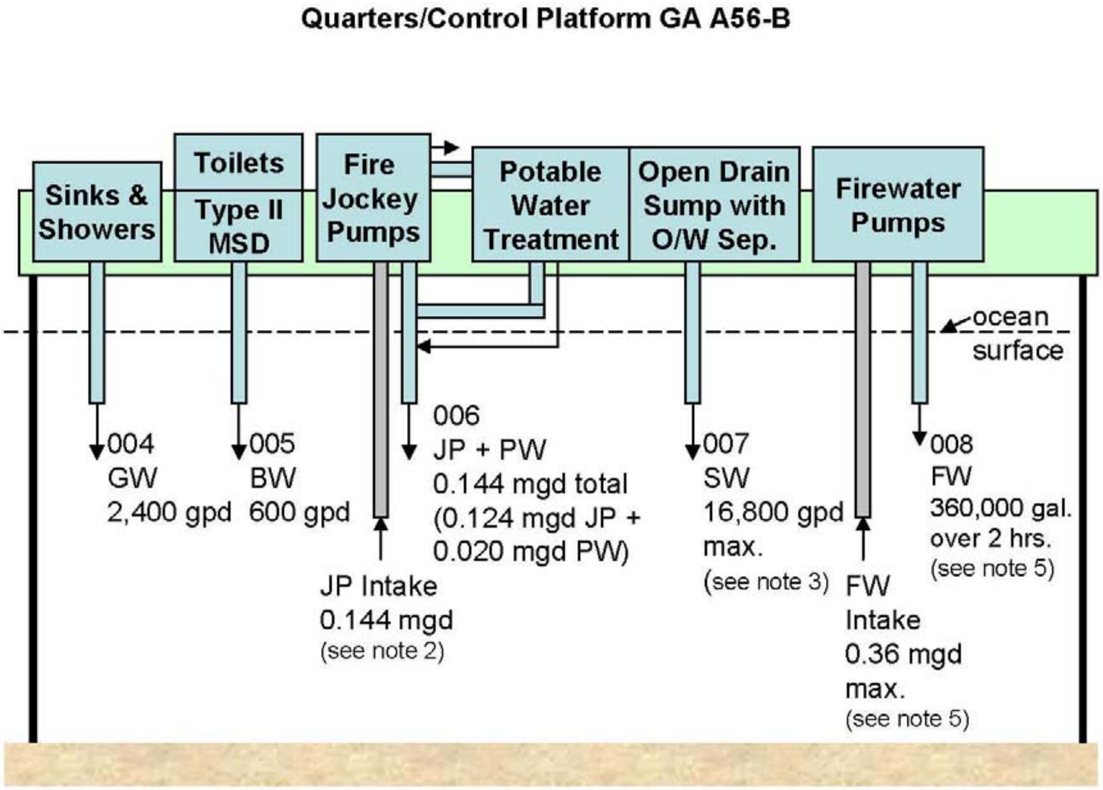


Legend:
GW = gray water discharge
BW = black water discharge
SW = stormwater discharge
gpd = gallons per day

Notes:

1. GW and SW discharge rates represent average daily values.
2. SW discharge rate represents the maximum daily flow based on a 1 yr/24hr storm of 4 inches/day.
3. Potable water and fire water supply for Platform GA A56-A provided from adjacent Platform GA A56-B.

Figure 3.1-2 Water Balance Diagram – Quarters/Control Platform GA A56-B



Legend:

GW = gray water discharge
BW = black water discharge
JP = jockey pump intake/discharge
PW = potable water treat. discharge
SW = stormwater discharge
FW = fire water test intake/discharge
mgd = million gallons per day
gpm = gallons per minute
gpd = gallons per day

Notes:

1. GW and SW discharge rates represent average daily values.
2. JP intake at 100 gpm, of which 20 gpm is routed to PW system. PW discharge (18 gpm or 0.026 mgd) routed to and combined with JP excess water, resulting in a combined total discharge of 100 gpm (0.144 mgd).
3. SW discharge rate represents a maximum daily flow based on 1 yr/24hr storm of 4 inches/day.
4. FW and JP intakes located at depth of 40 feet below ocean surface.
5. Firewater pump testing occurs for 2 hours each month (1 hr/pump) at a rate of 3,000 gpm.

The Type II MSD will be designed to ensure that discharge total suspended solids concentrations do not exceed 150 mg/l and fecal coliform counts do not exceed 100 most probable number (MPN) count in 100 milliliters. The treated black water discharge will be low flow discharge, similar in quality to discharges from other offshore platforms in the Gulf of Mexico and is expected to result in negligible short term adverse impacts on local water quality.

PP GA A56-A will not have a living quarters. The platform will have a toilet and sink in the MCC/Control building and have sinks in other miscellaneous buildings. The discharge from the sinks is considered "gray" water and will be discharged directly overboard via a vertically downward oriented submerged discharge pipe (Outfall 001). The estimated treated gray water discharge rate from PP GA A56-A will be approximately 450 gpd average and 600 gpd maximum. The pumping platforms discharge of gray water is expected to be similar in quality to that of the quarters/control platform, with discharge at an even lower flow rate, and should have no adverse impacts on local water quality.

The discharge from the toilet on PP GA A56-A is considered "black" water and will be routed through a sewage grinder (macerator) prior to being routed overboard via a vertically downward oriented submerged discharge pipe (Outfall 002). The total discharge rate each day from each PP GA A56-A will be less than 1 gpm. The estimated black water discharge rate from QP GA A56-A will be approximately 300 gpd average and 400 gpd maximum. As indicated in USEPA Form 2D, this black water discharge is expected to have a higher TSS concentration and higher fecal coliform count than that from the quarters/control platform, but will discharge at a much lower flow rate. The black water discharge will be a low flow discharge, similar in quality to discharges from small marine vessels in the Gulf of Mexico, and is expected to result in negligible short term adverse impacts on local water quality.

3.1.2 Firewater System Water Intake and Discharge

Seawater pumping and jockey pump equipment serving the Offshore Terminal's fire water system will be located on QP GA A56-B. The firewater pumping system will provide all of the firewater required for both platforms. QP GA A56-B will have two 3,000 gpm diesel engine driven firewater pumps and two 100 gpm electric submersible jockey water pumps. The firewater pumps and jockey water pumps will be submerged approximately 40 feet (12.2 m) below the ocean surface and will be connected to the platform via fiberglass column piping. The intake pipes will be equipped with screens sized to prevent large solids and debris from entering the pumping equipment.

The firewater pumps and jockey water pumps will discharge into pressurized firewater ring mains located on Platforms GA A56-A and GA A56-B. Additionally, the firewater pumps and jockey water pumps will have PCVs which will open and route firewater overboard if the pressure in the ring main gets too high. One jockey water pump will run continuously and the other will serve as a standby. As noted above, in addition to serving the fire water system, water from the jockey pumps (approximately 20 gpm) will also be routed to the potable water system for treatment in the watermaker. The continuous discharge from the operating jockey pump combined with the discharge of RO system reject and filter backwash from the watermaker represents the 100 gpm (0.144 mgd) discharge from Outfall 006.

The two 3,000 gpm firewater pumps will be tested on a monthly basis. Each firewater pump will be started and run for approximately one hour each month. During the testing, approximately 3,000 gpm of seawater will be routed overboard. This intermittent discharge associated with firewater pump testing represents Outfall 008. The water quality of firewater pump testing discharges should be essentially identical to that of ambient seawater and the discharge is expected to result in no adverse impact to local water quality.

3.1.3 Stormwater Discharges

Each of the Project's two proposed platforms will have a separate open drain system that will collect rainwater and liquids that are drained from the platform equipment. Each platform's open drain system will route collected rainwater through an oil/water separator prior to discharge.

PP GA A56-A will have plated main and cellar decks that will be equipped with grated drain boxes to collect rainwater and spills. The collected drain fluids will flow through open drain headers into an open drain sump that will be located on the sub-cellar deck. The platform also will have a sub-cellar deck hangdown sump that will collect water from the sub-cellar deck drains. This water will also be routed (pumped) up into the open drain sump. The open drain sump will be equipped with a weir-based oil/water separator that will serve to separate clean (oil free) water from oil. The clean water leaving the open drain sump will be discharged overboard via a pipeline with an outlet located 10 feet (3 m) below the ocean surface (Outfall 003). Oil collected in the separator will be pumped into the PP GA A56-A closed drain vessel, from which it will be re-routed into the crude oil transmission system.

The PP GA A56-A open drain sump will be designed to handle up to 730 gallons per minute (gpm) of rainwater (equivalent to a 2 inch per hour rain event). The open drain sump will be designed such that its overboard discharge of clean water will comply with GOM discharge water quality requirements. The sump will be designed to ensure that discharge oil and grease concentrations are less than 24 mg/l; the average discharge concentration should be well below this maximum value.

The open drain system of QP GA A56-B will be designed similar to that of PP GA A56-A, only somewhat smaller. The QP GA A56-B open drain sump will be designed to handle up to 160 gpm of rainwater (equivalent to a 2 inch per hour rain event) and its discharge (Outfall 007) will similarly comply with GOM discharge water quality requirements. Oil from the open sump pump will be routed to the PP GA A56-A closed drain vessel for subsequent recycling.

3.2 Construction Phase Discharges of Pipeline Hydrostatic Test Water

The Department of Transportation (DOT) requires all newly installed offshore oil pipelines to be hydrostatically tested at a stabilized pressure of at least 1.25 times the Maximum Allowable Operating Pressure (MAOP) for at least eight (8) hours prior to operational service. The yard fabricated & installed risers, and the yard fabricated tie-in spool pieces, will be hydrostatically tested at a stabilized pressure of at least 1.25 times the MAOP for a period of not less than four (4) hours. A successful test will confirm that there are no existing leaks in the line, and it is indeed safe for product flow. The testing of the prefabricated components will take place at the fabrication facility.

During detailed design, a hydrostatic testing plan will be developed that will identify the number and location of the specific pipeline test sections. After the pipelines are installed, they will be pigged and hydrostatically tested in segments. The Offshore Pipeline will be tested from the Freeport Valve Site (FVS) to PP GA A56-A. The Offloading Pipeline pairs will be tested using the pigging loop, first with one pipeline from PP GA A56-A to the PLEM and then with the second pipeline tested from the PLEM to PP GA A56-A.

The hydrostatic testing and dewatering process for the Offshore Pipeline and Offloading Pipelines will be conducted as follows:

- The offshore crude oil pipeline segments (the Offshore Pipeline and the Offloading Pipelines) will be installed "wet". These pipelines will be hydrostatically tested using the initial fill water as a testing medium; the injection of corrosion inhibitors, biocides, or oxygen scavengers into the fill water is not envisioned at this time

- Whether the Offshore Pipeline or the Offloading Pipelines will be laid first will ultimately be determined based on logistical considerations at a latter point in the design. The sequencing in the evaluation that follows assumes that the Offloading Pipelines will be laid first, followed by the laying of the Offshore Pipeline.

- The Offshore Pipeline will be installed from north to south (from the HDD tie-in point to the target box north of the PP). The Offloading Pipelines will similarly be installed from target boxes near the respective PLEMs to target boxes near the PP. The onshore component to the FVS would be constructed at some point in time during the Offshore Pipeline installation process (likely after completion of HDD pullback). Once construction of the Pumping Platform and the installation of the PLEMs have been completed, the offshore tie-ins will be completed, as will the lowering of the Offshore Pipeline.

- With the completion of all tie-ins, the Offshore Pipeline will be one complete pipeline from the FVS to PP risers and the Offloading Pipelines will be completed looped pipeline pairs from the PP to the respective SPM PLEM. Filtered seawater will be added to the Offshore Pipeline at the PP in order to fill the final 0.68 mile (1.09 km) long on-shore segment of the pipe from the MHWM to the FVS.

- The 34.86-mile (56.10-km) Offshore Pipeline then will be tested, as will the each of the 4,000-foot (1,219 m) long Offloading Pipeline segments.

- Post hydrostatic testing dewatering of the Offshore Pipeline and Offloading Pipelines will be performed using pressurized oil originally inserted at the Texas City Crude Terminal location. Oil will be routed from the crude terminal through the onshore pipeline segments, arriving at the FVS. A pig will be installed at the FVS and the pressurized oil force the pig through the Offshore Pipeline, displacing approximately 13.3 million gallons (MG) sweater from the pipeline, and resulting in a discharge at the Pumping Platform (Outfall 009). Oil will continue to be forced through the Offshore Pipeline, until it is completely dewatered. The discharge of 13.3 MG of seawater will be allowed to cascade over the side of the platform cellar deck, to provide for aeration as it drops to the water surface below. The estimated discharge rate will be approximately 3,900 gpm and the estimated duration of the one-time discharges approximately 57 hours.

- Oil then will also be used to dewater the Offloading Pipeline loops. Approximately 0.61 MG of seawater will be discharged at the Pumping Platform in association with the dewatering of the loop to SPM No. 1 (Outfall 010) and a similar quantity for the dewatering of the loop serving SPM No. 2 (Outfall 011). In each case, the discharge of 0.61 MG of seawater will be allowed to cascade over the side of the platform cellar deck, to provide for aeration as it drops to the water surface below. The estimated discharge rate will be approximately 3,900 gpm and the estimated duration of the discharge approximately 3 hours for each pipeline pair.

TOPS does not plan to use treatment chemicals (e.g., corrosion inhibitors, oxygen scavengers, biocides, etc.) during the initial flooding of the pipeline. A filter train will be installed in the open end of the pipeline prior to placing the pipeline in the water. These filters will prevent debris, sediment and larger aquatic organisms from entering the pipeline.

The Fuel Gas Pipeline will be tested independently from the various crude oil pipelines. The 36.28 miles (58.39 km) pipeline will be filled with filtered seawater (approximately 0.55 MG) in the vicinity of the PP, tested and then dewatered from the Williams Platform in BR 538 towards the PP, with the discharge occurring at the PP, cascading over the side of the platform cellar deck (Outfall 012). The discharge rate is expected to be approximately 160 gpm and the duration of the discharge is expected to be approximately 57 hours. It is not anticipated that treatment chemicals will be used associated with the hydrostatic testing of the FGP.

The water quality of the various hydrostatic test water discharges is expected to be approximately the same as the surrounding ambient seawater. The dissolved oxygen concentration of the test water may be slightly lower at the end of the pipe, but cascading of the test water over the side of the platform is expected to provide aeration so that as the water enters sea its dissolved oxygen concentration should be at or very near to that of the surrounding seawater. Hydrostatic test water discharges will be one-time, short duration events and adverse impacts associated with the discharges, if any, should be minor, short term impacts.

4.0 References

Barnard, W. R. and P. N. Froelich. 1981. Nutrient geochemistry of the Gulf of Mexico in Proceedings of a symposium on environmental research needs in the Gulf of Mexico, Key Biscayne, FL, 30 September–5 October, 1979. Miami, FL: U.S. Dept. of Commerce, Atlantic Oceanographic and Meteorological Laboratories. Vol. 2A, pp. 128–135.

Gulf of Mexico Fishery Management Council (GMFMC). 1998. Generic Amendment for Addressing Essential Fish Habitat Requirements in the following Fishery Management Plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States Waters, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, coastal Migratory Pelagic Resources (Mackerels) in the Gulf of Mexico and South Atlantic, Stone Crab Fishery of the Gulf of Mexico, Spiny Lobster in the Gulf of Mexico and South Atlantic, Coral and Coral Reefs of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, 3018 U.S. Highway 301 North, Suite 100, Tampa, Florida. October.

Louisiana Universities Marine Consortium (LUMCON). 2007. Dead Zone Size Near Top End – Press Release – July 28, 2007. (http://www.gulfhypoxia.net/shelfwide07/PressRelease07.pdf) Accessed February 2008.

Minerals Management Service (MMS). 2001. Proposed Use of Floating Production, Storage, and Offloading Systems on the Gulf of Mexico Outer Continental Shelf: Western and Central Planning Areas. Final Environmental Impact Statement. U.S. Department of the Interior. Minerals Management Service. Gulf of Mexico Outer Continental Shelf Region. Outer Continental Shelf EIS/EA, MMS 2000-090.

_____. 1998a. Texas-Louisiana Shelf Circulation and Transport Processes Study: Synthesis Report. Commonly referred to as the “LATEX A” study. U.S. Dept. of the Interior. Minerals Management Service. Gulf of Mexico Outer Continental Shelf Region. MMS 98-0035 (Technical Report) and MMS 98-0036 (Appendices).

_____. 1998b. An Observational Study of the Mississippi-Atchafalaya Coastal Plume, Final Report. Commonly referred to as the “LATEX B” study. U.S. Dept. of the Interior. Minerals Management Service. Gulf of Mexico Outer Continental Shelf Region. MMS 98-0040.

_____. 1996. Gulf of Mexico Sales 166 and 168: Central and Western Planning Areas. Draft Environmental Impact Statement. U.S. Dept. of the Interior. Minerals Management Service. Gulf of Mexico Outer Continental Shelf Region. Outer Continental Shelf EIS/EA, MMS 96-0007.

_____. 1990. Gulf of Mexico Sales 131, 135, and 137: Central, Western, and Eastern Planning Areas. Final Environmental Impact Statement. U.S. Dept of the Interior. Minerals Management Service. Gulf of Mexico Outer Continental Shelf Region EIS/EA, MMS 90-0042.

National Data Buoy Center (NDBC) website (www.ndbc.noaa.gov). Accessed February 2008.

National Oceanic and Atmospheric Administration (NOAA) “Tides and Currents” website (www.tidesandcurrents.noaa.gov). Accessed January 2008.

Rabalais, N. N., R. E. Turner, D. Justic, Q. Dorch, and W. J. Wiseman Jr. 1999. Characterization of Hypoxia: Topic 1 Report for the Integrated Assessment of Hypoxia in the Gulf of Mexico. NOAA Coastal Ocean Program Decision Analysis Series No. 15. NOAA Coastal Ocean Program, Silver Spring, MD. May 1999.

Rabalais, N. N., R. E. Turner, and W. J. Wiseman Jr. 2002. Gulf of Mexico Hypoxia, A.K.A. "The Dead Zone." Annual Review of Ecology and Systematics, November 2002, Vol. 33: Pages 235-263..

Appendix 1

Sewage Treater Unit – Representative Information

(Note that sewage treater unit is anticipated to be a Type II MSD similar to that shown in this Appendix. The unit ultimately installed may or may not be the specific Red Fox unit shown.)

SEWAGE UNITS CONVENTIONAL

This wastewater treatment technology has been utilized by Red Fox for over (30) years. This design is utilized on vessel applications.

The process used by the MSD involves the same three steps as the conventional unit, but the clarifier operates under a fluid head pressure allowing flocculation and settling of the solids in the clarification chamber to occur even when the vessel is in motion:

Aeration: Supports naturally occurring bacteria that eliminates the waste.

Clarification: Causes the separation of the bacteria sludge from the treated water.

Disinfection: Eliminates the presence of any living bacteria before discharge of the effluent into the environment.

RedFox Model	Persons Black Water	Persons Black & Gray Water
RF-200-C	10	4
RF-350-C	18	7
RF-500-C	25	10
RF-750-C	38	15
RF-1000-C	50	20
RF-1500-C	75	30
RF-2000-C	100	40
RF-2500-C	125	50
RF-3000-C	150	60
RF-3500-C	175	70
RF-4000-C	200	80
RF-4500-C	225	90
RF-5000-C	250	100
RF-5500-C	275	110
RF-6000-C	300	120
RF-6500-C	325	130
RF-7000-C	350	140
RF-7500-C	375	150
RF-9000-C	450	180
RF-12000-C	600	240

Conventional Marine Sanitation Device offers these benefits:

- Applicable for processing 100 to 12,000 gal/day - or crew sizes from 2 to 600.
- USCG/IMO certified Type II MSD and also meets EPA regulations.
- Offered in our standard configurations or custom designed special configuration to meet the customer's specifications and space limitations.
- Low maintenance - Very few moving parts and requirements for maintenance. If maintenance or repairs become necessary, no special tools are required.
- Low power/utility consumption.
- No odor.
- Option of a chlorine generator.
- Reasonably priced.
- Operates with fresh or saltwater.
- No sludge is developed.

***Larger Size Units Available Upon Request**