FACT SHEET AND EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

For draft Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0002927000, U.S. Environmental Protection Agency (EPA) ID No. TX0069493, to discharge to water in the state

Issuing Office: Texas Commission on Environmental Quality (TCEQ)
P.O. Box 13087
Austin, Texas 78711-3087

Applicant: Lyondell Chemical Company
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Date: June 22, 2021

Permit Action: Major amendment with renewal to TPDES Permit No. WQ0002927000 to use a site-specific hardness for calculating water quality-based effluent limits; to authorize increased copper limits at Outfall 001; to remove limits and monitoring requirements for total aluminum, total zinc, and total xylenes at Outfall 001; to add wastestreams to Outfalls 001, 002, and 008; to modify various wastewater descriptions; to increase the daily maximum pH limit at Outfall 002; to reduce the monitoring frequency at Outfalls 002 and 003 for total organic carbon and oil and grease; to use site-specific partitioning coefficients for aluminum at Outfalls 003, 004, and 005 for calculating water quality-based effluent limits; to update the discharge and monitoring locations for Outfalls 008, 009, and 010; to revise the discharge route description for Outfall 009; to remove Other Requirements Nos. 5, 12, and 14; and to update Other Requirement No. 4.

I. EXECUTIVE DIRECTOR RECOMMENDATION

The executive director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The draft permit will expire at midnight, five years from the date of permit issuance.

II. APPLICANT ACTIVITY

The applicant currently operates the Lyondell Chemical Channelview facility that manufactures synthetic organic chemicals.

III. DISCHARGE LOCATION

As described in the application, the facility is located at 2502 Sheldon Road in the City of Channelview, Harris County, Texas 77530. Discharge is via Outfalls 001-006, and 008 to Harris County Flood Control District (HCFCD) ditch G103-02-03; via Outfall 009 to an unnamed ditch, thence to Bear Lake, which is considered to be part of the San Jacinto River Tidal; via Outfall 010 to a Wallisville roadside ditch; thence all to San Jacinto River Tidal in Segment No. 1001 of the San Jacinto River Basin.

IV. RECEIVING STREAM USES

The unclassified receiving waters have minimal aquatic life use for HCFCD ditch G103-02-03, the unnamed ditch, and the Wallisville roadside ditch. The designated uses for Segment No. 1001 are primary contact recreation and high aquatic life use.

V. STREAM STANDARDS

The general criteria and numerical criteria that make up the stream standards are provided in 30 TAC §§ 307.1 - 307.10.

VI. DISCHARGE DESCRIPTION

The following is a quantitative description of the discharge described in the monthly effluent report data for the period January 2016 through May 2021. The "average of daily average" values presented in the following table are the average of all daily average values for the reporting period for each pollutant. The "maximum of daily maximum" values presented in the following table are the individual maximum values for the reporting period for each pollutant. Flows are expressed in million gallons per day (MGD). All pH values are expressed in standard units (SU). Concentration values are expressed in milligrams per liter (mg/L). Mass-based values are expressed as pounds per day (lbs/day). Not required by the existing permit and is, therefore, not applicable (N/A). No discharge is indicated by ND.

A. Flow

Outfall	Frequency	Average of Daily Averages, MGD	Maximum of Daily Maximums, MGD
001	Continuous	2.0266	5.60
002	Intermittent	400	103,869
003	Intermittent	126	31,151
004	Intermittent	0.15534	1.70
005	Intermittent	0.43114	4.00
006	Intermittent	0.35241	2.930
007	Intermittent	ND	ND
008	Continuous	ND	ND
009	Intermittent	ND	ND
010	Intermittent	ND	ND

B. Effluent Characteristics

Outfall	Parameter	Average of Daily Averages, lbs/day	Maximum of Daily Maximums, lbs/day
001 (Interim Phase)	Carbonaceous Biochemical Oxygen Demand, 5-day ($CBOD_5$)	41.6	491
	Ammonia Nitrogen (NH_3-N)	4.51	39
	Total Suspended Solids (TSS)	123	713
	Oil and Grease	93.8	145

Outfall	Parameter	Average of Daily Averages, lbs/day	Maximum of Daily Maximums, lbs/day
001 (Interim Phase)	Total Organic Carbon (TOC)	559 [1]	1,498
	Dissolved Oxygen (DO)	5.30 mg/L minimum	N/A
	Aluminum, Total	0.90	1.18
	Chromium, Total	0.045	0.115
	Copper, Total	0.276	0.740
	Zinc, Total	0.194	0.40
	Acenaphthene	0	0
	Acenaphthylene	0	0
	Acrylonitrile	0	0
	Anthracene	0	0
	Benzene	0	0
	Benzo(a)anthracene	0	0
	3,4-Benzofluoranthene	0	0
	Benzo(k)fluoranthene	0	0
	Benzo(a)pyrene	0	0
	Bis(2-ethylhexyl)phthalate	0	0
	Carbon Tetrachloride	0	0
	Chlorobenzene	0	0
	Chloroethane	0	0
	Chloroform	0.161	0.230
	2-Chlorophenol	0	0
	Chrysene	0	0
	Di-n-butyl phthalate	0	0
	1,2-Dichlorobenzene	0	0
	1,3-Dichlorobenzene	0	0
	1,4-Dichlorobenzene	0	0
	1,1-Dichloroethane	0	0
	1,2-Dichloroethane	0	0
	1,1-Dichloroethylene	0	0
	1,2-trans Dichloroethylene	0	0
	2,4-Dichlorophenol	0	0
	1,2-Dichloropropane	0	0
	1,3-Dichloropropylene	0	0
	Diethyl phthalate	0	0
	2,4-Dimethylphenol	0	0
	Dimethyl phthalate	0	0
	4,6-Dinitro-o-cresol	0	0
	2,4-Dinitrophenol	0	0
	2,4-Dinitrotoluene	0	0
	2,6-Dinitrotoluene	0	0
	Ethylbenzene	0	0
	Fluoranthene	0	0
	Fluorene	0	0
	Hexachlorobenzene	0	0

[1] The daily average effluent limitation was required prior to January 11, 2017.

Outfall	Parameter	Average of Daily Averages, lbs/day	Maximum of Daily Maximums, lbs/day
001 (Interim Phase)	Hexachlorobutadiene	0	0
	Hexachloroethane	0	0
	Methyl Chloride	0	0
	Methylene Chloride	0	0
	Naphthalene	0	0
	Nitrobenzene	0	0
	2-Nitrophenol	0	0
	4-Nitrophenol	0	0
	Phenanthrene	0	0
	Phenol	0	0
	Pyrene	0	0
	Tetrachloroethylene	0	0
	Toluene	0	0
	1,2,4-Trichlorobenzene	0	0
	1,1,1-Trichloroethane	0	0
	1,1,2-Trichloroethane	0	0
	Trichloroethylene	0	0
	Vinyl Chloride	0	0
	Xylenes, Total	0	0
	pH	6.1 SU minimum	10.1 [2] SU

Outfall	Parameter	Average of Daily Averages, mg/L	Maximum of Daily Maximums, mg/L
002	TOC	N/A	108
	Oil and Grease	N/A	5.0
	pH	6.9 SU minimum	9.1 SU
003	TOC	N/A	110
	Oil and Grease	N/A	6.0
	Aluminum, Total [3]	1.36	4.63
	pH	6.7 SU minimum	9.1 SU
004	TOC	N/A	16
	Oil and Grease	N/A	5.0
	Aluminum, Total [3]	0.451	2.14
	pH	6.9 SU minimum	9.4 SU
005	TOC	N/A	372
	Oil and Grease	N/A	5.0

[2] The exceedances of the daily maximum pH effluent limitation of 9.0 SU during the reporting period at Outfall 001 of 10.0 SU during October 2016 and 10.1 SU during December 2017 are in compliance with continuous pH monitoring requirements in the permit which allow for exceedance outside the pH range of 6.0 SU – 9.0 SU provided the exceedance does not exceed the range of 5-11 standard pH units, the individual exceedance does not exceed 60 minutes, and the sum of all excursions does not exceed 7 hours and 26 minutes in any calendar month. Therefore, the exceedances of the daily maximum pH effluent limitations at Outfall 001 are not effluent limitation violations.

[3] The daily average and daily maximum total aluminum reporting requirement expired on April 30, 2018.

Outfall	Parameter	Average of Daily Averages, mg/L	Maximum of Daily Maximums, mg/L
005	Aluminum, Total [3]	1.99	13.3
	pH	7.1 SU minimum	8.9 SU
006	TOC	N/A	112
	Oil and Grease	N/A	5.0
	pH	7.1 SU minimum	8.9 SU
007	TSS	ND	ND
	Oil and Grease	ND	ND
	pH	ND	ND
008, 009, & 010	TOC	ND	ND
	Oil and Grease	ND	ND
	pH	ND	ND

Effluent limit violations documented in the monthly effluent reports are summarized in the following table.

C. Effluent Limitation Violations

Outfall	Pollutant (units)	Month/ Year	Daily Average		Daily Maximum	
			Limit	Reported	Limit	Reported
002	TOC (mg/L)	2/2018	-	-	75	108
	pH (SU)	7/2016	-	-	9.0	9.1
	pH (SU)	6/2018	-	-	9.0	9.1
003	TOC (mg/L)	10/2020	-	-	75	110
	pH (SU)	12/2020	-	-	9.0	9.1
004	pH (SU)	12/2020	-	-	9.0	9.4
005	TOC (mg/L)	5/2016	-	-	75	372
006	TOC (mg/L)	8/2016	-	-	75	112

These limited number of exceedances are intermittent and isolated and do not represent a recurring pattern of non-compliance. Review of the compliance period of September 01, 2015 through August 31, 2020 also indicates that the permittee has a satisfactory customer rating of 3.85 and a satisfactory site rating of 3.46. Therefore, no changes are being made to the draft permit in response to these limited number of exceedances.

VII. DRAFT EFFLUENT LIMITATIONS

See Appendix D of this Fact Sheet and Executive Director's Preliminary Decision (fact sheet) for a comparison of technology-based effluent limitations, water quality-based effluent limitations, existing effluent limitations, and the effluent limitations established in the draft permit.

OUTFALL LOCATIONS

The following outfall locations are in accordance with the interoffice memorandum dated May 5, 2021 (critical conditions).

Outfall	Latitude	Longitude
001	29.812209 N	95.10018 W

Outfall	Latitude	Longitude
002	29.812209 N	95.10018 W
003	29.811602 N	95.115608 W
004	29.81603 N	95.116603 W
005	29.81597 N	95.117561 W
006	29.81589 N	95.125481 W
007 [4]	N/A	N/A
008	29.816029 N	95.116604 W
009	29.820842 N	95.106945 W
010 [5]	29.824186 N	95.109371 W

VIII. SUMMARY OF CHANGES FROM APPLICATION

A. The applicant requested the following provision that the executive director did not grant:

1. The request to reduce the monitoring frequency at Outfalls 002 and 003 for total organic carbon from once per week to once per two weeks is denied based on agency guidance.[6] The minimum monitoring frequency recommended is once per week for flow and pH; and once per two weeks for TOC and oil and grease. There have been effluent violations for TOC at Outfalls 002 and 003 during the period of review. Therefore, the request to reduce the monitoring frequency for TOC at Outfalls 002 and 003 is denied.

B. The following changes have been made from the application that make the draft permit more stringent:

1. Water quality-based daily maximum effluent limitations for the protection of aquatic life have been added for total aluminum at Outfalls 002, 003, 004, 005, and 006 based on effluent screening. See Section X.D of this fact sheet. An interim three-year compliance period is included in the draft permit for total aluminum at Outfalls 002, 003, 004, 005, and 006 in accordance with 30 TAC § 307.2(f). The interim compliance period will give the applicant time to identify sources of the aforementioned pollutant, develop mitigation strategies and treatment options, and attain the water quality-based limits.

2. Added more protective calculated water quality-based effluent limitations at Outfall 001 for benzo(a)anthracene, benzo(a)pyrene, hexachlorobenzene, and hexachlorobutadiene (daily maximum only) in the Interim Phase and benzo(a)anthracene, benzo(a)pyrene, hexachlorobenzene, hexachlorobutadiene, and phenanthrene (daily maximum) in the Final Phase. An interim three-year compliance period is not included in the draft permit for these pollutants because the permittee's discharge monitoring reports indicate the pollutants are not present in detectable concentrations.

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[4] Outfall 007 is for stormwater from a concrete batch plant associated with construction activities, which is not currently active, and its location will vary by construction project.

[5] Outfall 010 has yet to be constructed and the coordinates are an approximation.

[6] *Guidance Document for Establishing Monitoring Frequencies for Domestic and Industrial Wastewater Discharge Permits*, TCEQ Document No. 98-001.000-OWR-WQ, May 1998.

3. Added a self-expiring daily maximum total zinc monitoring and reporting requirement at Outfall 005, based on effluent screening.

4. Added Other Requirement No. 12 to address cooling water intake structure notifications, as follows:

> "The permittee shall provide written notification to the TCEQ Industrial Permits Team (MC 148) and Region 12 Office of any change in procedure or facility modification which alters the method by which the facility obtains water for cooling purposes. This notification must be submitted 30 days prior to any such change and must include a description of the planned changes. The TCEQ may, upon review of the notification, reopen the permit to include additional terms and conditions as necessary."

IX. SUMMARY OF CHANGES FROM EXISTING PERMIT

A. The permittee requested the following amendments that the executive director recommends granting:

1. Application of a site-specific hardness for calculating water quality-based effluent limits. The approved site-specific hardness value of 147 mg/L (as calcium carbonate, $CaCO_3$) applies to the freshwater portions of the receiving water bodies and has been used to calculate the applicable water quality-based effluent limitations.

2. Increased copper limits at Outfall 001. The calculated total copper effluent limitations have increased due to the application of the site-specific hardness value. The approved site-specific hardness value is new information. The total copper calculated water quality-based mass loadings are still more protective then the calculated technology-based mass loadings.

   Backsliding for water quality-based effluent limitations (WQBELs) is allowed where the water quality standard is being attained in the receiving water and the increase is compliant with antidegradation requirements of the Clean Water Act (CWA §303(d)(4)(B) and §402(o)(3)). The San Jacinto River Tidal is currently attaining water quality standards for total copper, which satisfies the requirements of the CWA §§402(o)(1) and 303(d)(4). According to the memorandum from the Standards Implementation Team dated March 30, 2021, a Tier 1 antidegradation review has preliminarily determined that existing water quality uses will not be impaired by this permit action and that numerical and narrative criteria to protect existing uses will be maintained. This change meets the anti-backsliding exemption in 40 CFR §122.44(l)(2)(i)(B)(1), which allows backsliding in cases where "*Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.*"

3. Remove limits and monitoring requirements for total aluminum, total zinc, and total xylenes at Outfall 001. Effluent data show levels below WQBELs for total aluminum and total zinc. The average reported effluent concentration for total aluminum and total zinc is 0.0716 mg/L and 0.0165 mg/L, respectively. All effluent data for total xylenes are non-detect. There are no effluent guidelines for total aluminum, total

zinc, or total xylenes applicable to the process wastewaters discharge via Outfall 001 and the effluent data is new information.

Backsliding for water quality-based effluent limitations (WQBELs) is allowed where the water quality standard is being attained in the receiving water and the increase is compliant with antidegradation requirements of the Clean Water Act (CWA §303(d)(4)(B) and §402(o)(3)). The San Jacinto River Tidal is currently attaining water quality standards for aluminum, total zinc, and total xylenes, which satisfies the requirements of the CWA §§402(o)(1) and 303(d)(4). Again, according to the memorandum from the Standards Implementation Team dated March 30, 2021, a Tier 1 antidegradation review has preliminarily determined that existing water quality uses will not be impaired by this permit action and that numerical and narrative criteria to protect existing uses will be maintained. This change meets the anti-backsliding exemption in 40 CFR §122.44(l)(2)(i)(B)(1), which allows backsliding in cases where "*Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.*" Therefore, the effluent limits and monitoring requirements for total aluminum, total zinc, and total xylenes at Outfall 001 have been removed.

4. Add wastestreams to Outfalls 001, 002, and 008 and modify various wastewater descriptions. The additional wastewaters (**in bold**) authorized for discharge via Outfall 001 are cooling tower and boiler blowdown (**including maintenance wastewaters**), **water treatment wastes, utility wastewaters, construction stormwater, and landfarm runoff and supernate (from wastewater treatment solids).** The additional wastewaters authorized for discharge via Outfall 002 are landfarm runoff and supernate (from wastewater treatment solids). The additional wastewaters (**in bold**) authorized for discharge via Outfall 008 are cooling tower **and boiler blowdown (including maintenance wastewaters)**. Existing Other Requirement No. 13, which addresses utility wastewaters has been revised as follows:

> "Utility wastewater includes, but is not limited to: potable water, vehicle rinse water, firewater (which has not come in direct contact with raw material, intermediate product, finished product, by-product, or waste product), hydrotest water, clarified water, demineralized water, steam condensate and blowdown, non-contact once-through cooling water, de minimis amounts of cooling tower water, raw and well water, groundwater seepage, condensate, analyzer instrumentation drain wastewaters, and allowable non-stormwaters. Allowable non-stormwaters are based on the *Multi-Sector General Permit for Industrial Stormwater* (MSGP; TXR050000, Part II, Section A, Item 6) and include the following:
>
> (a) discharges from emergency fire-fighting activities;
> (b) uncontaminated fire hydrant flushings (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated, and discharges are not expected to adversely affect aquatic life);
> (c) potable water sources (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated, and discharges are not expected to adversely affect aquatic life);

(d) lawn watering and similar irrigation drainage, provided that all pesticides, herbicides, and fertilizer have been applied in accordance with the approved labeling;
(e) water from the routine external washing of buildings, conducted without the use of detergents or other chemicals;
(f) water from the routine washing of pavement conducted without the use of detergents or other chemicals and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed);
(g) uncontaminated air conditioner condensate, compressor condensate, and steam condensate, and condensate from the outside storage of refrigerated gases or liquids;
(h) water from foundation or footing drains where flows are not contaminated with pollutants (e.g., process materials, solvents, or other pollutants);
(i) uncontaminated water used for dust suppression;
(j) springs and other uncontaminated groundwater; and
(k) incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of the facility but excluding intentional discharges from the cooling tower (e.g., "piped" cooling tower blowdown or drains)."

5. Increase the daily maximum pH limit at Outfall 002. The requested pH effluent limits of 6.0 – 9.5 SU are included at Outfall 002 and are not expected to cause a violation of the 6.5-9.0 SU pH criteria for the San Jacinto River Tidal (Segment No. 1001). See the discussion under section X. D. 8. (Protection of pH Standards) of this fact sheet.

6. Reduce the monitoring frequency at Outfalls 002 and 003 for total organic carbon and oil and grease from once per week to once per two weeks. The minimum monitoring frequency recommended in the *Guidance Document for Establishing Monitoring Frequencies for Domestic and Industrial Wastewater Discharge Permits* (TCEQ Document No. 98-001.000-OWR-WQ, May 1998) for industrial facilities is once per week for flow and pH; and once per two weeks for TOC and oil and grease.

   The permittee has a satisfactory compliance history rating for both the customer and facility site. There have been no effluent violations for oil and grease at Outfalls 002 and 003 during the period of review. There have been effluent violations for TOC at Outfalls 002 and 003 during the period of review. Therefore, only the monitoring frequency at Outfalls 002 and 003 for oil and grease have been reduced from once per week to once per two weeks.

7. Use site-specific partitioning coefficients for aluminum at Outfalls 003, 004, and 005 for calculating water quality-based effluent limits. Per the interoffice memorandum dated March 30, 2021 (standards) the site-specific aluminum partitioning coefficients (dissolved fraction) have been approved at Outfalls 003, 004, and 005. The dissolved fraction applicable to the freshwater portions of the discharge route for Outfall 003 is 0.755, for Outfall 004 is 0.797, and for Outfall 005 is 0.484.

8. Update the discharge route description for Outfall 009 and the discharge and monitoring locations for Outfalls 008, 009, and 010. The discharge route description for Outfall 009 and the location coordinates and monitoring point descriptions for Outfalls 008, 009, and 010 have been updated to more accurately depict current conditions.

9. Remove Other Requirements Nos. 5, 12, and 14. Existing Other Requirement No. 5, which addressed a compliance schedule for total copper, existing Other Requirement No. 12, which required resampling at Outfall 005, and existing Other Requirement No. 14, which required an aluminum partitioning coefficient study for Outfalls 003, 004, and 005 have been complete and are removed from the draft permit.

10. Update Other Requirement No. 4. Existing Other Requirement No. 4 addressing pond conditions has been updated to current pond liner requirements.

B. The following additional changes have been made to the draft permit:

1. Pages 3-13 were updated (May 2021 version).

2. The single grab limitations were revised for several pollutants at Outfall 001. Single grab limits were calculated as discussed in Appendix E of this fact sheet, except for benzo(a)anthracene, benzo(a)pyrene, and hexachlorobenzene. The single grab limits for benzo(a)anthracene, benzo(a)pyrene, and hexachlorobenzene are equal to the minimum analytical level (MAL) of 0.005 mg/L based on application of the MALs as the single grab limit in other similar permits and as a means to simplify the permit requirements for inspection purposes.

3. Added Other Requirement No. 5 to address the compliance schedule required for attainment of water quality-based effluent limitations for total aluminum at Outfalls 003 and 005.

4. Added Other Requirement No. 14 to address the definition of water treatment wastes.

5. Updated existing Other Requirement Nos. 2 (minimum analytical levels), 7 (pH excursions), and 11 (reporting requirements).

X. DRAFT PERMIT RATIONALE

The following section sets forth the statutory and regulatory requirements considered in preparing the draft permit. Also set forth are any calculations or other necessary explanations of the derivation of specific effluent limitations and conditions, including a citation to the applicable effluent limitation guidelines and water quality standards.

A. REASON FOR PERMIT ISSUANCE

The applicant applied to the TCEQ for a major amendment to use a site-specific hardness for calculating water quality-based effluent limits; to authorize increased copper limits at Outfall 001; to remove limits and monitoring for total aluminum, total zinc, and total xylenes at Outfall 001; to add wastestreams to Outfalls 001, 002, and 008; to modify various wastewater descriptions; to increase the daily maximum pH limit at Outfall 002; to reduce the monitoring frequency at Outfalls 002 and 003 for total organic carbon and oil and grease; to use site-specific partitioning coefficients for aluminum at Outfalls 003, 004, and 005 for calculating water quality-based effluent limits; to update the discharge and monitoring locations for Outfalls 008, 009, and 010; to revise the discharge route description for Outfall 009; to remove Other Requirements Nos. 5, 12, and 14; and to update Other Requirement No. 4.

The existing permit authorizes the discharge of process wastewater, Barge Dock wastewater (Tanks 6901 and 6902), hydrostatic test water, laboratory wastewater, cooling tower and boiler blowdown, loading area and process area washdown, tank farm wastewater, heat exchanger blasting slab wastewater, demineralization regeneration blowdown, maintenance wastewater, steam condensate and blowdown, groundwater from monitoring and recovery wells (onsite and offsite), and stormwater (including, but not limited to, runoff from production units, landfarm runoff, and stormwater from the adjacent cogeneration facility) at a daily average flow not to exceed 3.2 MGD (interim phase), 3.8 MGD (final phase) via Outfall 001; stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, construction stormwater, and de minimis quantities from spill cleanup on an intermittent and flow-variable basis via Outfalls 002, 003, 004, 005, 006, 009, and 010; stormwater associated with construction activities from a concrete batch plant on an intermittent and flow-variable basis via Outfall 007; and cooling tower blowdown, stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, construction stormwater, and de minimis quantities from spill cleanup on a continuous and flow-variable basis via Outfall 008.

The executive director has reviewed this action for consistency with the goals and policies of the Texas Coastal Management Program (CMP) in accordance with the regulations of the General Land Office and has determined that the action is consistent with the applicable CMP goals and policies.

B. WATER QUALITY SUMMARY

Discharge Routes

The discharge route is via Outfalls 001-006, and 008 to Harris County Flood Control District (HCFCD) ditch G103-02-03; via Outfall 009 to an unnamed ditch, thence to Bear Lake, which is considered to be part of the San Jacinto River Tidal; via Outfall 010 to a Wallisville roadside ditch; thence all to San Jacinto River Tidal in Segment No. 1001 of the San Jacinto River Basin. The unclassified receiving waters have minimal aquatic life use for HCFCD ditch G103-02-03, the unnamed ditch, and the Wallisville roadside ditch. The designated uses for Segment No. 1001 are primary contact recreation and high aquatic life use. Effluent limitations and conditions established in the draft permit comply with state water quality standards and the applicable water quality management plan. The effluent limits in the draft permit will maintain and protect the existing instream uses. Additional discussion of the water quality aspects of the draft permit can be found at Section X.D. of this fact sheet.

Antidegradation Review

In accordance with Title 30 Texas Administrative Code Section 307.5 and TCEQ's *Procedures to Implement the Texas Surface Water Quality Standards* (June 2010), an antidegradation review of the receiving waters was performed. A Tier 1 antidegradation review has preliminarily determined that existing water quality uses will not be impaired by this permit action. Numerical and narrative criteria to protect existing uses will be maintained. A Tier 2 review has preliminarily determined that no significant degradation of water quality is expected in San Jacinto River Tidal, which has been identified as having high aquatic life use. Existing uses will be maintained and protected. The preliminary determination can be reexamined and may be modified if new information is received.

Endangered Species Review
The discharge from this permit is not expected to have an effect on any federal endangered or threatened aquatic or aquatic-dependent species or proposed species or their critical habitat. This determination is based on the United States Fish and Wildlife Service's (USFWS's) biological opinion on the State of Texas authorization of the TPDES (September 14, 1998; October 21, 1998 update). To make this determination for TPDES permits, TCEQ and EPA only considered aquatic or aquatic-dependent species occurring in watersheds of critical concern or high priority as listed in Appendix A of the USFWS's biological opinion. The determination is subject to reevaluation due to subsequent updates or amendments to the biological opinion. The permit does not require EPA review with respect to the presence of endangered or threatened species.

Impaired Water Bodies
Segment No. 1001 is currently listed on the State's inventory of impaired and threatened waters, the 2020 Clean Water Act Section 303(d) list. The listing is for dioxin and polychlorinated biphenyls (PCBs) in edible tissue from the Lake Houston Dam to Interstate Highway 10 (AUs 1001_1 and 1001_02). The permittee indicated that dioxin and PCBs, which were banned by the EPA in 1979 are not expected to be present in the effluent. Furthermore, the application[7] reported non-detectable levels of PCBs at the minimal analytical level (MAL) of 0.2 micrograms per liter (µg/L) at Outfalls 001. through 004. Effluent data for primarily stormwater driven Outfalls 005, 006, and 008-010 was not included with the application. The discharge is not expected to contribute to the impairments for dioxin and PCBs in edible tissue.

C. TECHNOLOGY-BASED EFFLUENT LIMITATIONS/CONDITIONS

1. GENERAL COMMENTS

Regulations in Title 40 of the Code of Federal Regulations (40 CFR) require that technology-based limitations be placed in wastewater discharge permits based on effluent limitations guidelines, where applicable, or on best professional judgment (BPJ) in the absence of guidelines.

The draft permit authorizes the discharge of process wastewater, Barge Dock wastewater (Tanks 6901 and 6902), hydrostatic test water, laboratory wastewater, cooling tower and boiler blowdown (including maintenance wastewaters), loading area and process area washdown, tank farm wastewater, heat exchanger blasting slab wastewater, water treatment wastes, maintenance wastewater, steam condensate and blowdown, utility wastewater, groundwater from monitoring and recovery wells (onsite and offsite), construction stormwater, and stormwater (including, but not limited to, runoff from production units, landfarm runoff and supernate (from wastewater treatment solids), and stormwater from the adjacent cogeneration facility) at a daily average flow not to exceed 3.2 MGD (interim phase), 3.8 MGD (final phase) via Outfall 001; stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, construction stormwater, landfarm runoff and supernate (from wastewater treatment solids), and de minimis quantities from spill cleanup

[7] Lyondell Chemical Company's TCEQ-10055 (05/10/2019) Industrial Wastewater Permit Application Technical Report 1.0, Worksheet 2.0 for Outfalls 001-004, Pollutant Analyses Requirements.

on an intermittent and flow-variable basis via Outfalls 002; stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, construction stormwater, and de minimis quantities from spill cleanup on an intermittent and flow-variable basis via Outfalls 003, 004, 005, 006, 009, and 010; stormwater associated with construction activities from a concrete batch plant on an intermittent and flow-variable basis via Outfall 007; and cooling tower and boiler blowdown (including maintenance wastewaters), stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, construction stormwater, and de minimis quantities from spill cleanup on a continuous and flow-variable basis via Outfall 008.

The discharge of process wastewater via Outfall 001 from this facility is subject to federal effluent limitations guidelines at 40 CFR Part 414-Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF). Waste streams are subject to guidelines at Subpart F-*Commodity Organic Chemicals*, Subpart G-*Bulk Organic Chemicals*, Subpart H- *Specialty Organic Chemicals*, and Subpart I-*Direct Discharge Point Sources that Use End-of-Pipe Biological Treatment.* A new source determination was performed, and the discharge of process wastewater is not a new source as defined at 40 CFR Section 122.2, except for Subpart G wastewater. Therefore, new source performance standards (NSPS) are required for the Subpart G wastewater discharge. Note that NSPS for Subparts F, G, and H are identical to the BPT effluent limitations, which are the effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology (BPT) currently available.

The discharge of Barge Dock wastewater (Tanks 6901 and 6902), hydrostatic test water, laboratory wastewater, cooling tower and boiler blowdown (including maintenance wastewaters), loading area and process area washdown, tank farm wastewater, heat exchanger blasting slab wastewater, water treatment wastes, maintenance wastewater, steam condensate and blowdown, utility wastewater, groundwater from monitoring and recovery wells (onsite and offsite), construction stormwater, and stormwater (including, but not limited to, runoff from production units, landfarm runoff and supernate (from wastewater treatment solids), and stormwater from the adjacent cogeneration facility) via Outfall 001 are not subject to federal effluent limitations guidelines, and any technology-based effluent limitations are based on BPJ.

The discharge of stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, construction stormwater, and de minimis discharges of water from spill cleanup via Outfalls 002, 003, 004, 005, 006, 008, 009, and 010 are not subject to federal effluent limitations guidelines, and any technology-based effluent limitations are based on BPJ.

The discharge of stormwater associated with construction activities from a concrete batch plant via Outfall 007 is not subject to federal effluent limitation guidelines, and any technology-based effluent limitations are based on BPJ and the Construction General Stormwater Permit (TXR150000). The discharge represented at reporting Outfall 007 specifically addresses discharges from a concrete batch plant located in the construction area, which is an eligible discharge included in the Stormwater Associated with Construction Activities

provision of the draft permit located at Other Requirement No. 18 of the draft permit.

Outfall 001

The Lyondell Chemical Company Channelview South Complex produces bulk, commodity, and specialty organic chemicals. There is also an associated cogeneration facility, which produces steam and electricity for use in the chemical manufacturing process. The Channelview South Complex includes a High Purity Isobutylene (HPIB) unit. Isobutylene is handled as an intermediate product and an isobutylene feed of 90% is supplied by internal pipeline to the HPIB unit. Wastewater from the HPIB unit is routed the same as that of the Methyl Tertiary Butyl Ether (MTBE) and Ethyl Tertiary Butyl Ether (ETBE) unit. Lyondell plans to construct a Propylene Oxide (PO) / Tertiary Butyl Alcohol (TBA) plant.

In general, the treatment of process wastewaters includes physical, chemical, biological, and filtration treatment processes. Primary treatment includes primary oil removal, equalization, contaminated stormwater management, and neutralization. Secondary treatment combines the biological and chemical treatment processes through the use of an activated sludge biological treatment system. The system includes nutrient addition, aeration, clarification, and optional granular activated carbon treatment. Sludge handling includes digestion, thickening, and on-site Class II land application. Process wastewaters are authorized for discharge only via Outfall 001.

Wastewaters from the Propylene Oxide/Styrene Monomer Unit I (PO/SM I), Ethylbenzene Unit I (EB I), Phenylethyl Alcohol (PEA) unit, PO/SM II, EB II units, and cogeneration unit (Cogen) are routed to two equalization tanks. Wastewaters from the MTBE/ETBE/EB I/HPIB/BOO units are normally routed directly from the process unit to the two equalization tanks. During abnormal operations, the wastewater from the Butanediol (BOO) unit, MTBE/ETBE/HPIB units, and Polyols unit are routed to a surge tank prior to being sent to the equalization tanks due to the variability in wastewater composition. Use of the surge tank allows blending of the wastewater into the treatment system at a slow and controlled rate. If necessary, wastewater from the surge tank can be routed to the on-site underground injection system. The primary function of the equalization system is to allow wastewater from the various sources to become uniformly mixed prior to the biological system. The equalization process dampens surges in hydraulic and organic loading to the biological treatment system, which results in more efficient operation. In addition, it is also possible to neutralize the wastewater prior to treatment. This includes neutralization at the process units prior to routing to the wastewater treatment facilities or in the feed to the aeration tanks. Neutralization is accomplished by the addition of sulfuric acid to reduce the pH to an acceptable range for biological treatment. Occasionally, neutralization ofthe wastewater once within the wastewater treatment facilities is required.

From the two equalization tanks, the equalized wastewater flows to the two aeration tanks. Secondary treatment is provided through the activated sludge

biological treatment process. The process combines biochemical reduction of soluble organic compounds by bacteria in the aeration system and the physical separation of the biosolids in the clarifying system. Nutrients are added to the wastewater as it is routed to the aeration tanks. The facility uses phosphoric acid and aqueous ammonia to supply the proper balance of nitrogen and phosphorus for biological treatment. The return activated sludge (biosolids) from the clarifiers is added directly to the aeration tanks.

The aeration system consists of two aboveground aerated tanks, which may be operated in series or in parallel. The aeration tanks are equipped with a jet mixing system that introduces air at the bottom ofthe tanks to ensure aerobic conditions and effective mixing between the microorganisms, wastewater,and nutrients. This results in the breaking down of the organic contaminants to stable materials such as water, carbon dioxide, and new cells. A third tank is available to serve as an additional aeration tank or digester on an as needed basis. This tank has surface mechanical aerators.

The effluent from the aeration tanks is routed to the final clarifiers where biosolids are removed by settling with the aid of treatment chemicals such as polymers and anti-foaming agents. A portion of the concentrated solids at the bottom of the clarifiers is returned to the aeration tanks (return activated sludge, RAS), which ensures that the activated sludge system is adequately populated with microorganisms. The remaining sludge (waste activated sludge, WAS) is routed to the aerobic sludgedigester as part of the sludge handling system. The clarified water overflows to a sump where it is combined with several non-process wastewaters, including cooling tower and boiler blowdown, and ion exchange regeneration wastewater, and these combined waters are discharged through Outfall 001.

Aerobic digestion of the waste sludge occurs in an in-ground basin. The third aeration tank may also be used as an aerobic digester. This process results in a reduction of the volume of sludge, which is later landfarmed. Aerobic digestion occurs when the activated sludge is aerated over a period of time and utilizes its own biomass as a substrate. Periodically, digested sludge is routed to the adjacent sludge holding basin, which is used as a thickener to concentrate the solids further prior to landfarming the digested solids. The supernatant liquid from the sludge holding basin is pumped to the feed of the aeration tanks for reprocessing in the biological treatment facility.

The thickened sludge is pumped to one of the four operating cells at the Class II landfarm. Once a cell is at approximately 75% capacity with solids, the cell is taken out of service and dewatered. A crop is planted within the cell to further remove constituents from the sludge. Once the crop is matured, it is harvested and sent to an off-site waste disposal site. Afterwards, a filtration grass is planted within the cell. Once the grass is matured, the cell can be put back in service. Stormwater that accumulates in active landfarm cells is pumped back to the equalization tanks for treatment along with other industrial wastewaters. Stormwater that accumulates in inactive landfarm cells can be discharged though stormwater Outfall 002 or sent through wastewater treatment.

The other primary means of process wastewater disposal generated in the manufacturing units is by use of two on-site hazardous waste injection wells. As feasible, Lyondell implements projects to reroute streams that are currently being injected, to the biological treatment facility. In addition to the process wastewaters, there are several non-process wastewater sources that discharge through Outfall 001, including cooling tower blowdown, boiler blowdown, and ion exchange regeneration wastewaters. In addition, stormwater may be diverted from Outfall 002. Prior to mixing with the wastewater treated in the biological treatment facility, the boiler blowdown and ion exchange regeneration wastewater are neutralized to a pH between 6 and 9 in one of two neutralization basins. The remaining non-process wastewaters, such as cooling tower blowdown, are not typically treated prior to discharge to the sump upstream of Outfall 001.

The existing wastewater treatment system is being upgraded to efficiently treat the new wastewater generated from the PO/TBA plant along with the existing site wastewater. The PO/TBA wastewater characteristics are similar and compatible as the PO product is currently being produced from the PO/SM units, and TBA is presently handled as an intermediate product in the MTBE/ETBE unit. The PO/TBA wastewater streams will be routed directly to a new equalization (EQ) tank located in the PO/TBA plant and subsequently pumped across the site to one new aeration tank, which will be constructed in the existing wastewater treatment unit.

The new aeration tank will be sized to match the existing aeration tank volumes and will have a jet aeration/mixing system with recirculation pumps and aeration blowers similar to the existing system. This will maximize the mixed liquor suspended solids concentration with all three tanks online and if needed, allow the site production units to continue operating with one aeration tank offline. An increased quantity of supplemental nitrogen and phosphorus will be dosed into the combined wastewater to provide for the increased organic loading from the PO/TBA wastewater. The new aeration tank will be covered to collect the off-gas for treatment. Because of the added chemical oxygen demand (COD) load with the PO/TBA wastewaters, it is expected that more heat will be generated from the biological reactions in the activated sludge units, so a heat exchanger will be added to the new aeration tank, similar to the existing exchangers.

Flow will be gravity-fed from the aeration tank to a new degas tank with a mechanical mixer. From the degas tank, the mixed liquor will flow by gravity into the new clarifier where the biomass and other solids will settle and be separated from the mixed liquor by gravity. The new clarifier will be equipped with a polymer feed system for the increased flow and solids loading. The effluent from the new clarifier and the two existing clarifiers will flow through the effluent weir box and combine in the new sand filter feed sump. The effluent will then be pumped into four new continuously backwashing sand filters. The sand filters will further remove TSS from the clarified effluent prior to discharge. The sand filter effluent will flow by gravityto Outfall 001 for discharge. The backwash water from the sand

filters will be collected in a new backwash tank and pumped to the existing digester.

In addition to the PO/TBA wastewaters being routed to the existing wastewater treatment unit, contaminated stormwater, utility wastewaters, and miscellaneous authorized streams generated from the new PO/TBA plant will be routed to a new stormwater tank located within the PO/TBA plant area. This stormwater tank will be designated specifically for first-flush stormwater and contaminated non process wastewaters where they will be collected and transferred to the new PO/TBA equalization tank, and then to the wastewater treatment unit. There will also be a new stand-alone 3,000-gallon per minute (gpm) cooling tower.

Outfall 002

Outfall 002 is primarily a stormwater outfall. Other wastewaters that may be discharged include utility wastewaters, hydrostatic test water, service water, water from maintenance activities, water from the landfarm, and de minimis wastewaters from spill cleanups. The total area drained through Outfall 002 is 221.75 acres. Outfall 002 discharges through a 2.5-foot Cipolletti (trapezoidal) weir to an on-site ditch, the same as Outfall 001. Discharge volume is calculated by rainfall amount and run-off coefficient rather than an instantaneous weir reading.

Outfall 002 discharges stormwater from the eastern portion of the plant including the PO/SM I, EB I,PEA, Polyols, MTBE/ETBE/HPIB, and BOO manufacturing units through various sumps, the formerfire training field, and the East Maintenance Area. Stormwater from inactive cells in the on-site landfarm may be routed to either the wastewater treatment unit or to Outfall 002.

The process units each have systems to collect and contain potentially contaminated stormwater. Theareas within the process units containing unit operations with the potential to contaminate stormwater runoff have been segregated by curbs from the stormwater system. Stormwater that is potentially contaminated and first-flush stormwater is contained and routed to the biological treatment system. Additional stormwater may be contained in stormwater sumps (all units) and retention tanks (PO/SMI, EB I, PEA, Polyols, and MTBE/ETBE/HPIB units) prior to determining final disposition of the stormwater. Based on internal assessment, the water may be released to the stormwater system or routed to the biological treatment facility.

Stormwater from non-process areas is collected in a series of concrete stormwater ditches. The ditches are equipped with gates that allow for the segregation of stormwater from various areas of the facility. When contamination of stormwater is suspected, the ditch gates can be closed to contain the stormwater and prevent it from commingling with uncontaminated stormwater. The stormwater contained in the ditch may then be sampled and analyzed prior to discharge or rerouting to the biological treatment facility or to Outfall 001.

Outfall 003
Outfall 003 is primarily a stormwater outfall. Other wastewaters that may be discharged include utility wastewaters, hydrostatic test water, service water, water from maintenance activities, and de minimiswastewaters from spill cleanups. The total area drained through Outfall 003 is 69.2 acres. Outfall 003 discharges through a 90° V-notch weir into two stormwater detention areas in series, which were required by the HCFCD to reduce the rate of flow before release into HCFCD ditch G103-02-03.

Outfall 003 discharges uncontaminated stormwater collected from the PO/SM II and EB II manufacturing units through various sumps. The PO/SM II and EB II process units have a system to collect and contain potentially contaminated stormwater. The areas within the process units that contain unit operations with the potential to contaminate stormwater have been segregated by curbs from the stormwater system. Stormwater that is potentially contaminated is contained and routed to the biological treatment system. Additional stormwater is contained in stormwater sumps, designated stormwater retention tanks, or a stormwater retention pond (BDO unit) prior to determining final disposition of the stormwater. Based on analytical results, the water may be released to the stormwater system or routed to the biological treatment facility.

Uncontaminated stormwater from outside the curbed areas is not contained but flows through a seriesof concrete stormwater ditches to the outfall. The ditches are equipped with gates to allow for segregation of stormwater in the event contamination is suspected. The stormwater may then be sampled and analyzed prior to discharge or rerouting to the biological treatment facility.

Outfall 004
Outfall 004 is primarily a stormwater outfall. Other wastewaters that may be discharged include utility wastewaters, hydrostatic test water, service water, water from maintenance activities, and de minimiswastewaters from spill cleanups. The total area drained through Outfall 004 is 15.61 acres. Outfall 004 discharges through a 60° V-notch weir via a 48-inch pipe into an on-site ditch. Outfall 004 discharges stormwater collected from the warehouse and concrete slabs where the formeradministration buildings were located north of the PO/SM II complex. The administration buildings were demolished in December 2019, after a new administration building was constructed at the North Plant. What remains from the South Plant administration buildings are the concrete slabs and warehouses.

Outfalls 005 and 006
Outfalls 005 and 006 are primarily stormwater outfalls. Other wastewaters that may be discharged include utility wastewaters, hydrostatic test water, service water, water from maintenance activities, and de minimis wastewaters from spill cleanups. The total area drained by the two outfalls is 68.6 acres. Each outfall receives approximately half of the runoff from the area. Outfall 005 discharges through a 60° V-notch weir into a 54-inch pipe. Outfall 006 discharges through a 90° V-notch weir into a 48-inch pipe. Both

outfalls flow into HCFCD ditchG103-02-03. Outfalls 005 and 006 discharge stormwater from the area west of the PO/SM II complex. This area contains the two PO/SM II process flares, a maintenance laydown area, warehouses, office buildings,and parking areas.

Outfalls 008, 009, and 010

Outfalls 008, 009, and 010 were added to the TPDES permit in 2017 as proposed outfalls associated with the future PO/TBA manufacturing unit. The unit is now currently under construction and Outfalls 008 and 009 are expected to be started up in 2022. Outfall 010 has not been constructed and may not be needed, but Lyondell wishes to retain it in the permit in case the need arises. All three outfalls are authorized in the existing TPDES permit to discharge stormwater, utility wastewaters, hydrostatic test water, service water, water from maintenance activities, and de minimiswastewaters from spill cleanups. Outfall 008 is also authorized to discharge cooling tower blowdown and there is an amendment request to add boiler blowdown and cooling tower and boiler maintenance wastewaters. Outfall 008 will discharge from the future Pond 3 into an on-site ditch. Outfall 009will discharge from the future Pond 1 and 2 system into an unnamed ditch. Outfall 010 will discharge into the Wallisville roadside ditch.

Ponds 1, 2, and 3 are exempt from the liner requirements in Other Requirement No. 4 of the existing permit. This requirement specifies that before any new pond that will receive only non-process wastewater is placed in service, that a determination be obtained from the TCEQ whether the pond must be lined. Lyondell submitted a request for liner determination on October 11, 2018 and the TCEQ approved the liner exemption by letter on February 4, 2019.

Two new stormwater tanks will be located in the PO/TBA unit to manage post-first flush, non-contaminated stormwater. Water in the tanks will be tested and if found to meet the stormwater discharge limits, will be drained to a stormwater ditch and discharged via Outfall 008. Water that does not meet stormwater discharge limits will be routed to the wastewater treatment unit via the new equalization tank.

Outfall 008 will drain the majority of the PO/TBA unit stormwater, cooling tower blowdown, boiler blowdown, and utility wastewaters. Normally boiler blowdown will be routed to the cooling tower recirculation line via cooling tower circulation pumps, and as such, will become part of the cooling tower blowdown. During initial startup of the PO/TBA unit, however, the boilers will be started up first, resulting in boiler blowdown discharging to Outfall 008 directly instead of routing to the cooling tower. Once both the boiler and cooling tower systems are running, the boiler blowdown will be routed to the PO/TBA cooling tower recirculation line. However, there may be times during maintenance or repair, that the boiler blowdown would need to be routed directly to the outfall. With the inclusion of cooling tower blowdown, the discharge from Outfall 008 will be continuous. Outfall

008 will discharge from Pond 3 on the south side of the PO/TBA plant into an on-site ditch, which then flows into HCFCD ditch G103-02-03.

Non-process areas located in the southeastern and northeastern sections of the PO/TBA unit will discharge through Outfall 009 to an on-site ditch. The discharge from the outfall will be intermittent and variable. The future detention Ponds 1 and 2 will be interconnected and Outfall 009 will discharge from Pond 2.

Water Supply
Lyondell Channelview obtains potable water from the Harris County Water Control and Improvement District (WCID) No. 84. Water used for industrial purposes at Lyondell Channelview is supplied from Lake Houston. The City of Houston owns 100% of Lake Houston and the Coastal Water Authority (CWA) manages Lake Houston. The intake structure at Lake Houston is controlled and operated by CWA.

Water from CWA is pumped into a canal system that leads to the adjacent Equistar Chemicals Channelview North Complex. The water from the canal is pumped to a surface water treatment unit where the water is filtered and clarified before being pumped to Lyondell Channelview for use in the manufacturing process. Periodically, the water from Lake Houston may have elevated copper levels, which is monitored at the entry and exit to the surface water treatment unit. Currently, the CWA is implementing the Luce Bayou Interbasin Transfer Project, which will transfer water from the TrinityRiver to Lake Houston via a canal system to meet the increased demand for surface water by municipalities and industry within Harris County. This project is scheduled to be completed in 2021.

Domestic Wastewater
Domestic wastewater generated at the facility is not authorized for discharge from this facility. Domestic wastewater is routed to Harris County Water Control and Improvement District No. 84 (TPDES Permit No. WQ0010558-001) wastewater treatment plant or to Equistar Chemicals, LP Channelview Complex (TPDES Permit No. WQ0000391000) for treatment and disposal. Some domestic wastewater may be collected in on-site portable toilets during construction/maintenance work and transported off-site for treatment.

2. CALCULATIONS

See Appendix A of this fact sheet for calculations and further discussion of technology-based effluent limitations proposed in the draft permit. A comparison of technology-based effluent limits, existing effluent limitations, and calculated water quality-based effluent limits can be found in Appendix D of this fact sheet.

3. 316(B) COOLING WATER INTAKE STRUCTURES

a. SCREENING

The facility obtains water from the City of Houston, a public water system (PWS No. TX1010013), for cooling purposes. The use of water obtained from a public water system for cooling purposes does not constitute the use of a cooling water intake structure; therefore, the facility is not subject to Section 316(b) of the CWA or 40 CFR Part 125, Subpart J.

b. PERMIT ACTION

Other Requirement No. 12 has been included in the draft permit to require the permittee to notify the TCEQ in the event of a change to the method by which cooling water is obtained. Upon receipt of such notification, the TCEQ may reopen the permit to include additional terms and conditions as necessary.

D. WATER QUALITY-BASED EFFLUENT LIMITATIONS/CONDITIONS

1. GENERAL COMMENTS

The *Texas Surface Water Quality Standards* found at 30 TAC Chapter 307 state that surface waters will not be toxic to man from ingestion of water, consumption of aquatic organisms, or contact with the skin, or to terrestrial or aquatic life. The methodology outlined in the TCEQ guidance document *Procedures to Implement the Texas Surface Water Quality Standards* (IPs) is designed to ensure compliance with 30 TAC Chapter 307. Specifically, the methodology is designed to ensure that no source will be allowed to discharge any wastewater that (1) results in instream aquatic toxicity; (2) causes a violation of an applicable narrative or numerical state water quality standard; (3) results in the endangerment of a drinking water supply; or (4) results in aquatic bioaccumulation that threatens human health. Calculated water quality-based effluent limits can be found in Appendix B of this fact sheet.

TPDES permits contain technology-based effluent limits reflecting the best controls available. Where these technology-based permit limits do not protect water quality or the designated uses, additional water quality-based effluent limitations or conditions are included. State narrative and numerical water quality standards are used in conjunction with EPA criteria and other toxicity databases to determine the adequacy of technology-based permit limits and the need for additional water quality-based controls. A comparison of technology-based effluent limits and calculated water quality-based effluent limits can be found in Appendix D of this fact sheet.

2. AQUATIC LIFE CRITERIA

a. SCREENING

Water quality-based effluent limitations are calculated from freshwater and saltwater aquatic life criteria found in Table 1 of the *Texas Surface Water Quality Standards* (30 TAC Chapter 307). The following evaluation applies to Outfalls 001-006 and Outfalls 008-010.

Outfalls 001-006 and 008-010

There is no mixing zone or zone of initial dilution (ZID) for these discharges directly to HCFCD ditch G102-02-03 (Outfalls 001-006 and 008), to an unnamed ditch (Outfall 009), and to the Wallisville roadside ditch (Outfall 010) all are intermittent streams; acute freshwater criteria apply at the end of pipe. All intermittent streams are within three miles of the San Jacinto River Tidal (Segment No. 1001). Acute and chronic saltwater criteria are applied in the bay, estuary, or wide tidal river.

For all the intermittent streams, the percent effluent for acute protection of aquatic life is 100% because the seven-day, two-year low-flow (7Q2) of the intermittent stream is 0.0 cubic feet per second (cfs). TCEQ practice is to establish minimum estimated effluent percentages at the edges of the ZID and aquatic life mixing zone for discharges that are 10 MGD or less into bays, estuaries, and wide tidal rivers that are at least 400 feet wide. These critical effluent percentages are as follows:

Acute Effluent % (stream)	100 %
Acute Effluent % (bay, estuary, or wide tidal river)	30 %
Chronic Effluent % (bay, estuary, or wide tidal river)	8 %

Outfall 007

Outfall 007 will be discharges of stormwater associated with construction activities from a concrete batch plant, which is not currently active, and its location will vary by construction project. Typically, critical conditions are not developed for stormwater outfalls and water quality-based effluent limits are not developed.

General Screening Procedures

Wasteload allocations (WLAs) are calculated using the above estimated effluent percentages, criteria outlined in the *Texas Surface Water Quality Standards*, and partitioning coefficients for metals (when appropriate and designated in the implementation procedures). Discharges via Outfalls 001-006 and 008-010 are to an intermittent freshwater water body (HCFCD ditch G102-02-0), an unnamed ditch, or the Wallisville roadside ditch) within three miles of a wide tidal river, the San Jacinto River Tidal. The WLA is the end-of-pipe effluent concentration that can be discharged when, after mixing in the receiving stream, the instream numerical criteria will not be exceeded. The long-term average (LTA) is the long-term average effluent concentration for which the WLA will never be exceeded using a selected percentile confidence level.

For the freshwater portion of the discharge route, from the WLA, a LTA is calculated using a lognormal probability distribution, a given coefficient of variation (0.6), and a 99th percentile confidence level. The LTA is used to calculate a daily average and daily maximum effluent limitation for the protection of aquatic life using the same statistical considerations with the 99th percentile confidence level and a standard number of monthly effluent samples collected (12).

For the wide tidal river portion of the discharge route, from the WLA, a LTA is calculated using a lognormal probability distribution, a given coefficient of variation (0.6), and a 90th percentile confidence level. The lower of the two LTAs (acute and chronic) is used to calculate a daily average and daily maximum effluent limitation for the protection of aquatic life using the same statistical considerations with the 99th percentile confidence level and a standard number of monthly effluent samples collected (12).

Assumptions used in deriving the effluent limitations include segment-specific values for TSS, pH, hardness, and chloride according to the *IPs*. The permittee requested to use a site-specific hardness for calculating water quality-based effluent limits. Per the interoffice memorandum dated March 30, 2021 (standards), the approved site-specific hardness value of 147 mg/L (as calcium carbonate, $CaCO_3$) applies only to the freshwater portions of the HCFCD ditch G103-02-03, the unnamed ditch, and the Wallisville roadside ditch. A site-specific water-effect-ratio of 1.8 applies for total copper for the San Jacinto River Tidal (Segment No. 1001) based on TSWQS, Appendix E.

Per the interoffice memorandum dated May 5, 2021 (critical conditions), freshwater segment values from Segment No. 1016 are used for the immediate freshwater receiving water bodies and are 82 mg/L chlorides, 7.5 SU for pH, and 12 mg/L for TSS. The segment-specific value for TSS for Segment No. 1001 is used for the San Jacinto River Tidal and is 8 mg/L for TSS. For additional details on the calculation of water quality-based effluent limitations, refer to the *IPs*.

TCEQ practice for determining significant potential is to compare the reported analytical data against percentages of the calculated daily average water quality-based effluent limitation. Permit limitations are required when analytical data reported in the application equals or exceeds 85 percent of the calculated daily average water quality-based effluent limitation. Monitoring and reporting is required when analytical data reported in the application equals or exceeds 70 percent of the calculated daily average water quality-based effluent limitation.

Calculated water quality-based effluent limitations at Outfall 001 are compared to calculated technology-based effluent limitations for parameters required under EPA categorical guidelines (40 CFR Part 414) and to existing effluent limitations. Since the EPA categorical guideline-based effluent limitations at Outfall 001 are required to be expressed in

terms of mass (lbs/day), equivalent mass effluent limitations for the water quality-based effluent limitations are calculated and used for direct comparison purposes.

When the mass equivalent water quality-based effluent limitation is more stringent than the required mass technology-based effluent limitation, the water quality-based effluent limitation is imposed at the outfall. See Appendix B of this fact sheet for the calculation of water quality-based effluent limitations for aquatic life protection.

b. PERMIT ACTION

Effluent data for primarily stormwater driven Outfalls 005 and 006 were not initially included with the application and were subsequently submitted. Outfalls 008-010 were also not included with the application because they are not yet in operation. Effluent testing included in existing Other Requirement No. 19 is continued in the draft permit for Outfalls 008-010.

The permittee submitted effluent data for Outfalls 003, 004, and 005 in compliance with existing Other Requirement No. 14 comparing total and dissolved aluminum concentrations. Evaluation of the submitted effluent data indicated an aluminum partition coefficient study was appropriate, per an August 15, 2014, electronic mail from Michael Pfeil of the Water Quality Standards Implementation Team of the Water Quality Assessment Section. The study results were submitted to the TCEQ on December 21, 2020. Per the interoffice memorandum dated March 30, 2021 (standards) the site-specific aluminum partitioning coefficients (dissolved fraction) have been approved at Outfalls 003, 004, and 005. The dissolved fraction applicable to the freshwater portions of the discharge route for Outfall 003 is 0.755, for Outfall 004 is 0.797, and for Outfall 005 is 0.484.

Analytical data reported in the application was screened against the calculated water quality-based effluent limitations for the protection of aquatic life. The average of the reported analytical data (including the monthly effluent data for outfalls 003, 004, and 005) does not exceed 70 percent of the calculated daily average water quality-based effluent limitation for aquatic life protection, except for total aluminum at Outfalls 002, 003, 004, 005, and 006.

The average effluent concentration for total aluminum of 2.394 mg/L at Outfall 002 exceeds the calculated water quality-based total aluminum daily average effluent limitation of 0.835 mg/L for aquatic life protection at Outfall 002. The average effluent concentration for total aluminum of 3.047 mg/L at Outfall 003 exceeds the calculated water quality-based total aluminum daily average effluent limitation of 1.103 mg/L for aquatic life protection at Outfall 003. The average effluent concentration for total aluminum of 6.848 mg/L at Outfall 004 exceeds the calculated water quality-based total aluminum daily average effluent limitation of 1.047

mg/L for aquatic life protection at Outfall 004. The average effluent concentration for total aluminum of 9.194 mg/L at Outfall 005 exceeds the calculated water quality-based total aluminum daily average effluent limitation of 1.725 mg/L for aquatic life protection at Outfall 005. The average effluent concentration for total aluminum of 1.858 mg/L at Outfall 006 exceeds the calculated water quality-based total aluminum daily average effluent limitation of 0.835 mg/L for aquatic life protection at Outfall 006. Therefore, daily maximum total aluminum effluent limitations have been included at Outfalls 002, 003, 004, 005, and 006.

An interim three-year compliance period is included in the draft permit for total aluminum at Outfalls 002, 003, 004, 005, and 006 in accordance with 30 TAC § 307.2(f). The interim compliance period will give the applicant time to identify sources of the aforementioned pollutants, develop mitigation strategies and treatment options, and attain the water quality-based limits.

In addition, the average effluent concentration for total zinc of 169 mg/L at Outfall 005 exceeds 70 percent of the calculated water quality-based total aluminum daily average effluent limitation of 236 mg/L for aquatic life protection at Outfall 005. Therefore, a self-expiring daily maximum total zinc monitoring and reporting requirement has been included at Outfall 005.

The limits in the existing permit were compared to the calculated water quality-based effluent limits to determine whether the existing limits are still protective. See Appendix D of this fact sheet for a comparison of the existing effluent limits with the calculated water quality-based effluent limits.

The limits in the existing permit were compared to the calculated water quality-based effluent limits to determine whether the existing limits are still protective. The calculated water quality-based effluent limitations at Outfall 001 for benzo(a)anthracene, benzo(a)pyrene, and hexachlorobenzene in the Interim Phase; and benzo(a)anthracene, benzo(a)pyrene, hexachlorobenzene, hexachlorobutadiene, and phenanthrene (daily maximum) in the Final Phase are more stringent and have been included in the draft permit. An interim three-year compliance period is not included in the draft permit for these pollutants because the permittee's discharge monitoring reports indicate the pollutants are not present in detectable concentrations.

The permittee requested to increase the total copper effluent limitations at Outfall 001. Water quaity-based effluent limitations for total copper are included in the draft permit at Outfall 001. See section IX (Summary of Changes from Existing Permit) of this fact sheet for the discussion and determination of these requests.

No additional limits or monitoring and reporting requirements have been added to the draft permit for aquatic life protection.

3. WHOLE EFFLUENT TOXICITY (BIOMONITORING) CRITERIA

a. SCREENING AND REASONABLE POTENTIAL ANALYSIS

The existing permit includes chronic marine biomonitoring requirements at Outfall 001.

In the past three years, the permittee performed twenty-four chronic tests with no demonstrations of significant toxicity (i.e., no failures) by the mysid shrimp (*Mysidopsis bahia*) or inland silverside (*Menidia beryllina*).

A reasonable potential determination was performed in accordance with 40 CFR §122.44(d)(1)(ii) to determine whether the discharge will reasonably be expected to cause or contribute to an exceedance of a state water quality standard or criterion within that standard. Each test species is evaluated separately. The reasonable potential determination is based on representative data from the previous three years of chronic whole effluent toxicity (WET) testing. This determination was performed in accordance with the methodology outlined in the TCEQ letter to the EPA dated December 28, 2015 and approved by the EPA in a letter dated December 28, 2015.

With no demonstrations of significant toxicity during the period of record for either test species, a determination of no reasonable potential was made. All of the test results were used for this determination.

b. PERMIT ACTION

The provisions of this section apply to Outfall 001.

Based on information contained in the permit application, the TCEQ has determined that there may be pollutants present in the effluent(s) that may have the potential to cause toxic conditions in the receiving stream.

Whole effluent toxicity testing (biomonitoring) is the most direct measure of potential toxicity, which incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. Biomonitoring of the effluent is, therefore, required as a condition of this permit to assess potential toxicity. The biomonitoring procedures stipulated as a condition of this permit are as follows:

i) Chronic static renewal 7-day survival and growth test using the mysid shrimp (*Mysidopsis bahia*). The frequency of the testing shall be once per quarter.

ii) Chronic static renewal 7-day larval survival and growth test using the inland silverside (*Menidia beryllina*). The frequency of the testing shall be once per quarter.

Toxicity tests shall be performed in accordance with protocols described in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms,* Third Edition (EPA-821-R-02-014) or the latest revision. The stipulated test species are appropriate to measure the toxicity of the effluent consistent with the requirements of the state water quality standards. The biomonitoring frequency has been established to reflect the likelihood of ambient toxicity and to provide data representative of the toxic potential of the facility's discharge.

This permit may be reopened to require effluent limits, additional testing, or other appropriate actions to address toxicity if biomonitoring data show actual or potential ambient toxicity to be the result of the permittee's discharge to the receiving stream or water body.

If none of the first four consecutive quarterly tests demonstrates significant lethal or sublethal effects, the permittee may submit this information in writing and, upon approval, reduce the testing frequency to once per six months for the invertebrate test species and once per year for the vertebrate test species. If one or more of the first four consecutive quarterly tests demonstrates significant sublethal effects, the permittee is required by the permit to continue quarterly testing for that species until four consecutive quarterly tests demonstrate no significant sublethal effects. At that time, the permittee may apply for the appropriate testing frequency reduction for that species. If one or more of the first four consecutive quarterly tests demonstrates significant lethal effects, the permittee is required by the permit to continue quarterly testing for that species until the permit is reissued.

c. DILUTION SERIES

The permit requires five (5) dilutions in addition to the control (0% effluent) to be used in the toxicity tests. These additional effluent concentrations shall be 3%, 5%, 6%, 8%, and 11%. The low-flow effluent concentration (critical dilution) is defined as 8% effluent.

The dilution series outlined above was calculated using a 0.75 factor applied to the critical dilution. The critical dilution is the estimated effluent dilution at the edge of the aquatic life mixing zone, which is discussed in Section X.D.2.a. of this fact sheet.

4. AQUATIC ORGANISM TOXICITY CRITERIA (24-HOUR ACUTE)

a. SCREENING

The existing permit includes 24-hour acute marine biomonitoring requirements for Outfall 001. In the past three years, the permittee has performed twelve 24-hour acute tests, with no demonstrations of significant mortality. Minimum 24-hour acute marine biomonitoring requirements are proposed in the draft permit as outlined below.

b. PERMIT ACTION

Twenty-four-hour 100% acute biomonitoring tests are required at Outfall 001 at a frequency of once per six months for the life of the permit.

The biomonitoring procedures stipulated as a condition of this permit are as follows:

i) Acute 24-hour static toxicity test using the mysid shrimp (*Mysidopsis bahia*). A minimum of five (5) replicates with eight (8) organisms per replicate shall be used for this test.

ii) Acute 24-hour static toxicity test using the inland silverside (*Menidia beryllina*). A minimum of five (5) replicates with eight (8) organisms per replicate shall be used for this test.

Toxicity tests shall be performed in accordance with protocols described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, Fifth Edition (EPA-821-R-02-012) or the latest revision.

5. AQUATIC ORGANISM BIOACCUMULATION CRITERIA

a. SCREENING

Water quality-based effluent limitations for the protection of human health are calculated using criteria for the consumption of fish tissue found in Table 2 of the *Texas Surface Water Quality Standards* (30 TAC Chapter 307). The following evaluation applies to Outfalls 001-006 and Outfalls 008-010.

Outfalls 001-006 and 008-010
Discharges are to HCFCD ditch G102-02-03 (Outfalls 001-006 and 008), to an unnamed ditch (Outfall 009), and to the Wallisville roadside ditch (Outfall 010) all are intermittent streams within three miles of the San Jacinto River Tidal, a wide tidal river. Fish tissue bioaccumulation criteria are applied in the bay, estuary, or wide tidal river for a discharge to an intermittent stream that enters a bay, estuary, or wide tidal river within 3 miles downstream of the discharge point. TCEQ practice is to establish a minimum estimated effluent percentage for discharges that are 10 MGD or less into bays, estuaries, and wide tidal rivers that are at least 400 feet wide. This critical effluent percentage is:

Human Health Effluent %: 4%

Outfall 007
Outfall 007 will be discharges of stormwater associated with construction activities from a concrete batch plant, which is not currently active, and its location will vary by construction project. Typically, critical conditions are

not developed for stormwater outfalls and water quality-based effluent limits are not developed.

General Screening Procedures

Water quality-based effluent limitations for human health protection against the consumption of fish tissue are calculated using the same procedure as outlined for calculation of water quality-based effluent limitations for aquatic life protection. A 99th percentile confidence level in the long-term average calculation is used, with only one long-term average value being calculated.

Significant potential is again determined by comparing reported analytical data against 70 percent and 85 percent of the calculated daily average water quality-based effluent limitation.

Calculated water quality-based effluent limitations at Outfall 001 are compared to calculated technology-based effluent limitations for parameters required under EPA categorical guidelines (40 CFR Part 414) and to existing effluent limitations. Since the guideline-based effluent limitations at Outfall 001 are required to be expressed in the terms of mass (lbs/day), equivalent mass effluent limitations for the water quality-based effluent limitations are calculated, and if more stringent they are imposed at the outfall in place of the technology-based effluent limitation. See Appendix B of this fact sheet for calculations of water quality-based effluent limitations for human health protection. Also, see Appendix D of this fact sheet for comparisons of technology-based with water quality-based effluent limitations.

b. PERMIT ACTION

Effluent data for primarily stormwater driven Outfalls 005 and 006 were not initially included with the application and were subsequently submitted. Outfalls 008-010 were also not included with the application because they are not yet in operation. Effluent testing included in existing Other Requirement No. 19 is continued in the draft permit for Outfalls 008-010.

Analytical data reported in the application was screened against calculated water quality-based effluent limitations for the protection of human health. Reported analytical data for all outfalls does not exceed 70 percent of the calculated daily average water quality-based effluent limitation for human health protection. No additional limits or monitoring and reporting requirements have been added to the draft permit.

The limits in the existing permit were compared to the calculated water quality-based effluent limits to determine whether the existing limits are still protective. The calculated water quality-based effluent limits for benzo(*a*)anthracene, benzo(*a*)pyrene, hexachlorobenzene, and hexachlorobutadiene are more stringent than the existing limits at Outfall 001.

An interim three-year compliance period is not included in the draft permit for these pollutants because the permittee's discharge monitoring reports indicate the pollutants are not present in detectable concentrations.

6. DRINKING WATER SUPPLY PROTECTION

a. SCREENING

Segment No. 1001, which receives the discharge from this facility, is not designated as a public water supply. Screening reported analytical data of the effluent against water quality-based effluent limitations calculated for the protection of a drinking water supply is not applicable.

b. PERMIT ACTION

None.

7. TOTAL DISSOLVED SOLIDS, CHLORIDE, AND SULFATE STANDARDS PROTECTION

a. SCREENING

Concentrations and relative ratios of dissolved minerals such as chloride and sulfate that compose total dissolved solids (TDS) will be maintained to protect existing and attainable uses. Discharge via Outfall 001 is to an intermittent stream within three miles of a wide tidal river. The San Jacinto River Tidal (Segment No. 1001) is a classified saltwater segment. In order to evaluate the intermittent stream, Segment No. 1016 values are used for screening. The discharge to saltwater is evaluated on a case-by-case basis as outlined in the *IPs*.

The average concentration of TDS, chloride, and sulfate in the effluent is greater than the freshwater segment criterion. Screening procedures and effluent limitations for TDS, chloride, and sulfate are calculated using the methodology in the *IPs* and criteria in the *Texas Surface Water Quality Standards* (30 TAC Chapter 307). Detailed calculations are presented in Appendix C.

b. PERMIT ACTION

Based on the screening, no effluent limitations are needed for TDS, chloride, or sulfate.

8. PROTECTION OF pH STANDARDS

a. SCREENING

The existing permit includes pH limits of 6.0 – 9.0 standard units at Outfalls 001-010, which discharge into unclassified water bodies.

Consistent with the procedures for pH screening that were submitted to EPA with a letter dated May 28, 2014, and approved by EPA in a letter dated June 2, 2014, requiring a discharge to an unclassified water body to meet pH limits of 6.0 – 9.0 standard units reasonably ensures instream compliance with *Texas Surface Water Quality Standards* pH criteria.

The permittee requests to increase the daily maximum pH limit at Outfall 002 from 9.0 SU to 9.5 SU. Outfall 002 discharges primarily stormwater, but is also authorized to discharge construction stormwater, utility wastewater, hydrostatic test water, service water, water from maintenance activities, and de minimis quantities from spill cleanup.

The permittee asserts the elevated pH levels at Outfall 002 are believed to be caused by algae growth in the open ditch system prior to Outfall 002. Algal photosynthetic activity can temporarily increase the pH over 9.0 SU during daylight hours, particularly during warmer periods that promote algal growth. Algae use carbon dioxide as a carbon source for growth during photosynthesis. Carbon dioxide in water produces carbonic acid. When carbon dioxide is reduced, carbonic acid is also reduced and the pH increases. Outfall 002 discharges when there is a high enough rainfall event. Between discharges there will be some residual water in the ditches and also, the ditch gates may be closed at times to temporarily retain waters; consequently, algae can grow in the water that remains in the ditches between outfall discharges.

Furthermore, the existing permit requires Outfall 002 pH effluent sampling occur within the first hour of discharge. Although rainwater typically has a pH below 7 SU, it can be expected that the pH measurements collected within the first hour of discharge would be higher if stormwater is pushing through residual ditch water with a higher pH, and that eventually the pH would decrease in the outfall discharge.

Moreover, Outfall 002 discharges into an on-site ditch that also receives the discharge from Outfall 001. Outfall 002 is approximately 35 feet upstream of where the Outfall 001 discharge pipe enters the ditch and mixing of the two flows is almost immediate. On average, the Outfall 001 daily maximum pH is lower than the Outfall 002 daily maximum pH, which helps moderate any higher pH flows from Outfall 002. Based on monitoring data from July 2017 to July 2020, the median of the Outfall 001 daily maximum pH values is 7.9 SU compared to 8.2 SU for Outfall 002. The ditch carrying the flows from Outfalls 001 and 002 drains into HCFCD ditch G103-02-03, approximately 0.23 of a mile upstream of the San Jacinto River Tidal.

b. PERMIT ACTION

The existing pH limits of 6.0 – 9.0 SU are carried forward in the draft permit at Outfalls 001 and 003-010.

Based on the above reasons and per the interoffice memorandum dated March 30, 2021 (standards), the requested pH effluent limits of 6.0 – 9.5 SU are included at Outfall 002 and are not expected to cause a violation of the 6.5-9.0 SU pH criteria for the San Jacinto River Tidal (Segment No. 1001.

9. DISSOLVED OXYGEN PROTECTION

a. SCREENING

In accordance with the interoffice memorandum dated May 18, 2021 (modeling), a dissolved oxygen (DO) analysis of the discharge at Outfall 001 was conducted using an uncalibrated QUAL-TX model along with an updated version of the calibrated QUAL-TX model documented in the *Waste Load Evaluation WLE-1R for the Houston Ship Channel System* (September 2006) for an interim effluent flow of 3.2 MGD and a final effluent flow of 3.8 MGD at Outfall 001.

Coefficients and kinetics used in the models are a combination of site-specific, standardized default, and estimated values. The results of this evaluation can be re-examined upon receipt of information that conflicts with the assumptions employed in this analysis.

Due to the intermittent nature and limited oxygen demanding constituents expected from Outfalls 002-010, no significant depletion of oxygen is expected in the receiving waters due to these discharges.

No additional modeling work was performed for the current permit action.

b. PERMIT ACTION

Based on model results, the existing effluent limits of 414 lbs/day $CBOD_5$, 46 lbs/day ammonia nitrogen (NH_3-N), and 4 mg/L DO for the interim phase and 703 lbs/day $CBOD_5$, 46 lbs/day NH_3-N, and 4 mg/L DO for the final phase is predicted to be adequate to maintain the DO criteria of 2.0 mg/L for the HCFCD ditch G103-02-03 and the DO criteria of 4.0 mg/L for the San Jacinto River Tidal (Segment No. 1001). Therefore, the existing effluent limitations for $CBOD_5$, NH_3-N, and 4 mg/L DO are continued in the draft permit.

XI. PRETREATMENT REQUIREMENTS

This facility is not defined as a publicly owned treatment works. Pretreatment requirements are not proposed in the draft permit.

XII. VARIANCE REQUESTS

No variance requests have been received.

XIII. PROCEDURES FOR FINAL DECISION

When an application is declared administratively complete, the chief clerk sends a letter to the applicant advising the applicant to publish the Notice of Receipt of Application and Intent to Obtain Permit in the newspaper. In addition, the chief clerk instructs the applicant to place a copy of the application in a public place for reviewing and copying in the county where the facility is or will be located. This application will be in a public place throughout the comment period. The chief clerk also mails this notice to any interested persons and, if required, to landowners identified in the permit application. This notice informs the public about the application and provides that an interested person may file comments on the application or request a contested case hearing or a public meeting.

Once a draft permit is completed, it is sent, along with the executive director's preliminary decision, as contained in the technical summary or fact sheet, to the chief clerk. At that time, the Notice of Application and Preliminary Decision will be mailed to the same people and published in the same newspaper as the prior notice. This notice sets a deadline for making public comments. The applicant must place a copy of the executive director's preliminary decision and draft permit in the public place with the application.

Any interested person may request a public meeting on the application until the deadline for filing public comments. A public meeting is intended for the taking of public comment and is not a contested case proceeding.

After the public comment deadline, the executive director prepares a response to all significant public comments on the application or the draft permit raised during the public comment period. The chief clerk then mails the executive director's response to comments and final decision to people who have filed comments, requested a contested case hearing, or requested to be on the mailing list. This notice provides that if a person is not satisfied with the executive director's response and decision, they can request a contested case hearing or file a request to reconsider the executive director's decision within 30 days after the notice is mailed.

The executive director will issue the permit unless a written hearing request or request for reconsideration is filed within 30 days after the executive director's response to comments and final decision is mailed. If a hearing request or request for reconsideration is filed, the executive director will not issue the permit and will forward the application and request to the TCEQ commissioners for their consideration at a scheduled commission meeting. If a contested case hearing is held, it will be a legal proceeding similar to a civil trial in state district court.

If the executive director calls a public meeting or the commission grants a contested case hearing as described above, the commission will give notice of the date, time, and place of the meeting or hearing. If a hearing request or request for reconsideration is made, the commission will consider all public comments in making its decision and shall either adopt the executive director's response to public comments or prepare its own response.

For additional information about this application, contact Melinda Luxemburg, P.E. at (512) 239-4541.

XIV. ADMINISTRATIVE RECORD

The following section is a list of the fact sheet citations to applicable statutory or regulatory provisions and appropriate supporting references.

A. PERMIT

TPDES Permit No. WQ0002927000 issued on January 11, 2017.

B. APPLICATION

TPDES wastewater permit application received on January 5, 2021 and additional information received on May 12, 2021.

C. 40 CFR CITATIONS

40 CFR Part 414 Subparts F, G, and H (BPT) and Subpart I.

D. LETTERS/MEMORANDA/RECORDS OF COMMUNICATION

Letter dated May 28, 2014, from L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ, to Bill Honker, Director, Water Quality Protection Division, EPA (TCEQ proposed development strategy for pH evaluation procedures).

Letter dated June 2, 2014, from William K. Honker, P.E., Director, Water Quality Protection Division, EPA, to L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ (Approval of TCEQ proposed development strategy for pH evaluation procedures).

Letter dated December 28, 2015, from L'Oreal Stepney, P.E., Deputy Director, Office of Water, TCEQ, to Bill Honker, Director, Water Quality Protection Division, EPA (TCEQ proposed development strategy for procedures to determine reasonable potential for whole effluent toxicity limitations).

Letter dated December 28, 2015, from William K. Honker, P.E., Director, Water Quality Protection Division, EPA, to L'Oreal W. Stepney, P.E., Deputy Director, Office of Water, TCEQ (Approval of TCEQ proposed development strategy for procedures to determine reasonable potential for whole effluent toxicity limitations).

TCEQ Interoffice Memorandum dated March 30, 2021, from Jenna R. Lueg of the Standards Implementation Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Standards Memo).

TCEQ Interoffice Memorandum dated May 5, 2021, from Katie Cunningham of the Water Quality Assessment Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Critical Conditions Memo).

TCEQ Interoffice Memorandum dated May 18, 2021, from Xing Lu, P.E. of the Water Quality Assessment Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Modeling Memo).

TCEQ Interoffice Memorandum dated June 9, 2021, from Brad (Charles) Caston of the Standards Implementation Team, Water Quality Assessment Section, to the Industrial Permits Team, Wastewater Permitting Section (Biomonitoring Memo).

E. MISCELLANEOUS

The *State of Texas 2018 Integrated Report* – Texas 303(d) List (Category 5), TCEQ, November 19, 2015.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective March 1, 2018, as approved by EPA Region 6.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective March 6, 2014, as approved by EPA Region 6, for portions of the 2018 standards not approved by EPA Region 6.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective July 22, 2010, as approved by EPA Region 6, for portions of the 2014 standards not yet approved by EPA Region 6.

Texas Surface Water Quality Standards, 30 TAC §§307.1 - 307.10, TCEQ, effective August 17, 2000, and Appendix E, effective February 27, 2002, for portions of the 2010 standards not yet approved by EPA Region 6.

Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition (EPA-821-R-02-014).

Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition (EPA-821-R-02-012).

Procedures to Implement the Texas Surface Water Quality Standards, TCEQ, June 2010, as approved by EPA Region 6.

Procedures to Implement the Texas Surface Water Quality Standards, TCEQ, January 2003, for portions of the 2010 IPs not approved by EPA Region 6.

Guidance Document for Establishing Monitoring Frequencies for Domestic and Industrial Wastewater Discharge Permits, TCEQ Document No. 98-001.000-OWR-WQ, May 1998.

Appendix A
Calculated Technology-Based Effluent Limits

Interim Phase

Effluent limitations guidelines (ELGs) under 40 CFR Part 414 are applicable to the Lyondell Chemical Channelview Complex. Effluent limitations calculated using the applicable ELGs, which includes Subparts F, G, H, and I, are included in the draft permit. The following calculations are based on the most recent available information submitted with the Lyondell Chemical Company's TCEQ-10055 (05/10/2019) Industrial Wastewater Permit Application Technical Report, Attachment T-1, Table 3.1, page 13 of 17. The discharge from the primary wastewater outfall (Outfall 001) at the facility consists of process wastewater, utility wastewaters, and stormwater. The average flows provided are as follows:

Waste Stream Description	Outfall 001 (Interim Phase)
OCPSF Process Wastewater includes the following:	
PO/SM-I, EB-I, and PEA Unit Complex	360,000 gpd
PO/SM-II and EB-II Unit Complex	180,000 gpd
MTBE/ETBE/HPIB Unit	360,000 gpd
Polyols Unit (normally to deep well disposal & not included in total)	72,000 gpd
Butanediol Unit	72,000 gpd
Stormwater, potentially contaminated	210,300 gpd
Landfarm runoff	57,600 gpd
Clarifier sludge to digester (removed from treatment system through clarifier sludge wasting and subtracted from total).	<79,200 gpd>
Total OCPSF Process Wastewater	1,160,700 gpd ≈ 1.16 MGD
Utility Wastewater includes the following:	
Cogen	28,800 gpd
Cooling tower blowdown	1,440,000 gpd
Boiler blowdown, ion exchange regeneration	576,000 gpd
Miscellaneous minor flows	Variable
Total Utility Wastewater	2,044,800 gpd ≈ 2.045 MGD
Domestic Wastewater	0.0 gpd
Total Interim Phase Flow	3,205,500 gpd ≈ 3.2 MGD

Appendix A
Calculated Technology-Based Effluent Limits

Interim Phase

The process wastewaters are subject to the Organic Chemical, Plastics, and Synthetic Fibers (OCPSF) Categorical Effluent Guidelines promulgated under 40 Code of Federal Regulations (CFR) Part 414.

Outfall 001 Interim Phase Conventional Pollutant Allocation Calculations:

OCPSF PROCESS WASTEWATER - BOD_5 and TSS are based on the ELGs provided in Subparts F, G, and H. The application indicates the following percentages for the applicable subpart:

Commodity Organic Chemicals (414.41 – Subpart F)	30%
Bulk Organic Chemicals (414.41 – Subpart G)	22%
Specialty Organic Chemicals (414.41 – Subpart H)	48%

The ELGs are prorated based on these production values by the following formula:

(Subpart F ELG × fraction of total production) + (Subpart G ELG × fraction of total production) + (Subpart H ELG × fraction of total production) = Total Production ELG

BOD_5-Average			
Sub-F	(30 mg/L) × (0.30)	=	9.0 mg/L
Sub-G	(34 mg/L) × (0.22)	=	7.48 mg/L
Sub-H	(45 mg/L) × (0.48)	=	+ 21.6 mg/L
TOTAL			38.08 mg/L
BOD_5-Maximum			
Sub-F	(80 mg/L) × (0.30)	=	24.0 mg/L
Sub-G	(92 mg/L) × (0.22)	=	20.24 mg/L
Sub-H	(120 mg/L) × (0.48)	=	+ 57.6 mg/L
TOTAL			101.84 mg/L
TSS-Average			
Sub-F	(46 mg/L) × (0.30)	=	13.8 mg/L
Sub-G	(49 mg/L) × (0.22)	=	10.78 mg/L
Sub-H	(57 mg/L) × (0.48)	=	+ 27.36 mg/L
TOTAL			51.94 mg/L
TSS-Maximum			
Sub-F	(149 mg/L) × (0.30)	=	44.7 mg/L
Sub-G	(159 mg/L) × (0.22)	=	34.98 mg/L
Sub-H	(183 mg/L) × (0.48)	=	+ 87.84 mg/L
TOTAL			167.52 mg/L

The following formula is used to convert concentration to mass:

Allowable Mass (lbs/day) = [Allowable Concentration (mg/L)] × Flow (MGD) × 8.345

Daily Average BOD_5 = (38.08 mg/L) × (1.1607 MGD) × (8.345) = 368.8 lbs/day

Appendix A
Calculated Technology-Based Effluent Limits

Interim Phase

Daily Maximum BOD_5 = (101.84 mg/L) × (1.1607 MGD) × (8.345) = 986.4 lbs/day

Daily Average TSS = (51.94 mg/L) × (1.1607 MGD) × (8.345) = 503.1 lbs/day
Daily Maximum TSS = (167.52 mg/L) × (1.1607 MGD) × (8.345) = 1,622 lbs/day

UTILITY WASTEWATER - Based on BPJ allocations for non-categorical/non-domestic contributing waste sources.

Daily Average BOD_5 =(10 mg/L) × (2.045 MGD) × (8.345) = 170.6 lbs/day
Daily Maximum BOD_5 = (20 mg/L) × (2.045 MGD) × (8.345) = 341.3 lbs/day
Daily Average TSS = (30 mg/L) × (2.045 MGD) × (8.345) = 511.9 lbs/day
Daily Maximum TSS = (100 mg/L) × (2.045 MGD) × (8.345) = 1,706 lbs/day

DOMESTIC WASTEWATER - Based on 30 TAC 309.1(b).

Daily Average BOD_5 = (20 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day
Daily Maximum BOD_5 = (45 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day
Daily Average TSS = (20 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day
Daily Maximum TSS = (45 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day

CONVENTIONAL POLLUTANTS ALLOCATIONS SUMMATIONS - The contributing wastestreams were summed to calculate the technology-based mass effluent limitations.

		Daily Average Lbs/day	Daily Maximum Lbs/day
BOD_5			
	OCPSF Wastewater	368.8	986.4
	Utility Wastewater	170.6	341.3
	Domestic Wastewater	+ 0.0	+ 0.0
	TOTAL	539.4 ≈ 539 lbs/day	1,327.7 ≈ 1,327 lbs/day
TSS			
	OCPSF Wastewater	503.1	1,622
	Utility Wastewater	511.9	1,706
	Domestic Wastewater	+ 0.0	+ 0.0
	TOTAL	1,015.0 ≈ 1,015 lbs/day	3,328.0 = 3,328 lbs/day

OCPSF - TOXIC POLLUTANT STANDARDS

BAT Effluent Limitations for the OCPSF Point Source Category40 CFR 414.91 (Subpart I) - Federal Register Vol. 58, No. 130, July 9, 1993

Total Flow from Outfall 001	3.2 MGD
Process Wastewater Flow	1.1607 MGD
Chromium-Bearing Wastewater Flow	0.131 MGD
Copper-Bearing Wastewater Flow	0.131 MGD

Appendix A
Calculated Technology-Based Effluent Limits

Interim Phase

Mass, lbs/day = (Concentration, µg/L/1000) × Flow, MGD × 8.345

Parameter	Daily Avg µg/L	Daily Max µg/L	Daily Avg lbs/day	Daily Max lbs/day
Chromium	1110	2770	1.2134	3.0281
Copper	1450	3380	1.5851	3.6949
Acenaphthene	22	59	0.2131	0.5715
Acenaphthylene	22	59	0.2131	0.5715
Acrylonitrile	96	242	0.9299	2.3440
Anthracene	22	59	0.2131	0.5715
Benzene	37	136	0.3584	1.3173
Benzo(a)anthracene	22	59	0.2131	0.5715
3,4-Benzofluoranthene	23	61	0.2228	0.5908
Benzo(k)fluoranthene	22	59	0.2131	0.5715
Benzo(a)pyrene	23	61	0.2228	0.5908
Bis(2-ethylhexyl)phthalate	103	279	0.9977	2.7024
Carbon Tetrachloride	18	38	0.1743	0.3681
Chlorobenzene	15	28	0.1453	0.2712
Chloroethane	104	268	1.0073	2.5959
Chloroform (includes utility wastewater, flow = 3.2 MGD)	21	46	0.5607	1.2283
2-Chlorophenol	31	98	0.3003	0.9492
Chrysene	22	59	0.2131	0.5715
Di-n-butyl phthalate	27	57	0.2615	0.5521
1,2-Dichlorobenzene	77	163	0.7458	1.5788
1,3-Dichlorobenzene	31	44	0.3003	0.4262
1,4-Dichlorobenzene	15	28	0.1453	0.2712
1,1-Dichloroethane	22	59	0.2131	0.5715
1,2-Dichloroethane	68	211	0.6587	2.0438
1,1-Dichloroethylene	16	25	0.1550	0.2422
1,2-trans Dichloroethylene	21	54	0.2034	0.5230
2,4-Dichlorophenol	39	112	0.3778	1.0848
1,2-Dichloropropane	153	230	1.4820	2.2278
1,3-Dichloropropylene	29	44	0.2809	0.4262
Diethyl phthalate	81	203	0.7846	1.9663
2,4-Dimethylphenol	18	36	0.1743	0.3487
Dimethyl phthalate	19	47	0.1840	0.4552
4,6-Dinitro-o-cresol	78	277	0.7555	2.6830
2,4-Dinitrophenol	71	123	0.6877	1.1914
2,4-Dinitrotoluene	113	285	1.0945	2.7605

Appendix A
Calculated Technology-Based Effluent Limits

Interim Phase

Parameter	Daily Avg µg/L	Daily Max µg/L	Daily Avg lbs/day	Daily Max lbs/day
2,6-Dinitrotoluene	255	641	2.4699	6.2088
Ethylbenzene	32	108	0.3100	1.0461
Fluoranthene	25	68	0.2422	0.6587
Fluorene	22	59	0.2131	0.5715
Hexachlorobenzene	15	28	0.1453	0.2712
Hexachlorobutadiene	20	49	0.1937	0.4746
Hexachloroethane	21	54	0.2034	0.5230
Methyl Chloride	86	190	0.8330	1.8403
Methylene Chloride	40	89	0.3874	0.8621
Naphthalene	22	59	0.2131	0.5715
Nitrobenzene	27	68	0.2615	0.6587
2-Nitrophenol	41	69	0.3971	0.6683
4-Nitrophenol	72	124	0.6974	1.2011
Phenanthrene	22	59	0.2131	0.5715
Phenol	15	26	0.1453	0.2518
Pyrene	25	67	0.2422	0.6490
Tetrachloroethylene	22	56	0.2131	0.5424
Toluene	26	80	0.2518	0.7749
1,2,4-Trichlorobenzene	68	140	0.6587	1.3560
1,1,1-Trichloroethane	21	54	0.2034	0.5230
1,1,2-Trichloroethane	21	54	0.2034	0.5230
Trichloroethylene	21	54	0.2034	0.5230
Vinyl Chloride	104	268	1.0073	2.5959

The existing daily maximum (DM) effluent limitations for TOC and oil and grease at Outfall 001 of 4,581 lbs/day TOC DM and 399 lbs/day oil and grease DM are continued in the draft permit.

Single grab values have been calculated as follows:

Single grab, mg/L = (Daily Max, µg/L/1000) × 2.0 × (Process flow, MGD/Total Flow, MGD)

Single grab, mg/L = (Daily Max, µg/L/1000) × 2.0 × (1.1607 MGD/3.2 MGD)

Appendix A
Calculated Technology-Based Effluent Limits

Final Phase

Effluent limitations guidelines (ELGs) under 40 CFR Part 414 are applicable to the Lyondell Chemical Channelview Complex. Effluent limitations calculated using the applicable ELGs, which includes Subparts F, G, H, and I, are included in the draft permit. The following calculations are based on the most recent available information submitted with the Lyondell Chemical Company's TCEQ-10055 (05/10/2019) Industrial Wastewater Permit Application Technical Report, Attachment T-1, Table 3.2, page 13 of 17. The discharge from the primary wastewater outfall (Outfall 001) at the facility consists of process wastewater, utility wastewaters, and stormwater. The average flows provided are as follows:

Waste Stream Description	**Outfall 001 (Final Phase)**
OCPSF Process Wastewater includes the following:	
PO/SM-I, EB-I, and PEA Unit Complex	360,000 gpd
PO/SM-II and EB-II Unit Complex	180,000 gpd
MTBE/ETBE/HPIB Unit	360,000 gpd
Polyols Unit (normally to deep well disposal & not included in total)	72,000 gpd
Butanediol Unit	72,000 gpd
Stormwater, potentially contaminated	210,300 gpd
PO/TBA Unit	218,000 gpd
PO/TBA stormwater, potentially contaminated	415,600 gpd
Landfarm runoff	57,600 gpd
Clarifier sludge to digester (removed from treatment system through clarifier sludge wasting and subtracted from total).	<118,800 gpd >
Total OCPSF Process Wastewater	1,754,400 gpd ≈ 1.755 MGD
Utility Wastewater includes the following:	
Cogen	28,800 gpd
Cooling tower blowdown	1,440,000 gpd
Boiler blowdown, ion exchange regeneration	576,000 gpd
PO/TBA cooling tower blowdown (normally to Outfall 008 and not included in total).	380,160 gpd
Miscellaneous minor flows	Variable
Total Utility Wastewater	2,044,800 gpd ≈ 2.045 MGD
Domestic Wastewater	0.0 gpd
Total Final Phase Flow	3,799,500 gpd ≈ 3.8 MGD

Appendix A
Calculated Technology-Based Effluent Limits

Final Phase

The process wastewaters are subject to the OCPSF Categorical Effluent Guidelines promulgated under 40 CFR Part 414.

Outfall 001 Final Phase Conventional Pollutant Allocation Calculations:

OCPSF PROCESS WASTEWATER - BOD_5 and TSS are based on the ELGs provided in Subparts F, G, and H. The application indicates the following percentages for the applicable subpart:

Commodity Organic Chemicals (414.41 – Subpart F)	31%
Bulk Organic Chemicals (414.41 – Subpart G)	36%
Specialty Organic Chemicals (414.41 – Subpart H)	33%

The ELGs are prorated based on these production values by the following formula:

(Subpart F ELG × fraction of total production) + (Subpart G ELG × fraction of total production) + (Subpart H ELG × fraction of total production) = Total Production ELG

BOD_5-Average			
Sub-F	(30 mg/L) × (0.31)	=	9.3 mg/L
Sub-G	(34 mg/L) × (0.36)	=	12.24 mg/L
Sub-H	(45 mg/L) × (0.33)	=	+ 14.85 mg/L
TOTAL			36.39 mg/L
BOD_5-Maximum			
Sub-F	(80 mg/L) × (0.31)	=	24.8 mg/L
Sub-G	(92 mg/L) × (0.36)	=	33.12 mg/L
Sub-H	(120 mg/L) × (0.33)	=	+ 39.60 mg/L
TOTAL			97.52 mg/L
TSS-Average			
Sub-F	(46 mg/L) × (0.31)	=	14.26 mg/L
Sub-G	(49 mg/L) × (0.36)	=	17.64 mg/L
Sub-H	(57 mg/L) × (0.33)	=	+ 18.81 mg/L
TOTAL			50.71 mg/L
TSS-Maximum			
Sub-F	(149 mg/L) × (0.31)	=	46.19 mg/L
Sub-G	(159 mg/L) × (0.36)	=	57.24 mg/L
Sub-H	(183 mg/L) × (0.33)	=	+ 60.39 mg/L
TOTAL			163.82 mg/L

The following formula is used to convert concentration to mass:

Allowable Mass (lbs/day) = [Allowable Concentration (mg/L)] × Flow (MGD) × 8.345

Daily Average BOD_5 = (36.39 mg/L) × (1.755 MGD) × (8.345) = 532.9 lbs/day

Appendix A
Calculated Technology-Based Effluent Limits

Final Phase

Daily Maximum BOD_5 = (97.52 mg/L) × (1.755 MGD) × (8.345) = 1,428 lbs/day

Daily Average TSS = (50.71 mg/L) × (1.755 MGD) × (8.345) = 742.6 lbs/day
Daily Maximum TSS = (163.82 mg/L) × (1.755 MGD) × (8.345) = 2,399 lbs/day

UTILITY WASTEWATER - Based on BPJ allocations for non-categorical/non-domestic contributing waste sources.

Daily Average BOD_5 =(10 mg/L) × (2.045 MGD) × (8.345) = 170.6 lbs/day
Daily Maximum BOD_5 = (20 mg/L) × (2.045 MGD) × (8.345) = 341.3 lbs/day
Daily Average TSS = (30 mg/L) × (2.045 MGD) × (8.345) = 511.9 lbs/day
Daily Maximum TSS = (100 mg/L) × (2.045 MGD) × (8.345) = 1,706 lbs/day

DOMESTIC WASTEWATER - Based on 30 TAC 309.1(b).

Daily Average BOD_5 = (20 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day
Daily Maximum BOD_5 = (45 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day
Daily Average TSS = (20 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day
Daily Maximum TSS = (45 mg/L) × (0.0 MGD) × (8.345) = 0.0 lbs/day

CONVENTIONAL POLLUTANTS ALLOCATIONS SUMMATIONS - The contributing wastestreams were summed to calculate the technology-based mass effluent limitations.

		Daily Average Lbs/day	Daily Maximum Lbs/day
BOD_5			
	OCPSF Wastewater	532.9	1,428
	Utility Wastewater	170.6	341.3
	Domestic Wastewater	+ 0.0	+ 0.0
	TOTAL	703.5 ≈ 703 lbs/day	1,769.3 ≈ 1,769 lbs/day
TSS			
	OCPSF Wastewater	742.6	2,399.2
	Utility Wastewater	511.9	1,706.5
	Domestic Wastewater	+ 0.0	+ 0.0
	TOTAL	1,254.5 ≈ 1,254 lbs/day	4,105.7 = 4,105 lbs/day

OCPSF - TOXIC POLLUTANT STANDARDS

BAT Effluent Limitations for the OCPSF Point Source Category40 CFR 414.91 (Subpart I) - Federal Register Vol. 58, No. 130, July 9, 1993

Total Flow from Outfall 001	3.8 MGD
Process Wastewater Flow	1.755 MGD
Chromium-Bearing Wastewater Flow	0.131 MGD
Copper-Bearing Wastewater Flow	0.131 MGD

Appendix A
Calculated Technology-Based Effluent Limits

Final Phase

Mass, lbs/day = (Concentration, µg/L/1000) × Flow, MGD × 8.345

Parameter	Daily Avg µg/L	Daily Max µg/L	Daily Avg lbs/day	Daily Max lbs/day
Chromium	1110	2770	1.2134	3.0281
Copper	1450	3380	1.5851	3.6949
Acenaphthene	22	59	0.3222	0.8641
Acenaphthylene	22	59	0.3222	0.8641
Acrylonitrile	96	242	1.4060	3.5442
Anthracene	22	59	0.3222	0.8641
Benzene	37	136	0.5419	1.9918
Benzo(a)anthracene	22	59	0.3222	0.8641
3,4-Benzofluoranthene	23	61	0.3368	0.8934
Benzo(k)fluoranthene	22	59	0.3222	0.8641
Benzo(a)pyrene	23	61	0.3368	0.8934
Bis(2-ethylhexyl)phthalate	103	279	1.5085	4.0861
Carbon Tetrachloride	18	38	0.2636	0.5565
Chlorobenzene	15	28	0.2197	0.4101
Chloroethane	104	268	1.5231	3.9250
Chloroform (includes utility wastewater, flow = 3.7992 MGD)	21	46	0.6657	1.4583
2-Chlorophenol	31	98	0.4540	1.4353
Chrysene	22	59	0.3222	0.8641
Di-n-butyl phthalate	27	57	0.3954	0.8348
1,2-Dichlorobenzene	77	163	1.1277	2.3872
1,3-Dichlorobenzene	31	44	0.4540	0.6444
1,4-Dichlorobenzene	15	28	0.2197	0.4101
1,1-Dichloroethane	22	59	0.3222	0.8641
1,2-Dichloroethane	68	211	0.9959	3.0902
1,1-Dichloroethylene	16	25	0.2343	0.3661
1,2-trans Dichloroethylene	21	54	0.3076	0.7909
2,4-Dichlorophenol	39	112	0.5712	1.6403
1,2-Dichloropropane	153	230	2.2408	3.3685
1,3-Dichloropropylene	29	44	0.4247	0.6444
Diethyl phthalate	81	203	1.1863	2.9730
2,4-Dimethylphenol	18	36	0.2636	0.5272
Dimethyl phthalate	19	47	0.2783	0.6883
4,6-Dinitro-o-cresol	78	277	1.1423	4.0568
2,4-Dinitrophenol	71	123	1.0398	1.8014
2,4-Dinitrotoluene	113	285	1.6549	4.1740

Appendix A
Calculated Technology-Based Effluent Limits

Final Phase

Parameter	Daily Avg µg/L	Daily Max µg/L	Daily Avg lbs/day	Daily Max lbs/day
2,6-Dinitrotoluene	255	641	3.7346	9.3877
Ethylbenzene	32	108	0.4687	1.5817
Fluoranthene	25	68	0.3661	0.9959
Fluorene	22	59	0.3222	0.8641
Hexachlorobenzene	15	28	0.2197	0.4101
Hexachlorobutadiene	20	49	0.2929	0.7176
Hexachloroethane	21	54	0.3076	0.7909
Methyl Chloride	86	190	1.2595	2.7826
Methylene Chloride	40	89	0.5858	1.3034
Naphthalene	22	59	0.3222	0.8641
Nitrobenzene	27	68	0.3954	0.9959
2-Nitrophenol	41	69	0.6005	1.0105
4-Nitrophenol	72	124	1.0545	1.8160
Phenanthrene	22	59	0.3222	0.8641
Phenol	15	26	0.2197	0.3808
Pyrene	25	67	0.3661	0.9812
Tetrachloroethylene	22	56	0.3222	0.8201
Toluene	26	80	0.3808	1.1716
1,2,4-Trichlorobenzene	68	140	0.9959	2.0504
1,1,1-Trichloroethane	21	54	0.3076	0.7909
1,1,2-Trichloroethane	21	54	0.3076	0.7909
Trichloroethylene	21	54	0.3076	0.7909
Vinyl Chloride	104	268	1.5231	3.9250

The existing daily maximum (DM) effluent limitations for TOC and oil and grease at Outfall 001 of 5,440 lbs/day TOC DM and 474 lbs/day oil and grease DM are continued in the draft permit.

Single grab values have been calculated as follows:

Single grab, mg/L = (Daily Max, µg/L/1000) × 2.0 × (Process flow, MGD/Total Flow, MGD)

Single grab, mg/L = (Daily Max, µg/L/1000) × 2.0 × (1.755 MGD/3.8 MGD)

Appendix A
Calculated Technology-Based Effluent Limits

Primarily Stormwater Driven Outfalls 002 – 010 Determinations

Effluent limitations for primarily stormwater driven Outfalls 002-006 and 008-010. The following industrial stormwater technology-based effluent limitations are applicable:

Outfalls	Parameter	Daily Average, mg/L	Daily Maximum, mg/L
002-006 &	Flow (based on BPJ)	Report, MGD	Report, MGD
008-010	TOC	N/A	75
	Oil & Grease	N/A	15
	pH, SU	6.0 minimum	9.0 maximum (9.5 max at Outfall 002)

In addition, allowable non-stormwaters, which are *de minimis* in nature, are included with utility wastewaters. The allowable non-stormwaters are based on the Multi Sector General Permit (MSGP), TPDES General Permit No. TXR050000 and include the following:

(a) discharges from emergency fire-fighting activities;
(b) uncontaminated fire hydrant flushing (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated, and discharges are not expected to adversely affect aquatic life);
(c) potable water sources (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated, and discharges are not expected to adversely affect aquatic life);
(d) lawn watering and similar irrigation drainage, provided that all pesticides, herbicides, and fertilizer have been applied in accordance with the approved labeling;
(e) water from the routine external washing of buildings, conducted without the use of detergents or other chemicals;
(f) water from the routine washing of pavement conducted without the use of detergents or other chemicals and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed);
(g) uncontaminated air conditioner condensate, compressor condensate, and steam condensate, and condensate from the outside storage of refrigerated gases or liquids;
(h) water from foundation or footing drains where flows are not contaminated with pollutants (e.g., process materials, solvents, or other pollutants);
(i) uncontaminated water used for dust suppression;
(j) springs and other uncontaminated groundwater; and
(k) incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of the facility but excluding intentional discharges from the cooling tower (e.g., "piped" cooling tower blowdown or drains).

Outfall 007: Effluent limitations for stormwater associated with construction activities from a concrete batch plant located in the construction area. The following technology-based effluent limits are based on the Construction General Stormwater Permit (TXR150000):

Outfall	Parameter	Daily Average, mg/L	Daily Maximum, mg/L
007	Flow (based on BPJ)	Report, MGD	Report, MGD
	TSS	N/A	100
	Oil & Grease	N/A	15
	pH, SU	6.0 minimum	9.0 maximum

Appendix B
Calculated Water Quality-Based Effluent Limits

Outfalls 001-006 and 008-010

TEXTOX MENU #10 – INTERMITTENT FRESHWATER STREAM WITHIN 3 MILES OF A BAY OR WIDE TIDAL RIVER

The water quality-based effluent limitations developed below are calculated using:

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater and Saltwater Aquatic Life
Table 2, 2018 Texas Surface Water Quality Standards (TSWQS) for Human Health
"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010 (IPs)

The site-specific hardness value of 147 mg/L (as calcium carbonate, $CaCO_3$) applies only to the freshwater portions of HCFCD ditch G103-02-03, the unnamed ditch, and Wallisville Roadside ditch. Site-specific aluminum partitioning coefficients (dissolved fraction) have been approved at Outfalls 003, 004, and 005. The dissolved fraction applicable to the freshwater portions of the discharge route for Outfall 003 is 0.755, for Outfall 004 is 0.797, and for Outfall 005 is 0.484. A site-specific water-effect-ratio of 1.8 applies for total copper for the San Jacinto River Tidal (Segment No. 1001) based on TSWQS, Appendix E.

PERMIT INFORMATION

Permittee Name:	Lyondell Chemical Company
TPDES Permit No.:	WQ0002927000
Outfall No.:	001-006 & 008-010
Prepared by:	Melinda Luxemburg, P.E.
Date:	June 23, 2021

DISCHARGE INFORMATION

Intermittent Receiving Waterbody:	intermittent streams (use freshwater segment values)	
Segment No. for Freshwater Ambient Data:	1016	
TSS (mg/L) (Intermittent):	12	
pH (Standard Units) (Intermittent):	7.5	
Hardness (mg/L as CaCO3) (Intermittent):	147	(Site-specific hardness value)
Chloride (mg/L) (Intermittent):	82	
Effluent Flow for Aquatic Life (MGD):	<10	
% Effluent for Acute Aquatic Life (Intermittent):	100	
Saltwater Receiving Waterbody:	San Jacinto River Tidal	
Segment No.:	1001	
TSS (mg/L)(Bay / Tidal River):	8	
% Effluent for Chronic Aquatic Life (Bay/Tidal River):	8	
% Effluent for Acute Aquatic Life (Bay/Tidal River):	30	
Oyster Waters:	No	
Effluent Flow for Human Health (MGD):	<10	
% Effluent for Human Health (Bay/Tidal River):	4	

Appendix B
Calculated Water Quality-Based Effluent Limits

CALCULATE DISSOLVED FRACTION (AND ENTER WATER EFFECT RATIO IF APPLICABLE):

Stream/River Metal	*Intercept (b)*	*Slope (m)*	*Partition Coefficient (Kp)*	*Dissolved Fraction (Cd/Ct)*	*Source*	*Water Effect Ratio (WER)*	*Source*
Aluminum (Outfalls 001, 002, 006, & 008-010)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Aluminum (Outfalls 003)	N/A	N/A	N/A	0.755	Site-specific	1.00	Assumed
Aluminum (Outfalls 004)	N/A	N/A	N/A	0.797	Site-specific	1.00	Assumed
Aluminum (Outfalls 005)	N/A	N/A	N/A	0.484	Site-specific	1.00	Assumed
Arsenic	5.68	-0.73	78018.52	0.516		1.00	Assumed
Cadmium	6.60	-1.13	240173.56	0.258		1.00	Assumed
Chromium (total)	6.52	-0.93	328368.46	0.202		1.00	Assumed
Chromium (trivalent)	6.52	-0.93	328368.46	0.202		1.00	Assumed
Chromium (hexavalent)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Copper	6.02	-0.74	166496.80	0.334		1.00	Assumed
Lead	6.45	-0.80	386060.17	0.178		1.00	Assumed
Mercury	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Nickel	5.69	-0.57	118813.75	0.412		1.00	Assumed
Selenium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Silver	6.38	-1.03	185542.46	0.310		1.00	Assumed
Zinc	6.10	-0.70	221092.05	0.274		1.00	Assumed

CALCULATE DISSOLVED FRACTION (AND ENTER WATER EFFECT RATIO IF APPLICABLE):

Estuarine Metal	*Intercept (b)*	*Slope (m)*	*Partition Coefficient (Kp)*	*Dissolved Fraction (Cd/Ct)*	*Source*	*Water Effect Ratio (WER)*	*Source*
Aluminum	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Arsenic	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Cadmium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Chromium (total)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Chromium (trivalent)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Chromium (hexavalent)	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Copper	4.85	-0.72	15840.73	0.888		1.80	30 TAC §307 Appendix E
Lead	6.06	-0.85	196053.01	0.389		1.00	Assumed
Mercury	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Nickel	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Selenium	N/A	N/A	N/A	1.00	Assumed	1.00	Assumed
Silver	5.86	-0.74	155493.92	0.446		1.00	Assumed
Zinc	5.36	-0.52	77695.02	0.617		1.00	Assumed

Appendix B
Calculated Water Quality-Based Effluent Limits

AQUATIC LIFE - CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	FW Acute Criterion (µg/L)	SW Acute Criterion (µg/L)	SW Chronic Criterion (µg/L)	FW WLAa (µg/L)	SW WLAa (µg/L)	SW WLAc (µg/L)	FW LTAa (µg/L)	SW LTAa (µg/L)	SW LTAc (µg/L)	Daily Avg. (µg/L)	Daily Max. (µg/L)
Aldrin	3.0	1.3	N/A	3.0	4.33	N/A	1.72	1.39	N/A	2.04	4.31
Aluminum (Outfalls 001, 002, 006, & 008-010)	991	N/A	N/A	991	N/A	N/A	568	N/A	N/A	835	1766
Aluminum (Outfalls 003)	991	N/A	N/A	1313	N/A	N/A	752	N/A	N/A	1106	2339
Aluminum (Outfalls 004)	991	N/A	N/A	1243	N/A	N/A	712	N/A	N/A	1047	2216
Aluminum (Outfalls 005)	991	N/A	N/A	2048	N/A	N/A	1173	N/A	N/A	1725	3649
Arsenic	340	149	78	658	497	975	377	159	595	234	494
Cadmium	12.5	40.0	8.75	48.4	133	109	27.8	42.7	66.7	40.8	86.3
Carbaryl	2.0	613	N/A	2.0	2043.33	N/A	1.15	653.87	N/A	1.68	3.56
Chlordane	2.4	0.09	0.004	2.4	0.300	0.050	1.38	0.096	0.031	0.045	0.095
Chlorpyrifos	0.083	0.011	0.006	0.083	0.037	0.075	0.048	0.012	0.046	0.017	0.036
Chromium (trivalent)	781	N/A	N/A	3859	N/A	N/A	2211	N/A	N/A	3251	6877
Chromium (hexavalent)	15.7	1090	49.6	15.7	3633	620	9.00	1163	378	13.2	28.0
Copper	20.4	24.3	6.48	61.2	91.3	91.3	35.1	29.2	55.7	42.9	90.8
Copper (oyster waters)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cyanide (free)	45.8	5.6	5.6	45.8	18.7	70.0	26.2	5.97	42.7	8.78	18.6
4,4'-DDT	1.1	0.13	0.001	1.1	0.433	0.013	0.630	0.139	0.0076	0.011	0.024
Demeton	N/A	N/A	0.1	N/A	N/A	1.25	N/A	N/A	0.763	1.12	2.37
Diazinon	0.17	0.819	0.819	0.17	2.73	10.2	0.097	0.874	6.24	0.143	0.303
Dicofol [Kelthane]	59.3	N/A	N/A	59.3	N/A	N/A	34.0	N/A	N/A	49.9	106
Dieldrin	0.24	0.71	0.002	0.24	2.37	0.025	0.138	0.757	0.015	0.022	0.047
Diuron	210	N/A	N/A	210	N/A	N/A	120.330	N/A	N/A	176.885	374.226
Endosulfan I (*alpha*)	0.22	0.034	0.009	0.22	0.113	0.113	0.126	0.036	0.069	0.053	0.113
Endosulfan II (*beta*)	0.22	0.034	0.009	0.22	0.113	0.113	0.126	0.036	0.069	0.053	0.113
Endosulfan sulfate	0.22	0.034	0.009	0.22	0.113	0.113	0.126	0.036	0.069	0.053	0.113
Endrin	0.086	0.037	0.002	0.086	0.123	0.025	0.049	0.039	0.015	0.022	0.047
Guthion [Azinphos Methyl]	N/A	N/A	0.01	N/A	N/A	0.125	N/A	N/A	0.076	0.112	0.237
Heptachlor	0.52	0.053	0.004	0.52	0.177	0.050	0.298	0.057	0.031	0.045	0.095
Hexachlorocyclohexane (*gamma*) [Lindane]	1.126	0.16	N/A	1.126	0.533	N/A	0.645	0.171	N/A	0.251	0.531
Lead	98	133	5.3	552	1139	170	316	364	104	153	323
Malathion	N/A	N/A	0.01	N/A	N/A	0.125	N/A	N/A	0.076	0.112	0.237
Mercury	2.4	2.1	1.1	2.4	7.00	13.8	1.38	2.24	8.39	2.02	4.28
Methoxychlor	N/A	N/A	0.03	N/A	N/A	0.375	N/A	N/A	0.229	0.336	0.711
Mirex	N/A	N/A	0.001	N/A	N/A	0.013	N/A	N/A	0.0076	0.011	0.024
Nickel	649	118	13.1	1573	393	164	902	126	99.9	147	311
Nonylphenol	28	7	1.7	28	23.3	21.3	16.0	7.47	13.0	11.0	23.2
Parathion (ethyl)	0.065	N/A	N/A	0.065	N/A	N/A	0.037	N/A	N/A	0.055	0.116
Pentachlorophenol	14.4	15.1	9.6	14.4	50.3	120	8.3	16.1	73.2	12.1	25.7
Phenanthrene	30	7.7	4.6	30	25.7	57.5	17.2	8.21	35.1	12.1	25.5
Polychlorinated Biphenyls [PCBs]	2.0	10	0.03	2.0	33.3	0.375	1.15	10.7	0.229	0.336	0.711
Selenium	20	564	136	20	1880	1700	11.5	602	1037	16.8	35.6
Silver	0.8	2	N/A	17.80	15.0	N/A	10.20	4.79	N/A	7.04	14.9
Toxaphene	0.78	0.21	0.0002	0.78	0.700	0.0025	0.447	0.224	0.0015	0.0022	0.0047
Tributyltin [TBT]	0.13	0.24	0.0074	0.13	0.800	0.093	0.074	0.256	0.056	0.083	0.175
2,4,5 Trichlorophenol	136	259	12	136	863	150	77.9	276	91.5	115	242
Zinc	162	92.7	84.2	593	501	1707	340	160	1041	236	499

Appendix B
Calculated Water Quality-Based Effluent Limits

HUMAN HEALTH - CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*Fish Only Criterion (ug/L)*	*WLAh (ug/L)*	*LTAh (ug/L)*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Acrylonitrile	115	2875	2674	3930	8315
Aldrin	1.147E-05	2.87E-04	2.67E-04	3.92E-04	8.29E-04
Anthracene	1317	32925	30620	45012	95229
Antimony	1071	26775	24901	36604	77441
Arsenic	N/A	N/A	N/A	N/A	N/A
Barium	N/A	N/A	N/A	N/A	N/A
Benzene	581	14525	13508	19857	42011
Benzidine	0.107	2.68	2.49	3.66	7.74
Benzo(a)anthracene	0.025	0.625	0.581	0.854	1.81
Benzo(a)pyrene	0.0025	0.063	0.058	0.085	0.181
Bis(chloromethyl)ether	0.2745	6.86	6.38	9.38	19.8
Bis(2-chloroethyl)ether	42.83	1071	996	1464	3097
Bis(2-ethylhexyl)phthalate	7.55	189	176	258	546
Bromodichloromethane (Dichlorobromomethane)	275	6875	6394	9399	19885
Bromoform [Tribromomethane]	1060	26500	24645	36228	76646
Cadmium	N/A	N/A	N/A	N/A	N/A
Carbon Tetrachloride	46	1150	1070	1572	3326
Chlordane	0.0025	0.063	0.058	0.085	0.181
Chlorobenzene	2737	68425	63635	93544	197906
Chlorodibromomethane (Dibromochloromethane)	183	4575	4255	6254	13232
Chloroform [Trichloromethane]	7697	192425	178955	263064	556551
Chromium (hexavalent)	502	12550	11672	17157	36298
Chrysene	2.52	63.0	58.6	86.1	182
Cresols [Methylphenols]	9301	232525	216248	317885	672532
Cyanide (free)	N/A	N/A	N/A	N/A	N/A
4,4'-DDD	0.002	0.050	0.047	0.068	0.145
4,4'-DDE	0.00013	0.0033	0.0030	0.0044	0.0094
4,4'-DDT	0.0004	0.010	0.0093	0.014	0.029
2,4'-D	N/A	N/A	N/A	N/A	N/A
Danitol [Fenpropathrin]	473	11825	10997	16166	34201
1,2-Dibromoethane	4.24	106	98.6	145	307
m-Dichlorobenzene [1,3-Dichlorobenzene]	595	14875	13834	20336	43023
o-Dichlorobenzene [1,2-Dichlorobenzene]	3299	82475	76702	112752	238542
p-Dichlorobenzene [1,4-Dichlorobenzene]	N/A	N/A	N/A	N/A	N/A
3,3'-Dichlorobenzidine	2.24	56.0	52.1	76.6	162
1,2-Dichloroethane	364	9100	8463	12441	26320
1,1-Dichloroethylene [1,1-Dichloroethene]	55114	1377850	1281401	1883659	3985156
Dichloromethane [Methylene Chloride]	13333	333325	309992	455689	964076
1,2-Dichloropropane	259	6475	6022	8852	18728
1,3-Dichloropropene [1,3- Dichloropropylene]	119	2975	2767	4067	8605
Dicofol [Kelthane]	0.30	7.50	6.98	10.3	21.7
Dieldrin	2.0E-05	5.00E-04	4.65E-04	6.84E-04	1.45E-03
2,4-Dimethylphenol	8436	210900	196137	288321	609986
Di-*n*-Butyl Phthalate	92.4	2310	2148	3158	6681

Appendix B
Calculated Water Quality-Based Effluent Limits

HUMAN HEALTH - CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS:

Parameter	*Fish Only Criterion (ug/L)*	*WLAh (ug/L)*	*LTAh (ug/L)*	*Daily Avg. (ug/L)*	*Daily Max. (ug/L)*
Dioxins/Furans [TCDD Equivalents]	7.97E-08	1.99E-06	1.85E-06	2.72E-06	5.76E-06
Endrin	0.02	0.500	0.465	0.684	1.45
Epichlorohydrin	2013	50325	46802	68799	145555
Ethylbenzene	1867	46675	43408	63809	134998
Ethylene Glycol	1.68E+07	4.20E+08	3.91E+08	5.74E+08	1.21E+09
Fluoride	N/A	N/A	N/A	N/A	N/A
Heptachlor	0.0001	0.0025	0.0023	0.0034	0.0072
Heptachlor Epoxide	0.00029	0.0073	0.0067	0.010	0.021
Hexachlorobenzene	0.00068	0.017	0.016	0.023	0.049
Hexachlorobutadiene	0.22	5.50	5.12	7.52	15.9
Hexachlorocyclohexane (*alpha*)	0.0084	0.210	0.195	0.287	0.607
Hexachlorocyclohexane (*beta*)	0.26	6.50	6.05	8.89	18.8
Hexachlorocyclohexane (*gamma*) [Lindane]	0.341	8.53	7.93	11.7	24.7
Hexachlorocyclopentadiene	11.6	290	270	396	839
Hexachloroethane	2.33	58.3	54.2	79.6	168
Hexachlorophene	2.90	72.5	67.4	99.1	210
4,4'-Isopropylidenediphenol [Bisphenol A]	15982	399550	371582	546225	1155618
Lead	3.83	246	229	336	711
Mercury	0.025	0.625	0.581	0.854	1.81
Methoxychlor	3.0	75	70	103	217
Methyl Ethyl Ketone	9.92E+05	2.48E+07	2.31E+07	3.39E+07	7.17E+07
Methyl *tert*-butyl ether [MTBE]	10482	262050	243707	358249	757927
Nickel	1140	28500	26505	38962	82431
Nitrate-Nitrogen (as Total Nitrogen)	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	1873	46825	43547	64014	135432
N-Nitrosodiethylamine	2.1	52.5	48.8	71.8	152
N-Nitroso-di-*n*-Butylamine	4.2	105	97.7	144	304
Pentachlorobenzene	0.355	8.88	8.25	12.1	25.7
Pentachlorophenol	0.29	7.25	6.74	9.91	21.0
Polychlorinated Biphenyls [PCBs]	6.4E-04	0.016	0.015	0.022	0.046
Pyridine	947	23675	22018	32366	68475
Selenium	N/A	N/A	N/A	N/A	N/A
1,2,4,5-Tetrachlorobenzene	0.24	6.00	5.58	8.20	17.4
1,1,2,2-Tetrachloroethane	26.35	659	613	901	1905
Tetrachloroethylene [Tetrachloroethylene]	280	7000	6510	9570	20246
Thallium	0.23	5.75	5.35	7.86	16.6
Toluene	N/A	N/A	N/A	N/A	N/A
Toxaphene	0.011	0.275	0.256	0.376	0.795
2,4,5-TP [Silvex]	369	9225	8579	12611	26681
1,1,1-Trichloroethane	784354	19608850	18236231	26807259	56714677
1,1,2-Trichloroethane	166	4150	3860	5673	12003
Trichloroethylene [Trichloroethene]	71.9	1798	1672	2457	5199
2,4,5-Trichlorophenol	1867	46675	43408	63809	134998
TTHM [Sum of Total Trihalomethanes]	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	16.5	413	384	564	1193

Appendix B
Calculated Water Quality-Based Effluent Limits

CALCULATE 70% AND 85% OF DAILY AVERAGE EFFLUENT LIMITATIONS:

Aquatic Life *Parameter*	*70% of Daily Avg.* *(µg/L)*	*85% of Daily Avg.* *(µg/L)*
Aldrin	1.43	1.73
Aluminum (Outfalls 001, 002, 006, & 008-010)	584	710
Aluminum (Outfalls 003)	774	940
Aluminum (Outfalls 004)	733	890
Aluminum (Outfalls 005)	1207	1466
Arsenic	164	199
Cadmium	28.6	34.7
Carbaryl	1.18	1.43
Chlordane	0.031	0.038
Chlorpyrifos	0.012	0.015
Chromium (trivalent)	2275	2763
Chromium (hexavalent)	9.26	11.2
Copper	30.1	36.5
Copper (oyster waters)	N/A	N/A
Cyanide (free)	6.15	7.46
4,4'-DDT	0.0078	0.0095
Demeton	0.785	0.953
Diazinon	0.100	0.122
Dicofol [Kelthane]	35.0	42.5
Dieldrin	0.016	0.019
Diuron	124	150
Endosulfan I (*alpha*)	0.037	0.045
Endosulfan II (*beta*)	0.037	0.045
Endosulfan sulfate	0.037	0.045
Endrin	0.016	0.019
Guthion [Azinphos Methyl]	0.078	0.095
Heptachlor	0.031	0.038
Hexachlorocyclohexane (*gamma*) [Lindane]	0.176	0.213
Lead	107	130
Malathion	0.078	0.095
Mercury	1.42	1.72
Methoxychlor	0.235	0.286
Mirex	0.0078	0.0095
Nickel	103	125
Nonylphenol	7.68	9.33
Parathion (ethyl)	0.038	0.047
Pentachlorophenol	8.5	10.3
Phenanthrene	8.45	10.3
Polychlorinated Biphenyls [PCBs]	0.235	0.286
Selenium	11.8	14.3
Silver	4.93	5.98
Toxaphene	0.0016	0.0019
Tributyltin [TBT]	0.058	0.071
2,4,5 Trichlorophenol	80.2	97.4
Zinc	165	200

Appendix B
Calculated Water Quality-Based Effluent Limits

CALCULATE 70% AND 85% OF DAILY AVERAGE EFFLUENT LIMITATIONS:

Human Health	*70% of Daily Avg.*	*85% of Daily Avg.*
Parameter	*(µg/L)*	*(µg/L)*
Acrylonitrile	2751	3341
Aldrin	2.74E-04	3.33E-04
Anthracene	31508	38260
Antimony	25623	31113
Arsenic	N/A	N/A
Barium	N/A	N/A
Benzene	13900	16879
Benzidine	2.56	3.11
Benzo(*a*)anthracene	0.598	0.726
Benzo(*a*)pyrene	0.060	0.073
Bis(chloromethyl)ether	6.57	7.97
Bis(2-chloroethyl)ether	1025	1244
Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	181	219
Bromodichloromethane [Dichlorobromomethane]	6579	7989
Bromoform [Tribromomethane]	25360	30794
Cadmium	N/A	N/A
Carbon Tetrachloride	1101	1336
Chlordane	0.060	0.073
Chlorobenzene	65481	79512
Chlorodibromomethane [Dibromochloromethane]	4378	5316
Chloroform [Trichloromethane]	184145	223605
Chromium (hexavalent)	12010	14584
Chrysene	60.3	73.2
Cresols [Methylphenols]	222519	270202
Cyanide (free)	N/A	N/A
4,4'-DDD	0.048	0.058
4,4'-DDE	0.0031	0.0038
4,4'-DDT	0.0096	0.0116
2,4'-D	N/A	N/A
Danitol [Fenpropathrin]	11316	13741
1,2-Dibromoethane [Ethylene Dibromide]	101	123
m-Dichlorobenzene [1,3-Dichlorobenzene]	14235	17285
o-Dichlorobenzene [1,2-Dichlorobenzene]	78926	95839
p-Dichlorobenzene [1,4-Dichlorobenzene]	N/A	N/A
3,3'-Dichlorobenzidine	53.6	65.1
1,2-Dichloroethane	8708	10575
1,1-Dichloroethylene [1,1-Dichloroethene]	1318561	1601110
Dichloromethane [Methylene Chloride]	318982	387335
1,2-Dichloropropane	6196	7524
1,3-Dichloropropene [1,3-Dichloropropylene]	2847	3457
Dicofol [Kelthane]	7.18	8.72
Dieldrin	4.78E-04	5.81E-04
2,4-Dimethylphenol	201825	245073
Di-*n*-Butyl Phthalate	2211	2684
Dioxins/Furans [TCDD Equivalents]	1.91E-06	2.32E-06

Appendix B
Calculated Water Quality-Based Effluent Limits

CALCULATE 70% AND 85% OF DAILY AVERAGE EFFLUENT LIMITATIONS:

Human Health	*70% of Daily Avg.*	*85% of Daily Avg.*
Parameter	*70%*	*85%*
Endrin	0.478	0.581
Epichlorohydrin	48160	58479
Ethylbenzene	44667	54238
Ethylene Glycol	4.02E+08	4.88E+08
Fluoride	N/A	N/A
Heptachlor	0.0024	0.0029
Heptachlor Epoxide	0.0069	0.0084
Hexachlorobenzene	0.016	0.020
Hexachlorobutadiene	5.26	6.39
Hexachlorocyclohexane (*alpha*)	0.201	0.244
Hexachlorocyclohexane (*beta*)	6.22	7.55
Hexachlorocyclohexane (*gamma*) [Lindane]	8.16	9.91
Hexachlorocyclopentadiene	278	337
Hexachloroethane	55.7	67.7
Hexachlorophene	69.4	84.2
4,4'-Isopropylidenediphenol [Bisphenol A]	382357	464291
Lead	235	286
Mercury	0.598	0.726
Methoxychlor	71.8	87.2
Methyl Ethyl Ketone	2.37E+07	2.88E+07
Methyl *tert*-butyl ether [MTBE]	250774	304511
Nickel	27274	33118
Nitrate-Nitrogen (as Total Nitrogen)	N/A	N/A
Nitrobenzene	44810	54412
N-Nitrosodiethylamine	50.2	61.0
N-Nitroso-di-*n*-Butylamine	100	122
Pentachlorobenzene	8.49	10.3
Pentachlorophenol	6.94	8.42
Polychlorinated Biphenyls [PCBs]	0.015	0.019
Pyridine	22656	27511
Selenium	N/A	N/A
1,2,4,5-Tetrachlorobenzene	5.74	6.97
1,1,2,2-Tetrachloroethane	630	765
Tetrachloroethylene [Tetrachloroethylene]	6699	8134
Thallium	5.50	6.68
Toluene	N/A	N/A
Toxaphene	0.263	0.320
2,4,5-TP [Silvex]	8828	10720
1,1,1-Trichloroethane	1.88E+07	2.28E+07
1,1,2-Trichloroethane	3971	4822
Trichloroethylene [Trichloroethene]	1720	2089
2,4,5-Trichlorophenol	44667	54238
TTHM [Sum of Total Trihalomethanes]	N/A	N/A
Vinyl Chloride	395	479

Appendix B
Calculated Water Quality-Based Effluent Limits

Water quality-based mass equivalent limitations at Outfall 001 are calculated by using the following formula:

Mass limits = [(concentration limits ug/L)/1000] x [Flow MGD] x [8.345] = limits lbs/day

Interim Phase

Aquatic Life TEXTOX Flow is <10 MGD use 3.2 MGD

POLLUTANT	Dly Avg ug/L	Dly Max ug/L	Dly Avg lbs/day	Dly Max lbs/day
Phenanthrene	12.1	25.5	0.3231	0.6809
Aluminum, total	835	1,766	22.29	47.16
Copper, total	42.9	90.8	1.14	2.42
Zinc, total	236	499	6.302	13.32

Human Health TEXTOX Flow is <10 MGD use 3.2 MGD

POLLUTANT	Dly Avg ug/L	Dly Max ug/L	Dly Avg lbs/day	Dly Max lbs/day
Acrylonitrile	3,930	8,315	104	222
Anthracene	45,012	95,229	1,202	2,542
Benzene	19,857	42,011	530	1,121
Benzo(a)anthracene	0.854	1.81	0.0228	0.0483
Benzo(a)pyrene	0.085	0.181	0.0022	0.00483
Bis(2-ethylhexyl)phthalate	258	546	6.88	14.5
Carbon Tetrachloride	1,572	3,326	41.97	88.81
Chlorobenzene	93,544	197,906	2,497	5,284
Chloroform	263,064	556,551	7,024.861	14,862.137
Chrysene	86.1	182	2.299	4.860
Di-n-butyl Phthalate	3,158	6,681	84.33	178
1,2-Dichlorobenzene (Ortho)	112,752	238,542	3,010	6,370
1,3-Dichlorobenzene (Meta)	20,336	43,023	543	1,148
1,4-Dichlorobenzene (Para)	N/A	N/A	N/A	N/A
1,2-Dichloroethane	12,441	26,320	332	702
1,1-Dichloroethylene	1,883,659	3,985,156	50,301	106,419
1,2-Dichloropropane	8,852	18,728	236	500
1,3-Dichloropropene (1,3-Dichloropropylene)	4,067	8,605	108	229
2,4-Dimethylphenol	288,321	609,986	7,699	16,289
Ethylbenzene	63,809	134,998	1,703	3,604

Appendix B
Calculated Water Quality-Based Effluent Limits

Interim Phase

POLLUTANT	Dly Avg ug/L	Dly Max ug/L	Dly Avg lbs/day	Dly Max lbs/day
Hexachlorobenzene	0.023	0.049	0.00061	0.00131
Hexachlorobutadiene	7.52	15.9	0.2008	0.4245
Hexachloroethane	79.6	168	2.125	4.486
Dichloromethane (Methylene Chloride)	455,689	964,076	12,168	25,744
Nitrobenzene	64,014	135,432	1,709	3,616
Tetrachloroethylene	9,570	20,246	255	540
Toluene	N/A	N/A	N/A	N/A
1,1,1-Trichloroethane	26,807,259	56,714,677	715,861	1,514,508
1,1,2-Trichloroethane	5,673	12,003	151	320
Trichloroethylene	2,457	5,199	65.61	138
Vinyl Chloride	564	1,193	15.06	31.85

Final Phase

Aquatic Life TEXTOX Flow is <10 MGD use 3.8 MGD

POLLUTANT	Dly Avg ug/L	Dly Max ug/L	Dly Avg lbs/day	Dly Max lbs/day
Phenanthrene	12.1	25.5	0.383	0.808
Aluminum, total	835	1,766	26.4	56.0
Copper, total	42.9	90.8	1.36	2.87
Zinc, total	236	499	7.48	15.8

Human Health TEXTOX Flow is <10 MGD use 3.8 MGD

POLLUTANT	Dly Avg ug/L	Dly Max ug/L	Dly Avg lbs/day	Dly Max lbs/day
Acrylonitrile	3,930	8,315	124	263
Anthracene	45,012	95,229	1,427	3,019
Benzene	19,857	42,011	629	1,332
Benzo(a)anthracene	0.854	1.81	0.0270	0.0574
Benzo(a)pyrene	0.085	0.181	0.0027	0.00574
Bis(2-ethylhexyl)phthalate	258	546	8.18	17.3
Carbon Tetrachloride	1,572	3,326	49.8	105

Appendix B
Calculated Water Quality-Based Effluent Limits

Final Phase

POLLUTANT	Dly Avg ug/L	Dly Max ug/L	Dly Avg lbs/day	Dly Max lbs/day
Chlorobenzene	93,544	197,906	2,966	6,275
Chloroform	263,064	556,551	8,342	17,648
Chrysene	86.1	182	2.73	5.77
Di-n-butyl Phthalate	3,158	6,681	100	211
1,2-Dichlorobenzene (Ortho)	112,752	238,542	3,575	7,564
1,3-Dichlorobenzene (Meta)	20,336	43,023	644	1,364
1,4-Dichlorobenzene (Para)	N/A	N/A	N/A	N/A
1,2-Dichloroethane	12,441	26,320	394	834
1,1-Dichloroethylene	1,883,659	3,985,156	59,732	126,373
1,2-Dichloropropane	8,852	18,728	280	593
1,3-Dichloropropene (1,3-Dichloropropylene)	4,067	8,605	128	272
2,4-Dimethylphenol	288,321	609,986	9,142	19,343
Ethylbenzene	63,809	134,998	2,023	4,280
Hexachlorobenzene	0.023	0.049	0.00073	0.00155
Hexachlorobutadiene	7.52	15.9	0.238	0.504
Hexachloroethane	79.6	168	2.52	5.32
Dichloromethane (Methylene Chloride)	455,689	964,076	14,450	30,571
Nitrobenzene	64,014	135,432	5,029	4,294
Tetrachloroethylene	9,570	20,246	303	642
Toluene	N/A	N/A	N/A	N/A
1,1,1-Trichloroethane	26,807,259	56,714,677	850,084	1,798,479
1,1,2-Trichloroethane	5,673	12,003	179	380
Trichloroethylene	2,457	5,199	77.9	164
Vinyl Chloride	564	1,193	17.8	37.8

Appendix B
Calculated Water Quality-Based Effluent Limits

Outfall 007: Aquatic life and human health screening is not generally applicable to predominately stormwater discharges. TPDES stormwater permits normally do not contain water quality-based effluent limitations. As stated in 30 TAC § 307.8(e), controls on the quality of permitted stormwater discharges are largely based on implementing best management practices and technology-based limits. Stormwater quality is compared to the allowable concentrations of metals found in 30 TAC § 319.22 (Quality Levels – Inland Waters) and 30 TAC § 319.23 (Quality Levels – Tidal Waters) to ensure that those concentrations are not exceeded, as detailed in the following tables:

30 TAC § 319.22 Quality Levels – Inland Waters (Stormwater Metal Limitations)

Parameter	Daily Average mg/L	Daily Maximum mg/L	MAL mg/L
Arsenic, total	0.1	0.2	0.0005
Barium, total	1.0	2.0	0.003
Cadmium, total	0.05	0.1	0.001
Chromium, total	0.5	1.0	0.003
Copper, total	0.5	1.0	0.002
Lead, total	0.5	1.0	0.0005
Manganese, total	1.0	2.0	0.0005
Mercury, total	0.005	0.005	0.000005
Nickel, total	1.0	2.0	0.002
Selenium, total	0.05	0.1	0.005
Silver, total	0.05	0.1	0.0005
Zinc, total	1.0	2.0	0.005

30 TAC § 319.23 Quality Levels – Tidal Waters (Stormwater Metal Limitations)

Parameter	Daily Average mg/L	Daily Maximum mg/L	MAL mg/L
Arsenic, total	0.1	0.2	0.0005
Barium, total	1.0	2.0	0.003
Cadmium, total	0.1	0.2	0.001
Chromium, total	0.5	1.0	0.003
Copper, total	0.5	1.0	0.002
Lead, total	0.5	1.0	0.0005
Manganese, total	1.0	2.0	0.0005
Mercury, total	0.005	0.005	0.000005
Nickel, total	1.0	2.0	0.002
Selenium, total	0.1	0.2	0.005
Silver, total	0.05	0.1	0.0005
Zinc, total	1.0	2.0	0.005

Appendix C
TDS, Chloride, and Sulfate Screening Calculations

Intermittent Stream within 3 miles of a wide tidal river:

The following procedures are used to evaluate TDS, chloride, and sulfate loadings in discharges to an intermittent stream within 3 miles of a lake considered part of a wide tidal river. Screening procedures and effluent limitations are calculated using the methodology in the document "Procedures to Implement the Texas Surface Water Quality Standards" (IPs; June 2010, as approved by EPA) and criteria in the Texas Surface Water Quality Standards (30 TAC § 307, as approved by EPA).

TCEQ Implementation Procedures specify the use of two screening procedures for intermittent streams within 3 miles of a wide tidal river. Since discharge enters Bear Lake, which is part of the San Jacinto River Tidal, a classified segment, the lake may also be evaluated, if needed. Segment No. 1001 is a classified saltwater segment. In order to evaluate the intermittent stream, Segment No. 1016 values will be used. Note discharges to marine waters are evaluated on a case-by-case basis.

Segment Number: Marine Segment No. 1001 and Freshwater Segment No. 1016

Enter values needed for screening:			Data Source (edit if different)
TDS CC - segment criterion - TDS	1000	mg/L	2014 TSWQS, Appendix A
Cl CC - segment criterion - chloride	150	mg/L	2014 TSWQS, Appendix A
SO4 CC - segment criterion - sulfate	150	mg/L	2014 TSWQS, Appendix A
TDS CE - average effluent concentration - TDS	2585	mg/L	Permit application
Cl CE - average effluent concentration - chloride	240	mg/L	Permit application
SO4 CE - average effluent concentration - sulfate	1300	mg/L	Permit application

TDS Screening

The TDS screening value is determined by first calculating an initial TDS concentration, C_{TDS}, as follows:

$$C_{TDS} = (\text{TDS CC} / 500\ \text{mg/L}) * 2{,}500\ \text{mg/L}$$

Where:	
	C_{TDS} = TDS concentration used to determine Csv screening value
	TDS CC = TDS criterion at the first downstream segment
	500 mg/L = the median TDS concentration in Texas streams
	2,500 mg/L = the minimum TDS screening value

C_{TDS} = 5000 mg/L

The next step is to use the initial C_{TDS} to set the actual TDS screening value, TDS Csv, using the following table:

If C_{TDS}		Then TDS Csv
≤ 2,500 mg/L	=	2,500 mg/L
> 2,500 mg/L but ≤ 6,000 mg/L	=	C_{TDS}
> 6,000 mg/L	=	6,000 mg/L

Appendix C
TDS, Chloride, and Sulfate Screening Calculations

Some specific types of intermittent streams have alternative screening values (Csv):

Specific Type of Intermittent Stream	If C_{TDS} is	Default Csv =
Dry except for short-term flow in immediate response to rainfall.	< 4,000 mg/L	4,000 mg/L
	≥ 4,000 mg/L	C_{TDS}
Constructed ditch conveying stormwater and wastewater, considered water in the state.	< 4,000 mg/L	4,000 mg/L
	≥ 4,000 mg/L	C_{TDS}
Within 3 miles of tidal waters.	—	6,000 mg/L

Once TDS Csv is established, the next step is to compare the effluent TDS concentration, TDS CE, to the screening value. Control measures, which may include effluent limitations, are considered for TDS if the effluent TDS is greater than the screening value.

Values needed for Screening			Data Source
TDS CE - average effluent TDS concentration	2585	mg/L	Permit application
TDS Csv - TDS screening value	**5000**	mg/L	Determined above

No control measures needed if:	2585	≤	5000
Consider control measures if:	2585	>	5000

No control measures needed for TDS

Chloride and sulfate are not typically screened for discharges to intermittent streams because the TDS screening should be adequately protective. However, for situations where TDS screening alone may not provide adequate protection, similar screening may be performed for chloride and sulfate, per the June 2010 IPs, page 177.

Chloride Screening

The chloride screening value is determined by first calculating an initial chloride concentration, C_{CL}, as follows:

CL Csv = (TDS Csv / TDS CC) * CL CC

Where:	CL Csv = Chloride screening value
	TDS Csv = TDS screening value
	TDS CC = TDS criterion at the first downstream segment
	CL CC = Chloride criterion at the first downstream segment

Appendix C
TDS, Chloride, and Sulfate Screening Calculations

CL Csv = (5000 mg/L / 1000 mg/L) * 150 mg/L = 750 mg/L

Values needed for Screening			Data Source
CL CE - average effluent chloride concentration	240	mg/L	Permit application
CL Csv - Chloride screening value	**750**	mg/L	Determined above

No control measures needed if:	240	≤	750
Consider control measures if:	240	>	750

No control measures needed for Chloride

Sulfate Screening

The sulfate screening value is determined by first calculating an initial sulfate concentration, SO4, as follows:

SO4 Csv = (TDS Csv / TDS CC) * SO4 CC

Where:	SO4 Csv = Sulfate screening value
	TDS Csv = TDS screening value
	TDS CC = TDS criterion at the first downstream segment
	SO4 CC = Sulfate criterion at the first downstream segment

SO4 Csv = (5000 mg/L / 1000 mg/L) * 150 mg/L = 750 mg/L

Values needed for Screening			Data Source
SO4 CE - average effluent sulfate concentration	1300	mg/L	Permit application
SO4 Csv - Sulfate screening value	**750**	mg/L	Determined above

No control measures needed if:	1300	≤	750
Consider control measures if:	1300	>	750

No control measures needed for Chloride

Possible Control Measures needed for Sulfate – Evaluate discharge to a wide tidal river, the first receiving water downstream of the intermittent stream. Note the San Jacinto River Tidal is tidally influenced.

Please note the following screening procedure is not specifically outlined in the June 2010 IPs, but is applied by inference to further evaluate sulfate loadings in discharges to a bay or wide tidal river (June 2010 IPs, page 180):

Appendix C
TDS, Chloride, and Sulfate Screening Calculations

Bay or Wide Tidal River

The following procedure may be used to evaluate sulfate loadings in discharges to a wide tidal river. Compare the effluent sulfate concentration to the segment median values. Sources for determining the median concentrations include: (1) the tables in Appendix D of the Procedures to Implement the TSWQS (IPs); (2) the most recent five years of data in the Surface Water Quality Monitoring Information System (SWQMIS) database; or (3) other available data. The absence of numerical criteria will not preclude evaluations and regulatory actions to protect estuarine salinity.

Further sulfate screening may be performed as follows:

$$SO4\ C_{SV} = (TDS\ C_{SV} / TDS\ C_A) * SO4\ C_A = 750\ mg/L$$

Where:	SO4 CC = No segment criterion set for Segment No. 1001 TDS Csv = TDS screening value TDS CA = Median ambient concentration from Appendix D = 940 mg/L SO4 CA = Median ambient concentration from Appendix D = 246 mg/L SO4 CE = average effluent sulfate concentration = 1300 mg/L

$$SO4\ C_{SV} = (5{,}000\ mg/L / 940\ mg/L) * 246\ mg/L = 1{,}308.5\ mg/L$$

Using the less protective TDS C_{SV} for intermittent streams within 3 miles of tidal waters of 6,000 mg/L.

$$SO4\ C_{SV} = (6{,}000\ mg/L / 940\ mg/L) * 246\ mg/L = 1{,}570\ mg/L$$

No control measures needed if C_E. ≤. SO4 C_{SV}:	1,300 mg/L ≤ 1,308 mg/L or 1,570 mg/L
Consider control measures if C_E > SO4 C_{SV}:	1,300 mg/L > 1,308 mg/L or 1,570 mg/L

No Control Measures needed for Sulfate.

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

The following table is a summary of technology-based effluent limitations calculated/assessed in the draft permit (Technology-Based), calculated/ assessed water quality-based effluent limitations (Water Quality-Based), and effluent limitations in the existing permit (Existing Permit). Effluent limitations appearing in bold are the most stringent of the three and are included in the draft permit.

Outfall	*Pollutant*	*Technology-Based*		*Water Quality-Based*		*Existing Permit*	
		Daily Avg	*Daily Max*	*Daily Avg*	*Daily Max*	*Daily Avg*	*Daily Max*
		lbs/day	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*
001 Interim Phase	Flow, MGD	3.2	7.2			**3.2**	**7.2**
	$CBOD_5$	539	1,327	414 *(15.5 mg/L= WLE-1R)*		**414**	**1,016**
	Ammonia Nitrogen (NH_3-N)			46 *(1.72 mg/L= WLE-1R)*		**46**	**183**
	Total Suspended Solids (TSS)	1,015	3,328			**1,015**	**3,328**
	Total Organic Carbon (TOC)	Report	4,581			Report	**4,581**
	Oil and grease	-	399			**N/A**	**399**
	Chromium, Total	1.21	3.02			**1.21**	**3.02**
	Copper, Total	1.58	3.69	**1.14** *(0.0429 mg/L)*	**2.42** *(0.0908 mg/L)*	0.638	1.35
	Acenaphthene	0.213	0.571			**0.213**	**0.571**
	Acenaphthylene	0.213	0.571			**0.213**	**0.571**
	Acrylonitrile	0.929	2.34	104	222	**0.929**	**2.34**
	Anthracene	0.213	0.571	1,202	2,542	**0.213**	**0.571**
	Benzene	0.358	1.31	530	1,121	**0.358**	**1.31**
	Benzo(a)anthracene	0.213	0.571	**0.0228**	**0.0483**	0.213	0.571
	3,4-Benzofluoranthene	0.222	0.590			**0.222**	**0.590**
	Benzo(k)fluoranthene	0.213	0.571			**0.213**	**0.571**
	Benzo(a)pyrene	0.222	0.590	**0.0022**	**0.0048**	0.222	0.590
	Bis(2-ethylhexyl)phthalate	0.997	2.70	6.88	14.5	**0.997**	**2.70**
	Carbon Tetrachloride	0.174	0.368	41.9	88.8	**0.174**	**0.368**
	Chlorobenzene	0.145	0.271	2,497	5,284	**0.145**	**0.271**

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg lbs/day	Daily Max lbs/day	Daily Avg lbs/day	Daily Max lbs/day	Daily Avg lbs/day	Daily Max lbs/day
001 Interim Phase	Chloroethane	1.00	2.59			**1.00**	**2.59**
	Chloroform	0.560	1.22	7,024	14,862	**0.560**	**1.22**
	2-Chlorophenol	0.300	0.949			**0.300**	**0.949**
	Chrysene	0.213	0.571	2.29	4.86	**0.213**	**0.571**
	Di-n-butyl Phthalate	0.261	0.552	84.3	178	**0.261**	**0.552**
	1,2-Dichlorobenzene (ortho)	0.745	1.57	3,010	6,370	**0.745**	**1.57**
	1,3-Dichlorobenzene (meta)	0.300	0.426	543	1,148	**0.300**	**0.426**
	1,4-Dichlorobenzene (para)	0.145	0.271			**0.145**	**0.271**
	1,1-Dichloroethane	0.213	0.571			**0.213**	**0.571**
	1,2-Dichloroethane	0.658	2.04	332	702	**0.658**	**2.04**
	1,1-Dichloroethylene	0.155	0.242	50,301	106,419	**0.155**	**0.242**
	1,2-trans-Dichloroethylene	0.203	0.523			**0.203**	**0.523**
	2,4-Dichlorophenol	0.377	1.08			**0.377**	**1.08**
	1,2-Dichloropropane	1.48	2.22	236	500	**1.48**	**2.22**
	1,3-Dichloropropylene	0.280	0.426	108	229	**0.280**	**0.426**
	Diethyl Phthalate	0.784	1.96			**0.784**	**1.96**
	2,4-Dimethylphenol	0.174	0.348	7,699	16,289	**0.174**	**0.348**
	Dimethyl Phthalate	0.184	0.455			**0.184**	**0.455**
	4,6-Dinitro-o-cresol	0.755	2.68			**0.755**	**2.68**
	2,4-Dinitrophenol	0.687	1.19			**0.687**	**1.19**
	2,4-Dinitrotoluene	1.09	2.76			**1.09**	**2.76**
	2,6-Dinitrotoluene	2.46	6.20			**2.46**	**6.20**
	Ethylbenzene	0.310	1.04	1,703	3,604	**0.310**	**1.04**
	Fluoranthene	0.242	0.658			**0.242**	**0.658**
	Fluorene	0.213	0.571			**0.213**	**0.571**
	Hexachlorobenzene	0.145	0.271	**0.00061**	**0.00131**	0.00401	0.00881
	Hexachlorobutadiene	0.193	0.474	0.200	**0.424**	**0.193**	0.474

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	*Pollutant*	*Technology-Based*		*Water Quality-Based*		*Existing Permit*	
		Daily Avg	*Daily Max*	*Daily Avg*	*Daily Max*	*Daily Avg*	*Daily Max*
		lbs/day	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*
001 Interim Phase	Hexachloroethane	0.203	0.523	2.12	4.48	**0.203**	**0.523**
	Methyl Chloride	0.833	1.84			**0.833**	**1.84**
	Methylene Chloride	0.387	0.862	12,168	25,744	**0.387**	**0.862**
	Naphthalene	0.213	0.571			**0.213**	**0.571**
	Nitrobenzene	0.261	0.658	1,709	3,616	**0.261**	**0.658**
	2-Nitrophenol	0.397	0.668			**0.397**	**0.668**
	4-Nitrophenol	0.697	1.20			**0.697**	**1.20**
	Phenanthrene	0.213	0.571	0.323	0.680	**0.213**	**0.571**
	Phenol	0.145	0.251			**0.145**	**0.251**
	Pyrene	0.242	0.649			**0.242**	**0.649**
	Tetrachloroethylene	0.213	0.542	255	540	**0.213**	**0.542**
	Toluene	0.251	0.774			**0.251**	**0.774**
	1,2,4-Trichlorobenzene	0.658	1.35			**0.658**	**1.35**
	1,1,1-Trichloroethane	0.203	0.523	715,861	1,514,508	**0.203**	**0.523**
	1,1,2-Trichloroethane	0.203	0.523	151	320	**0.203**	**0.523**
	Trichloroethylene	0.203	0.523	65.6	138	**0.203**	**0.523**
	Vinyl Chloride	1.00	2.59	15.0	31.8	**1.00**	**2.59**
	Xylenes, Total					2.14	4.27
	Dissolved Oxygen (DO), minimum			4.0 min (*WLE-1R*)	N/A	**4.0 min.**	N/A
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

[1] Segment No. 1001 criteria.

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg lbs/day	Daily Max lbs/day	Daily Avg lbs/day	Daily Max lbs/day	Daily Avg lbs/day	Daily Max lbs/day
001 Final Phase	Flow, MGD	3.8	7.2			**3.8**	**7.2**
	$CBOD_5$	703	1,769	703 (*22.1 mg/L= WLE-1R*)		**703**	**1,725**
	Ammonia Nitrogen (NH_3-N)			46 (*1.45 mg/L= WLE-1R*)		**46**	**183**
	Total Suspended Solids (TSS)	1,254	4,105			**1,254**	**4,105**
	Total Organic Carbon (TOC)	Report	5,440			**Report**	**5,440**
	Oil and grease	-	474			**N/A**	474
	Chromium, Total	1.21	3.02			**1.21**	**3.02**
	Copper, Total	1.58	3.69	**1.36** (*0.0239 mg/L*)	**2.87** (*0.051 mg/L*)	0.757	1.60
	Acenaphthene	0.322	0.864			**0.322**	**0.864**
	Acenaphthylene	0.322	0.864			0.322	0.864
	Acrylonitrile	1.40	3.54	124	263	**1.40**	**3.54**
	Anthracene	0.322	0.864	1,427	3,019	**0.322**	**0.864**
	Benzene	0.541	1.99	629	1,332	**0.541**	**1.99**
	Benzo(a)anthracene	0.322	0.864	**0.0270**	**0.0574**	0.322	0.756
	3,4-Benzofluoranthene	0.336	0.893			**0.336**	**0.893**
	Benzo(k)fluoranthene	0.322	0.864			**0.322**	0.864
	Benzo(a)pyrene	0.336	0.893	**0.0027**	**0.0057**	0.336	0.756
	Bis(2-ethylhexyl)phthalate	1.50	4.08	8.18	17.3	**1.50**	**4.08**
	Carbon Tetrachloride	0.263	0.556	49.8	105	**0.263**	**0.556**
	Chlorobenzene	0.219	0.410	2,966	6,275	**0.219**	0.410
	Chloroethane	1.52	3.92			**1.52**	**3.92**
	Chloroform	0.665	1.45	8,342	17,648	**0.665**	**1.45**
	2-Chlorophenol	0.454	1.43			**0.454**	**1.43**

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg lbs/day	Daily Max lbs/day	Daily Avg lbs/day	Daily Max lbs/day	Daily Avg lbs/day	Daily Max lbs/day
001 Final Phase	Chrysene	0.322	0.864	2.73	5.77	**0.322**	**0.864**
	Di-n-butyl Phthalate	0.395	0.834	100	211	**0.395**	**0.834**
	1,2-Dichlorobenzene (ortho)	1.12	2.38	3,575	7,564	**1.12**	**2.38**
	1,3-Dichlorobenzene (meta)	0.454	0.644	644	1,364	**0.454**	**0.644**
	1,4-Dichlorobenzene (para)	0.219	0.410			**0.219**	**0.410**
	1,1-Dichloroethane	0.322	0.864			**0.322**	**0.864**
	1,2-Dichloroethane	0.995	3.09	394	834	**0.995**	**3.09**
	1,1-Dichloroethylene	0.234	0.366	59,732	126,373	**0.234**	**0.366**
	1,2-trans-Dichloroethylene	0.307	0.790			**0.307**	**0.790**
	2,4-Dichlorophenol	0.571	1.64			**0.571**	**1.64**
	1,2-Dichloropropane	2.24	3.36	280	593	**2.24**	**3.36**
	1,3-Dichloropropylene	0.424	0.644	128	272	**0.424**	**0.644**
	Diethyl Phthalate	1.18	2.97			**1.18**	**2.97**
	2,4-Dimethylphenol	0.263	0.527	9,142	19,343	**0.263**	**0.527**
	Dimethyl Phthalate	0.278	0.688			**0.278**	**0.688**
	4,6-Dinitro-o-cresol	1.14	4.05			**1.14**	**4.05**
	2,4-Dinitrophenol	1.03	1.80			**1.03**	**1.80**
	2,4-Dinitrotoluene	1.65	4.17			**1.65**	**4.17**
	2,6-Dinitrotoluene	3.73	9.38			**3.73**	**9.38**
	Ethylbenzene	0.468	1.58	2,023	4,280	**0.468**	**1.58**
	Fluoranthene	0.366	0.995			**0.366**	**0.995**
	Fluorene	0.322	0.864			**0.322**	**0.864**
	Hexachlorobenzene	0.219	0.410	**0.00073**	**0.00155**	0.00475	0.01046
	Hexachlorobutadiene	0.292	0.717	**0.238**	**0.504**	0.292	0.717
	Hexachloroethane	0.307	0.790	2.52	5.32	**0.307**	**0.790**
	Methyl Chloride	1.25	2.78			**1.25**	**2.78**
	Methylene Chloride	0.585	1.30	14,450	30,571	**0.585**	**1.30**
	Naphthalene	0.322	0.864			**0.322**	**0.864**

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	*Pollutant*	*Technology-Based*		*Water Quality-Based*		*Existing Permit*	
		Daily Avg	*Daily Max*	*Daily Avg*	*Daily Max*	*Daily Avg*	*Daily Max*
		lbs/day	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*
001 Final Phase	Nitrobenzene	0.395	0.995	5,029	4,294	**0.395**	**0.995**
	2-Nitrophenol	0.600	1.01			**0.600**	**1.01**
	4-Nitrophenol	1.05	1.81			**1.05**	**1.81**
	Phenanthrene	0.322	0.864	0.383	**0.808**	**0.322**	0.810
	Phenol	0.219	0.380			**0.219**	**0.380**
	Pyrene	0.366	0.981			**0.366**	**0.981**
	Tetrachloroethylene	0.322	0.820	303	642	**0.322**	**0.820**
	Toluene	0.380	1.17			**0.380**	**1.17**
	1,2,4-Trichlorobenzene	0.995	2.05			**0.995**	**2.05**
	1,1,1-Trichloroethane	0.307	0.790	850,084	1,798,479	**0.307**	**0.790**
	1,1,2-Trichloroethane	0.307	0.790	179	380	**0.307**	**0.790**
	Trichloroethylene	0.307	0.790	77.9	164	**0.307**	**0.790**
	Vinyl Chloride	1.52	3.92	17.8	37.8	**1.52**	**3.92**
	Xylenes, Total					2.14	4.27
	Dissolved Oxygen (DO), minimum			4.0 min (*WLE-1R*)	N/A	**4.0 min.**	N/A
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

Outfall	*Pollutant*	*Technology-Based*		*Water Quality-Based*		*Existing Permit*	
		Daily Avg	*Daily Max*	*Daily Avg*	*Daily Max*	*Daily Avg*	*Daily Max*
		mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
002	Flow MGD	Report	Report			**Report**	**Report**
	TOC	N/A	75			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	Total Aluminum			-	**1.766** [3]	**N/A**	**Report** [2]
	pH (standard units)	6.0 SU min.	**9.5 SU**	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	9.0 SU

[2] Beginning upon the date of permit issuance and lasting three-years from the date of permit issuance.

[3] Beginning three years from the permit issuance date and lasting until the date of permit expiration.

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg	Daily Max	Daily Avg	Daily Max	Daily Avg	Daily Max
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
003	Flow MGD	Report	Report			**Report**	**Report**
	TOC	N/A	75			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	Total Aluminum			-	**2.339** [3]	**N/A**	**Report** [2]
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg	Daily Max	Daily Avg	Daily Max	Daily Avg	Daily Max
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
004	Flow MGD	Report	Report			**Report**	**Report**
	TOC	N/A	75			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	Total Aluminum			-	**2.216** [3]	**N/A**	**Report** [2]
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg	Daily Max	Daily Avg	Daily Max	Daily Avg	Daily Max
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
005	Flow MGD	Report	Report			**Report**	**Report**
	TOC	N/A	75			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	Total Aluminum			-	**3.649** [3]	**N/A**	**Report** [2]
	Total Zinc			-	**Report** [4]	**N/A**	**Report** [4]
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

[2] Beginning upon the date of permit issuance and lasting three-years from the date of permit issuance.

[3] Beginning three years from the permit issuance date and lasting until the date of permit expiration.

[4] Beginning upon the date of permit issuance and lasting eighteen months from the date of permit issuance.

Appendix D
Comparison of Technology-Based Effluent Limits and Water Quality-Based Effluent Limits

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg	Daily Max	Daily Avg	Daily Max	Daily Avg	Daily Max
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
006	Flow MGD	Report	Report			**Report**	**Report**
	TOC	N/A	75			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	Total Aluminum			-	**1.766** [3]	**N/A**	**Report** [2]
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg	Daily Max	Daily Avg	Daily Max	Daily Avg	Daily Max
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
007	Flow MGD	Report	Report			**Report**	**Report**
	TSS	N/A	100			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

Outfall	Pollutant	Technology-Based		Water Quality-Based		Existing Permit	
		Daily Avg	Daily Max	Daily Avg	Daily Max	Daily Avg	Daily Max
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
008-010	Flow MGD	Report	Report			**Report**	**Report**
	TOC	N/A	75			**N/A**	**75**
	Oil and grease	N/A	15			**N/A**	**15**
	pH (standard units)	6.0 SU min.	9.0 SU	6.5 SU [1] min.	9.0 SU [1]	**6.0 SU min.**	**9.0 SU**

[2] Beginning upon the date of permit issuance and lasting three-years from the date of permit issuance.

[3] Beginning three years from the permit issuance date and lasting until the date of permit expiration.