FACT SHEET AND EXECUTIVE DIRECTOR’S FINAL DECISION

For proposed Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXG310000 to discharge wastewater associated with oil and gas extraction activities into water in the state.

Issuing Office: Texas Commission on Environmental Quality

P.O. Box 13087

Austin, TX 78711-3087

Prepared By: Chris Linendoll, E.I.T.

Wastewater Permitting Section

Water Quality Division

Date: December 2023

Permit Action: New General Permit to replace existing U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit Nos. TXG260000 and TXG330000

Table of Contents

[I. Summary 2](#_Toc127866395)

[II. Executive Director’s Recommendation 2](#_Toc127866396)

[III. Permit Applicability 2](#_Toc127866397)

[IV. Permit Effluent Limitations and Monitoring Requirements 5](#_Toc127866398)

[V. Significant Changes from Existing EPA General Permit Nos. TXG260000 and TXG330000 12](#_Toc127866399)

[VI. Addresses 20](#_Toc127866400)

[VII. Legal Basis 21](#_Toc127866401)

[VIII. Regulatory Background 22](#_Toc127866402)

[IX. Permit Coverage 22](#_Toc127866403)

[X. Technology-Based Requirements 24](#_Toc127866404)

[XI. Water Quality-Based Requirements 38](#_Toc127866405)

[XII. Cooling Water Intake Structure Requirements 62](#_Toc127866406)

[XIII. Monitoring and Reporting 63](#_Toc127866407)

[XIV. Procedures for Final Decision 64](#_Toc127866408)

[XV. Administrative Record 65](#_Toc127866409)

[Appendix A-1 69](#_Toc127866410)

[Appendix A-2 72](#_Toc127866416)

[Appendix A-3 75](#_Toc127866422)

[Appendix A-4 78](#_Toc127866428)

[Appendix B 81](#_Toc127866434)

[Appendix C 88](#_Toc127866441)

[Appendix D 95](#_Toc127866448)

[Appendix E 102](#_Toc127866455)

[Appendix F 104](#_Toc127866462)

# I. Summary

The Texas Commission on Environmental Quality (TCEQ or Commission) is issuing a new TPDES general permit (to replace existing EPA NPDES General Permit Nos. TXG260000 and TXG330000) authorizing discharges of wastewater associated with oil and gas extraction activities into water in the state, and the application of cooling water intake structure requirements. The TPDES general permit authorizes discharges of various waste streams described below from Onshore Stripper Well Facilities Located East of the 98th Meridian (herein after referred to as Stripper Well Facilities), Coastal Facilities, and Territorial Seas Facilities (located within three statute miles of the Texas coastline). The TPDES general permit also establishes specific prohibitions regarding the discharge of various waste streams from operations whose discharges are authorized under the TPDES general permit; prohibitions regarding discharges from other operations described below; and establishes cooling water intake structure operational requirements included under Section 316b of the Clean Water Act (CWA).

The purpose of the development of this new TPDES general permit is two-fold: one, the implementation of House Bill 2771, 86th Legislative Session which transfers permitting authority for discharges of certain waste streams from crude oil and natural gas facilities into water in the state from the Railroad Commission of Texas (RRC) to TCEQ, and two, for the TCEQ to regulate such discharges into water in the state under the TPDES program after TCEQ receiving authority from EPA to regulate such discharges. All discharges associated with oil and gas extraction activities adjacent to water in the state (i.e., evaporation and land application) and other activities not related to discharge to water in the state remains under the jurisdiction of the RRC. Upon issuance of this TPDES general permit, oil and gas extraction activities will no longer be required to obtain individual RRC authorizations to discharge to surface waters or separate federal authorization to discharge to surface waters via either NPDES General Permit Nos. TXG260000 or TXG330000. One combined state and federal authorization to discharge to surface waters will be able to be obtained under the TPDES general permit.

# II. Executive Director’s Recommendation

The Executive Director has made a final decision that this draft TPDES general permit, if issued, meets all statutory and regulatory requirements. It is proposed that the TPDES general permit expire five years from the effective date.

# III. Permit Applicability

This TPDES general permit authorizes the discharge to water in the state of various waste streams described below from Stripper Well Facilities, Coastal Facilities, and Territorial Seas Facilities. The TPDES general permit also establishes specific prohibitions for the discharge of various waste streams from operations proposed for authorization under the TPDES general permit; prohibitions for discharges from other operations described below; and establishes cooling water intake structure (CWIS) operational requirements included under Section 316b of the CWA.

1. The TPDES general permit specifies which facilities may be authorized under this TPDES general permit and those that must be authorized by an individual TPDES permit or another TPDES general permit.
2. The following activities are not eligible for this TPDES general permit coverage:
   1. discharges prohibited by 30 Texas Administrative Code (TAC) Chapter 311, *Watershed Protection* or 30 TAC Chapter 213, *Edwards Aquifer;*
   2. discharges of wastewater associated with oil and gas extraction facilities adjacent to water in the state (e.g., land application or evaporation) that are regulated by the RRC. Discharges from these facilities into water in the state are authorized under this draft TPDES general permit;
   3. new sources or new discharges [as defined in 40 Code of Federal Regulation (CFR) § 122.2, 40 CFR § 435.11(w), and 40 CFR § 435.41(x)] of the constituent(s) of concern to impaired waters are not authorized by this draft TPDES general permit unless otherwise allowable under 30 TAC Chapter 305, *Consolidated Permits*, and applicable state law. Impaired waters are those that do not meet applicable water quality standard(s) and are listed as category 4 or 5 in the current version of the *Texas Integrated Report of Surface Water Quality*, and waterbodies on the CWA, § 303(d) list. Constituents of concern are those for which the water body is listed as impaired. As a note, the Water Quality Assessment Section interoffice memorandum regarding the dissolved oxygen modeling assessment for discharges of produced wastewater to the territorial seas identified the Gulf of Mexico being impaired for mercury. Available data to TCEQ indicates non-detect values for mercury for existing territorial seas produced wastewater discharges. Several samples submitted historically to RRC do not meet current TCEQ minimum analytical levels (MALs) thus a monitoring and reporting requirement for total mercury is proposed in the draft TPDES general permit for discharges of produced wastewater to the territorial seas;
   4. discharges of the constituent(s) of concern to impaired water bodies for which there is a total maximum daily load (TMDL) implementation plan unless they are consistent with the approved TMDL and the implementation plan. (The Executive Director may amend this TPDES general permit or develop a separate TPDES general permit for discharges to these water bodies. For discharges not eligible for coverage under this draft TPDES general permit, the discharger must apply for and receive an individual TPDES permit or other applicable TPDES general permit prior to discharging to water in the state);
   5. discharges that would adversely affect a listed endangered or threatened species or its critical habitat. (Federal requirements related to endangered species apply to all TPDES permitted activities. Site-specific controls may be required to ensure the protection of endangered or threatened species is achieved);
   6. discharges from facilities defined in 40 CFR Part 435, Subpart C (Onshore Subcategory) and 40 CFR 435, Subpart E (Agricultural and Wildlife Use Subcategory);
   7. discharges from facilities included under 40 CFR Part 435, Subpart A (Offshore Subcategory) located greater than three statute miles from the coastline in an area of the Gulf of Mexico that is commonly referred to as the Outer Continental Shelf. Such discharges may be authorized via separate State of Texas authority under TCEQ General Permit No. WQG280000 and EPA authority under NPDES General Permit No. GMG290000. Discharges beyond 10.357 statute miles from the coastline do not require authorization from the State of Texas and are regulated solely by EPA [Note: 10.357 statute miles = 9 nautical miles x (1.15078 statute miles / nautical mile)];
   8. discharges from Stripper Well Facilities into water in the state located west of the 98th meridian;
   9. discharges from Stripper Well Facilities to tidally influenced or marine water bodies;
   10. discharge of hydrostatic test water: oil and gas extraction facilities seeking to discharge hydrostatic test water into water in the state have the option of obtaining coverage under TPDES General Permit No. TXG670000 or obtaining an individual TPDES permit;
   11. activities associated with oil and gas extraction activities which are not associated with discharges into water in the state regulated by the RRC. Such activities include, but are not limited to drilling new wells, plugging and abandoning existing wells, blowout prevention control, spill prevention, surface coatings and preparation, and other activities not associated with wastewater discharges into water in the state;
   12. discharges into Areas of Biological Concern, including marine sanctuaries and live bottom areas;
   13. discharges of radiological substances or materials in excess of the amount regulated by 30 TAC Chapter 336 as required by 30 TAC § 307.4(c);
   14. discharge of waste streams generated at a location where that waste stream is prohibited from discharge to waters in the U.S. from a location where that waste stream is authorized for discharge to waters in the U.S., as established in 40 CFR Part 435, Subpart G (one example of what is not authorized is produced wastewater generated at a Coastal Facility, where produced wastewater is prohibited from discharge being transported and discharged from a Territorial Seas Facility where such discharge is authorized);
   15. discharges from operations defined as Centralized Waste Treatment (CWT) facilities as established in 40 CFR Part 437; and
   16. discharge of halogenated phenolic compounds as part of any waste stream authorized for discharge.
3. Facilities that handle or dispose of various waste streams from Stripper Well Facilities, Coastal Facilities, and Territorial Seas Facilities by any of the following practices are not required to obtain coverage under either this TPDES general permit or an individual TPDES permit:
4. recycling with no resulting discharge into water in the state, including recycling of waste streams in industrial processes, hydraulic fracturing, etc.;
5. pumping and hauling or otherwise transporting to an authorized disposal facility;
6. discharge to a publicly owned treatment works (POTW), provided the POTW is authorized to receive such waste streams;
7. underground injection in accordance with 30 TAC Chapter 331, *Underground Injection Control*; or underground injection in accordance with RRC rules; and
8. storage in above-ground storage tanks with no resulting discharge into water in the state.

# IV. Permit Effluent Limitations and Monitoring Requirements

1. Discharge into water in the state from Stripper Well Facilities is authorized in the draft TPDES general permit and subject to the following effluent limitations and monitoring requirements:

* Produced Wastewater, Well Treatment Fluids, and Workover Fluids

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | N/A | Estimate | Once/month |
| Total Dissolved Solids | 3000 mg/L | N/A | Grab | Once/year |
| Oil and Grease | 35 mg/L | 25 mg/L | Grab | Once/month |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/month |
| Lethal Whole Effluent Toxicity (WET) limit > 100% (Parameter 51711) *Daphnia pulex* (24-hour acute LC50 1) | > 100% | > 100% | Grab | Once/six months2 |
| Lethal Whole Effluent Toxicity (WET) limit > 100% (Parameter 51714) *Pimephales promelas* (24-hour acute LC50 1) | > 100% | > 100% | Grab | Once/six months 2 |

1 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

2 Should well treatment or workover fluids be discharged with produced wastewater, testing of the effluent on such combined discharges shall occur within the once/six months monitoring frequency.

Discharge into water in the state of the following waste streams from Stripper Well Facilities is prohibited in the TPDES general permit:

* Drilling Fluids
* Drill Cuttings
* Produced Sand
* Dewatering Effluent
* Formation Test Fluids
* Well Completion Fluids
* Hydrate Control Fluids
* Domestic Waste
* Sanitary Waste
* Contaminated Miscellaneous Discharges and Uncontaminated Miscellaneous Discharges
* Contaminated Stormwater

1. Discharge into water in the state from Coastal Facilities is authorized in the TPDES general permit and subject to the following effluent limitations and monitoring requirements:

* Deck Drainage

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Domestic Waste

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample  Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | Report, MGD | Instantaneous | Five/week |
| Floating Solids, Garbage, Foam | No discharge | N/A | Observation | Once/day |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L | Grab | Once/week |
| Total Suspended Solids | 65 mg/L | 20 mg/L | Grab | Once/week |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A | Grab | Once/week |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL | Grab | Once/quarter |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL | Grab | Once/quarter |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A | Grab | Five/week |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/day |

* Sanitary Waste (M10 and M9IM) - these terms are defined in the general permit

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample  Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | Report, MGD | Instantaneous | Five/week |
| Floating Solids | No discharge | N/A | Observation | Once/day |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L | Grab | Once/week |
| Total Suspended Solids | 65 mg/L | 20 mg/L | Grab | Once/week |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A | Grab | Once/week |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL | Grab | Once/quarter |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL | Grab | Once/quarter |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A | Grab | Five/week |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/day |

* Uncontaminated Miscellaneous Discharges

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Contaminated Miscellaneous Discharges

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | N/A | Estimate | Once/month |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/week |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (24-hour Acute LC50 2) | > 100% | > 100% | Grab | Once/six months |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (24-hour Acute LC50 2) | > 100% | > 100% | Grab | Once/six months |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

2 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

Discharges into water in the state from the following sources from Coastal Facilities are prohibited in the TPDES general permit:

* Drilling Fluids
* Drill Cuttings
* Produced Wastewater
* Produced Sand
* Dewatering Effluent
* Formation Test Fluids
* Well Treatment, Completion, and Workover Fluids
* Hydrate Control Fluids
* Contaminated stormwater for inland facilities (not defined as deck drainage)

1. Discharge into water in the state from Territorial Seas Facilities is authorized in the TPDES general permit and subject to the following effluent limitations and monitoring requirements:

* Produced Wastewater and Hydrate Control Fluids

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample  Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | 0.126 MGD | Estimate | Once/day |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |
| Oil & Grease | 42 mg/L | 29 mg/L | Grab | Once/month |
| Carbonaceous Biochemical Oxygen Demand (5-day) | N/A | 6483 mg/L | Grab | Once/month |
| Ammonia (as N) | N/A | 112 mg/L | Grab | Once/month |
| Temperature | Report, °F | N/A | In-Situ | Once/quarter |
| Total Dissolved Solids | Report, mg/L | N/A | Grab | Once/quarter |
| Total Copper | 0.371 mg/L | 0.175 mg/L | Grab | Once/month |
| Total Manganese | 32.14 mg/L | 15.19 mg/L | Grab | Once/month |
| Total Mercury | Report, mg/L | N/A | Grab | Once/month |
| Total Zinc | 11.57 mg/L | 5.47 mg/L | Grab | Once/month |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/week |
| Sublethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (Chronic NOEC 2) | 1.1% | 1.1% | Grab | Once/quarter |
| Sublethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (Chronic NOEC 2) | 1.1% | 1.1% | Grab | Once/quarter |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (24-hour acute LC50 3) | > 100% | > 100% | Grab | Once/six months |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (24-hour acute LC50 3) | > 100% | > 100% | Grab | Once/six months |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

2 The NOEC is defined as the greatest effluent dilution at which no significant sublethality is demonstrated. Significant sublethality is defined as a statistically significantly difference between a specified effluent dilution and the control for a sublethal endpoint. The daily maximum limitation established above is a 7-day minimum limitation.

3 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

* Well Treatment, Completion, and Workover Fluids

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | Report, MGD | Estimate | Once/day |
| Free Oil 1 | No discharge | N/A | EPA Approved Method 1 | Once/day |
| Oil & Grease | 42 mg/L | 29 mg/L | Grab | Once/month |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/week |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (24-hour acute LC50 2) | > 100% | > 100% | Grab 3 | Once/six months |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (24-hour acute LC50 2) | > 100% | > 100% | Grab 3 | Once/six months |

1 As determined by the static sheen test utilizing EPA Method 1617.

2 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

3 Should the planned or actual discharge occur for a duration of 24 hours or greater, the sample type shall be a 24-hour composite.

* Deck Drainage

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Domestic Waste

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample  Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | Report, MGD | Instantaneous | Five/week |
| Floating Solids and Foam | No discharge | N/A | Observation | Once/day |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L | Grab | Once/week |
| Total Suspended Solids | 65 mg/L | 20 mg/L | Grab | Once/week |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A | Grab | Once/week |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL | Grab | Once/quarter |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL | Grab | Once/quarter |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A | Grab | Five/week |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/day |

* Sanitary Waste (M10 and M9IM) – these terms are defined in the general permit.

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample  Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | Report, MGD | Instantaneous | Five/week |
| Floating Solids | No discharge | N/A | Observation | Once/day |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L | Grab | Once/week |
| Total Suspended Solids | 65 mg/L | 20 mg/L | Grab | Once/week |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A | Grab | Once/week |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL | Grab | Once/quarter |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL | Grab | Once/quarter |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A | Grab | Five/week |
| pH | 6.0 – 9.0 standard units | N/A | Grab | Once/day |

* Uncontaminated Miscellaneous Discharges

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Contaminated Miscellaneous Discharges

| Parameter | Daily Maximum Limitations | Daily Average Limitations | Sample Type | Monitoring Frequency |
| --- | --- | --- | --- | --- |
| Flow | Report, MGD | N/A | Estimate | Once/month |
| Free Oil 1 | No discharge | N/A | Observation | Once/day |
| pH | 6.0 - 9.0 standard units | N/A | Grab | Once/week |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (24-hour acute LC50 2) | > 100% | > 100% | Grab | Once/six months |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (24-hour acute LC50 2) | > 100% | > 100% | Grab | Once/six months |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

2 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

Discharge into water in the state of the following waste streams from Territorial Seas Facilities is prohibited in the TPDES general permit:

* Drilling Fluids
* Drill Cuttings
* Produced Sand
* Dewatering Effluent
* Formation Test Fluids

# V. Significant Changes from Existing EPA General Permit Nos. TXG260000 and TXG330000

**A. General Changes from EPA’s existing TXG260000 and TXG330000 (applicable to all facilities)**

* 1. Conditions in the draft TPDES general permit in relation to who is required to apply for authorization are proposed to be simplified and be consistent with other TPDES general permits. Owners and operators (provided the operator has independent operational control of a facility) are required to apply for authorization. EPA’s existing TXG260000 and TXG330000 contained different conditions related to state tracts, leases, facilities (which may include different types of operations – exploratory, development, production, etc.). Each individual discharging facility (e.g., production platform, drilling rig, central tank battery and associated treatment tanks, etc.) is required to submit an individual NOI. This TPDES general permit does not authorize multiple discharging facilities under a lease to be combined into one NOI. Should a facility contain all waste streams and transport such waste streams to another facility for subsequent treatment, management, and discharge; such facility is not required to submit an NOI provided there are no resulting discharges to water in the state from such facility.
  2. The draft TPDES general permit proposes to remove all language related to electronic application submittal requirements based on the limited number of facilities currently authorized under EPA’s existing general permits TXG260000 and TXG330000. Information obtained from EPA indicates it did not proceed with developing electronic permit application tools based on the limited number of facilities covered under both of EPA’s existing NPDES general permits. Discharge monitoring reports (DMRs) will continue to be required to be submitted electronically under this new draft TPDES general permit.
  3. The draft TPDES general permit proposes to remove all conditions not related to discharge to water in the state in EPA’s existing TXG260000 and TXG330000 that were not transferred to TCEQ via HB 2771 (which authorizes TCEQ to regulate discharges into water in the state). Conditions such as spill prevention, blowout prevention control, drilling of new wells, plugging wells, well abandonment, surface preparation and coatings, etc. remain under the regulatory authority of the RRC. Additionally, standard TPDES permit language related to maintenance of treatment units is revised to recognize RRC retains jurisdiction related to pits and impoundments as identified in RRC’s Oil and Gas Division’s Notice to Oil and Gas Operators, dated August 2021.
  4. The draft TPDES general permit proposes to revise definitions in EPA’s existing TXG260000 and TXG330000 and new definitions have been established in the draft TPDES general permit. The draft TPDES general permit reconciles discrepancies in definitions between EPA’s existing TXG260000 and TXG330000 and further revises definitions to be consistent (where applicable) with EPA’s existing NPDES General Permit No. GMG290000 for discharges to the Outer Continental Shelf (OCS) which was issued and effective five years after issuance of these two existing NPDES general permits. New definitions were developed to ensure enforceability of the draft TPDES general permit.
  5. The draft TPDES general permit proposes to prohibit the discharge of hydrostatic test waters. Oil and gas extraction facilities seeking authorization to discharge into water in the state have the ability to obtain coverage under TPDES General Permit No. TXG670000 or otherwise obtain an individual TPDES permit. Hydrostatic test waters discharged adjacent to water in the state (e.g., land application or evaporation) remains under the authority of RRC.
  6. The term “produced water” in EPA’s existing TXG260000 and TXG330000 (and as defined in 40 CFR Part 435) has been revised in the draft TPDES general permit to “produced wastewater” to be consistent with TWC § 26.131 and 30 TAC § 305.541(b) which adopted 40 CFR Part 435 by reference.
  7. The draft TPDES general permit proposes to include a condition prohibiting the discharges of radiological substances or materials in excess of amounts authorized under 30 TAC Chapter 336. TCEQ review of EPA issued individual NPDES permits for oil and gas extraction activities under 40 CFR Part 435, Subpart E (Agricultural and Wildlife Use Subcategory) indicated EPA has included conditions in those individual NPDES permits which are not established in EPA’s existing TXG26000 or TXG330000 (i.e., requiring monitoring for certain radioactive parameters).
  8. The draft TPDES general permit proposes to establish Notice of Intent (NOI) application and annual water quality assessment fees consistent with TCEQ regulations and all other TPDES general permits which are not established in EPA’s existing TXG260000 and TXG330000. The NOI fee is proposed to be established consistent with current fees charged by RRC for filing of oil and gas applications seeking discharge authorization. The annual fee is set at the minimum amount established in TCEQ regulations.
  9. The draft TPDES general permit provides clarification on the authority to discharge stormwater from oil and gas extraction facilities authorized under the TPDES general permit. Discharges of deck drainage, which includes stormwater, from Territorial Seas Facilities and Coastal Facilities which are located in waters are authorized under the TPDES general permit as regulated by 40 CFR Part 435. Discharges of stormwater from Stripper Well Facilities and Coastal Facilities located inland are not authorized under the TPDES general permit. Discharges of “uncontaminated stormwater” from these facilities are exempt from obtaining NPDES authorization to discharge under 40 CFR § 122.26(a)(2)(ii). Discharges of stormwater that do not meet the designation of “uncontaminated stormwater” from Stripper Well Facilities and inland Coastal Facilities are not authorized for discharge under this TPDES general permit and have the option of obtaining discharge authorization via TPDES Multi-Sector General Permit No. TXR050000 (operating facilities), TXR150000 (facilities under construction), or obtaining an individual TPDES permit. The requirement to obtain an NPDES permit for discharges of “contaminated stormwater” is established in 40 CFR § 122.26(a)(14)(iii).

**B. Changes Specific to Stripper Well Facilities authorized under EPA’s existing TXG330000**

1. The draft TPDES general permit proposes to remove restrictions established in EPA’s existing TXG330000 to the Carrizo/Wilcox, Reklaw, or Bartosh formations and authorizes discharges from Stripper Well Facilities associated with any formation east of the 98th meridian.
2. The draft TPDES general permit proposes to remove authorization to discharge waste streams not known to be associated with Stripper Well Facilities (deck drainage, formation test fluids, sanitary waste, domestic waste, and miscellaneous discharges). EPA proposed a new NPDES general permit, TXG350000, to separate Stripper Well Facilities from coastal oil and gas extraction facilities. This draft NPDES general permit which did not proceed to final issuance (reasons unknown to TCEQ) proposed these same revisions. Although these waste streams are not known to be associated with this type of operation, the draft TPDES general permit includes provisions prohibiting these discharges in the event any of these types of waste streams are generated at Stripper Well Facilities.
3. The draft TPDES general permit proposes to increase the 24-hour acute whole effluent toxicity (WET) testing frequency established in EPA’s existing TXG330000 for the discharge of produced wastewater from once per year to once per six months, as established by the EPA approved TCEQ’s *Procedures to Implement the Texas Surface Water Quality Standards*, RG-194.
4. The draft TPDES general permit proposes to revise conditions established in EPA’s existing TXG330000 associated with 24-hour acute WET limitations and associated monitoring requirements to remove compliance schedules, conducting toxicity reduction evaluations (TREs), conducting repeat tests, reopening the general permit to require chemical specific limits, and requiring passing a WET test prior to discharge. All new discharges are required to meet water quality-based effluent limitations upon permit issuance as required by 30 TAC Chapter 307. The compliance period for existing discharges authorized under EPA’s existing TXG330000 has expired. Conditions related to reopening the general permit, establishing chemical specific limits, conducting TREs, etc. are not appropriate conditions for a general permit that already establishes WET limitations. The draft TPDES general permit further proposes to remove exemption from compliance with the 24-hour acute WET limitations established in EPA’s existing TXG330000 based on an excess, imbalance, or deficiency of dissolved salts; and the allowance of the submittal of an ion adjustment protocol. Facilities seeking this exemption as allowed under 30 TAC Chapter 307 have the ability to apply for an individual TPDES permit.
5. The draft TPDES general permit proposes to establish a prohibition on discharges to receiving waters considered to be marine waters as currently authorized under EPA’s existing TXG330000. Information received from EPA and RRC indicate there are no existing onshore stripper well facility discharges to marine water bodies. Additionally, the draft TPDES general permit removes all marine water WET testing requirements and additional metals testing requirements to marine impaired water bodies established in EPA’s existing TXG330000, as these discharges are prohibited in the draft TPDES general permit.
6. The draft TPDES general permit proposes to establish conditions requiring permittees to maintain records on how oil-producing wells meet the criteria established in 40 CFR 435, Subpart F (Stripper Subcategory) to qualify for authorization to discharge onshore east of the 98th meridian.
7. The draft TPDES general permit proposes to authorize the discharge of well treatment and workover fluids provided they are discharged with produced wastewater as 40 CFR § 435.60 recognizes onshore stripper wells are engaged in production and well treatment. For purposes of Stripper Well Facilities, hydraulic fracturing fluids are not considered well treatment fluids and are thus prohibited from discharge.
8. The draft TPDES general permit proposes to remove the best professional judgement (BPJ) technology-based effluent limitation on free oil for the discharge of produced wastewater established in EPA’s existing TXG330000. EPA’s existing TXG330000 currently requires oil and grease effluent limitations with the same monitoring frequency for free oil of once/month. See discussion in the technology-based effluent limitations rationale section of this fact sheet.
9. The draft TPDES general permit proposes to establish new technology-based effluent limitations for pH for the discharge of produced wastewater. See discussion in the technology-based effluent limitations rationale section of this fact sheet.

**C. Changes Specific to Coastal Facilities authorized under EPA’s existing TXG330000**

1. The draft TPDES general permit proposes to expand and reclassify miscellaneous discharges authorized under EPA’s existing TXG330000. In addition to the waste streams currently authorized for discharge as miscellaneous discharges, the draft TPDES general permit proposes to authorize uncontaminated miscellaneous discharges (currently authorized as miscellaneous discharges) and contaminated miscellaneous discharges (authorized under EPA’s existing TXG260000 as miscellaneous discharges of sea water and fresh water which have been chemically treated). These waste streams (and associated definitions) proposed for authorization have been further expanded to be consistent with EPA’s existing NPDES General Permit No. GMG290000 for discharges from OCS facilities, which was re-issued in 2017, five years after the effective date of EPA’s existing TXG330000. These additional waste streams are similar to discharges authorized to bays and estuaries in individual industrial TPDES permits, and oil and gas extraction activities located in coastal waters could potentially generate and discharge similar waste streams as those located in the territorial seas unless otherwise restricted by 40 CFR Part 435. See discussion below related to compliance schedules for whole effluent toxicity (WET) limitations discussed in the territorial seas section.
2. The draft TPDES general permit proposes to revise cooling water intake structure (CWIS) requirements established under Section 316(b) of the CWA. EPA’s existing TXG330000 only applied requirements to new CWIS’s. EPA regulations at 40 CFR § 125.130(c), 40 CFR § 125.90(b), and 40 CFR § 125.91(d) apply to existing and below threshold offshore oil and gas CWIS’s and TCEQ is proposing to subject these operations to requirements established in EPA regulations.
3. The draft TPDES general permit proposes to add dissolved oxygen and pH limitations and include a daily maximum limitation for total residual chlorine (in addition to the existing minimum limitation) for the discharge of sanitary waste which are not included in EPA’s existing TXG330000. 30 TAC Chapter 309 establishes minimum secondary treatment standards for the discharge of domestic wastewater which include requirements for dissolved oxygen, pH, and a maximum total residual chlorine. See discussion below in the technology-based limitations rationale section of this fact sheet.
4. The draft TPDES general permit proposes to add instantaneous flow monitoring for the discharge of sanitary waste as required by 30 TAC Chapter 319 which is not established in EPA’s existing TXG330000. See discussion below in the technology-based limitations rationale section of this fact sheet.
5. The draft TPDES general permit proposes to revise the daily maximum limitations for biochemical oxygen demand (5-day) and total suspended solids established in EPA’s existing TXG330000 from 45 milligrams per liter (mg/L) to 65 mg/L. Daily average limitations are proposed in the draft TPDES general permit for these discharges which are not established in EPA’s existing TXG330000. See discussion below in the technology-based limitations rationale section of this fact sheet.
6. The draft TPDES general permit proposes to increase the total residual chlorine monitoring frequency for the discharge of sanitary waste from once per month as established in EPA’s existing TXG330000 to five times per week as established in 30 TAC Chapter 319.
7. The draft TPDES general permit proposes to increase the *Enterococci* daily maximum limitation established in EPA’s existing TXG330000 for sanitary waste based on revisions to the Texas Surface Water Quality Standards (30 TAC Chapter 307) and reduce *Enterococci* monitoring frequency based on 30 TAC Chapter 319. See the technology-based and water quality-based limitations rationale sections of this fact sheet.
8. The draft TPDES general permit proposes to apply Fecal Coliform effluent limitations for the discharge of sanitary waste to all discharges to segments designated for oyster waters, consistent with the Texas Surface Water Quality Standards, not just those oyster waters designated segments impaired for bacteria as currently established in EPA’s existing TXG330000.
9. The draft TPDES general permit proposes to apply all effluent limitations established for the discharge of sanitary waste to the discharge of domestic waste. Specifically, limitations and/or monitoring requirements are proposed for biochemical oxygen demand (5-day), total suspended solids, dissolved oxygen, total residual chlorine, bacteria, flow, and pH which are not established in EPA’s existing TXG330000. See discussion below in the technology-based and water quality-based effluent limitations rationale sections of this fact sheet.
10. The draft TPDES general permit proposes to prohibit the discharge of formation test fluids authorized under EPA’s existing TXG330000. This waste stream is not authorized for discharge to the territorial seas under EPA’s existing TXG260000 or to the OCS in EPA’s existing NPDES General Permit No. GMG290000. Oil and gas extraction activities located in coastal waters should generally generate and discharge similar waste streams as those located in the territorial seas or the OCS unless otherwise restricted by 40 CFR Part 435.
11. The draft TPDES general permit proposes to prohibit the discharge of hydrate control fluids which is not addressed under EPA’s existing TXG330000. EPA’s existing TXG260000 authorizes this discharge and applies the same limitations as produced wastewater which is prohibited from discharge in EPA’s existing TXG330000.
12. The draft TPDES general permit proposes to establish a monitoring frequency of once per day (via observation) for the prohibition of discharge for floating solids, garbage, and foam for domestic waste. EPA’s existing TXG330000 establishes this discharge prohibition but does not establish a monitoring frequency as required by 40 CFR Part 122.
13. **Changes Specific to Territorial Seas Facilities authorized under EPA’s existing TXG260000**
14. The draft TPDES general permit proposes to reclassify “miscellaneous discharges” and “miscellaneous discharges of seawater and freshwater which have been chemically treated” as established in EPA’s existing TXG260000 to “uncontaminated miscellaneous discharges” and “contaminated miscellaneous discharges,” respectively. Waste streams proposed for authorization to discharge have been revised (where appropriate) to be consistent with EPA’s existing discharges. These waste streams (and associated definitions) proposed for authorization have been further expanded to be consistent with EPA’s existing NPDES General Permit No. GMG290000 for discharges from OCS facilities, which was re-issued in 2017, five years after the effective date of EPA’s existing TXG260000.
15. The draft TPDES general permit proposes to revise the WET limitations and associated biomonitoring testing procedures for the discharge of produced wastewater and hydrate control fluids; and contaminated miscellaneous discharges which are established in EPA’s existing TXG260000. The draft TPDES general permit removes conditions associated with the requirement to pass WET tests prior to discharge, the requirement to cease discharge upon a WET test failure until the results of a retest comply with WET limitations, and conditions to reopen the general permit to require chemical specific effluent limitations or other conditions. Failure of a WET test is considered a violation of the terms and conditions of the draft TPDES general permit and is subject to appropriate compliance and enforcement conditions. The draft TPDES general permit further proposes to remove exemption from compliance with the 24-hour acute WET limitations established in EPA’s existing TXG260000 based on an excess, imbalance, or deficiency of dissolved salts; and the allowance of the submittal of an ion adjustment protocol. Facilities seeking this exemption as allowed under 30 TAC Chapter 307 have the ability to apply for an individual TPDES permit.
16. WET limitations for the discharge of contaminated miscellaneous discharges have been revised to comply with 24-hour acute conditions compared to 48-hour acute conditions established in EPA’s existing TXG260000. See discussion in the water quality-based effluent limitations rationale section of this fact sheet, as well as compliance schedules associated with such discharges.
17. The draft TPDES general permit proposes to apply one single critical dilution applicable to chronic WET limitations and associated biomonitoring requirements for the discharge of produced wastewater and hydrate control fluids. EPA’s existing TXG260000 establishes numerous critical dilutions utilized for WET limitations based on discharge rate (in barrels per day) and depth of discharge point to the sea floor. EPA’s existing TXG260000 further allows routine adjustment of the critical dilution based on the most recent reported discharge volume on the latest DMR. The draft TPDES general permit establishes one critical dilution (and associated additional dilutions to be used in WET tests) at 1.1% based on a discharge rate of 3000 barrels/day (0.126 million gallons per day, MGD), six-inch pipe diameter, and depth to the sea floor of 4-6 meters. Furthermore, EPA’s existing TXG260000 establishes provisions for alternative critical dilutions based on flow rates greater than 25,000 barrels per day and facilities incorporating diffusers. These conditions have been removed in the draft TPDES general permit, facilities seeking these site-specific discharge scenarios must apply for an individual TPDES permit. The chronic WET testing frequency for the discharge of produced wastewater/hydrate control fluids in the draft TPDES general permit will increase from once per six months to once per quarter consistent with RG-194. Compliance schedules for existing permitted discharges are authorized. See discussion in the water quality-based effluent limitations rationale section of this fact sheet.
18. The draft TPDES general permit proposes to replace the 48-hour acute WET effluent limitations for the discharge of contaminated miscellaneous discharges (at varying critical dilutions based on discharge rate and pipe diameter) to 24-hour acute WET 100% effluent limitations. 48-hour WET conditions are typically included in TPDES permits when instream effluent dilutions are at extremely low levels where normally 7-day chronic WET conditions would be imposed. This revision is consistent with requirements established in RG-194 and compliance schedules for existing permitted discharges are authorized.
19. The draft TPDES general permit proposes to establish 24-hour acute WET limitations for the discharge of well treatment, completion, and workover fluids and to remove conditions regulating discharges of priority pollutants established in EPA’s existing TXG260000 as WET limitations properly regulate the discharge of priority pollutants. See discussion in the water quality-based effluent limitations rationale section of this fact sheet. Applying WET limitations for these discharges in place of priority pollutant controls is appropriate and further justified, as well treatment, completion and workover fluids generally return as a slug with produced wastewater and are managed and discharged as a combined waste stream along with produced wastewater. Compliance schedules for existing permitted discharges is authorized.
20. The draft TPDES general permit proposes to remove the industry-wide or facility-specific “Produced Water Characterization Study” requirements in EPA’s existing TXG260000. Discussion with EPA indicated the results of these studies did not indicate adverse water quality impacts from produced wastewater discharges in the Gulf of Mexico. See discussion in Part X. and XI. of this fact sheet related to produced wastewater studies historically conducted and submitted to EPA from the Offshore Operators Committee (OOC).
21. The draft TPDES general permit proposes an increase in the monitoring frequency of free oil for the discharge of uncontaminated miscellaneous discharges and contaminated miscellaneous discharges from once per week established in EPA’s existing TXG260000 to once per day. This revision is consistent with conditions established for these discharges in EPA’s existing general permits, TXG330000 and GMG290000.
22. The draft TPDES general permit proposes to authorize the discharge of hydrate control fluids provided they are discharged as a combined waste stream with produced wastewater. EPA’s existing TXG260000 establishes this condition as a narrative requirement and the proposed draft TPDES general permit clarifies this condition in the effluent limitations and monitoring requirements section.
23. The draft TPDES general permit proposes to add new water quality-based effluent limitations for the discharge of produced wastewater for total copper, total manganese, and total zinc which are not established in EPA’s existing TXG260000. A three-year compliance schedule for existing produced wastewater discharged via either EPA’s existing TXG260000 or an RRC individual authorization is provided in the draft TPDES general permit. Additionally, a monitoring and reporting requirement is established for total mercury for discharges of produced wastewater. See the water quality-based effluent limitations rationale section of this fact sheet.
24. The draft TPDES general permit proposes to establish new technology-based effluent limitations on pH for the discharge of produced wastewater/hydrate control fluids; well treatment, completion, and workover fluids; and contaminated miscellaneous discharges, which are not established in EPA’s existing TXG260000. See discussion in the technology-based effluent limitations rationale section of this fact sheet.
25. The draft TPDES general permit proposes to require the following technology-based and water quality-based effluent limitations and/or monitoring requirements for the discharge of sanitary waste: biochemical oxygen demand (5-day), total suspended solids, flow, dissolved oxygen, bacteria, pH, and total residual chlorine (daily maximum) as required by 30 TAC Chapters 307, 309, and 319. EPA’s existing TXG260000 does not include these limitations (the majority of these limitations were established for sanitary waste discharges to coastal waters in EPA’s existing TXG330000).
26. The draft TPDES general permit proposes to increase the total residual chlorine monitoring frequency for the discharge of sanitary waste from once per month as established in EPA’s existing TXG260000 to five times per week (5/week). This requirement is also established by 30 TAC Chapter 319.
27. All effluent limitations established for the discharge of sanitary waste are also proposed in the draft TPDES general permit for the discharge of domestic waste. Specifically, limitations and/or monitoring requirements are proposed for biochemical oxygen demand (5-day), total suspended solids, dissolved oxygen, total residual chlorine, bacteria, flow, and pH which are not established in EPA’s existing TXG260000. See discussion below in the technology-based and water quality-based effluent limitations rationale sections of this fact sheet.
28. The draft TPDES general permit proposes to revise CWIS requirements established under Section 316b of the CWA. EPA’s existing TXG260000 only applies requirements to new CWIS’s. EPA regulations at 40 CFR § 125.130(c), 40 CFR § 125.90(b), and 40 CFR § 125.91(d) apply to existing and below threshold offshore oil and gas CWIS’s. TCEQ is proposing to subject existing and below threshold CWIS operations to requirements established in EPA regulations.
29. A daily average produced wastewater flow limitation of 0.126 MGD is proposed in the draft TPDES general permit, see discussion in the water quality-based effluent limitations rationale section of this fact sheet.
30. Water quality-based effluent limitations for Carbonaceous Biochemical Oxygen Demand (5-day) and Ammonia-Nitrogen for produced wastewater discharges are proposed in the draft TPDES general permit. See discussion in the water quality-based effluent limitations rationale section of this fact sheet.
31. Monitoring and reporting requirements are proposed in the draft TPDES general permit for temperature and total dissolved solids (TDS) for the discharge of produced wastewater. See the discussion in the water quality-based effluent limitations rationale section of this fact sheet.
32. Discharges of produced wastewater are restricted in relation to the discharge outfall configuration. Based on CORMIX modeling and dissolved oxygen modeling, discharges of produced wastewater are restricted to a pipe diameter of no greater than six inches, and discharge depth to the sea floor of no less than five meters.

# VI. Addresses

Comments on this general permit should be sent to:

Office of the Chief Clerk (MC-105)

TCEQ

P.O. Box 13087

Austin, TX 78711-3087

(512) 239-3300

Questions concerning this general permit should be directed to:

Chris Linendoll, E.I.T.

TCEQ, Water Quality Division

Wastewater Permitting Section (MC-148)

P.O. Box 13087

Austin, TX 78711-3087

(254) 761-3025

Supplementary information on this fact sheet is organized as follows:

VII. Legal Basis

VIII. Regulatory Background

IX. Permit Coverage

X. Technology-based Requirements

XI. Water Quality-based Requirements

XII. Cooling Water Intake Structure Requirements

XIII. Monitoring

XIV. Procedures for Final Decision

XV. Administrative Record

# VII. Legal Basis

Texas Water Code (TWC), § 26.121 makes it unlawful to discharge pollutants into water in the state except as authorized by the Commission. TWC, § 26.027 authorizes the Commission to issue permits and amendments to permits for the discharge of waste or pollutants into water in the state.

TWC§ 26.040 provides the Commission with the authority to issue general permits that authorize the discharge of waste into or adjacent to water in the state by category of discharges in the state if the dischargers: engage in the same or substantially similar types of authorizations; discharge the same types of waste; are subject to the same requirements regarding effluent limitations or operating conditions; are subject to the same or similar monitoring requirements and are more appropriately regulated under a general permit. General permits must be published in one or more newspapers of general circulation and in the Texas Register. Additionally, if the Commission receives public comment on the proposed general permit, the Commission cannot issue the general permit before responding to the comments in writing.

* 1. On September 14, 1998, the TCEQ received authority from the EPA to administer the TPDES program. The TCEQ and the EPA signed a Memorandum of Agreement (MOA) which authorizes the administration of the NPDES program to the TCEQ as it applies to the State of Texas. TWC § 26.131, as amended by HB 2771 in the 86th Legislature, 2019, transfers regulatory authority for discharges into water in the state from oil and gas exploration, production, processing, or treatment operations, or transmission facilities from the EPA and the Railroad Commission of Texas to TCEQ, upon EPA approval of NPDES authority for these discharges, which occurred on January 15, 2021.

CWA §§ 301, 304, and 401 (33 United States Code (USC), §§ 1331, 1314, and 1341) include provisions which state that NPDES permits must include effluent limitations requiring authorized discharges to: (1) meet standards reflecting levels of technological capability; (2) comply with EPA-approved state water quality standards; and (3) comply with other state requirements adopted under authority retained by states under CWA, § 510, 33 USC § 1370. CWA § 316(b) establishes requirements related to the operation of CWISs.

Two types of technology-based effluent limitations must be included in a draft TPDES general permit. With regard to conventional pollutants, i.e., pH, biochemical oxygen demand (BOD), oil and grease, total suspended solids (TSS), and fecal coliform bacteria, CWA § 301(b)(1)(E) requires effluent limitations based on “best conventional pollutant control technology” (BCT). With regard to nonconventional and toxic pollutants, CWA, § 301(b)(2)(A), (C), and (D) require effluent limitations based on “best available technology economically achievable” (BAT), a standard that generally represents the best performing existing technology in an industrial category or subcategory. BAT and BCT effluent limitations may never be less stringent than corresponding effluent limitations based on best practicable control technology (BPT), a standard applicable to similar discharges before March 31, 1989 under CWA, § 301(b)(1)(A). Furthermore, when a category of discharge(s) authorized under an NPDES general permit is subject to new source performance standards (NSPS) established in 40 CFR Chapter I, Subchapter N, general permits must be developed to comply with such NSPS conditions.

In many cases, EPA adopts nationally applicable guidelines identifying the BPT, BCT, BAT, and NSPS standards to which specific industrial categories and subcategories (and which apply to specific waste streams within these categories and subcategories) are subject. Until such guidelines are published, CWA, § 402(a)(1) requires that appropriate BCT and BAT effluent limitations be included in permitting actions based on BPJ.

# VIII. Regulatory Background

The Commission was given authority to issue general permits in place of authorizations by rule through House Bill (HB) 1542, passed during the 75th legislative session (1997). Further clarification of this general permit authority was provided in HB 1283, passed during the 76th legislative session (1999). Prior to the amendments of TWC § 26.131 via HB 2771 in the 86th Legislative Session, discharges of waste streams proposed for authorization to discharge under this TPDES general permit into water in the state from oil and gas extraction activities were under authority of the RRC. Separate authorization to discharge into waters of the U.S. and requirements on the operation of CWISs was required from EPA and the RRC because the RRC did not have NPDES authority to regulate these discharges or operation of CWISs. HB 2771 transferred the authority to regulate these discharges into water in the state to TCEQ upon the TCEQ obtaining NPDES authority from EPA, which was obtained via a revised MOA between TCEQ and EPA dated January 15, 2021.

# IX. Permit Coverage

The purpose of this TPDES general permit is to: regulate the discharge of various waste streams described below; prohibit the discharge of various waste streams described below; and impose requirements on the operation of CWISs associated with oil and gas extraction activities from Stripper Well Facilities, Coastal Facilities, and Territorial Seas Facilities. This TPDES general permit consolidates separate state permitting requirements currently issued under the authority of RRC and federal permitting requirements currently issued by EPA under the NPDES program into one combined state and federal authorization issued under the TPDES program.

To obtain authorization to discharge to water in the state under the TPDES general permit, an applicant must comply with the following requirements:

A. Applicants seeking authorization to discharge to water in the state under authority of this TPDES general permit must submit a completed NOI on a form approved by the Executive Director. Permittees authorized under NPDES General Permit No. TXG260000 effective February 8, 2012 and NPDES General Permit No. TXG330000 effective September 11, 2014 are required to submit a new NOI within 90 days of the effective date of this TPDES general permit to continue authorization to discharge. Permittees authorized to discharge to water in the state via an existing RRC authorization are also required to submit a new NOI within 90 days of the effective date of this TPDES general permit to continue authorization to discharge to surface waters. The NOI shall, at a minimum, include the legal name and address of the owner and operator, the facility name and address, specific description(s) of its location, type of facility or discharges, the name of the receiving waters, and other contents established in the NOI. Each individual facility (e.g., production platform, drilling rig, etc.) with a discharge is required to submit an individual NOI. This TPDES general permit does not authorize multiple discharges from separated facilities under a single lease to be combined into one NOI. Should a facility contain all waste streams and transport such waste streams to another facility for subsequent treatment, management, and discharge; such facility is not required to submit an NOI provided there are no resulting discharges to water in the state from such facility.

B. Submission of an NOI is an acknowledgment that the conditions of this TPDES general permit are applicable to the proposed discharges, and that the applicant agrees to comply with the conditions of this TPDES general permit. Provisional authorization to discharge under the terms and conditions of this TPDES general permit begins 48 hours after a paper NOI is postmarked for delivery to the TCEQ. If the TCEQ provides for electronic submission of NOIs during the term of this TPDES general permit, authorization begins immediately after the TCEQ confirms receipt of the electronic NOI. Following review of the NOI, the Executive Director shall: determine that the NOI is complete and confirm authorization by providing a written notification and an authorization number; determine that the NOI is incomplete, and request additional information needed to complete the NOI; or deny authorization in writing. Denial of an authorization will be made in accordance with 30 TAC § 205.4(c). Applicants seeking authorization to discharge from Stripper Well Facilities to a municipal separate storm sewer system (MS4) must provide a copy of the NOI, or electronic equivalent, to the operator of the system at the same time the NOI is submitted to the TCEQ.

C. For Stripper Well Facilities discharges located in areas regulated by 30 TAC Chapter 213, *Edwards Aquifer*, this authorization to discharge is separate from the requirements of the applicant’s responsibilities under that rule. Discharge may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that chapter are met. For discharges located on or within ten stream miles upstream of the Edwards Aquifer recharge zone, applicants must also submit a copy of the NOI to the appropriate TCEQ regional office.

Counties: Comal, Bexar, Medina, Uvalde, and Kinney

Contact: TCEQ Edwards Aquifer Program Manager

San Antonio Regional Office

14250 Judson Rd.

San Antonio, Texas 78233-4480

210-490-3096

Counties: Bell, Williamson, Travis, and Hays

Contact: TCEQ Edwards Aquifer Program Manager

Austin Regional Office

P.O. Box 13087

Austin, TX 78711-3087

512-239-2929

D. Authorization under this TPDES general permit is not transferable. If either the owner or operator of the regulated entity changes, then both the present owner and operator must submit a Notice of Termination (NOT) and the new owner and operator must submit an NOI. The NOT and NOI must be submitted no later than 10 days before the change. Stripper Well Facilities discharging to a MS4 must submit a copy of the NOT to the operator of the system at the same time the NOT is submitted to the TCEQ.

E. If the owner or operator becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in an NOI, the correct information must be provided to the Executive Director in a Notice of Change (NOC) within 14 days after discovery. If relevant information provided in the NOI changes (for example, phone number, address, outfall information, type of facility or discharges, or the receiving waters) an NOC must be submitted within 14 days of the change. Stripper Well Facilities discharging to an MS4 must submit a copy of any NOC to the operator of the system at the same time the NOC is submitted to the TCEQ.

# X. Technology-Based Requirements

The limitations and conditions of the draft TPDES general permit have been developed to comply with the technology-based standards of the CWA. Currently there are established nationally applicable effluent limitation guidelines identifying the BPT, BCT, BAT, and NSPS standards for a subset of discharges proposed for authorization to discharge by this draft TPDES general permit. The most restrictive of EPA established BPT, BCT, BAT, and NSPS standards are controlling and thus established as conditions in the draft TPDES general permit (e.g., when BPT standards allow discharges and establish an effluent limitation and where BAT standards outright prohibit discharge, the BAT standard is controlling). For waste streams proposed to be authorized for discharge under this draft TPDES general permit where EPA’s nationally applicable effluent limitation guidelines have not developed technology-based standards, the technology-based effluent limitations are based on BPJ. The parameters selected for BCT/BAT limits using BPJ are the primary pollutants of concern for a subset of discharges proposed to be authorized in the draft TPDES general permit. Where EPA national effluent limitation guidelines are less restrictive than TCEQ established technology-based standards, TCEQ established technology-based standards are proposed in the draft TPDES general permit (e.g., minimum secondary based treatment requirements for the discharge of sanitary waste and domestic waste established in 30 TAC Chapter 309). TCEQ has established state-wide standards for hazardous metals established in 30 TAC Chapter 319, Subchapter B. TCEQ considered application of these hazardous metal limitations in the draft TPDES general permit for the discharge of produced wastewater from Stripper Well Facilities and Territorial Seas Facilities (see further discussion below in this section of the fact sheet).

Technology-based effluent limitations are established for the three categories of discharges proposed to be authorized under the draft TPDES general permit: Stripper Well Facilities, Coastal Facilities, and Territorial Seas Facilities.

1. **Stripper Well Facilities**:

EPA has established technology-based effluent limitation guidelines at 40 CFR Part 435, Subpart F (Stripper Subcategory). These effluent limitation guidelines do not establish any specific numerical effluent limitations. 40 CFR § 435.60 describes stripper wells as wells which produce 10 barrels per well per calendar day or less of crude oil and which are operating at the maximum feasible rate of production and in accordance with recognized conservation practices. These facilities are engaged in production and well treatment in the oil and gas extraction point source category. 40 CFR § 435.61(c) defines the term “well” and establishes that a well does not include gas wells or wells injecting water for disposal or for enhanced recovery of oil or gas. 40 CFR § 435.61(d) defines the term “gas well” as any well which produces natural gas in a ratio to the petroleum liquids production greater than 15,000 cubic feet of gas per one barrel of petroleum liquids.

EPA’s existing NPDES General Permit No. TXG330000 has established the following technology-based permit limitations:

* Produced Wastewater
  + Flow: Monitor
  + Oil & Grease: 25 mg/L daily average and 35 mg/L daily maximum
  + Free Oil: No discharge via visual observation.
* Drilling Fluids – No discharge
* Drill Cuttings – No discharge
* Produced Sand – No discharge
* Dewatering Effluent – No discharge
* Deck Drainage
* Free Oil: No discharge via visual observation
* Formation Test Fluids
* No discharge, except to bays and estuaries where no chloride standards have been established
* Free Oil: No discharge as determined by the static sheen test
* pH: 6.0-9.0 standard units
* Well Treatment, Completion, and Workover Fluids – No discharge
* Domestic Waste
* Floating solids: No discharge
* Garbage: No discharge
* Foam: No discharge
* Sanitary Waste
  + Floating solids: No discharge
  + BOD (5-day): 45 mg/L daily maximum
  + TSS: 45 mg/L daily maximum
  + Total Residual Chlorine: 1.0 mg/L (minimum) and maintained as close as possible to that level
* Miscellaneous Discharges
* Free Oil: No discharge via visual observation

EPA proposed a new general permit, NPDES General Permit No. TXG350000, to separate Stripper Well Facilities from Coastal Facilities as authorized under TXG330000. This draft NPDES general permit did not proceed to final issuance. This draft NPDES general permit proposed to remove authorization to discharge waste streams not associated with nominal/marginal stripper wells and TCEQ is proposing those same conditions in this draft TPDES general permit to remove authorization to discharge deck drainage, formation test fluids, domestic waste, sanitary waste, and miscellaneous discharges. TCEQ practice is to establish pH technology-based effluent limitations in TPDES permits that authorize potentially contaminated waste streams. Technology-based effluent limitations of pH of 6.0-9.0 standard units for the discharge of produced wastewater (and well treatment/workover fluids) are proposed in the draft TPDES general permit. Appendix F of this fact sheet includes an assessment of pH limitations of 6.0-9.0 standard units demonstrating these proposed effluent limitations will meet instream pH water quality standards. TCEQ is also proposing to remove the Free Oil “no discharge visual observation” technology-based effluent limitation based on oil and grease technology-based effluent limitations established in EPA’s existing TXG330000 at the same monitoring frequency, and a 40 CFR Part 136 approved test method for oil and grease properly controls free oil discharges. Removal of the Free Oil technology-based effluent limitation complies with anti-backsliding requirements in 40 CFR § 122.44(l) based on the technical mistake justification (oil and grease effluent limitations are already established at the same monitoring frequency of observed no free oil discharges). The discharge of well treatment and workover fluids are proposed to be authorized in the draft TPDES general permit provided they are commingled and managed with produced wastewater and discharged as a combined waste stream. For purposes of Stripper Well Facilities (conventional wells), hydraulic fracturing fluids are not considered well treatment fluids and are thus prohibited from discharge.

TCEQ has established state-wide quality levels for inland waters at 30 TAC § 319.22 which are provided in the table below. Data provided from RRC (see Part XI of this fact sheet) was compared against these levels to determine the need to establish effluent limitations in the draft TPDES general permit. Based on this evaluation no 30 TAC Chapter 319 hazardous metals effluent limitations are proposed for the discharge of produced wastewater in the draft TPDES general permit.

30 TAC Chapter 319.22 Hazardous Metals Quality Levels Discharge to Inland Waters:

| Parameter | Daily Average | Daily Composite | Grab Sample |
| --- | --- | --- | --- |
| Total Arsenic | 0.1 mg/L | 0.2 mg/L | 0.3 mg/L |
| Total Barium | 1.0 mg/L | 2.0 mg/L | 4.0 mg/L |
| Total Cadmium | 0.05 mg/L | 0.1 mg/L | 0.2 mg/L |
| Total Chromium | 0.5 mg/L | 1.0 mg/L | 5.0 mg/L |
| Total Copper | 0.5 mg/L | 1.0 mg/L | 2.0 mg/L |
| Total Lead | 0.5 mg/L | 1.0 mg/L | 1.5 mg/L |
| Total Manganese | 1.0 mg/L | 2.0 mg/L | 3.0 mg/L |
| Total Mercury | 0.005 mg/L | 0.005 mg/L | 0.01 mg/L |
| Total Nickel | 1.0 mg/L | 2.0 mg/L | 3.0 mg/L |
| Total Selenium | 0.05 mg/L | 0.1 mg/L | 0.2 mg/L |
| Total Silver | 0.05 mg/L | 0.1 mg/L | 0.2 mg/L |
| Total Zinc | 1.0 mg/L | 2.0 mg/L | 6.0 mg/L |

1. **Coastal Facilities:**

EPA has established technology-based effluent limitation guidelines at 40 CFR 435, Subpart D (Coastal Subcategory). 40 CFR § 435.40 establishes this subpart is applicable to those facilities engaged in field exploration, drilling, well production, and well treatment in the oil and gas industry in areas defined as coastal. 40 CFR § 435.40(a) defines Coastal Facilities as any location in or on a water of the United States landward of the inner boundary of the territorial seas. 40 CFR § 435.40(b)(1) and (2) further define Coastal Facilities as facilities located landward from the inner boundary of the territorial seas and located inland (i.e., on land) based on latitude and longitude coordinates included in 40 CFR § 435.40.

BAT effluent limitations are established at 40 CFR § 435.43 for the following:

* Produced Wastewater – No discharge
* Drilling Fluids, Drill Cuttings, and Dewatering Effluent – No discharge
* Well Treatment, Completion, and Workover Fluids – No discharge
* Produced Sand – No discharge
* Deck Drainage
* Free Oil: No discharge as established by visual sheen observation.
* Domestic Waste
* Foam: No discharge

BCT effluent limitations are established at 40 CFR § 435.44 for the following:

* Produced Wastewater
* Oil & Grease: 48 mg/L daily average and 72 mg/L daily maximum
* Drilling Fluids, Drill Cuttings, and Dewatering Effluent – No discharge
* Well Treatment, Completion, and Workover Fluids
* Free Oil: No discharge as established by the static sheen method.
* Produced Sand – No discharge
* Deck Drainage
* Free Oil: No discharge as established by visual sheen observation.
* Sanitary Waste (M10)
* Total Residual Chlorine: Minimum of 1.0 mg/L (and maintained as close as possible to this level)
* Sanitary Waste (M91M)
* Floating Solids: No discharge
* Domestic Waste
* Floating Solids: No discharge
* Garbage: No discharge

NSPS effluent limitations are established at 40 CFR § 435.45 for the following:

* Produced Wastewater – No discharge
* Drilling Fluids, Drill Cuttings, and Dewatering Effluent – No discharge
* Well Treatment, Completion, and Workover Fluids – No discharge
* Produced Sand – No discharge
* Deck Drainage
* Free Oil: No discharge as established by visual sheen observation
* Sanitary Waste (M10)
* Total Residual Chlorine: Minimum of 1.0 mg/L (and maintained as close as possible to this level)
* Sanitary Waste (M91M)
* Floating Solids: No discharge
* Domestic Waste
* Floating Solids: No discharge
* Garbage: No discharge
* Foam: No discharge

EPA’s existing NPDES General Permit No. TXG330000 has established the following technology-based permit limitations for discharges not regulated by 40 CFR Part 435, Subpart D; or are more restrictive than 40 CFR Part 435, Subpart D:

* Formation Test Fluids
  + No discharge except to bays and estuaries where no chloride standards have been established
  + Free Oil: No discharge via visual observation
  + pH: 6.0-9.0 standard units.
* Sanitary Waste
  + BOD (5-day): 45 mg/L daily maximum
  + TSS: 45 mg/L daily maximum.
* Miscellaneous Discharges
  + Free Oil: No discharge as established by visual observation.

TCEQ is proposing to prohibit the discharge of formation test fluids as EPA’s existing TXG260000 (Territorial Seas Facilities) does not authorize this discharge. Additionally, oil and gas extraction activities located in coastal waters or the territorial seas should consistently be regulated from a technology-based standpoint unless otherwise limited by 40 CFR Part 435.

TCEQ regulations at 30 TAC § 309.1 establish minimum state-wide secondary treatment standards for the discharge to surface waters of domestic wastewater (which includes both sanitary waste and domestic waste proposed for discharge under the draft TPDES general permit). These standards are as follows: BOD (5-day) – 20 mg/L daily average and 65 mg/L single grab; TSS – 20 mg/L daily average and 65 mg/L single grab, Dissolved Oxygen - 2.0 mg/L daily minimum, and pH 6.0-9.0 standard units. 30 TAC § 309.3(g) establishes minimum disinfection requirements for the discharge of domestic wastewater for total residual chlorine (0.5 mg/L minimum with a product of 20 based on minutes of contact time and 4.0 mg/L maximum). 30 TAC § 319.19(a) requires flow monitoring for the discharge of domestic wastewater. TCEQ is proposing effluent limitations which are not established in EPA’s existing TXG330000 as follows: daily average effluent limitations for BOD (5-day) and TSS; minimum dissolved oxygen effluent limitations; pH effluent limitations; maximum total residual chlorine effluent limitations; and flow monitoring. Appendix F of this fact sheet includes an assessment of pH limitations of 6.0-9.0 standard units demonstrating these proposed effluent limitations will meet instream pH water quality standards. Total residual chlorine effluent limitations are established at a minimum of 1.0 mg/L (based on 20-minute contact time) and 4.0 mg/L daily maximum. All proposed secondary treatment technology-based effluent limitations for sanitary waste are also being proposed for domestic waste. EPA’s existing TXG330000 establishes daily maximum effluent limitations for BOD (5-day) and TSS at 45 mg/L which are being revised to the appropriate single grab effluent limitations (as established in 30 TAC Chapter 309) because EPA’s existing TXG330000 requires a grab sample; this proposed revision complies with anti-backsliding requirements established in 40 CFR § 122.44(l) based on the technical mistake justification.

TCEQ is proposing to expand “miscellaneous discharges” authorized under EPA’s existing TXG330000, and revise definitions associated with these discharges, from the general category of “miscellaneous discharges” to “uncontaminated miscellaneous discharges” and “contaminated miscellaneous discharges.” Uncontaminated miscellaneous discharges are proposed to retain technology-based effluent limitations from EPA’s existing TXG330000 (no discharge of free oil based on visual observation). Contaminated miscellaneous discharges are proposed to be subject to a technology-based effluent limitation of no discharge of free oil (visual observation), flow monitoring consistent with EPA’s existing TXG260000, and an effluent limitation on pH of 6.0-9.0 standard units based on the TCEQ practice of establishing technology-based effluent limitations in TPDES permits for pH that authorize discharge of potentially contaminated waste streams. Oil and gas extraction activities located in coastal waters or the territorial seas should be regulated consistently from a technology-based standpoint unless otherwise limited by 40 CFR Part 435. Contaminated miscellaneous discharges proposed for authorization under the draft TPDES general permit are typical discharges authorized from industrial facilities regulated under the TPDES program.

1. **Territorial Seas Facilities:**

EPA has established technology-based effluent limitation guidelines at 40 CFR Part 435, Subpart A (Offshore Subcategory). 40 CFR § 435.10 establishes this subpart is applicable to those facilities engaged in field exploration, drilling, well production, and well treatment in the oil and gas industry which are located in waters that are seaward of the inner boundary of the territorial seas (“offshore”) as defined in section 502(g) of the CWA. Under the authority of the CWA, TCEQ has jurisdiction to regulate discharge to the territorial seas under the TPDES program within three statute miles of the coastline. Discharges beyond three statute miles are considered to be to the OCS and TCEQ does not have authority to regulate these discharges under the TPDES program. A state-only general permit (WQG280000) has been developed to regulate oil and gas extraction activity discharges to the OCS out to the limit under state statutory authority (out to three leagues). Separate authorization to discharge to the OCS is required from EPA under the NPDES program. 40 CFR Part 435, Subpart A establishes different conditions for facilities located within three miles of the coastline versus facilities located greater than three miles from the coastline. Conditions outlined below are for facilities located within three miles of the coastline.

BAT effluent limitations are established at 40 CFR § 435.13 for the following:

* Produced Wastewater
  + Oil & Grease: 29 mg/L daily average and 42 mg/L daily maximum
* Drilling Fluids and Drill Cuttings - No discharge
* Well Treatment, Completion, and Workover Fluids
  + Oil & Grease: 29 mg/L daily average and 42 mg/L daily maximum
* Deck Drainage
  + Free Oil: No discharge as established by visual sheen observation
* Produced Sand – No discharge
* Domestic Waste
  + Foam: No discharge

BCT effluent limitations are established at 40 CFR § 435.14 for the following:

* Produced Wastewater
  + Oil & Grease: 48 mg/L daily average and 72 mg/L daily maximum
* Drilling Fluids and Drill Cuttings - No discharge
* Well Treatment, Completion, and Workover Fluids
  + Free Oil: No discharge as established by the static sheen method
* Deck Drainage
  + Free Oil: No discharge as established by visual sheen observation
* Produced Sand – No discharge
* Sanitary Waste (M10)
  + Total Residual Chlorine: Minimum of 1.0 mg/L (and maintained as close as possible to this level)
* Sanitary Waste (M91M)
  + Floating Solids: No discharge
* Domestic Waste
  + Floating solids: No discharge
  + All other domestic waste: See 33 CFR Part 151

NSPS effluent limitations are established at 40 CFR § 435.15 for the following:

* Produced Wastewater
* Oil & Grease: 29 mg/L daily average and 42 mg/L daily maximum
* Drilling Fluids and Drill Cuttings - No discharge
* Well Treatment, Completion, and Workover Fluids
* Oil & Grease: 29 mg/L daily average and 42 mg/L daily maximum
* Deck Drainage
* Free Oil: No discharge as established by visual sheen observation
* Produced Sand – No discharge
* Sanitary Waste (M10)
* Total Residual Chlorine: Minimum of 1.0 mg/L (and maintained as close as possible to this level)
* Sanitary Waste (M91M)
* Floating Solids: No discharge
* Domestic Waste
* Floating Solids: No discharge
* Foam: No discharge
* All other domestic waste: See 33 CFR Part 151

TCEQ has established state-wide quality levels for tidal waters at 30 TAC § 319.23 which are provided in the table below. These effluent limitations are end-of-pipe criteria and do not consider instream dilution. EPA failed to consider this state regulation in development of TXG260000. Data included in **the “Supplemental Information Report to the 2004 Final Environmental Impact Statement,” dated September 2011** (see Part XI of this fact sheet) for the discharges of produced wastewater; and well treatment, completion, and workover fluids were compared against these levels to determine the need to establish 30 TAC Chapter 319 effluent limitations in the draft TPDES general permit. The Offshore Operators Committee (OOC) also provided more recent produced wastewater data which was submitted to RRC in applications for individual authorizations from the time frame between 2016-2020 in an electronic mail (email) communication with TCEQ dated May 4, 2021 (see Part XI of this fact sheet). This data was also compared against hazardous metals levels established in 30 TAC § 319.23.

Typical TPDES permitting procedures require inclusion of hazardous metals limitations in TPDES permits when available effluent data indicates potential exceedances of levels established in 30 TAC § 319.23. Based on this evaluation 30 TAC Chapter 319 effluent limitations initially were considered for inclusion in the draft TPDES general permit for the discharge of produced wastewater for total arsenic, total barium, total cadmium, total manganese, total selenium, total silver, and total zinc. 30 TAC Chapter 319 effluent limitations for the discharge of well treatment, completion, and workover fluids are not warranted based on this analysis.

30 TAC § 319.26 states, in part, that the commission may authorize less stringent quality levels than those set forth in 30 TAC § 319.23 only where the applicant demonstrates that there will be no significant adverse impact on water quality and that the less stringent quality levels are necessary based on considerations consistent with provisions of the Texas Water Code.

The OOC in a letter to TCEQ dated June 10, 2021, applied for an exception to the hazardous metals limitations established in 30 TAC § 319.23 as allowed under 30 TAC § 319.26 in the draft TPDES general permit for the discharge of produced wastewater. This letter referenced two previous produced wastewater studies on the Gulf of Mexico conducted by OOC related to conditions established in historical EPA NPDES oil and gas general permits to satisfy the no-significant-adverse-impact-on-water-quality aspect of the rule. A 2015 study entitled “OOC Produced Water and Water Based Mud Characterization Study” assessed the aquatic life chronic toxicity impacts of produced wastewater discharges. A 1997 study entitled “Gulf of Mexico Produced Water Bioaccumulation Study” assessed bioaccumulation of chemicals in marine organisms and impacts on human consumption of marine organisms. In review of these studies, TCEQ identified shortcoming regarding applying the studies to the drafting of this TPDES general permit, which include: the sampling and analysis did not include all the metals listed in 30 TAC Chapter 319, the studies used larger mixing zones than allowed under TCEQ procedures, only chronic aquatic life toxicity was assessed (acute toxicity was not addressed), some methods utilized are not approved under 40 CFR Part 136, and sampling for dissolved metals vs. total metals as total metals are typically assessed by TCEQ. Furthermore, barium and manganese do not have established TCEQ water quality standards that would need to be considered in approving this exception request to demonstrate no significant impact on water quality. Based on TCEQ’s review of these two studies and TCEQ’s own water quality impact assessments outlined in Section XI of this fact sheet, TCEQ supports OOC’s 30 TAC Chapter 319 metals exception request related to the no significant adverse impact on water quality aspect of 30 TAC § 319.26.

To satisfy the second condition established in 30 TAC § 319.26 (less stringent quality levels are necessary based on considerations consistent with provisions of the Texas Water Code), OOC in its June 2021 letter provided information related to the likely economic impact of imposing 30 TAC § 319.23 hazardous metals limitations in the draft TPDES general permit based on an inability of treatment technology to achieve compliance with these limitations.

OOC indicated that it would be likely existing offshore oil and gas activities would cease production, new developments would not be pursued, significant cost impacts would be realized for capture of produced wastewater and onshore transport for ultimate disposal, and a reduction in state lease revenues and royalties would occur should 30 TAC § 319.23 limitations be imposed. Furthermore, the information provided by OOC discussed the health and safety impacts associated with onshore transport and disposal of produced wastewater.

TCEQ performed an assessment of OOC’s request associated with this second aspect of the rule conditions and identified the regulatory history associated with the conditions established in 30 TAC § 319.26. 9 TexReg 4078, (July 27, 1984) outlines the Texas Water Development Board’s (TWDB) adoption of the existing regulation and amendments to this regulation that existed prior the existing regulation. The Texas Register preamble identifies Section 26.003 of the Texas Water Code, which is the policy statement of this Chapter, as being applicable to applying less stringent levels than those established in 30 TAC § 319.26. Section 26.003 of the Texas Water Code states, in part, “taking into consideration the economic development of the state”. OOC’s exception request related to economic impacts falls in line with this condition established in the Texas Water Code. This Texas Register publication outlines public comment received on the rule amendments and the TWDB’s position on comments received and demonstrations needed to be made by an applicant to justify less stringent hazardous metals levels. The preamble states in part “the applicant will need to show more than difficulty in paying the higher cost of treatment necessary to meet concentrations” for the TWDB to allow less stringent hazardous metals levels. The preamble further goes onto discuss three potential options an applicant could present to the TWDB to demonstrate “more than difficulty in paying higher costs”. The three options presented do not have direct applicability to treatment and discharge for produced wastewater offshore oil and gas discharges, however, the preamble does not restrict an applicant to these three options. Based on TCEQ’s initial evaluation of this exception request associated with economic impacts, granting less stringent hazardous metals levels could not be supported.

The OOC submitted a supplement to its initial 30 TAC Chapter 319 metals exception request in a letter dated November 22, 2021. OOC’s supplemental submission provided more detailed information related to: EPA developed national technology-based standards for offshore produced wastewater discharges, additional and detailed information on economic impacts to the State of Texas and the oil and gas offshore industry if 30 TAC Chapter 319 metals limitations were imposed in the TPDES general permit; and provided a study conducted by the American Petroleum Institute (API) of barium fate and transport in the Gulf of Mexico for offshore oil and gas discharges: “Barium in Produced Water: Fate and Effects in Marine Environment.” Based on TCEQ’s review of OOC’s November 22, 2021, letter, TCEQ supports not imposing hazardous metals limitations as established in 30 TAC § 319.23 as allowed under 30 TAC § 319.26.

30 TAC Chapter 319 Hazardous Metals Quality Levels Discharge to Tidal Waters:

| Parameter | Daily Average | Daily Composite | Grab Sample |
| --- | --- | --- | --- |
| Total Arsenic | 0.1 mg/L | 0.2 mg/L | 0.3 mg/L |
| Total Barium | 1.0 mg/L | 2.0 mg/L | 4.0 mg/L |
| Total Cadmium | 0.1mg/L | 0.2 mg/L | 0.3 mg/L |
| Total Chromium | 0.5 mg/L | 1.0 mg/L | 5.0 mg/L |
| Total Copper | 0.5 mg/L | 1.0 mg/L | 2.0 mg/L |
| Total Lead | 0.5 mg/L | 1.0 mg/L | 1.5 mg/L |
| Total Manganese | 1.0 mg/L | 2.0 mg/L | 3.0 mg/L |
| Total Mercury | 0.005 mg/L | 0.005 mg/L | 0.01 mg/L |
| Total Nickel | 1.0 mg/L | 2.0 mg/L | 3.0 mg/L |
| Total Selenium | 0.1 mg/L | 0.2 mg/L | 0.3 mg/L |
| Total Silver | 0.05 mg/L | 0.1 mg/L | 0.2 mg/L |
| Total Zinc | 1.0 mg/L | 2.0 mg/L | 6.0 mg/L |

EPA’s existing NPDES General Permit No. TXG260000 established the following technology-based permit limitations for discharges not regulated by 40 CFR Part 435, Subpart A; or are more restrictive than 40 CFR Part 435, Subpart A:

* Produced Wastewater
* Flow: Monitor
* Free Oil: No discharge as established by visual observation
* Well Treatment, Completion, and Workover Fluids
* Priority Pollutants: Prohibited from discharge other than in trace amounts
* Miscellaneous Discharges
* Free Oil: No discharge as established by visual observation.
* Miscellaneous Discharges of Seawater and Freshwater which have been Chemically Treated
* Treatment Chemicals: Not to exceed maximum concentration specified in EPA product registration labeling, maximum manufacturer’s recommended concentration, or 500 mg/L
* Free oil: No discharge as established by visual observation
* Flow: Monitor

TCEQ practice is to establish technology-based pH effluent limitations in TPDES permits that authorize potentially contaminated waste streams. Technology-based pH effluent limitations of 6.0-9.0 standard units for the discharge of produced wastewater/hydrate control fluids; well treatment, completion, and workover fluids; and contaminated miscellaneous discharge are proposed in the draft TPDES general permit. Appendix F of this fact sheet includes an assessment of pH limitations of 6.0-9.0 standard units demonstrating these proposed effluent limitations will meet instream pH water quality standards. TCEQ is proposing to revise “miscellaneous discharges” and “miscellaneous discharges of seawater and freshwater which have been chemically treated” as currently defined in EPA’s existing NPDES general permits. These waste streams are proposed to be defined as “uncontaminated miscellaneous discharges” and “contaminated miscellaneous discharges”, respectively in the draft TPDES general permit. TCEQ is proposing to remove effluent limitations in EPA’s existing TXG260000 for treatment chemicals used in contaminated miscellaneous discharges as the draft TPDES general permit adequately controls chemical usage via WET water quality-based effluent limitations. Secondary treatment standards, flow monitoring, and disinfection requirements for the discharge of domestic waste and sanitary waste are discussed above under the Coastal Facilities section and are proposed in the draft TPDES general permit for these discharges from Territorial Seas Facilities.

1. **Proposed Technology-Based Effluent Limitations:**

Technology-based effluent limitations proposed in the draft TPDES general permit based on EPA’s existing NPDES General Permit Nos. TXG260000 and TXG330000, 40 CFR Part 435, TCEQ established technology standards, or BPJ and anti-backsliding requirements established at 40 CFR § 122.44(l) are established as follows:

Stripper Well Facilities:

* Produced Wastewater, Well Treatment Fluids, and Workover Fluids

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | N/A |
| Oil and Grease | 35 mg/L | 25 mg/L |
| pH | 6.0 - 9.0 standard units | N/A |

* Drilling Fluids – No discharge
* Drill Cuttings – No discharge
* Produced Sand – No discharge
* Dewatering Effluent – No discharge
* Formation Test Fluids – No discharge
* Well Completion Fluids – No discharge
* Hydrate Control Fluids – No discharge
* Domestic Waste – No discharge
* Sanitary Waste – No discharge
* Contaminated Miscellaneous Discharges and Uncontaminated Miscellaneous Discharges – No discharge
* Contaminated Stormwater - No discharge

Coastal Facilities:

* Deck Drainage

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Free Oil1 | No discharge | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Domestic Waste

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | Report, MGD |
| Floating Solids, Garbage, Foam | No discharge | N/A |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L |
| Total Suspended Solids | 65 mg/L | 20 mg/L |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A |
| pH | 6.0 – 9.0 standard units | N/A |

* Sanitary Waste (M10 and M91M)

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | Report, MGD |
| Floating Solids | No discharge | N/A |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L |
| Total Suspended Solids | 65 mg/L | 20 mg/L |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A |
| pH | 6.0 – 9.0 standard units | N/A |

* Uncontaminated Miscellaneous Discharges

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Free Oil1 | No discharge | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Contaminated Miscellaneous Discharges

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | N/A |
| Free Oil1 | No discharge | N/A |
| pH | 6.0 -9.0 standard units | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Drilling Fluids – No discharge
* Drill Cuttings – No discharge
* Produced Wastewater – No discharge
* Produced Sand – No discharge
* Dewatering Effluent – No discharge
* Formation Test Fluids – No discharge
* Well Treatment, Completion, and Workover Fluids – No discharge
* Hydrate Control Fluids – No discharge
* Contaminated stormwater for inland facilities (not defined as deck drainage) – No discharge

Territorial Seas Facilities:

* Produced Wastewater and Hydrate Control Fluids

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Free Oil1 | No discharge | N/A |
| Oil & Grease | 42 mg/L | 29 mg/L |
| pH | 6.0 - 9.0 standard units | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Well Treatment, Completion, and Workover Fluids

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | Report, MGD |
| Free Oil1 | No discharge | N/A |
| Oil & Grease | 42 mg/L | 29 mg/L |
| PH | 6.0 – 9.0 standard units | N/A |

1 As determined by the static sheen test utilizing EPA Method 1617.

* Deck Drainage

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Free Oil1 | No discharge | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Domestic Waste

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | Report, MGD |
| Floating Solids and Foam | No discharge | N/A |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L |
| Total Suspended Solids | 65 mg/L | 20 mg/L |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A |
| pH | 6.0 – 9.0 standard units | N/A |

* Sanitary Waste (M10 and M91M)

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow | Report, MGD | Report, MGD |
| Floating Solids | No discharge | N/A |
| Biochemical Oxygen Demand (5-day) | 65 mg/L | 20 mg/L |
| Total Suspended Solids | 65 mg/L | 20 mg/L |
| Dissolved Oxygen | 2.0 mg/L (minimum) | N/A |
| Total Residual Chlorine | 1.0 mg/L (minimum) and 4.0 mg/L (maximum) | N/A |
| pH | 6.0 – 9.0 standard units | N/A |

* Uncontaminated Miscellaneous Discharges

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Free Oil1 | No discharge | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Contaminated Miscellaneous Discharges

|  |  |  |
| --- | --- | --- |
| Parameter | Daily Maximum | Daily Average |
| Flow | Report, MGD | N/A |
| Free Oil1 | No discharge | N/A |
| pH | 6.0 - 9.0 standard units | N/A |

1 As determined by the presence of a film or sheen upon or discoloration of the surface of the receiving water (visual sheen).

* Drilling Fluids – No discharge
* Drill Cuttings – No discharge
* Produced Sand – No discharge
* Dewatering Effluent – No discharge
* Formation Test Fluids – No discharge

# XI. Water Quality-Based Requirements

TPDES permits contain technology-based effluent limitations reflecting the best controls available. Where these technology-based permit limitations do not protect water quality or the designated uses, additional water quality-based effluent limitations and/or conditions are included in TPDES permits. State narrative and numerical water quality standards are used in conjunction with EPA criteria and other toxicity data bases to determine the adequacy of technology-based permit limitations and the need for additional water-quality based controls. Furthermore, the draft TPDES general permit has been developed to comply with the Ocean Discharge Criteria, established in 40 CFR Part 125, Subpart M.

The *Texas Surface Water Quality Standards* (TSWQS) 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*) RG-194 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.

**A. Assessment of Individual Toxics with Established Water Quality Standards:**

The Texas Toxicity Modeling Program (TEXTOX), developed by TCEQ, was used to perform a reasonable potential (RP) screening against available discharge data for this industry (oil and gas extraction) which TCEQ is regulating for the first time. TEXTOX is the method TCEQ uses to calculate water quality-based effluent limitations for toxics in accordance with the TSWQS and the IPs (RG-194). The receiving stream’s physical and chemical characteristics are used to calculate what concentrations of pollutants are allowed to be discharged while ensuring that no significant degradation of any water in the state will occur and that existing uses will be maintained and protected. Segment values found in Appendix D of the IPs (RG-194), pollutant criteria found in the TSWQS, the receiving stream’s critical low flow (as applicable), and the effluent flow (as applicable) are used to calculate the concentration of each pollutant the receiving stream can tolerate that would still be protective of aquatic life and human health.

Calculations of water quality-based effluent limitations for the protection of aquatic life and human health are presented in Appendices A 1-4 (Stripper Well Facilities); Appendix B (Coastal Facilities); and Appendices C, D, and E (Territorial Seas Facilities). Aquatic life criteria established in Table 1 and human health criteria established in Table 2 of the TSWQS are incorporated into the calculations. TSS, pH, Hardness, and Chloride values were obtained from segment numbers in Appendix D of the IPs (RG-194).

TCEQ practice for determining RP is to compare available analytical data from discharges against percentages of the calculated daily average water quality-based effluent limitations. Permit limitations are required when available analytical data exceeds 85 percent of the calculated daily average water quality-based effluent limitation. Monitoring and reporting are required when available analytical data exceeds 70 percent of the calculated daily average water quality-based effluent limitation.

The underlying methodology and statistics utilized to calculate individual pollutant water quality-based effluent limitations are outlined in RG-194, section titled “Toxic Pollutants,” pages 130-173.

Assessment of Produced Wastewater from Freshwater Stripper Well Facilities:

TEXTOX Menu 1 was used to calculate appropriate daily average and daily maximum water quality-based effluent limitations. TEXTOX Menu 1 was used to calculate appropriate effluent limitations for a discharge into intermittent freshwater body streams east of the 98th meridian using a 100% acute dilution which is independent of the discharge flow volume.

For freshwater bodies east of the 98th meridian, the segment numbers and segment criteria used to screen produced wastewater discharges under different discharge scenarios were determined by using criteria of segments that have the lowest and highest total suspended solids (TSS) and hardness, independent of each other.

Factors used to establish which segments are controlling related to certain pollutants to run TEXTOX are provided, as follows:

* Freshwater: Metals are more bioavailable the lower the hardness **-** According to the IPs (RG-194), in general, most metals toxicity increases in water that has low hardness values. Such metals include cadmium, trivalent chromium, copper, lead, nickel, and zinc. Therefore, water quality criteria for these metals are more stringent for receiving waters with a low hardness value. As hardness decreases, the applicable water quality-based effluent limitations become more stringent.
* Freshwater: One chemical, pentachlorophenol, is more bioavailable the lower the pH. Water quality criteria for pentachlorophenol depends on pH. Pentachlorophenol is more toxic in water that has low pH (acidic). Therefore, the lower the pH in a receiving water, the more stringent any applicable water quality-based effluent limitation is for pentachlorophenol.
* Freshwater: One metal, silver is more bioavailable the lower the chloride concentration.The percentage of dissolved silver that is in free ionic form depends on the concentration of chloride. More silver is present in the free ionic form (and is therefore more toxic) in water that has low chloride concentrations. Therefore, the lower the chloride concentration in the receiving water, the lower the applicable water quality-based effluent limitation is for silver.
* Freshwater: Some metals’ bioavailability is affected by TSS and/or hardness. Water quality criteria for certain metals (arsenic, cadmium, trivalent chromium, copper, lead, nickel, silver, and zinc) depend on TSS. As TSS increases, the partitioning coefficient (or Kp) and dissolved fraction of the metal decreases. Therefore, a rise in TSS results in less of the metal being bioavailable to aquatic life. As TSS decreases, more of the metal is bioavailable, therefore any applicable water quality-based effluent limitations to protect aquatic life become more stringent. However, TSS is not the only determining factor for the amount of bioavailable cadmium, trivalent chromium, copper, lead, nickel, and zinc. The effect of hardness can be stronger than the effect of TSS. Any applicable water quality-based effluent limitations for chromium, copper, lead, nickel, and zinc are most stringent when both TSS and hardness are low. An exception is cadmium, where any applicable water quality-based effluent limitations are most stringent when TSS is high and hardness is low.

For TEXTOX Menu 1, the segment number and corresponding segment-specific values, for the segment with the lowest and highest TSS and hardness (independent of each other), east of the 98th meridian, were used to evaluate appropriate water quality-based effluent limitations.

TCEQ’s review of EPA’s fact sheet developed in support of TXG330000 did not indicate EPA conducted an RP analysis of produced wastewater discharges from Stripper Well Facilities (note – the discharge of produced wastewater from Coastal Facilities under TXG330000 is prohibited). This is inconsistent with the approach that EPA used to authorize produced wastewater discharges to the territorial seas as outlined in the fact sheet they developed in support of TXG260000. To be consistent in rationale for the discharge of produced wastewater between Stripper Well Facilities and Territorial Seas Facilities, TCEQ contacted the RRC to inquire on the availability of effluent data for produced wastewater discharges from Stripper Well Facilities located east of the 98th meridian. RRC provided TCEQ with data for three representative permitted facilities contained from permit applications previously submitted to RRC.

**Produced Wastewater Data for Stripper Well Facilities (data from RRC):**

| Pollutant | Facility No. 1 | Facility No. 2 | Facility No. 3 |
| --- | --- | --- | --- |
| Total Aluminum | 0.320 mg/L | 0.153 mg/L | 0.00371 mg/L |
| Ammonia | 0.12 mg/L | 0.27 mg/L | 0.68 mg/L |
| Total Arsenic | < 0.002 mg/L | < 0.005 mg/L | < 0.005 mg/L |
| Total Barium | 0.0474 mg/L | 0.133 mg/L | < 0.003 mg/L |
| Benzene | < 0.0003 mg/L | 0.004 mg/L | < 0.001 mg/L |
| Total Cadmium | < 0.0003 mg/L | < 0.0003 mg/L | < 0.0003 mg/L |
| Calcium | 2.94 mg/L | 0.08 mg/L | < 0.1 mg/L |
| Chloride | 20.4 mg/L | 24.5 mg/L | 30.8 mg/L |
| Total Chromium | < 0.002 mg/L | < 0.003 mg/L | < 0.002 mg/L |
| Total Copper | < 0.002 mg/L | < 0.001 mg/L | < 0.001 mg/L |
| Cyanide | < 0.003 mg/L | < 0.02 mg/L | < 0.02 mg/L |
| Hexavalent Chromium | < 0.003 mg/L | < 0.003 mg/L | < 0.003 mg/L |
| Total Iron | 0.177 mg/L | 0.264 mg/L | < 0.007 mg/L |
| Total Lead | 0.000312 mg/L | < 0.0003 mg/L | < 0.0003 mg/L |
| Total Magnesium | 0.818 mg/L | 3.82 mg/L | < 0.1 mg/L |
| Total Manganese | 0.00542 mg/L | 0.016 mg/L | < 0.0005 mg/L |
| Total Mercury | < 0.00008 mg/L | < 0.00008 mg/L | < 0.00008 mg/L |
| Naphthalene | < 0.00194 mg/L | < 0.00198 mg/L | < 0.004 mg/L |
| Total Nickel | < 0.003 mg/L | 0.00108 mg/L | < 0.001 mg/L |
| Oil & Grease | < 5 mg/L | < 5 mg/L | < 5 mg/L |
| Phenol | < 0.00194 mg/L | < 0.00198 mg/L | < 0.002 mg/L |
| Potassium | 3.72 mg/L | 10.77 mg/L | < 0.1 mg/L |
| Total Selenium | < 0.002 mg/L | < 0.002 mg/L | < 0.002 mg/L |
| Total Silver | < 0.001 mg/L | < 0.0005 mg/L | < 0.0005 mg/L |
| Sodium | 503 mg/L | 612 mg/L | < 0.1 mg/L |
| Sulfate | < 1 mg/L | < 10 mg/L | 10.5 mg/L |
| Sulfide | < 0.05 mg/L | < 0.02 mg/L | < 0.05 mg/L |
| Total Dissolved Solids | 1195 mg/L | 1210 mg/L | 885 mg/L |
| Total Organic Carbon | 11.5 mg/L | 8.3 mg/L | 4.3 mg/L |
| Total Suspended Solids | 17 mg/L | 7 mg/L | < 2.5 mg/L |
| Total Zinc | 0.019 mg/L | 0.0104 mg/L | < 0.002 mg/L |

Screening this data against calculated water quality-based effluent limitations in Appendices A 1-4 indicated no pollutant-specific water quality-based effluent limitations are justified for discharges from Stripper Well Facilities in the draft TPDES general permit.

Assessment of Produced Wastewater and Well Treatment, Completion, and Workover Fluids from Marine Coastal and Territorial Seas Facilities:

TEXTOX Menu 5 was used to calculate appropriate daily average and daily maximum water quality-based effluent limitations. TEXTOX Menu 5 was used to calculate appropriate water quality-based effluent limitations for discharges into the Gulf of Mexico and into an appropriate bay or estuary when discharging less than 10 million gallons per day (MGD) using a zone of initial dilution (ZID) at 50 feet of 30%, an aquatic life mixing zone at 200 feet of 8%, and a human health mixing zone at 400 feet of 4% based on EPA’s horizontal jet plume model for discharges to the territorial seas other than produced wastewater (see further discussion on the assessment of produced wastewater discharges to the territorial seas below in this section of the fact sheet).

For a bay or estuary anywhere on the Texas coast, the segment number and criteria used was based on the lowest TSS. When these discharges were evaluated, they were screened in a way that resulted in calculation of the most stringent water quality-based effluent limitations.

Factors used to establish which segments are controlling to run TEXTOX:

* Saltwater: Bioavailability increases as TSS decreases. According to 30 TAC § 307.6(c)(1) - Table 1- Aquatic Life Protection, hardness is used to establish the criteria for cadmium, trivalent chromium, copper, lead, nickel, and zinc (i.e., it is used in the equation to calculate the acute and chronic criteria) in freshwater only. Hardness is not used in calculating criteria in saltwater. The determining factor for water quality-based effluent limitations calculations in saltwater is TSS. A decrease in TSS results in any applicable water quality-based effluent limitations being more stringent, due to more metal being more bioavailable.

For TEXTOX Menu 5, since the determining factor is TSS, the appropriate segment number and corresponding segment-specific values for the bay or estuary with the lowest TSS was used to evaluate appropriate water quality-based effluent limitations. Discharges to the territorial seas were evaluated using Segment No. 2501 (Gulf of Mexico).

As discussed above, TCEQ typically utilizes EPA’s horizontal plume model for discharges of less than 10 MGD to calculate standard instream dilution rates to marine water bodies. **In support of issuance of EPA’s existing TXG260000 (effective February 8, 2012), EPA conducted an RP analysis of produced wastewater discharges to the territorial seas which is outlined in EPA’s existing fact sheet for TXG260000 (dated October 4, 2011). The fact sheet indicates EPA utilized data obtained from the RRC [per table 6.1 of the 2004 final Environmental Impact Statement (EIS)] to conduct its RP analysis. This data summarized in EPA’s fact sheet is included in Table 4-2 of the “Supplemental Information Report to the 2004 Final Environmental Impact Statement,” dated September 2011. Data in the 2011 EIS supplement is included in the table below “Produced Wastewater for Territorial Seas Facilities.” Section 4.4.2 of the 2011 EIS supplement summarizes this RP analysis. It indicates the highest pollutant concentrations for available Texas discharge data obtained from RRC and worst-case discharge scenarios [(3885 barrels per day (bbl/day)] discharge rate and depth to sea floor of 7.32 meters were utilized based on modeling results from CORMIX versions 4.2 GP and 7.0.**

**EPA’s existing TXG260000 does not restrict flow rates or depths to sea floor for allowable produced wastewater discharges. Appendix A, Table 1 in EPA’s existing TXG260000 establishes produced wastewater discharge critical dilutions at flow rates up to 25,000 bbl/day and depths to sea floor between 0 and >16 meters. Appendix A, Table 1 of EPA’s existing TXG260000 establishes a maximum critical dilution at the edge of the aquatic life mixing zone of 7.8% (which is consistent with TCEQ’s established critical dilution at the edge of the aquatic life mixing zone of 8%) when utilizing EPA’s horizontal jet plume model. TCEQ initially performed an RP analysis of this EIS data against calculated water quality-based effluent limitations derived from using standard dilution rates from EPA’s horizontal jet plume model. The TCEQ’s RP analysis indicated the need to include numerous water quality-based effluent limitations not established in EPA’s existing TXG260000.**

**Based on the TCEQ’s initial RP assessment and consistent with historical EPA methodology, TCEQ initiated and completed its own CORMIX modelling assessment for produced wastewater discharges to the territorial seas. To properly assess individual water quality-based pollutants utilizing dilution modeling, permitted discharge flow is a key component in the analysis (see above discussion on issues with EPA development of existing TXG260000 related to unrestricted flow rates). TCEQ contacted the OOC to obtain acceptable produced wastewater discharge flow restrictions to be established in the TPDES general permit. OOC in coordination with its member companies agreed to a produced wastewater daily average flow restriction for discharges to the territorial seas to be included in the TPDES general permit at 3000 bbl/day (0.126 MGD when converting 1 bbl = 42 gallons). Additionally, OOC agreed to restrictions on the depth to sea floor from the discharge point of no less than 4-6 meters, and a maximum discharge pipe diameter of six inches. Furthermore, TCEQ obtained more recent produced wastewater analytical data that was submitted in recent permit applications to RRC for state authorizations to discharge from offshore oil and gas extraction facilities to water in the state. The more recent produced wastewater analytical data is summarized in the table below “Produced Wastewater Data for Territorial Seas Facilities” (analytical data from seven offshore platforms were assessed and the highest value observed is included in the referenced table). Data in parenthesis are included to indicate non-detect values provided in the submitted data that do not meet current TCEQ minimum analytical levels (MALs).**

**The following is a summary of inputs, assumptions, and other factors utilized in TCEQ’s territorial seas produced wastewater CORMIX assessment:**

* Effluent Characterization and CORMIX Model Version
* CORMIX model Version 11.0GTD (Version 11.0.1.0) was used for all model simulations.
* The pollutant type was specified as a conservative pollutant, meaning the pollutant does not undergo any decay or growth processes.
* The pollutant discharge concentration was set to 100% which is appropriate for the characterization of the discharge.
* A range of effluent densities were considered. Specifically, a maximum effluent density value (1109.4 kg/m3) and a minimum effluent density value (1019.64 kg/m3) were both modeled based on produced water effluent data, as provided by the RRC (temperature and total dissolved solids data provided in the table below), “Produced Wastewater Data for Territorial Seas Facilities”.
* Ambient Geometry
* The input values for average depth and depth at dischargewere presumed to be the same in the Gulf of Mexico. The depths are varied according to the modeled input parameters. The minimum depth modeled was 5 m, and the maximum depth modeled was 16 m.
* The wind speed (Uw) parameter was set to 2 m/s which is representative of a light wind and is the recommended wind speed by the CORMIX User Manual when measured data are not available.
* The ambient velocity (Ua) was set to 0.05 m/s, consistent with the TCEQ’s guidance document, *Mixing Analyses Using CORMIX*.
* A bottom friction (Manning *n*) value of 0.020 was assumed, consistent with TCEQ guidance for CORMIX analyses. A value of 0.020 is representative of a smooth channel bottom with no weeds.
* The water body was considered unbounded.
* In the ambient density data field, a non-freshwater density of 1017.65 kg/m3 was used based on temperature and salinity measurements collected from TCEQ Surface Water Quality Monitoring Stations (SWQM) in the Gulf of Mexico (Segment No. 2501). The ambient density is the average density value based on water column averages of temperature and salinity.
* From the SWQM data available, the median density difference from the top of the water column to the bottom of the water column was analyzed to determine whether stratification should be factored into the analysis. An additional model scenario was run on the most critical case, but it did not significantly change the model predictions.

* Discharge Geometry
* The CORMIX1 Single Port model was utilized in this exercise.
* The nearest bank was set to 1000 m to the left.
* Port diameters of 4 inches and 6 inches were both used throughout the modeling exercise.
* A submerged offshore discharge configuration was used with a submerged port height of 20 cm below the surface.
* A vertical angle (θ) was set to -90°, and a horizontal angle (σ) was set to 0°. This configuration represents a downward pipe pointing towards the channel bottom and in the direction of the ambient flow (i.e., co-flowing). When the vertical angle (θ) is set to ± 90°, the horizontal angle (σ) is automatically set to 0°.
* Mixing Zone Specifications
* No water quality standard was specified in the modeled iterations.
* Model results were assessed at the edges of the regulatory mixing zone boundaries, consistent with the *Procedures to Implement the Texas Surface Water Quality Standards* (TCEQ RG-194). Mixing zone boundaries were assessed at trajectory distances of 60.96 m for the chronic aquatic life mixing zone, 15.24 m for the zone of initial dilution (ZID), and 121.92 m for the human health mixing zone.
* The region of interest was 1000 m.
* **CORMIX Modeling Dilution Results**
* **Effluent Fraction at the edge of ZID (50 feet): 1.4%**
* **Effluent Fraction at the edge of the Aquatic Life Mixing Zone (200 feet): 1.1%**
* **Effluent Fraction at the edge of the Human Health Mixing Zone (400 feet): 0.9%**

**As described above, TCEQ performed an RP analysis for produced wastewater discharges to the territorial seas utilizing TCEQ’s CORMIX modelling results at a daily average flow of 3000 bbl/day (0.126 MGD), depth to sea floor of a minimum of 4-6 meters, and a maximum pipe diameter of six inches. U**pdated/more recent data obtained from OOC (RRC individual permit application data) were screened against calculated water quality-based effluent limitations in Appendices D/E. Based on this assessment and in relation to dissolved oxygen modeling discussed below, discharges of produced wastewater are restricted to a pipe diameter of no greater than six inches and depth to sea floor of no less than five meters. This resulted in **water quality-based effluent limitations or monitoring/reporting requirements for the following parameters for produced wastewater discharges from Territorial Seas Facilities in the draft TPDES general permit:**

* **Total Copper**
* **Total Manganese**
* **Total Mercury**
* **Total Zinc**

**Additionally, a water quality-based produced wastewater flow limitation of 0.126 MGD is proposed in the draft TPDES general permit (based on the RP analysis previously discussed), as well as monitoring and reporting requirements for TDS and temperature to obtain additional data and confirm the buoyancy of produced wastewater discharges when mixing with Gulf of Mexico ambient water.**

**Produced Wastewater Data for Territorial Seas Facilities:**

| Pollutant | EIS Data | RRC 2016 – 2020 Data |
| --- | --- | --- |
| Total Aluminum | 0.610 mg/L | 129 mg/L |
| Total Arsenic | 0.090 mg/L | 0.152 mg/L |
| Total Barium | 564 mg/L | 1200 mg/L |
| Benzene | 13.1 mg/L | 37.7 mg/L |
| Total Cadmium | 0.100 mg/L | 0.015 mg/L (< 0.2 mg/L) |
| Hexavalent Chromium | 0.143 mg/L | < 0.1 mg/L |
| Total Copper | 0.260 mg/L | 0.156 mg/L |
| Cyanide | 0.030 mg/L | 0.007 mg/L (< 0.05 mg/L) |
| Total Lead | 0.400 mg/L | 0.019 mg/L (< 0.120 mg/L) |
| Total Mercury | 0.0019 mg/L | 0.0002 mg/L (< 0.006 mg/L) |
| Total Nickel | 0.639 mg/L | < 0.5 mg/L |
| Total Selenium | 0.268 mg/L | 0.292 mg/L |
| Total Silver | 0.020 mg/L | < 0.05 mg/L |
| Total Zinc | 0.218 mg/L | 26.3 mg/L |
| Temperature | ---- | 183 °F |
| pH | ---- | 5.66 S.U. |
| Dissolved Oxygen | ---- | 0.0 mg/L |
| Hardness | ---- | 64,100 mg/L |
| Total Suspended Solids | ---- | 710 mg/L |
| Total Dissolved Solids | ---- | 149,000 mg/L |
| Chlorides | ---- | 90,700 mg/L |
| Sulfates | ---- | 1530 mg/L |
| Sulfides | ---- | 0.680 mg/L (< 1.0 mg/L) |
| Ammonia-Nitrogen | ---- | 68.7 mg/L |
| Calcium | ---- | 25,400 mg/L |
| Magnesium | ---- | 849 mg/L |
| Sodium | ---- | 40,100 mg/L |
| Potassium | ---- | 1250 mg/L |
| Iron | ---- | 71.7 mg/L |
| Total Manganese | ---- | 51.9 mg/L |
| Oil and Grease | ---- | 14.3 mg/L |
| Total Organic Carbon | ---- | 3050 mg/L |
| Phenols | ---- | 20.4 mg/L |
| Naphthalene | ---- | 65.1 mg/L |

**Table 2-4 of the “Supplemental Information Report to the 2004 Final Environmental Impact Statement,” dated September 2011 provides data for the discharge of fluids from an acidizing well treatment. Section 2.2.2.6 of that document indicates this data was developed from two offshore wells in California. Although this data may not be representative of discharges of well treatment, completion, and workover fluids from offshore oil and gas extraction activities in Texas, TCEQ performed an RP analysis of this discharge data using both the methodology described above for discharges of less than 10 MGD and EPA’s horizontal jet plume model. RRC historically only permitted discharges of produced wastewater. Thus, more recent data for well treatment, completion, and workover fluids specific to Texas offshore discharges is not available.** Screening this data against calculated water quality -based effluent limitations in Appendix C indicated no pollutant-specific water quality-based effluent limitations are justified in the draft TPDES general permit. EPA’s existing NPDES General Permit No. GMG290000 for discharges from OCS facilities includes conditions requiring industry studies on the discharge of these waste streams and the impacts of these discharges to the Gulf of Mexico for acute toxicity. An industry wide study titled “Final Report: Joint Industry Project Study of Well Treatment, Completion, and Workover Effluents”, submitted by Offshore Operators Committee, September 23, 2021, was reviewed by TCEQ which included analysis of specific individual pollutants, organics and metals. Based on the short duration identified in this study (median one hour) and small volume (median 473 barrels), typical procedures for screening individual pollutants for compliance with the Texas Surface Water Quality Standards developed by TCEQ are not applicable to the intermittent and low volume nature of these discharges and TCEQ is proposing water quality controls on these discharges via the establishment of 24-hour acute whole effluent toxicity (WET) limitations (see discussion below on whole effluent toxicity assessment).

**Well Treatment, Completion, Workover Fluids Data for Territorial Seas Facilities**

| Pollutant | EIS Data |
| --- | --- |
| Total Aluminum | 0.0531 mg/L |
| Total Antimony | < 0.0039 mg/L |
| Total Arsenic | < 0.0019 mg/L |
| Total Barium | 0.0126 mg/L |
| Total Beryllium | < 0.0001 mg/L |
| Total Boron | 0.0319 mg/L |
| Total Cadmium | 0.0004 mg/L |
| Total Calcium | 0.0353 mg/L |
| Total Chromium | 0.019 mg/L |
| Total Cobalt | < 0.0019 mg/L |
| Total Copper | 0.003 mg/L |
| Total Iron | 0.572 mg/L |
| Total Lead | < 0.00982 mg/L |
| Total Magnesium | 0.162 mg/L |
| Total Molybdenum | < 0.00096 mg/L |
| Total Nickel | 0.0529 mg/L |
| Total Selenium | < 0.0029 mg/L |
| Total Silver | < 0.0007 mg/L |
| Sodium | 1.64 mg/L |
| Total Thallium | 0.005 mg/L |
| Total Tin | 0.00666 mg/L |
| Total Titanium | 0.00068 mg/L |
| Total Vanadium | 0.0361 mg/L |
| Yttrium | 0.00019 mg/L |
| Total Zinc | 0.0285 mg/L |
| pH | 2.48 S.U. |
| Aniline | 0.434 mg/L |
| Naphthalene | Non-detect |
| o-Toluidine | 1.852 mg/L |
| 2-Methylnaphalene | Non-detect |
| 2,4,5-Trimethylamine | 2.048 mg/L |
| Oil and Grease | 0.619 mg/L |

Calculated water quality-based effluent limitations for Coastal Facilities discharges are provided in Appendix B. Analytical data is not available for waste streams proposed for authorization under the draft TPDES general permit that require water quality-based screening for Coastal Facilities (produced wastewater and well treatment/completion/workover fluids are prohibited from discharge to coastal waters). These calculations are provided for reference in the event future evaluations of the TPDES general permit would justify the need to for such water quality-based effluent limitations evaluation.

**B. Assessment of Barium and Manganese, which Do Not Have Established Water Quality Standards:**

Based on the OOC 30 TAC Chapter 319 metals exception request dated June 10, 2021, which is discussed above in the technology-based effluent limitations section of this fact sheet, TCEQ performed an assessment of not applying these state-wide established limitations and the potential water quality impacts of not applying these limitations for produced wastewater discharges to the territorial seas. This assessment was in addition to the previously discussed review of OOC-conducted and API-conducted aquatic toxicity and bioaccumulation studies. All metals with criteria established in 30 TAC Chapter 319 have established marine water quality standards in the TSWQS, with the exception of barium and manganese.

TCEQ’s Water Quality Assessment staff conducted research into EPA nationally developed water quality criteria applicable to marine discharges in the state of Texas as well as other available and applicable marine water quality toxicity data.

The following water quality criteria were determined to be applicable to marine water bodies in the State of Texas for aquatic life toxicity and bioaccumulation of metals in marine organisms:

Barium:

Acute Aquatic Life Criteria: 150 mg/L

Chronic Aquatic Life Criteria: 25 mg/L

Human Health Bioaccumulation Criteria: N/A

Manganese:

Acute Aquatic Life Criteria: N/A

Chronic Aquatic Life Criteria: N/A

Human Health Bioaccumulation Criteria: 0.100 mg/L

Calculations are presented in Appendix E of this fact sheet. Based on this assessment and comparing calculated water quality-based effluent limitations against historically reported analytical data, water quality-based effluent limitations are being proposed in the draft TPDES general permit for total manganese for the discharge of produced wastewater to the territorial seas, effluent limitations for total barium for produced wastewater discharges to the territorial seas are not being proposed using the RP methodology described above.

Discharges from Stripper Well Facilities, Coastal Facilities, and Territorial Seas Facilities (with the exception of produced wastewater) are not expected to contain elevated levels of barium and manganese, and do not justify further assessment or establishing controls in the draft TPDES general permit.

1. **Assessment of Dissolved Oxygen Impacts:**
   1. Produced wastewater from offshore oil and gas platforms may contain very high levels of oxygen-demanding substances. Available information from discharges into marine waters of the western Gulf of Mexico, off the shores of Texas and Louisiana, indicates frequent very high concentrations and extreme variability of direct oxygen-demanding substances such as Biochemical Oxygen Demand (BOD) and ammonia-nitrogen (NH3-N). Typically, these discharges undergo minimal, if any, treatment for constituents of this type. In addition, concentrations of dissolved oxygen (DO) in these produced wastewater discharges are often near 0.0 mg/L, according to available sampling data.
   2. Information related to: discharge flow volumes; 5-day Biochemical Oxygen Demand (BOD5) concentrations and loadings; NH3-N concentrations and loadings; and effluent DO concentrations was obtained from regulated facility representatives, including through the OOC. Information was also obtained from a hypoxic zone study conducted by EPA to study how produced wastewater discharges from offshore oil and gas operations may contribute to impacts on the hypoxic zone in the western Gulf of Mexico (offshore of Louisiana and the easternmost portion of Texas jurisdictional waters). Neither the hypoxic zone study nor existing EPA general permits for discharges of produced wastewater from offshore oil and gas platforms included an explicit analysis of potential localized DO impacts in relation to established state or federal water quality DO criterion standards in the vicinity of individual produced wastewater discharges. The TSWQS designates the portion of the Gulf of Mexico within Texas jurisdictional waters as having an Exceptional Aquatic Life Use with a corresponding DO criterion of 5.0 mg/L.
   3. In order to assess the potential for more-localized and near-field DO impacts and to set corresponding effluent limits for this TPDES general permit, if necessary, an analysis methodology was developed to represent individual produced wastewater discharges and consider the highly dispersive environment of the open waters of the Gulf of Mexico. This analysis approach included the use of CORMIX modeling in combination with a Continuously Stirred Tank Reactor (CSTR) model to evaluate potential DO impacts for a range of discharge conditions that would fall within the scope of this TPDES general permit authorization.
   4. A CORMIX modeling analysis was initially developed (using CORMIX 11.0GTD (Version 11.0.1.0) modeling software), separate from the DO modeling analysis, to determine appropriate Critical Condition dilution factor (percent effluent) values to use in the evaluation of this draft TPDES general permit. These percent effluent values were determined for the Zone of Initial Dilution (ZID), the Chronic Aquatic Life Mixing Zone, and the Human Health Mixing Zone. These dilution factors are used for the evaluation of pollutants and other substances typically characteristic of or otherwise anticipated to potentially be present in discharges based on the category of wastewater being discharged.
   5. The details of the CORMIX modeling analysis are available from the Critical Conditions review of this draft TPDES general permit which was discussed previously. Only the percent effluent (dilution) values corresponding to the Chronic Aquatic Life Mixing Zone portion of the Critical Conditions review are applicable to this DO modeling analysis. The TSWQS prescribe that certain water quality standards, including those applicable to a water body’s DO criteria, apply at and beyond the edge of the Chronic Aquatic Life Mixing Zone associated with that discharge, which for open-water marine water bodies is typically at a radius of 200 feet from the point of discharge.
   6. The CORMIX modeling analysis included a variety of discharge scenarios indicated to be within the scope of this draft TPDES general permit, with percent effluent predictions varying as these modeled parameter details were adjusted. Percent effluent values were derived for many cases other than the final dilution values determined to be most critical from a Critical Conditions review perspective. These fluctuating model conditions included discharge volume, discharge pipe diameter, and water body average depth (within the modeled portion of the water body). Due to the greater density of these produced wastewater discharges compared to the density of the receiving water body, all CORMIX model cases predicted the effluent plume to be negatively buoyant and that it would consequently sink towards the seafloor bottom. The same modeling scenarios and TPDES general permit coverage constraints applicable to the CORMIX analysis also apply to the DO modeling analysis, as the CORMIX modeling results are a critical component of the DO modeling analysis.
   7. Coverage under this draft TPDES general permit will be limited to produced wastewater discharges of up to 3000 barrels/day (bbl/day), equivalent to 0.126 million gallons per day (MGD). Furthermore, the DO modeling results are only considered valid for discharges into waters with an average depth of no less than 5 meters (16.4 feet) in the general vicinity of the discharge.
   8. For the analysis of this draft TPDES general permit, the CORMIX modeling analysis was set up to predict percent effluent values at the edge of the aquatic life mixing zones under a variety of potential discharge condition combinations - for average depths between 5 and 6 meters, between 6 and 9 meters, between 9 and 12 meters, between 12 and 14 meters, between 14 and 16 meters, and greater than 16 meters; for discharge pipe diameters of 4 inches and 6 inches; and for discharge flowrates of up to 3000 bbl/day.
   9. For the DO modeling analysis, these CORMIX results were then incorporated into a CSTR modeling approach to assess potential DO impacts beyond the edge of the Chronic Aquatic Life Mixing Zone. The CORMIX-predicted percent effluent values were used to establish predicted levels of oxygen-demanding constituents at the edge of the Chronic Aquatic Life Mixing Zone for further analysis of a similar array of DO modeling cases with various combinations of oxygen-demanding constituent concentrations.
   10. The CSTR modeling runs for this general permit were structured to assess discharge scenarios at 500 bbl/day, 1000 bbl/day, 2000 bbl/day, and 3000 bbl/day (using the highest flows for various flow range groupings) paired with the shallowest of the CORMIX depth range groupings (e.g., for the CORMIX percent effluent predicted value representing a 4-inch diameter discharge pipe for a discharge flowrate range between 2000 bbl/day and 3000 bbl/day at a depth range between 9 meters and 12 meters, the corresponding CSTR model run used that percent effluent with a model discharge flow input of 3000 bbl/day (converted to 0.126 MGD) at a model depth of 9 meters). These highest flow/shallowest depth cases represent higher effluent percentages for each modeled flow/depth/pipe diameter scenario and are thus the most pessimistic from a dissolved oxygen modeling perspective. Deeper scenarios did not equate to more pessimistic DO modeling results as is sometimes the case with an end-of-pipe modeling approach, since the deeper scenarios also equated to lower effluent percentages at the edge of the Chronic Aquatic Life Mixing Zone.
   11. In order to establish ambient water quality values to pair with the effluent quality values, an analysis of data from TCEQ SWQM stations located throughout the Gulf of Mexico was performed. The analysis developed values that would represent an approximation of average conditions that could be used in a general permitting approach. A total of 27 SWQM stations were used, some with surface-only data and some with water-column profile data, and some with a mix of both. The water-column profile samples included a mix of both stratified and unstratified conditions, according to SWQM guidance concerning salinity stratification. Periods of record and data quantities also varied considerably by station.
   12. Using this method, generalized representative ambient water quality values were established for use in the CSTR modeling analysis. These values included a summertime temperature (31.03°C), with July, August, and September found to be the three warmest months; median summertime salinity (31.5 ppt); percent DO saturation (93.67%), using only water-column data and taking salinity stratification into account (using either water-column-average values if not stratified or mixed-surface-layer values if stratified); a baseline ambient DO value of 5.85 mg/L, based on the temperature, salinity, and percent DO saturation values; BOD5 (3.0 mg/L); and NH3-N (0.05 mg/L).
   13. Edge-of-mixing-zone concentrations for BOD5, NH3-N, and DO were calculated using the CORMIX percent effluent values for various input combinations of end-of-pipe BOD5 and NH3-N concentrations, based on available oil and gas offshore facility produced wastewater sampling data, paired with calculated edge-of-mixing zone DO concentration values, using an assumed end-of-pipe effluent DO concentration of 0.0 mg/L and an ambient DO concentration of 5.85 mg/L. These edge-of-mixing-zone concentrations were then used as inputs for the CSTR modeling analysis.
   14. The CSTR models were set up consistent with standard open-water CSTR modeling procedures, using 10-acre model cells (three consecutive 10-acre cells), with average depths set in all cells (different depth scenarios) at depths of 5 meters, 6 meters, 9 meters, 12 meters, 14 meters, and 16 meters. Temperature and salinity in the models were set at 31.03°C and 31.5 ppt, respectively, representing summertime conditions, when DO conditions are typically expected to be most pessimistic, at least in terms of factors that can be represented in this modeling approach.
   15. The CORMIX analysis percent effluent calculations included a presumed small ambient flow (due to currents, tidal action, etc.) of 0.05 meters/second (0.164 feet/second). To be additionally conservative, especially considering the generalized nature of this assessment approach, as well as due to limitations of the CSTR model itself, no additional dilution, dispersion, or ambient flow was included in the CSTR portion of the modeling analysis.
   16. The CSTR models were run at various discharge flows, using mass-balance-calculated BOD5, NH3­-N, and DO concentration values, derived from the CORMIX percent effluent calculations, for flows of up to 3000 bbl/day for the analysis of this draft TPDES general permit. The most pessimistic CSTR modeling cases, in regard to predicted DO impacts were determined to be the combinations of overall highest discharge flows and overall shallowest discharge conditions, which corresponded to the highest predicted percent effluent values from the CORMIX modeling analysis.
   17. It should be noted that the CSTR model is not able to simulate temperature or salinity impacts of these discharges beyond the edge of the Chronic Aquatic Life Mixing Zone. However, mass-balance calculations using the percent effluent calculations with available discharge temperature and salinity values in combination with ambient (summertime) values indicates that resultant temperatures and salinities at the edge of the Chronic Aquatic Life Mixing Zone are expected to remain within the range of observed ambient data and are not expected to have a significant impact on predicted DO concentrations beyond the edge of the Chronic Aquatic Life Mixing Zone.
   18. Comparison of these CSTR DO modeling results with available effluent quality data indicates that inclusion of effluent limits for BOD5 and NH3-N is warranted in the draft TPDES general permit. As different combinations of BOD5 and NH3-N effluent limits would achieve similar modeling results, a menu of possible effluent set combinations was discussed with OOC representatives before the final effluent limit recommendations for this draft TPDES general permit were determined.
   19. Based on the results of the modeling analysis, end-of-pipe concentration effluent limits of 6,483 mg/L BOD5 and 112 mg/L NH3-N are predicted to be adequate for discharge flows of up to 3000 bbl/day to ensure that dissolved oxygen levels beyond the edge of the Chronic Aquatic Life Mixing Zone will be maintained above the criterion established by the Standards Implementation Team for the Gulf of Mexico (Segment No. 2501) (5.0 mg/L). Other effluent set combinations may also be adequate and can be evaluated in future permitting actions.
   20. Discharges of low volumes of produced wastewater from nominal/marginal Stripper Well Facilities are not expected to contain elevated levels of oxygen demanding substances, thus further evaluation of this discharge is not justified. In relation to the quality of produced wastewater from Stripper Well Facilities vs. Territorial Seas Facilities, total organic carbon (TOC) and Ammonia-Nitrogen values were assessed, indicating produced wastewater discharges from Stripper Well Facilities do not present a significant concern on receiving stream dissolved oxygen impacts. Secondary treatment levels for BOD (5-day) and minimum dissolved oxygen effluent limitations discussed in the technology-based section of this fact sheet should ensure protection for instream dissolved oxygen criteria for discharges of domestic waste and sanitary waste authorized under the draft TPDES general permit assumed at volumes less than 0.1 MGD. Likewise, additional waste streams authorized under the draft TPDES general permit from Coastal Facilities and Territorial Seas Facilities (other than produced wastewater) are not expected to contain elevated levels of oxygen demanding substances, thus further analysis of these discharges is not justified.

**D. Assessment of Thermal/Temperature Impacts:**

* 1. Based on new/updated analytical data obtained from the OOC (individual permit application data submitted to RRC) for produced wastewater discharges to the territorial seas that indicated significantly elevated temperature levels (see “Produced Wastewater Data for Territorial Seas Facilities” table above indicating values up to 183 °F), TCEQ performed an assessment on acceptable temperature levels for produced wastewater discharges to the territorial seas. No temperature assessment was performed by EPA in development of the existing TXG260000 NPDES general permit.
  2. In order to determine an acceptable produced wastewater temperature at which the TSWQS will not be exceeded at the maximum discharge volume for produced wastewater to the territorial seas allowed by this draft TPDES general permit (3000 bbl/day), simple, conservative heat-balance calculations were run. The results indicate that temperature limits are not required to ensure TSWQS for temperature are met at the edge of the chronic aquatic life mixing zone. These calculations are based on draft Thermal Evaluation Procedures, which have undergone two revisions based on stakeholder input received from five public meetings as well as initial comments from EPA. Though these procedures are still draft and have not been officially incorporated in the Texas Procedures to Implement the TSWQS (RG-194), in a letter dated April 1, 2020, the EPA agreed to allow their use in development of standard operating procedures (SOPs) to establish permitting controls and conditions for thermal discharges.
  3. The screening approach in the draft Thermal Procedures uses a risk-based approach. Screening procedures progress from simple, conservative analyses to more complex, site-specific approaches as necessary. In this case, the simple, conservative analysis was used. There are two thermal criteria applicable to this draft TPDES general permit - thermal maximum and maximum temperature differential (rise over ambient). The thermal maximum criterion for Segment 2501 is 95 degrees Fahrenheit (F). The maximum differential applicable to Segment 2501 is 4 degrees F September through May, and 1.5 degrees F for June, July, and August. The screening calculations are as follows:
  4. Screening for compliance with Maximum Temperature Criterion:
  5. Equation 1 below compares the maximum temperature at the edge of the chronic aquatic life mixing zone (right side of equation) with the maximum temperature criterion (TC) for Segment 2501 (left side of equation). A permit limit is not usually required when Equation 1 is satisfied (that is, TC> right side of equation).
  6. Equation 1: TC ≥ (EF)(TE) + (1 - EF)(TA)
  7. Where: TC = segment maximum temperature criterion (°F)
  8. EF = effluent fraction at the edge of the aquatic life mixing zone
  9. TE = maximum effluent temperature (°F)
  10. TA = ambient temperature (°F)
  11. The following items explain the variables used in Equation 1:
  12. TC The maximum temperature criterion for the segment is found in Appendix A of the TSWQS.
  13. EF Effluent fraction at the edge of the aquatic life mixing zone as described in the “Mixing Zones and ZIDs for Aquatic Life Protection” in the Procedures to Implement the Texas Surface Water Quality Standards (2010).
  14. TE The effluent temperature is (1) the daily maximum permitted temperature (when evaluating existing limits), (2) the maximum of self-reported temperature data for the months of June, July, and August for the preceding two years of available data (when evaluating the need for a temperature limit when the permit only includes monitoring and reporting requirements), or (3) the expected maximum effluent temperature provided in the permit application.
  15. TA The ambient temperature is initially set at 86.9 °F (30.5 °C), which is the same critical summer temperature used in dissolved oxygen modeling. A site-specific value may be used in lieu of the default temperature by calculating the 90th percentile using ambient temperature data for the months of June, July, and August from the Surface Water Quality Monitoring Information System (SWQMIS) database or other available data.
  16. Screening for compliance with rise over ambient temperature criterion:
  17. Equation 2 below compares the temperature at the edge of the aquatic life mixing zone (right side of equation) with the sum of the ambient temperature (TA) and the rise over ambient temperature criterion (ΔTC) (left side of equation). A permit limit is usually not required when Equation 2 is satisfied (that is, TA + ΔTC > right side of equation).
  18. Equation 2: (TA+ΔTC)≥(EF)(TE)+(1-EF)(TA)
  19. Where: TA = ambient temperature (°F)
  20. ΔTC = rise over ambient temperature criterion (°F)
  21. EF = effluent fraction at the edge of the aquatic life mixing zone
  22. TE = maximum effluent temperature (°F)
  23. The following items explain the variables used in Equation 2:
  24. TA The ambient temperature is initially set at 86.9 °F (30.5 °C), which is the same critical summer temperature used in dissolved oxygen modeling. A site-specific value may be used in lieu of the default temperature by calculating the 90th percentile using ambient temperature data for the months of June, July, and August from the SWQMIS database or other available data.
  25. ΔTC The rise over ambient temperature criteria are found in 30 TAC § 307.4(f). These criteria are water body specific. In this case:
  26. Tidal rivers, bays, and gulf water:
  27. Summer (June, July, and August): 1.5°F
  28. Fall, winter, and spring (September – May): 4°F
  29. EF Effluent fraction at the edge of the aquatic life mixing zone as described in the “Mixing Zones and ZIDs for Aquatic Life Protection” in the Procedures to Implement the Texas Surface Water Quality Standards (2010).
  30. TE The effluent temperature is (1) the daily maximum permitted temperature (when evaluating existing limits), (2) the maximum of self-reported temperature data for the months of June, July, and August for the preceding two years of available data (when evaluating the need for a temperature limit when the permit only includes monitoring and reporting requirements), or (3) the expected maximum effluent temperature provided in the permit application.
  31. Coverage under this draft TPDES general permit will be limited to discharges of up to 3000 barrels/day (bbl/day), equivalent to 0.126 million gallons per day (MGD).
  32. In order to establish ambient water quality values for use in these two thermal evaluation equations, an analysis of data from TCEQ SWQM stations located throughout the Gulf of Mexico was performed to develop values that would represent an approximation of average conditions that could be used in a general permitting approach. A total of 27 SWQM stations were used: some stations had surface-only data, some stations had water-column profile data, and some stations had a mix of both surface data and water-column profile data. The water-column profile samples included a mix of both stratified and unstratified conditions, according to SWQM guidance concerning salinity stratification. Periods of record and quantities of data also varied considerably by station. The data from the SWQM stations was used to obtain the 90th percentile temperature for June, July, and August in accordance with draft Thermal Evaluation Procedures. As a safeguard, additional data for the 90th and 10th percentiles of the lowest winter temperatures were used in the thermal evaluation calculations.
  33. Effluent temperature data from existing facilities that are currently permitted by EPA and/or RRC showed one outlier temperature of 183°F, with the remaining temperatures less than 150°F. The facility reporting the one data point of 183°F was contacted regarding this temperature value. They indicated that this did not appear to be typical and subsequent data obtained from this facility showed temperatures to be less than 150°F.
  34. A range of temperatures was used in the draft Thermal Procedure equations to determine whether the effluent discharged from produced wastewater facilities would violate TSWQS thermal criteria for discharge flows of up to 3000 bbl/day. The most conservative equation in this case was equation 2, rise over ambient. Based on the results of the draft Thermal Evaluation Procedure equations, it was determined that effluent temperatures up to 194°F would meet TSWQS temperature criteria for the Gulf of Mexico in Segment 2501 at the edge of the chronic aquatic life mixing zone. Because 194°F is well above the highest temperatures observed from these produced wastewater discharges, an end-of-pipe effluent temperature limit is not being proposed for this draft TPDES general permit.
  35. Discharges from Stripper Well Facilities, Coastal Facilities, and Territorial Seas Facilities, (with the exception of produced wastewater) are not expected to contain elevated temperature levels, thus no limitations and/or monitoring requirements are proposed in the draft TPDES general permit for these discharges.

1. **Assessment of Bacteria:**

The TSWQS establish bacteria criteria for water in the state. Specifically, 30 TAC § 307.4(j) establishes criteria for pathogens, 30 TAC § 307.7(b)(1) establishes criteria for contact recreation, and 30 TAC § 307.7(b)(3)(B) establishes bacteria criteria for the protection of oyster waters. The discharges of sanitary waste and domestic waste for Coastal Facilities and Territorial Seas Facilities proposed in the draft TPDES general permit have the potential to contain human pathogens and *Enterococci* and Fecal Coliform water quality-based effluent limitations are proposed to control these discharges. 30 TAC § 309.3(h) requires that bacteria effluent limitations be established in TPDES permits for the discharge of domestic wastewater (sanitary waste and domestic waste proposed in the draft TPDES general permit). 30 TAC § 319.9(b) establishes bacteria monitoring frequencies based on permitted flow (for the purpose of this draft TPDES general permit, flows are presumed to be less than 0.1 MGD). The TCEQ is proposing to revise/add to bacteria water quality-based effluent limitations contained in existing EPA General Permit Nos. TXG260000 and TXG330000 for the discharge of domestic waste and sanitary waste.

The discharge of sanitary waste and domestic waste is prohibited from Stripper Well Facilities thus, no bacteria limitations are proposed in the draft TPDES general permit for Stripper Well Facilities.

1. **Assessment of Dissolved Solids:**

30 TAC § 307.4(g)(1) establishes that concentrations of dissolved minerals such as total dissolved solids (TDS) must be maintained such that uses of receiving waters are not impaired. The IP’s (RG-194) (pages 174-186) contain established screening procedures and effluent limitation calculation procedures for the control of TDS for discharges to freshwater bodies. Existing EPA General Permit No. TXG330000 has an established daily maximum water quality-based effluent limitation for Total Dissolved Solids of 3000 mg/L applicable to discharges of produced wastewater from Stripper Well Facilities. Using the IP’s (RG-194) procedures for the minimum TDS screening value of 2500 mg/L to protect freshwater intermittent streams and applying the 2.12 factor to convert from a daily average effluent limitation to daily maximum effluent limitation (2500 mg/L x 2.12 = 5300 mg/L) indicates the existing daily maximum effluent limitation of 3000 mg/L in EPA’s existing TXG330000 is more stringent and is being proposed to be retained in the draft TPDES general permit.

TCEQ has not established numeric TDS standards in the TSWQS for marine water bodies. Nor has EPA established such controls in TXG260000 or TXG330000 for discharges to marine water bodies. The TSWQS establishes narrative criteria for dissolved solids and proper restrictions of impacts of discharges to marine water bodies are established in the draft TPDES general permit. TDS effluent limitations or other requirements are not proposed in the draft TPDES general permit for discharges from Coastal Facilities or Territorial Seas Facilities to marine water bodies.

1. **Whole Effluent Toxicity (WET) Assessment:**

The TSWQS in 30 TAC § 307.6(e) establishes requirements for total toxicity [e.g., whole effluent toxicity (WET)]. This section of the TSWQS establishes WET conditions for both acute and chronic WET. The IPs(RG-194) establish conditions when WET is appropriate or applicable to certain discharges. 30 TAC § 307.6(e)(2)(A) establishes that facilities whose discharges have a significant potential for exerting toxicity in receiving waters as described in the IP’s (RG-194) are required to conduct WET biomonitoring at appropriate dilutions. 30 TAC § 307.6(e)(2)(B) also requires that discharges shall not be acutely toxic to aquatic life, as determined by requiring greater than 50% survival in 100% effluent using a 24-hour acute toxicity test. WET biomonitoring requirements are typically required for continuously flowing discharges or discharges with the potential to exert toxicity in the receiving water body, according to the IP’s(RG-194).

Based on information available to TCEQ, conditions contained in EPA’s existing general permits (TXG260000 and TXG330000), and anti-backsliding requirements established in 40 CFR § 122.44(l), TCEQ has determined that there may be pollutants present in a subset of discharges proposed in the draft TPDES general permit that may have the potential to cause toxic conditions in the receiving water body and are required to be controlled via WET conditions.

Produced wastewater; well treatment, completion, and workover fluids; hydrate control fluids; and contaminated miscellaneous discharges authorized for discharge under this draft TPDES general permit may be continuously flowing and/or have the potential to exert toxicity in the receiving stream. Discharges other than those identified above authorized for discharge under this draft TPDES general permit either are not typically continuously flowing discharges or do not have the potential to exert toxicity in the receiving water body, and the effluent limitations for pollutants of concern in the draft TPDES general permit will preclude toxicity in the water body.

WET limitations proposed in the TPDES general permit differ from those established in EPA’s existing TXG260000 and TXG330000, as follows:

* Contaminated miscellaneous discharges are authorized from Coastal Facilities (with applicable WET limitations and applicable compliance schedules) under the draft TPDES general permit, however they are not authorized in EPA’s existing TXG33000. 24-hour acute WET limitations are established in the draft TPDES general permit to regulate contaminated miscellaneous discharges.
* Produced wastewater and hydrate control fluids for Territorial Seas Facilities discharges include 7-day chronic and 24-hour acute WET limitations as established in EPA’s existing TXG260000. One single 7-day chronic critical dilution (with its associated dilution series) is established in the draft TPDES general permit based on a daily average discharge rate of 3000 bbl/day, where EPA’s existing TXG260000 authorized continually varying WET limitations based on the most recent reported flow in monthly DMRs. Compliance schedules for existing permitted discharges is established.
* WET limitations and associated compliance schedules for the discharge of contaminated miscellaneous discharges from Territorial Seas Facilities are proposed in the draft TPDES general permit for 24-hour acute tests (100% effluent), as opposed to 48-hour acute tests established in EPA’s existing TXG260000 (where 48-hour acute tests include varying dilutions based on varying discharge rate and pipe diameter). This revision is consistent with RG-194 and TCEQ practice where 48-hour acute WET testing is normally reserved for discharges with extremely low dilution percentages that would typically require 7-day chronic WET conditions.
* Well treatment, completion, and workover fluids from Territorial Seas Facilities discharges are proposed to require 24-hour acute WET limitations with associated compliance schedules to replace conditions established in EPA’s existing TXG26000 that prohibit discharges of priority pollutants other than in trace amounts to improve enforceability of the TPDES general permit. EPA’s existing NPDES General Permit No. GMG290000 for discharges from OCS facilities includes conditions requiring industry studies on the discharge of these waste streams and the impacts of these discharges to the Gulf of Mexico for acute toxicity. An industry wide study titled “Final Report: Joint Industry Project Study of Well Treatment, Completion, and Workover Effluents”, submitted by Offshore Operators Committee, September 23, 2021 was reviewed by TCEQ and supports the addition of the 24-hour acute WET limitation. The study indicated discharges of these waste streams are short in duration (median duration of one hour) and small in volume (median 473 barrels). EPA’s draft GMG290000 is proposing 48-hour acute WET limitations at varying dilutions specific to each platform which TCEQ does not support in this general permit and specific conditions established for 24-hour acute WET conditions established in the Texas Surface Water Quality Standards.
* Compliance schedules justification for WET limitations is provided in the response to comments (RTC) prepared for this general permit as a result of publishing the draft general permit to solicit public comments and public comments received following publication.

WET 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 and WET limitations of a subset of discharges proposed for authorization are, therefore, required as conditions of this draft TPDES general permit to control potential toxicity.

1. **Proposed Water Quality-Based Effluent Limitations:**

Water quality-based effluent limitations and monitoring/reporting requirements proposed in the draft TPDES general permit based on the TSWQS are established as follows:

Stripper Well Facilities:

* Produced Wastewater, Well Treatment Fluids, and Workover Fluids

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Total Dissolved Solids | 3000 mg/L | N/A |
| Lethal Whole Effluent Toxicity (WET) limit > 100% (Parameter 51711) *Daphnia pulex* (24-hour acute LC50 1) | > 100% | > 100% |
| Lethal Whole Effluent Toxicity (WET) limit > 100% (Parameter 51714) *Pimephales promelas* (24-hour acute LC50 1) | > 100% | > 100% |

1. The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

2 Should well treatment or workover fluids be discharged with produced wastewater, testing of the effluent on such combined discharges shall occur within the once/six months monitoring frequency.

24-hour acute 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.

Coastal Facilities:

* Domestic Waste

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL |

* Sanitary Waste (M10 and M91M)

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL |

* Contaminated Miscellaneous Discharges

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (LC50 1) | > 100% | > 100% |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (Acute LC50 1) | > 100% | > 100% |

1 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

24-hour acute 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.

Territorial Seas Facilities:

* Produced Wastewater and Hydrate Control Fluids

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Flow (MGD) | N/A | 0.126 MGD |
| Carbonaceous Biochemical Oxygen Demand (5-day) | N/A | 6483 mg/L |
| Ammonia (as N) | N/A | 112 mg/L |
| Temperature | Report, °F | N/A |
| Total Dissolved Solids | Report, mg/L | N/A |
| Total Copper | 0.371 mg/L | 0.175 mg/L |
| Total Manganese | 32.14 mg/L | 15.19 mg/L |
| Total Mercury | Report, mg/L | N/A |
| Total Zinc | 11.57 mg/L | 5.47 mg/L |
| Sublethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (Chronic NOEC 1) | 1.1% | 1.1% |
| Sublethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (Chronic NOEC 1) | 1.1% | 1.1% |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (24-hour acute LC50 2) | > 100% | > 100% |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (24-hour acute LC50 2) | > 100% | > 100% |

1 The NOEC is defined as the greatest effluent dilution at which no significant sublethality is demonstrated. Significant sublethality is defined as a statistically significantly difference between a specified effluent dilution and the control for a sublethal endpoint. The daily maximum limitation established above is a 7-day minimum limitation.

2 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

7-day chronic toxicity tests are required to 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). 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 waste stream discharge. The draft TPDES general permit requires five (5) dilutions in addition to the control (0% effluent) to be used in the toxicity tests. These additional effluent concentrations are 0.5%, 0.6%, 0.8%, 1.1%, and 1.5%. The low-flow effluent concentration (critical dilution) is defined as 1.1% 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. 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 and submittal of an NOC, 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 draft TPDES general 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 draft TPDES general permit to continue quarterly testing for that species until the TPDES general permit is reissued.

24-hour acute 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.

* Well Treatment, Completion, and Workover Fluids

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (24-hour acute LC50 1) | > 100% | > 100% |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (24-hour acute LC50 1) | > 100% | > 100% |

1 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

24-hour acute 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.

* Contaminated Miscellaneous Discharges

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51712) *Menidia beryllina* (LC50 1) | > 100% | > 100% |
| Lethal Whole Effluent Toxicity (WET) limit (Parameter 51713) *Americamysis bahia* (Acute LC50 1) | > 100% | > 100% |

1 The LC50 (Lethal Concentration 50) is defined as the effluent dilution at which 50% of the organisms survive.

24-hour acute 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.

* Domestic Waste

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL |

* Sanitary Waste (M10 and M91M)

| Parameter | Daily Maximum | Daily Average |
| --- | --- | --- |
| Enterococci | 130 cfu or MPN/100 mL | 35 cfu or MPN/100 mL |
| Fecal Coliform | 43 cfu or MPN/100 mL | 14 cfu or MPN/100 mL |

1. **Anti-degradation review:**

Part II, Section B.2(a) and (b) of the draft TPDES general permit addresses discharges prohibited by the Watershed Protection and Edwards Aquifer and Contributing Zone rules related to Stripper Well Facilities. Part II, Section B.4 of the draft TPDES general permit states that the Executive Director may require an application for an individual TPDES permit to authorize a discharge from any activity that will not maintain existing uses of the receiving waters. Part II, Section B.6 of the draft TPDES general permit prohibits new sources or new dischargers of constituents of concern to impaired waters (CWA Section 303(d)-listed water bodies) unless otherwise allowable under 30 TAC Chapter 305. Part II, Section B.7 of the draft TPDES general permit states that the Executive Director may require an applicant to apply for an individual TPDES permit based on conditions of an approved TMDL and TMDL implementation plan. Part II, Section B.8 of the draft TPDES general permit prohibits discharges that would adversely affect a listed endangered or threatened species or its critical habitat. Part II, Section B.15 of the draft TPDES general permit prohibits discharges into areas of biological concern, including marine sanctuaries and live bottom areas. Part II, Section B.16 of the draft TPDES general permit prohibits the discharge of radioactive materials or substances in excess of the amount regulated by 30 TAC Chapter 336. See additional considerations associated with the anti-degradation assessment provided in the TCEQ’s Water Quality Assessment Section interoffice memorandum dated December 29, 2021.

In accordance with 30 TAC §307.5, effective February 7, 2018, and TCEQ’s *IP’s* (RG-194), an antidegradation review of this draft TPDES general permit was performed in order to ensure that no significant degradation of any water in the state will occur and that existing uses will be maintained and protected. It has been preliminarily determined that if the draft TPDES general permit requirements are properly implemented, no significant degradation is expected, and existing uses will be maintained and protected.

# XII. Cooling Water Intake Structure Requirements

* 1. Section § 316(b) of the CWA requires that the location, design, construction and capacity of CWISs reflect the Best Technology Available (BTA) for minimizing Impingement Mortality and Entrainment. EPA promulgated 316(b) Phase III regulations at 40 CFR Part 125, Subpart N, which require new offshore oil and gas facilities (coastal and territorial seas) to take measures to reduce entrainment and impingement of aquatic life. Inland coastal facilities as defined in 40 CFR §435.40(b)(1) and (2) are considered to be offshore for the purposes of applying 316(b) Phase III regulations.
  2. 316(b) Phase III regulations apply to new facilities which intake 2 million gallons per day of water and use at least 25 percent for cooling. Phase III regulations also apply on a BPJ basis to new and existing offshore facilities which use a CWIS but do not meet these minimum threshold requirements. The facilities which are affected by these requirements include: 1) new facilities which are regulated by the Offshore or Coastal Subcategories of the Oil and Gas Extraction Point Source Category Effluent Limitation Guidelines in 40 CFR Part 435 and commenced construction after July 17, 2006; and 2) existing facilities which are regulated by the Offshore or Coastal Subcategories of the Oil and Gas Extraction Point Source Category Effluent Limitation Guidelines in 40 CFR Part 435 and commenced construction on or prior to July 17, 2006. EPA regulations for Cooling Water Intake Structures for New Offshore Oil and Gas Extraction Facilities under Section 316(b) are established in 40 CFR Part 125, Subpart N, Effluent Guidelines and Standards. In general, EPA’s regulations require operators to submit information demonstrating that 316(b) Phase III facilities will be designed so that the water intake velocity is less than 0.5 feet per second and other measures such as screens are employed to reduce entrainment when feasible. Every new or existing offshore oil and gas facility (coastal or territorial seas) which meets the criteria above must comply with the CWIS requirements even when more than one facility (new and/or existing) are working at the same site.
  4. The 316(b) Phase III regulations also require baseline and periodic biological monitoring. Baseline monitoring is required to characterize the biological community which could be impacted by the intake of cooling water. Periodic monitoring is intended to measure the number of organisms and types of species entrained in the system. As proposed, the draft TPDES general permit will require certain 316(b) Phase III facilities to conduct this biological monitoring. Such a study will need to include sufficient detail to demonstrate the intake structure designs are sufficient to minimize impacts due to entrainment and impingement and that no additional measures are warranted.
  5. TCEQ is proposing to expand CWIS requirements in this draft TPDES general permit, as compared to the equivalent existing EPA general permits. EPA’s existing TXG260000 and TXG330000 only applied requirements to new CWIS’s. EPA regulations at 40 CFR § 125.130(c), 40 CFR § 125.90(b), and 40 CFR § 125.91(d) apply to existing and below-threshold offshore oil and gas CWIS’s. TCEQ is proposing to subject these operations to the requirements established in EPA regulations.

# XIII. Monitoring and Reporting

Monitoring is required by 40 CFR § 122.44(i) for each pollutant limited in an NPDES permit to ensure compliance with the permit limitations. The draft TPDES general permit has the following criteria established for monitoring.

* + 1. Samples shall be collected, measurements shall be taken, and visual observations shall be made at times and in a manner so as to be representative of the monitored and/or observed discharge.

B. All samples shall be collected according to the latest edition of "Standard Methods for the Examination of Water and Wastewater" (prepared and published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation), or the EPA’s, "Methods for Chemical Analysis of Water and Wastes" (1979), or the EPA’s, "Biological Field and Laboratory Methods for Measuring the Quality of Surface Waters and Effluents" (1973). The effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition.

C. Sample containers, holding times, and preservation methods shall either follow the requirements specified in 40 CFR Part 136 or the latest edition of “Standard Methods for the Examination of Water and Wastewater.” The effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition.

D. The permittee shall ensure that properly trained and authorized personnel monitor, sample, and as applicable, observe the discharge.

E. The sampling point and observation point (as applicable) must be “downstream” of any treatment unit or treatment technique that is used to improve or otherwise alter the quality of the discharge.

F. Analytical results for determining compliance with effluent limitations shall be submitted online using the NetDMR reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. Permittees that are issued an electronic reporting waiver shall submit analytical results to the TCEQ Enforcement Division (MC-224) on an approved DMR form (EPA No. 3320-1). Effluent sampling shall be conducted in accordance with the monitoring frequencies specified in this draft TPDES general permit. The DMR for any given month shall be due by the 20th day of the following month. The DMR for annual testing must be submitted to TCEQ by March 31st of the following year. All DMRs shall be signed in accordance with the requirements in Part IV.8 of this draft TPDES general permit. If non-compliance with a discharge limitation occurs, the permittee shall provide notification according to Part III.B.6 of this TPDES general permit.

G. All laboratory tests submitted to demonstrate compliance with this draft TPDES general permit must meet the requirements of 30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification. The effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition.

H. Records of monitoring and observation activities shall include:

* 1. date, time, and place of sample, measurement, or observation;
  2. identity of individual who collected the sample, made the measurement, or made the observation;
  3. date and time of laboratory analysis (the effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition);
  4. identity of the individual and laboratory who performed the analysis (the effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition);
  5. the technique or method of analysis (the effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition);
  6. the results of the analysis, measurement, or observation; and
  7. quality assurance/quality control records (the effluent limitations for the observation of free oil, floating solids, foam, and garbage are not subject to this condition).

I. If the permittee monitors any pollutant in a discharge more frequently than required by the draft TPDES general permit using approved analytical methods as specified in Part IV.7 of the draft TPDES general permit, all results of such monitoring shall be included in the calculation and recording of the values on the DMR. Increased frequency of sampling shall be indicated on the DMR.

J. Any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the appropriate TCEQ Regional Office and the Enforcement Division (MC-224) within five working days of becoming aware of the noncompliance.

# XIV. Procedures for Final Decision

* 1. The MOA for the TPDES program between the EPA and TCEQ provides that the EPA has no more than 90 days to comment, object, or make recommendations to the draft TPDES general permit before it is published in the *Texas Register*. According to 30 TAC Chapter 205, *General Permits for Waste Discharges*, when the draft TPDES general permit is proposed, notice shall be published, at a minimum, in at least one newspaper of statewide or regional circulation. The Commission may also publish notice in additional newspapers of statewide or regional circulation. Mailed notice shall also be provided to the following:
* the county judge of the county or counties in which the discharges under the draft TPDES general permit could be located;
* if applicable, state and federal agencies for which notice is required in 40 CFR § 124.10(c);
* persons on a relevant mailing list kept under 30 TAC § 39.407, relating to Mailing Lists; and
* any other person the Executive Director or Chief Clerk may elect to include.
  1. After notice of the draft TPDES general permit is published in the *Texas Register* and the newspaper(s), the public will have 30 days to provide public comment on the draft TPDES general permit.
  2. Any person may request a public meeting on the draft TPDES general permit to the Executive Director before the end of the public comment period. A public meeting will be granted if the Executive Director determines, on the basis of requests, that a significant degree of public interest in the draft TPDES general permit exists. A public meeting is intended for the taking of public comment and is not a contested case proceeding under the Texas Administrative Procedure Act.
  3. If the Executive Director holds a public meeting, the Commission will give notice of the date, time, and place of the meeting, as required by Commission rule. The Executive Director is required to prepare a response to all significant public comments on the draft TPDES general permit raised during the public comment period. The Executive Director is required to make the response available to the public. The draft TPDES general permit will then be filed with the Commission to consider final authorization of the draft TPDES general permit. The Executive Director’s response to public comment is required to be made available to the public and filed with the Chief Clerk at least ten days before the Commission acts on the draft TPDES general permit.

# XV. Administrative Record

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

* + 1. NPDES and TPDES General Permits

NPDES General Permit No. TXG260000 for Discharges from the Offshore Subcategory of the Oil and Gas Extraction Point Source Category to the Territorial Seas effective February 8, 2012.

NPDES General Permit No. TXG330000 for Discharges from the Oil and Gas Extraction Point Source Category to Coastal Waters of Texas and Onshore Stripper Well Category East of the 98th Meridian effective September 11, 2014.

NPDES General Permit No. GMG290000 for New and Existing Sources and New Discharges in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico effective October 1, 2017.

Draft NPDES General Permit No. TXG350000 for Discharges from the Oil and Gas Extraction Point Source Category, Stripper Subcategory in Texas, undated.

TPDES General Permit No. TXG670000 for Hydrostatic Test Discharges effective October 21, 2020.

* + 1. 40 CFR Citations

40 CFR Parts 122, 124, 125, 136, 435, and 437

* + 1. TCEQ Rules

30 TAC Chapters 39, 205, 281, 305, 307, 309, 311, 319, 331, 335, and 336

* + 1. Letters/Memoranda/Records of Communication

Analytical data obtained from the Railroad Commission of Texas for Onshore Stripper Wells Located East of the 98th Meridian for: Market Street Energy (printed 7/19/2018), Sellers Lease Service (printed 1/2/2020), and Sellers Lease Service (printed 1/30/2020).

Letter dated April 1, 2020, from C. Maguire (EPA) to L. Stepney (TCEQ) with attached “Draft Evaluating Thermal Discharges dated July 27, 2017.”

Electronic mail (email) from M. Lutz (J. Conner Consulting, Inc.) to Chris Linendoll (TCEQ) with attached Excel spreadsheet dated May 4, 2021, related to produced wastewater data submitted to RRC for produced wastewater discharges.

Letter dated June 10, 2021, from Greg Southworth, Associate Director, Offshore Operators Committee to Earl Lott, Director, Office of Water, TCEQ.

Letter dated June 17, 2021, from Earl Lott, Director, Office of Water, TCEQ to Greg Southworth, Associate Director, Offshore Operators Committee.

Notice to Oil and Gas Operators, prepared by Texas Railroad Commission of Texas, Oil and Gas Division, dated August 2021.

TCEQ Interoffice Memorandum dated August 10, 2021, from M. Pfeil (Water Quality Assessment Section) to Industrial Permits Team related to barium/manganese marine water quality criteria for development of the TPDES oil and gas general permit.

TCEQ Interoffice Memorandum dated September 15, 2021, from K. Cunningham (Water Quality Assessment Section) to Industrial Permits Team related to critical conditions assessment and CORMIX modeling for development of the TPDES oil and gas general permit.

TCEQ Interoffice Memorandum dated September 17, 2021, from J. Michalk (Water Quality Assessment Section) to Industrial Permits Team related to dissolved oxygen impact assessment for development of the TPDES oil and gas general permit.

TCEQ Interoffice Memorandum dated October 6, 2021, from P. Schaefer (Water Quality Assessment Section) to Industrial Permits Team related to temperature/thermal impact assessment for development of the TPDES oil and gas general permit.

Letter dated November 22, 2021, from Greg Southworth, Associate Director, Offshore Operators Committee to Earl Lott, Director, Office of Water, TCEQ.

TXG310000 Antidegradation Review, Interoffice Memorandum from the Standards Implementation Team to Wastewater Permitting Section dated December 29, 2021.

Letter dated November 14, 2022, from Maria L. Martinez, U.S. EPA Region 6 to Matthew Udenenwu, TCEQ.

Letter dated May 9, 2016, from B. Larsen, U.S. EPA Region 6 to Stephen Robinson, Tradition Resources Offshore LLC.

Letter dated June 8, 2023, from M. Lutz, J. Connor Consulting to Office of Chief Clerk, TCEQ.

* + 1. Miscellaneous

EPA, National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047, November 2002.

EPA, Quality Criteria for Water 1986 (EPA 440/5-86-001)

TCEQ, *Implementation Procedures of the Texas Surface Water Quality Standards*, (RG-194), January 2010.

“Supplemental Information Report to the 2004 Final Impact Statement, New Source NPDES General Permit for Discharges from the Offshore Subcategory of the Oil and Gas Extraction Point Source Category to the Territorial Seas of Texas (Permit No. TXG260000”, September 2011.

Fact Sheet and Supplemental Information for the Proposed Reissuance of the NPDES General Permit for Discharges from the Oil and Gas Extraction Point Source Category to Coastal Waters in Texas (TXG330000), March 7, 2012.

Fact Sheet and Supplemental Information for the Proposed NPDES General Permit for Discharges from the Offshore Subcategory of the Oil and Gas Extraction Point Source Category to the Territorial Seas of Texas (Permit Number TXG260000), October 4, 2011.

Fact Sheet for the Proposed Modification of the NPDES General Permit for Discharges from the Oil and Gas Extraction Point Source Category to Coastal Waters of Texas and Onshore Striper Well Category East of the 98th Meridian (TXG330000), November 6, 2013.

Fact Sheet and Supplemental Information for the Final Reissuance of the NPDES General Permit for New and Existing Sources in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (GMG290000), September 18, 2017.

Draft Fact Sheet and Supplemental Information for the Proposed Reissuance of the NPDES General Permit for Discharges from the Oil and Gas Extraction Point Source Onshore Stripper Well Category in Texas (TXG350000), February 24, 2017.

“Characteristics of Produced Water Discharged to the Gulf of Mexico Hypoxic Zone”, prepared by Environmental Assessment Division Argonne National Laboratory, ANL/EAD/05-3, August 2005.

“OOC Produced Water and Water Based Mud Characterization Study” – Final Report, prepared by Tetra Tech, September 2015.

“Gulf of Mexico Produced Water Bioaccumulation Study”, prepared by Continental Shelf Associates, Inc., April 1997.

Texas Register Publication, 9 TexReg 405, published January 20, 1984, amendments to 31 TAC Section 329.46.

“Barium in Produced Water: Fate and Effects in the Marine Environment”, American Petroleum Institute, September 1995, Publication Number 4633.

CORMIX Model Version 11.0 GTD (Version 11.0.1.0).

CORMIX User Manual (published December 2007 and updated February 2017 by Robert L. Doneker and Gerhard H. Jirka).

TCEQ’s Guidance Manual for Mixing Analyses Using CORMIX (revised on October 2, 2018 by Mark Rudolph, P.E.).

SWQM data for the Gulf of Mexico:  TCEQ Surface Water Quality Monitoring Stations (SWQM) in the Gulf of Mexico (Segment No. 2501).

“Final Report: Joint Industry Project Study of Well Treatment, Completion, and Workover Effluents”, submitted by Offshore Operators Committee, September 23, 2021.

# Appendix A-1: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #1 - INTERMITTENT STREAM

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater Aquatic Life

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/22/2020 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | intermittent stream |
| Segment No: | 0407 |
| TSS (mg/L): | 5 |
| pH (Standards Units) | 5.9 |
| Hardness (mg/L as CaCO3): | 12 |
| Chloride (mg/L): | 15 |
| Effluent Flow for Aquatic Life (MGD) | N/A |
| Critical Low Flow [7Q2] (cfs): | 0 |
| % Effluent for Acute Aquatic Life (ZID): | 100 |

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 | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Arsenic | 5.68 | -0.73 | 147826.36 | 0.575 |  | 1.00 | Assumed |
| Cadmium | 6.60 | -1.13 | 645897.93 | 0.236 |  | 1.00 | Assumed |
| Chromium (total) | 6.52 | -0.93 | 741238.38 | 0.212 |  | 1.00 | Assumed |
| Chromium (trivalent) | 6.52 | -0.93 | 741238.38 | 0.212 |  | 1.00 | Assumed |
| Chromium (hexavalent) | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Copper | 6.02 | -0.74 | 318245.45 | 0.386 |  | 1.00 | Assumed |
| Lead | 6.45 | -0.80 | 777721.31 | 0.205 |  | 1.00 | Assumed |
| Mercury | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Nickel | 5.69 | -0.57 | 195698.32 | 0.505 |  | 1.00 | Assumed |
| Selenium | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Silver | 6.38 | -1.03 | 457152.29 | 0.304 |  | 1.00 | Assumed |
| Zinc | 6.10 | -0.70 | 408057.15 | 0.329 |  | 1.00 | Assumed |

CALCULATE DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR THE PROTECTION OF AQUATIC LIFE:

| ***Parameter*** | ***FW Acute Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***LTAa (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Aldrin | 3.0 | 3.00 | 1.72 | 2.52 | 5.34 |
| Aluminum | 991 | 991 | 568 | 834 | 1765 |
| Arsenic | 340 | 591 | 339 | 498 | 1053 |
| Cadmium | 1.0876735 | 4.60 | 2.64 | 3.87 | 8.19 |
| Carbaryl | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Chlordane | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Chlorpyrifos | 0.083 | 0.0830 | 0.0476 | 0.0699 | 0.147 |
| Chromium (trivalent) | 100.35616 | 472 | 271 | 397 | 841 |
| Chromium (hexavalent) | 15.7 | 15.7 | 9.00 | 13.2 | 27.9 |
| Copper | 1.9264078 | 4.99 | 2.86 | 4.20 | 8.89 |
| Cyanide (free) | 45.8 | 45.8 | 26.2 | 38.5 | 81.6 |
| 4,4'-DDT | 1.1 | 1.10 | 0.630 | 0.926 | 1.96 |
| Demeton | N/A | N/A | N/A | N/A | N/A |
| Diazinon | 0.17 | 0.170 | 0.0974 | 0.143 | 0.302 |
| Dicofol [Kelthane] | 59.3 | 59.3 | 34.0 | 49.9 | 105 |
| Dieldrin | 0.24 | 0.240 | 0.138 | 0.202 | 0.427 |
| Diuron | 210 | 210 | 120 | 176 | 374 |
| Endosulfan I (*alpha*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan II (*beta*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan sulfate | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endrin | 0.086 | 0.0860 | 0.0493 | 0.0724 | 0.153 |
| Guthion [Azinphos Methyl] | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.52 | 0.520 | 0.298 | 0.438 | 0.926 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 1.126 | 1.13 | 0.645 | 0.948 | 2.00 |
| Lead | 6.0408833 | 29.5 | 16.9 | 24.8 | 52.6 |
| Malathion | N/A | N/A | N/A | N/A | N/A |
| Mercury | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Methoxychlor | N/A | N/A | N/A | N/A | N/A |
| Mirex | N/A | N/A | N/A | N/A | N/A |
| Nickel | 77.884661 | 154 | 88.3 | 129 | 274 |
| Nonylphenol | 28 | 28.0 | 16.0 | 23.5 | 49.8 |
| Parathion (ethyl) | 0.065 | 0.0650 | 0.0372 | 0.0547 | 0.115 |
| Pentachlorophenol | 2.8878145 | 2.89 | 1.65 | 2.43 | 5.14 |
| Phenanthrene | 30 | 30.0 | 17.2 | 25.2 | 53.4 |
| Polychlorinated Biphenyls [PCBs] | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Selenium | 20 | 20.0 | 11.5 | 16.8 | 35.6 |
| Silver | 0.8 | 4.83 | 2.77 | 4.07 | 8.61 |
| Toxaphene | 0.78 | 0.780 | 0.447 | 0.657 | 1.38 |
| Tributyltin [TBT] | 0.13 | 0.130 | 0.0745 | 0.109 | 0.231 |
| 2,4,5 Trichlorophenol | 136 | 136 | 77.9 | 114 | 242 |
| Zinc | 19.437726 | 59.1 | 33.9 | 49.7 | 105 |
|  |  |  |  |  |  |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Aldrin | 1.76 | 2.14 |
| Aluminum | 584 | 709 |
| Arsenic | 348 | 423 |
| Cadmium | 2.71 | 3.29 |
| Carbaryl | 1.17 | 1.43 |
| Chlordane | 1.41 | 1.71 |
| Chlorpyrifos | 0.0489 | 0.0594 |
| Chromium (trivalent) | 278 | 338 |
| Chromium (hexavalent) | 9.25 | 11.2 |
| Copper | 2.94 | 3.57 |
| Cyanide (free) | 27.0 | 32.7 |
| 4,4'-DDT | 0.648 | 0.787 |
| Demeton | N/A | N/A |
| Diazinon | 0.100 | 0.121 |
| Dicofol [Kelthane] | 34.9 | 42.4 |
| Dieldrin | 0.141 | 0.171 |
| Diuron | 123 | 150 |
| Endosulfan I (*alpha*) | 0.129 | 0.157 |
| Endosulfan II (*beta*) | 0.129 | 0.157 |
| Endosulfan sulfate | 0.129 | 0.157 |
| Endrin | 0.0507 | 0.0615 |
| Guthion [Azinphos Methyl] | N/A | N/A |
| Heptachlor | 0.306 | 0.372 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.663 | 0.806 |
| Lead | 17.4 | 21.1 |
| Malathion | N/A | N/A |
| Mercury | 1.41 | 1.71 |
| Methoxychlor | N/A | N/A |
| Mirex | N/A | N/A |
| Nickel | 90.8 | 110 |
| Nonylphenol | 16.5 | 20.0 |
| Parathion (ethyl) | 0.0383 | 0.0465 |
| Pentachlorophenol | 1.70 | 2.06 |
| Phenanthrene | 17.6 | 21.4 |
| Polychlorinated Biphenyls [PCBs] | 1.17 | 1.43 |
| Selenium | 11.7 | 14.3 |
| Silver | 2.85 | 3.46 |
| Toxaphene | 0.459 | 0.558 |
| Tributyltin [TBT] | 0.0766 | 0.0930 |
| 2,4,5 Trichlorophenol | 80.1 | 97.3 |
| Zinc | 34.8 | 42.3 |

# Appendix A-2: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #1 - INTERMITTENT STREAM

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater Aquatic Life

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/22/2020 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | intermittent stream |
| Segment No: | 0513 |
| TSS (mg/L): | 5 |
| pH (Standards Units) | 6.1 |
| Hardness (mg/L as CaCO3): | 12 |
| Chloride (mg/L): | 5 |
| Effluent Flow for Aquatic Life (MGD) | N/A |
| Critical Low Flow [7Q2] (cfs): | 0 |
| % Effluent for Acute Aquatic Life (ZID): | 100 |

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 | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Arsenic | 5.68 | -0.73 | 147826.36 | 0.575 |  | 1.00 | Assumed |
| Cadmium | 6.60 | -1.13 | 645897.93 | 0.236 |  | 1.00 | Assumed |
| Chromium (total) | 6.52 | -0.93 | 741238.38 | 0.212 |  | 1.00 | Assumed |
| Chromium (trivalent) | 6.52 | -0.93 | 741238.38 | 0.212 |  | 1.00 | Assumed |
| Chromium (hexavalent) | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Copper | 6.02 | -0.74 | 318245.45 | 0.386 |  | 1.00 | Assumed |
| Lead | 6.45 | -0.80 | 777721.31 | 0.205 |  | 1.00 | Assumed |
| Mercury | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Nickel | 5.69 | -0.57 | 195698.32 | 0.505 |  | 1.00 | Assumed |
| Selenium | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Silver | 6.38 | -1.03 | 457152.29 | 0.304 |  | 1.00 | Assumed |
| Zinc | 6.10 | -0.70 | 408057.15 | 0.329 |  | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***FW Acute Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***LTAa (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Aldrin | 3.0 | 3.00 | 1.72 | 2.52 | 5.34 |
| Aluminum | 991 | 991 | 568 | 834 | 1765 |
| Arsenic | 340 | 591 | 339 | 498 | 1053 |
| Cadmium | 1.0876735 | 4.60 | 2.64 | 3.87 | 8.19 |
| Carbaryl | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Chlordane | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Chlorpyrifos | 0.083 | 0.0830 | 0.0476 | 0.0699 | 0.147 |
| Chromium (trivalent) | 100.35616 | 472 | 271 | 397 | 841 |
| Chromium (hexavalent) | 15.7 | 15.7 | 9.00 | 13.2 | 27.9 |
| Copper | 1.9264078 | 4.99 | 2.86 | 4.20 | 8.89 |
| Cyanide (free) | 45.8 | 45.8 | 26.2 | 38.5 | 81.6 |
| 4,4'-DDT | 1.1 | 1.10 | 0.630 | 0.926 | 1.96 |
| Demeton | N/A | N/A | N/A | N/A | N/A |
| Diazinon | 0.17 | 0.170 | 0.0974 | 0.143 | 0.302 |
| Dicofol [Kelthane] | 59.3 | 59.3 | 34.0 | 49.9 | 105 |
| Dieldrin | 0.24 | 0.240 | 0.138 | 0.202 | 0.427 |
| Diuron | 210 | 210 | 120 | 176 | 374 |
| Endosulfan I (*alpha*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan II (*beta*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan sulfate | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endrin | 0.086 | 0.0860 | 0.0493 | 0.0724 | 0.153 |
| Guthion [Azinphos Methyl] | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.52 | 0.520 | 0.298 | 0.438 | 0.926 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 1.126 | 1.13 | 0.645 | 0.948 | 2.00 |
| Lead | 6.0408833 | 29.5 | 16.9 | 24.8 | 52.6 |
| Malathion | N/A | N/A | N/A | N/A | N/A |
| Mercury | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Methoxychlor | N/A | N/A | N/A | N/A | N/A |
| Mirex | N/A | N/A | N/A | N/A | N/A |
| Nickel | 77.884661 | 154 | 88.3 | 129 | 274 |
| Nonylphenol | 28 | 28.0 | 16.0 | 23.5 | 49.8 |
| Parathion (ethyl) | 0.065 | 0.0650 | 0.0372 | 0.0547 | 0.115 |
| Pentachlorophenol | 3.5307136 | 3.53 | 2.02 | 2.97 | 6.29 |
| Phenanthrene | 30 | 30.0 | 17.2 | 25.2 | 53.4 |
| Polychlorinated Biphenyls [PCBs] | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Selenium | 20 | 20.0 | 11.5 | 16.8 | 35.6 |
| Silver | 0.8 | 3.32 | 1.90 | 2.79 | 5.91 |
| Toxaphene | 0.78 | 0.780 | 0.447 | 0.657 | 1.38 |
| Tributyltin [TBT] | 0.13 | 0.130 | 0.0745 | 0.109 | 0.231 |
| 2,4,5 Trichlorophenol | 136 | 136 | 77.9 | 114 | 242 |
| Zinc | 19.437726 | 59.1 | 33.9 | 49.7 | 105 |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Aldrin | 1.76 | 2.14 |
| Aluminum | 584 | 709 |
| Arsenic | 348 | 423 |
| Cadmium | 2.71 | 3.29 |
| Carbaryl | 1.17 | 1.43 |
| Chlordane | 1.41 | 1.71 |
| Chlorpyrifos | 0.0489 | 0.0594 |
| Chromium (trivalent) | 278 | 338 |
| Chromium (hexavalent) | 9.25 | 11.2 |
| Copper | 2.94 | 3.57 |
| Cyanide (free) | 27.0 | 32.7 |
| 4,4'-DDT | 0.648 | 0.787 |
| Demeton | N/A | N/A |
| Diazinon | 0.100 | 0.121 |
| Dicofol [Kelthane] | 34.9 | 42.4 |
| Dieldrin | 0.141 | 0.171 |
| Diuron | 123 | 150 |
| Endosulfan I (*alpha*) | 0.129 | 0.157 |
| Endosulfan II (*beta*) | 0.129 | 0.157 |
| Endosulfan sulfate | 0.129 | 0.157 |
| Endrin | 0.0507 | 0.0615 |
| Guthion [Azinphos Methyl] | N/A | N/A |
| Heptachlor | 0.306 | 0.372 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.663 | 0.806 |
| Lead | 17.4 | 21.1 |
| Malathion | N/A | N/A |
| Mercury | 1.41 | 1.71 |
| Methoxychlor | N/A | N/A |
| Mirex | N/A | N/A |
| Nickel | 90.8 | 110 |
| Nonylphenol | 16.5 | 20.0 |
| Parathion (ethyl) | 0.0383 | 0.0465 |
| Pentachlorophenol | 2.08 | 2.52 |
| Phenanthrene | 17.6 | 21.4 |
| Polychlorinated Biphenyls [PCBs] | 1.17 | 1.43 |
| Selenium | 11.7 | 14.3 |
| Silver | 1.95 | 2.37 |
| Toxaphene | 0.459 | 0.558 |
| Tributyltin [TBT] | 0.0766 | 0.0930 |
| 2,4,5 Trichlorophenol | 80.1 | 97.3 |
| Zinc | 34.8 | 42.3 |

# Appendix A-3: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #1 - INTERMITTENT STREAM

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater Aquatic Life

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/22/2020 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | intermittent stream |
| Segment No: | 0614 |
| TSS (mg/L): | 1 |
| pH (Standards Units) | 7.1 |
| Hardness (mg/L as CaCO3): | 27 |
| Chloride (mg/L): | 7 |
| Effluent Flow for Aquatic Life (MGD) | N/A |
| Critical Low Flow [7Q2] (cfs): | 0 |
| % Effluent for Acute Aquatic Life (ZID): | 100 |

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 | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Arsenic | 5.68 | -0.73 | 478630.09 | 0.676 |  | 1.00 | Assumed |
| Cadmium | 6.60 | -1.13 | 3981071.71 | 0.201 |  | 1.00 | Assumed |
| Chromium (total) | 6.52 | -0.93 | 3311311.21 | 0.232 |  | 1.00 | Assumed |
| Chromium (trivalent) | 6.52 | -0.93 | 3311311.21 | 0.232 |  | 1.00 | Assumed |
| Chromium (hexavalent) | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Copper | 6.02 | -0.74 | 1047128.55 | 0.488 |  | 1.00 | Assumed |
| Lead | 6.45 | -0.80 | 2818382.93 | 0.262 |  | 1.00 | Assumed |
| Mercury | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Nickel | 5.69 | -0.57 | 489778.82 | 0.671 |  | 1.00 | Assumed |
| Selenium | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Silver | 6.38 | -1.03 | 2398832.92 | 0.294 |  | 1.00 | Assumed |
| Zinc | 6.10 | -0.70 | 1258925.41 | 0.443 |  | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***FW Acute Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***LTAa (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Aldrin | 3.0 | 3.00 | 1.72 | 2.52 | 5.34 |
| Aluminum | 991 | 991 | 568 | 834 | 1765 |
| Arsenic | 340 | 503 | 288 | 423 | 895 |
| Cadmium | 2.398942 | 11.9 | 6.85 | 10.0 | 21.2 |
| Carbaryl | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Chlordane | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Chlorpyrifos | 0.083 | 0.0830 | 0.0476 | 0.0699 | 0.147 |
| Chromium (trivalent) | 194.9762 | 841 | 482 | 708 | 1497 |
| Chromium (hexavalent) | 15.7 | 15.7 | 9.00 | 13.2 | 27.9 |
| Copper | 4.135944 | 8.47 | 4.85 | 7.13 | 15.0 |
| Cyanide (free) | 45.8 | 45.8 | 26.2 | 38.5 | 81.6 |
| 4,4'-DDT | 1.1 | 1.10 | 0.630 | 0.926 | 1.96 |
| Demeton | N/A | N/A | N/A | N/A | N/A |
| Diazinon | 0.17 | 0.170 | 0.0974 | 0.143 | 0.302 |
| Dicofol [Kelthane] | 59.3 | 59.3 | 34.0 | 49.9 | 105 |
| Dieldrin | 0.24 | 0.240 | 0.138 | 0.202 | 0.427 |
| Diuron | 210 | 210 | 120 | 176 | 374 |
| Endosulfan I (*alpha*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan II (*beta*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan sulfate | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endrin | 0.086 | 0.0860 | 0.0493 | 0.0724 | 0.153 |
| Guthion [Azinphos Methyl] | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.52 | 0.520 | 0.298 | 0.438 | 0.926 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 1.126 | 1.13 | 0.645 | 0.948 | 2.00 |
| Lead | 15.13817 | 57.8 | 33.1 | 48.6 | 103 |
| Malathion | N/A | N/A | N/A | N/A | N/A |
| Mercury | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Methoxychlor | N/A | N/A | N/A | N/A | N/A |
| Mirex | N/A | N/A | N/A | N/A | N/A |
| Nickel | 154.6672 | 230 | 132 | 194 | 410 |
| Nonylphenol | 28 | 28.0 | 16.0 | 23.5 | 49.8 |
| Parathion (ethyl) | 0.065 | 0.0650 | 0.0372 | 0.0547 | 0.115 |
| Pentachlorophenol | 9.645582 | 9.65 | 5.53 | 8.12 | 17.1 |
| Phenanthrene | 30 | 30.0 | 17.2 | 25.2 | 53.4 |
| Polychlorinated Biphenyls [PCBs] | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Selenium | 20 | 20.0 | 11.5 | 16.8 | 35.6 |
| Silver | 0.8 | 3.73 | 2.14 | 3.13 | 6.64 |
| Toxaphene | 0.78 | 0.780 | 0.447 | 0.657 | 1.38 |
| Tributyltin [TBT] | 0.13 | 0.130 | 0.0745 | 0.109 | 0.231 |
| 2,4,5 Trichlorophenol | 136 | 136 | 77.9 | 114 | 242 |
| Zinc | 38.64112 | 87.3 | 50.0 | 73.5 | 155 |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Aldrin | 1.76 | 2.14 |
| Aluminum | 584 | 709 |
| Arsenic | 296 | 359 |
| Cadmium | 7.04 | 8.55 |
| Carbaryl | 1.17 | 1.43 |
| Chlordane | 1.41 | 1.71 |
| Chlorpyrifos | 0.0489 | 0.0594 |
| Chromium (trivalent) | 495 | 601 |
| Chromium (hexavalent) | 9.25 | 11.2 |
| Copper | 4.99 | 6.06 |
| Cyanide (free) | 27.0 | 32.7 |
| 4,4'-DDT | 0.648 | 0.787 |
| Demeton | N/A | N/A |
| Diazinon | 0.100 | 0.121 |
| Dicofol [Kelthane] | 34.9 | 42.4 |
| Dieldrin | 0.141 | 0.171 |
| Diuron | 123 | 150 |
| Endosulfan I (*alpha*) | 0.129 | 0.157 |
| Endosulfan II (*beta*) | 0.129 | 0.157 |
| Endosulfan sulfate | 0.129 | 0.157 |
| Endrin | 0.0507 | 0.0615 |
| Guthion [Azinphos Methyl] | N/A | N/A |
| Heptachlor | 0.306 | 0.372 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.663 | 0.806 |
| Lead | 34.0 | 41.3 |
| Malathion | N/A | N/A |
| Mercury | 1.41 | 1.71 |
| Methoxychlor | N/A | N/A |
| Mirex | N/A | N/A |
| Nickel | 135 | 164 |
| Nonylphenol | 16.5 | 20.0 |
| Parathion (ethyl) | 0.0383 | 0.0465 |
| Pentachlorophenol | 5.68 | 6.90 |
| Phenanthrene | 17.6 | 21.4 |
| Polychlorinated Biphenyls [PCBs] | 1.17 | 1.43 |
| Selenium | 11.7 | 14.3 |
| Silver | 2.19 | 2.66 |
| Toxaphene | 0.459 | 0.558 |
| Tributyltin [TBT] | 0.0766 | 0.0930 |
| 2,4,5 Trichlorophenol | 80.1 | 97.3 |
| Zinc | 51.4 | 62.4 |

# Appendix A-4: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #1 - INTERMITTENT STREAM

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Freshwater Aquatic Life

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/22/2020 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | intermittent stream |
| Segment No: | 0804 |
| TSS (mg/L): | 41 |
| pH (Standards Units) | 7.2 |
| Hardness (mg/L as CaCO3): | 122 |
| Chloride (mg/L): | 42 |
| Effluent Flow for Aquatic Life (MGD) | N/A |
| Critical Low Flow [7Q2] (cfs): | 0 |
| % Effluent for Acute Aquatic Life (ZID): | 100 |

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 | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Arsenic | 5.68 | -0.73 | 31817.63 | 0.434 |  | 1.00 | Assumed |
| Cadmium | 6.60 | -1.13 | 59917.58 | 0.289 |  | 1.00 | Assumed |
| Chromium (total) | 6.52 | -0.93 | 104739.62 | 0.189 |  | 1.00 | Assumed |
| Chromium (trivalent) | 6.52 | -0.93 | 104739.62 | 0.189 |  | 1.00 | Assumed |
| Chromium (hexavalent) | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Copper | 6.02 | -0.74 | 67071.80 | 0.267 |  | 1.00 | Assumed |
| Lead | 6.45 | -0.80 | 144468.42 | 0.144 |  | 1.00 | Assumed |
| Mercury | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Nickel | 5.69 | -0.57 | 58981.15 | 0.293 |  | 1.00 | Assumed |
| Selenium | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Silver | 6.38 | -1.03 | 52339.87 | 0.318 |  | 1.00 | Assumed |
| Zinc | 6.10 | -0.70 | 93551.62 | 0.207 |  | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***FW Acute Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***LTAa (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Aldrin | 3.0 | 3.00 | 1.72 | 2.52 | 5.34 |
| Aluminum | 991 | 991 | 568 | 834 | 1765 |
| Arsenic | 340 | 784 | 449 | 659 | 1396 |
| Cadmium | 10.4123 | 36.0 | 20.6 | 30.3 | 64.1 |
| Carbaryl | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Chlordane | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Chlorpyrifos | 0.083 | 0.0830 | 0.0476 | 0.0699 | 0.147 |
| Chromium (trivalent) | 670.5379 | 3550 | 2034 | 2990 | 6326 |
| Chromium (hexavalent) | 15.7 | 15.7 | 9.00 | 13.2 | 27.9 |
| Copper | 17.12821 | 64.2 | 36.8 | 54.1 | 114 |
| Cyanide (free) | 45.8 | 45.8 | 26.2 | 38.5 | 81.6 |
| 4,4'-DDT | 1.1 | 1.10 | 0.630 | 0.926 | 1.96 |
| Demeton | N/A | N/A | N/A | N/A | N/A |
| Diazinon | 0.17 | 0.170 | 0.0974 | 0.143 | 0.302 |
| Dicofol [Kelthane] | 59.3 | 59.3 | 34.0 | 49.9 | 105 |
| Dieldrin | 0.24 | 0.240 | 0.138 | 0.202 | 0.427 |
| Diuron | 210 | 210 | 120 | 176 | 374 |
| Endosulfan I (*alpha*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan II (*beta*) | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endosulfan sulfate | 0.22 | 0.220 | 0.126 | 0.185 | 0.392 |
| Endrin | 0.086 | 0.0860 | 0.0493 | 0.0724 | 0.153 |
| Guthion [Azinphos Methyl] | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.52 | 0.520 | 0.298 | 0.438 | 0.926 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 1.126 | 1.13 | 0.645 | 0.948 | 2.00 |
| Lead | 80.13757 | 555 | 318 | 467 | 988 |
| Malathion | N/A | N/A | N/A | N/A | N/A |
| Mercury | 2.4 | 2.40 | 1.38 | 2.02 | 4.27 |
| Methoxychlor | N/A | N/A | N/A | N/A | N/A |
| Mirex | N/A | N/A | N/A | N/A | N/A |
| Nickel | 554.0195 | 1894 | 1085 | 1595 | 3374 |
| Nonylphenol | 28 | 28.0 | 16.0 | 23.5 | 49.8 |
| Parathion (ethyl) | 0.065 | 0.0650 | 0.0372 | 0.0547 | 0.115 |
| Pentachlorophenol | 10.66535 | 10.7 | 6.11 | 8.98 | 19.0 |
| Phenanthrene | 30 | 30.0 | 17.2 | 25.2 | 53.4 |
| Polychlorinated Biphenyls [PCBs] | 2.0 | 2.00 | 1.15 | 1.68 | 3.56 |
| Selenium | 20 | 20.0 | 11.5 | 16.8 | 35.6 |
| Silver | 0.8 | 9.42 | 5.40 | 7.93 | 16.7 |
| Toxaphene | 0.78 | 0.780 | 0.447 | 0.657 | 1.38 |
| Tributyltin [TBT] | 0.13 | 0.130 | 0.0745 | 0.109 | 0.231 |
| 2,4,5 Trichlorophenol | 136 | 136 | 77.9 | 114 | 242 |
| Zinc | 138.6845 | 671 | 384 | 564 | 1195 |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Aldrin | 1.76 | 2.14 |
| Aluminum | 584 | 709 |
| Arsenic | 461 | 560 |
| Cadmium | 21.2 | 25.7 |
| Carbaryl | 1.17 | 1.43 |
| Chlordane | 1.41 | 1.71 |
| Chlorpyrifos | 0.0489 | 0.0594 |
| Chromium (trivalent) | 2093 | 2541 |
| Chromium (hexavalent) | 9.25 | 11.2 |
| Copper | 37.8 | 45.9 |
| Cyanide (free) | 27.0 | 32.7 |
| 4,4'-DDT | 0.648 | 0.787 |
| Demeton | N/A | N/A |
| Diazinon | 0.100 | 0.121 |
| Dicofol [Kelthane] | 34.9 | 42.4 |
| Dieldrin | 0.141 | 0.171 |
| Diuron | 123 | 150 |
| Endosulfan I (*alpha*) | 0.129 | 0.157 |
| Endosulfan II (*beta*) | 0.129 | 0.157 |
| Endosulfan sulfate | 0.129 | 0.157 |
| Endrin | 0.0507 | 0.0615 |
| Guthion [Azinphos Methyl] | N/A | N/A |
| Heptachlor | 0.306 | 0.372 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.663 | 0.806 |
| Lead | 327 | 397 |
| Malathion | N/A | N/A |
| Mercury | 1.41 | 1.71 |
| Methoxychlor | N/A | N/A |
| Mirex | N/A | N/A |
| Nickel | 1116 | 1355 |
| Nonylphenol | 16.5 | 20.0 |
| Parathion (ethyl) | 0.0383 | 0.0465 |
| Pentachlorophenol | 6.28 | 7.63 |
| Phenanthrene | 17.6 | 21.4 |
| Polychlorinated Biphenyls [PCBs] | 1.17 | 1.43 |
| Selenium | 11.7 | 14.3 |
| Silver | 5.55 | 6.74 |
| Toxaphene | 0.459 | 0.558 |
| Tributyltin [TBT] | 0.0766 | 0.0930 |
| 2,4,5 Trichlorophenol | 80.1 | 97.3 |
| Zinc | 395 | 480 |

**Appendix B: Water Quality-Based Effluent Limitations Calculations**

TEXTOX MENU #5 - 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 Saltwater Aquatic Life

Table 2, 2018 Texas Surface Water Quality Standards for Human Health

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

**PERMIT INFORMATION**

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/22/2020 |

**DISCHARGE INFORMATION**

|  |  |
| --- | --- |
| Receiving Waterbody: | Sabine River Tidal |
| Segment No: | 0501 |
| TSS (mg/L): | 6 |
| Effluent Flow for Aquatic Life (MGD) | <10 |
| % Effluent for Chronic Aquatic Life (Mixing Zone): | 8 |
| % Effluent for Acute Aquatic Life (ZID): | 30 |
| Oyster Waters? | **No** |
| Effluent Flow for Human Health (MGD): | <10 |
| % Effluent for Human Health: | 4 |

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 | 19486.38 | 0.895 |  | 1.00 | Assumed |
| Lead | 6.06 | -0.85 | 250363.74 | 0.400 |  | 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 | 192383.61 | 0.464 |  | 1.00 | Assumed |
| Zinc | 5.36 | -0.52 | 90232.16 | 0.649 |  | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***SW Acute Criterion (µg/L)*** | ***SW Chronic Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***WLAc (µg/L)*** | ***LTAa (µg/L)*** | ***LTAc (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Acrolein | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Aldrin | 1.3 | N/A | 4.33 | N/A | 1.39 | N/A | 2.03 | 4.31 |
| Aluminum | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Arsenic | 149 | 78 | 497 | 975 | 159 | 595 | 233 | 494 |
| Cadmium | 40.0 | 8.75 | 133 | 109 | 42.7 | 66.7 | 62.7 | 132 |
| Carbaryl | 613 | N/A | 2043 | N/A | 654 | N/A | 961 | 2033 |
| Chlordane | 0.09 | 0.004 | 0.300 | 0.0500 | 0.0960 | 0.0305 | 0.0448 | 0.0948 |
| Chlorpyrifos | 0.011 | 0.006 | 0.0367 | 0.0750 | 0.0117 | 0.0458 | 0.0172 | 0.0364 |
| Chromium (trivalent) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Chromium (hexavalent) | 1090 | 49.6 | 3633 | 620 | 1163 | 378 | 555 | 1176 |
| Copper | 13.5 | 3.6 | 50.3 | 50.3 | 16.1 | 30.7 | 23.6 | 50.0 |
| Copper (oyster waters) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Cyanide (free) | 5.6 | 5.6 | 18.7 | 70.0 | 5.97 | 42.7 | 8.78 | 18.5 |
| 4,4'-DDT | 0.13 | 0.001 | 0.433 | 0.0125 | 0.139 | 0.00763 | 0.0112 | 0.0237 |
| Demeton | N/A | 0.1 | N/A | 1.25 | N/A | 0.763 | 1.12 | 2.37 |
| Diazinon | 0.819 | 0.819 | 2.73 | 10.2 | 0.874 | 6.24 | 1.28 | 2.71 |
| Dicofol [Kelthane] | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dieldrin | 0.71 | 0.002 | 2.37 | 0.0250 | 0.757 | 0.0153 | 0.0224 | 0.0474 |
| Diuron | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Endosulfan I (*alpha*) | 0.034 | 0.009 | 0.113 | 0.113 | 0.0363 | 0.0686 | 0.0533 | 0.112 |
| Endosulfan II (*beta*) | 0.034 | 0.009 | 0.113 | 0.113 | 0.0363 | 0.0686 | 0.0533 | 0.112 |
| Endosulfan sulfate | 0.034 | 0.009 | 0.113 | 0.113 | 0.0363 | 0.0686 | 0.0533 | 0.112 |
| Endrin | 0.037 | 0.002 | 0.123 | 0.0250 | 0.0395 | 0.0153 | 0.0224 | 0.0474 |
| Guthion [Azinphos Methyl] | N/A | 0.01 | N/A | 0.125 | N/A | 0.0763 | 0.112 | 0.237 |
| Heptachlor | 0.053 | 0.004 | 0.177 | 0.0500 | 0.0565 | 0.0305 | 0.0448 | 0.0948 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.16 | N/A | 0.533 | N/A | 0.171 | N/A | 0.250 | 0.530 |
| Lead | 133 | 5.3 | 1109 | 166 | 355 | 101 | 148 | 314 |
| Malathion | N/A | 0.01 | N/A | 0.125 | N/A | 0.0763 | 0.112 | 0.237 |
| Mercury | 2.1 | 1.1 | 7.00 | 13.8 | 2.24 | 8.39 | 3.29 | 6.96 |
| Methoxychlor | N/A | 0.03 | N/A | 0.375 | N/A | 0.229 | 0.336 | 0.711 |
| Mirex | N/A | 0.001 | N/A | 0.0125 | N/A | 0.00763 | 0.0112 | 0.0237 |
| Nickel | 118 | 13.1 | 393 | 164 | 126 | 99.9 | 146 | 310 |
| Nonylphenol | 7 | 1.7 | 23.3 | 21.3 | 7.47 | 13.0 | 10.9 | 23.2 |
| Parathion (ethyl) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Pentachlorophenol | 15.1 | 9.6 | 50.3 | 120 | 16.1 | 73.2 | 23.6 | 50.0 |
| Phenanthrene | 7.7 | 4.6 | 25.7 | 57.5 | 8.21 | 35.1 | 12.0 | 25.5 |
| Polychlorinated Biphenyls [PCBs] | 10 | 0.03 | 33.3 | 0.375 | 10.7 | 0.229 | 0.336 | 0.711 |
| Selenium | 564 | 136 | 1880 | 1700 | 602 | 1037 | 884 | 1870 |
| Silver | 2 | N/A | 14.4 | N/A | 4.60 | N/A | 6.75 | 14.2 |
| Toxaphene | 0.21 | 0.0002 | 0.700 | 0.00250 | 0.224 | 0.00153 | 0.00224 | 0.00474 |
| Tributyltin [TBT] | 0.24 | 0.0074 | 0.800 | 0.0925 | 0.256 | 0.0564 | 0.0829 | 0.175 |
| 2,4,5 Trichlorophenol | 259 | 12 | 863 | 150 | 276 | 91.5 | 134 | 284 |
| Zinc | 92.7 | 84.2 | 476 | 1622 | 152 | 990 | 224 | 474 |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR HUMAN HEALTH PROTECTION:

| ***Parameter*** | ***Fish Only Criterion (µg/L)*** | ***WLAh (µg/L)*** | ***LTAh (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Acrylonitrile | 115 | 2875 | 2674 | 3930 | 8315 |
| Aldrin | 1.147E-05 | 0.000287 | 0.000267 | 0.000392 | 0.000829 |
| Anthracene | 1317 | 32925 | 30620 | 45011 | 95228 |
| 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 | 42010 |
| Benzidine | 0.107 | 2.68 | 2.49 | 3.65 | 7.73 |
| Benzo(*a*)anthracene | 0.025 | 0.625 | 0.581 | 0.854 | 1.80 |
| Benzo(*a*)pyrene | 0.0025 | 0.0625 | 0.0581 | 0.0854 | 0.180 |
| Bis(chloromethyl)ether | 0.2745 | 6.86 | 6.38 | 9.38 | 19.8 |
| Bis(2-chloroethyl)ether | 42.83 | 1071 | 996 | 1463 | 3096 |
| Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate] | 7.55 | 189 | 176 | 258 | 545 |
| Bromodichloromethane [Dichlorobromomethane] | 275 | 6875 | 6394 | 9398 | 19884 |
| Bromoform [Tribromomethane] | 1060 | 26500 | 24645 | 36228 | 76645 |
| Cadmium | N/A | N/A | N/A | N/A | N/A |
| Carbon Tetrachloride | 46 | 1150 | 1070 | 1572 | 3326 |
| Chlordane | 0.0025 | 0.0625 | 0.0581 | 0.0854 | 0.180 |
| Chlorobenzene | 2737 | 68425 | 63635 | 93543 | 197905 |
| Chlorodibromomethane [Dibromochloromethane] | 183 | 4575 | 4255 | 6254 | 13232 |
| Chloroform [Trichloromethane] | 7697 | 192425 | 178955 | 263064 | 556550 |
| Chromium (hexavalent) | 502 | 12550 | 11672 | 17157 | 36298 |
| Chrysene | 2.52 | 63.0 | 58.6 | 86.1 | 182 |
| Cresols [Methylphenols] | 9301 | 232525 | 216248 | 317884 | 672532 |
| Cyanide (free) | N/A | N/A | N/A | N/A | N/A |
| 4,4'-DDD | 0.002 | 0.0500 | 0.0465 | 0.0683 | 0.144 |
| 4,4'-DDE | 0.00013 | 0.00325 | 0.00302 | 0.00444 | 0.00939 |
| 4,4'-DDT | 0.0004 | 0.0100 | 0.00930 | 0.0136 | 0.0289 |
| 2,4'-D | N/A | N/A | N/A | N/A | N/A |
| Danitol [Fenpropathrin] | 473 | 11825 | 10997 | 16165 | 34201 |
| 1,2-Dibromoethane [Ethylene Dibromide] | 4.24 | 106 | 98.6 | 144 | 306 |
| *m*-Dichlorobenzene [1,3-Dichlorobenzene] | 595 | 14875 | 13834 | 20335 | 43022 |
| *o*-Dichlorobenzene [1,2-Dichlorobenzene] | 3299 | 82475 | 76702 | 112751 | 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 | 76.5 | 161 |
| 1,2-Dichloroethane | 364 | 9100 | 8463 | 12440 | 26319 |
| 1,1-Dichloroethylene [1,1-Dichloroethene] | 55114 | 1377850 | 1281401 | 1883658 | 3985155 |
| Dichloromethane [Methylene Chloride] | 13333 | 333325 | 309992 | 455688 | 964075 |
| 1,2-Dichloropropane | 259 | 6475 | 6022 | 8851 | 18727 |
| 1,3-Dichloropropene [1,3-Dichloropropylene] | 119 | 2975 | 2767 | 4067 | 8604 |
| Dicofol [Kelthane] | 0.30 | 7.50 | 6.98 | 10.2 | 21.6 |
| Dieldrin | 2.0E-05 | 0.000500 | 0.000465 | 0.000683 | 0.00144 |
| 2,4-Dimethylphenol | 8436 | 210900 | 196137 | 288321 | 609986 |
| Di-*n*-Butyl Phthalate | 92.4 | 2310 | 2148 | 3158 | 6681 |
| Dioxins/Furans [TCDD Equivalents] | 7.97E-08 | 0.0000020 | 0.0000019 | 0.0000027 | 0.0000058 |
| Endrin | 0.02 | 0.500 | 0.465 | 0.683 | 1.44 |
| Epichlorohydrin | 2013 | 50325 | 46802 | 68799 | 145554 |
| Ethylbenzene | 1867 | 46675 | 43408 | 63809 | 134998 |
| Ethylene Glycol | 1.68E+07 | 420000000 | 390600000 | 574182000 | 1214766000 |
| Fluoride | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.0001 | 0.00250 | 0.00233 | 0.00341 | 0.00723 |
| Heptachlor Epoxide | 0.00029 | 0.00725 | 0.00674 | 0.00991 | 0.0209 |
| Hexachlorobenzene | 0.00068 | 0.0170 | 0.0158 | 0.0232 | 0.0491 |
| Hexachlorobutadiene | 0.22 | 5.50 | 5.12 | 7.51 | 15.9 |
| Hexachlorocyclohexane (*alpha*) | 0.0084 | 0.210 | 0.195 | 0.287 | 0.607 |
| Hexachlorocyclohexane (*beta*) | 0.26 | 6.50 | 6.05 | 8.88 | 18.7 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.341 | 8.53 | 7.93 | 11.6 | 24.6 |
| Hexachlorocyclopentadiene | 11.6 | 290 | 270 | 396 | 838 |
| Hexachloroethane | 2.33 | 58.3 | 54.2 | 79.6 | 168 |
| Hexachlorophene | 2.90 | 72.5 | 67.4 | 99.1 | 209 |
| 4,4'-Isopropylidenediphenol [Bisphenol A] | 15982 | 399550 | 371582 | 546224 | 1155618 |
| Lead | 3.83 | 240 | 223 | 327 | 692 |
| Mercury | 0.0250 | 0.625 | 0.581 | 0.854 | 1.80 |
| Methoxychlor | 3.0 | 75.0 | 69.8 | 102 | 216 |
| Methyl Ethyl Ketone | 9.92E+05 | 24800000 | 23064000 | 33904080 | 71729040 |
| Methyl *tert*-butyl ether [MTBE] | 10482 | 262050 | 243707 | 358248 | 757927 |
| Nickel | 1140 | 28500 | 26505 | 38962 | 82430 |
| Nitrate-Nitrogen (as Total Nitrogen) | N/A | N/A | N/A | N/A | N/A |
| Nitrobenzene | 1873 | 46825 | 43547 | 64014 | 135431 |
| N-Nitrosodiethylamine | 2.1 | 52.5 | 48.8 | 71.7 | 151 |
| N-Nitroso-di-*n*-Butylamine | 4.2 | 105 | 97.7 | 143 | 303 |
| Pentachlorobenzene | 0.355 | 8.88 | 8.25 | 12.1 | 25.6 |
| Pentachlorophenol | 0.29 | 7.25 | 6.74 | 9.91 | 20.9 |
| Polychlorinated Biphenyls [PCBs] | 6.4E-04 | 0.0160 | 0.0149 | 0.0218 | 0.0462 |
| 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 | 17.3 |
| 1,1,2,2-Tetrachloroethane | 26.35 | 659 | 613 | 900 | 1905 |
| Tetrachloroethylene [Tetrachloroethylene] | 280 | 7000 | 6510 | 9569 | 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 | 0.375 | 0.795 |
| 2,4,5-TP [Silvex] | 369 | 9225 | 8579 | 12611 | 26681 |
| 1,1,1-Trichloroethane | 784354 | 19608850 | 18236231 | 26807258 | 56714676 |
| 1,1,2-Trichloroethane | 166 | 4150 | 3860 | 5673 | 12003 |
| Trichloroethylene [Trichloroethene] | 71.9 | 1798 | 1672 | 2457 | 5198 |
| 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 | 563 | 1193 |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Acrolein | N/A | N/A |
| Aldrin | 1.42 | 1.73 |
| Aluminum | N/A | N/A |
| Arsenic | 163 | 198 |
| Cadmium | 43.9 | 53.3 |
| Carbaryl | 672 | 817 |
| Chlordane | 0.0313 | 0.0381 |
| Chlorpyrifos | 0.0120 | 0.0146 |
| Chromium (trivalent) | N/A | N/A |
| Chromium (hexavalent) | 389 | 472 |
| Copper | 16.5 | 20.0 |
| Copper (oyster waters) | N/A | N/A |
| Cyanide (free) | 6.14 | 7.46 |
| 4,4'-DDT | 0.00784 | 0.00952 |
| Demeton | 0.784 | 0.952 |
| Diazinon | 0.898 | 1.09 |
| Dicofol [Kelthane] | N/A | N/A |
| Dieldrin | 0.0156 | 0.0190 |
| Diuron | N/A | N/A |
| Endosulfan I (*alpha*) | 0.0373 | 0.0453 |
| Endosulfan II (*beta*) | 0.0373 | 0.0453 |
| Endosulfan sulfate | 0.0373 | 0.0453 |
| Endrin | 0.0156 | 0.0190 |
| Guthion [Azinphos Methyl] | 0.0784 | 0.0952 |
| Heptachlor | 0.0313 | 0.0381 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.175 | 0.213 |
| Lead | 104 | 126 |
| Malathion | 0.0784 | 0.0952 |
| Mercury | 2.30 | 2.79 |
| Methoxychlor | 0.235 | 0.285 |
| Mirex | 0.00784 | 0.00952 |
| Nickel | 102 | 124 |
| Nonylphenol | 7.68 | 9.32 |
| Parathion (ethyl) | N/A | N/A |
| Pentachlorophenol | 16.5 | 20.1 |
| Phenanthrene | 8.45 | 10.2 |
| Polychlorinated Biphenyls [PCBs] | 0.235 | 0.285 |
| Selenium | 619 | 751 |
| Silver | 4.72 | 5.74 |
| Toxaphene | 0.00156 | 0.00190 |
| Tributyltin [TBT] | 0.0580 | 0.0705 |
| 2,4,5 Trichlorophenol | 94.1 | 114 |
| Zinc | 156 | 190 |

| **Human Health** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Acrylonitrile | 2751 | 3340 |
| Aldrin | 0.000274 | 0.000333 |
| Anthracene | 31508 | 38260 |
| Antimony | 25622 | 31113 |
| Arsenic | N/A | N/A |
| Barium | N/A | N/A |
| Benzene | 13899 | 16878 |
| Benzidine | 2.55 | 3.10 |
| Benzo(*a*)anthracene | 0.598 | 0.726 |
| Benzo(*a*)pyrene | 0.0598 | 0.0726 |
| Bis(chloromethyl)ether | 6.56 | 7.97 |
| Bis(2-chloroethyl)ether | 1024 | 1244 |
| Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate] | 180 | 219 |
| Bromodichloromethane [Dichlorobromomethane] | 6579 | 7988 |
| Bromoform [Tribromomethane] | 25359 | 30793 |
| Cadmium | N/A | N/A |
| Carbon Tetrachloride | 1100 | 1336 |
| Chlordane | 0.0598 | 0.0726 |
| Chlorobenzene | 65480 | 79512 |
| Chlorodibromomethane [Dibromochloromethane] | 4378 | 5316 |
| Chloroform [Trichloromethane] | 184144 | 223604 |
| Chromium (hexavalent) | 12009 | 14583 |
| Chrysene | 60.2 | 73.2 |
| Cresols [Methylphenols] | 222519 | 270202 |
| Cyanide (free) | N/A | N/A |
| 4,4'-DDD | 0.0478 | 0.0581 |
| 4,4'-DDE | 0.00311 | 0.00377 |
| 4,4'-DDT | 0.00956 | 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] | 14234 | 17285 |
| *o*-Dichlorobenzene [1,2-Dichlorobenzene] | 78926 | 95838 |
| *p*-Dichlorobenzene [1,4-Dichlorobenzene] | N/A | N/A |
| 3,3'-Dichlorobenzidine | 53.5 | 65.0 |
| 1,2-Dichloroethane | 8708 | 10574 |
| 1,1-Dichloroethylene [1,1-Dichloroethene] | 1318561 | 1601109 |
| Dichloromethane [Methylene Chloride] | 318982 | 387335 |
| 1,2-Dichloropropane | 6196 | 7524 |
| 1,3-Dichloropropene [1,3-Dichloropropylene] | 2846 | 3457 |
| Dicofol [Kelthane] | 7.17 | 8.71 |
| Dieldrin | 0.000478 | 0.000581 |
| 2,4-Dimethylphenol | 201824 | 245073 |
| Di-*n*-Butyl Phthalate | 2210 | 2684 |
| Dioxins/Furans [TCDD Equivalents] | 0.0000019 | 0.0000023 |
| Endrin | 0.478 | 0.581 |
| Epichlorohydrin | 48159 | 58479 |
| Ethylbenzene | 44666 | 54237 |
| Ethylene Glycol | 401927400 | 488054700 |
| Fluoride | N/A | N/A |
| Heptachlor | 0.00239 | 0.00290 |
| Heptachlor Epoxide | 0.00693 | 0.00842 |
| Hexachlorobenzene | 0.0162 | 0.0197 |
| Hexachlorobutadiene | 5.26 | 6.39 |
| Hexachlorocyclohexane (*alpha*) | 0.200 | 0.244 |
| Hexachlorocyclohexane (*beta*) | 6.22 | 7.55 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 8.15 | 9.90 |
| Hexachlorocyclopentadiene | 277 | 336 |
| Hexachloroethane | 55.7 | 67.6 |
| Hexachlorophene | 69.3 | 84.2 |
| 4,4'-Isopropylidenediphenol [Bisphenol A] | 382357 | 464291 |
| Lead | 229 | 278 |
| Mercury | 0.598 | 0.726 |
| Methoxychlor | 71.7 | 87.1 |
| Methyl Ethyl Ketone | 23732856 | 28818468 |
| Methyl *tert*-butyl ether [MTBE] | 250773 | 304511 |
| Nickel | 27273 | 33117 |
| 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 | 6.93 | 8.42 |
| Polychlorinated Biphenyls [PCBs] | 0.0153 | 0.0185 |
| 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] | 6698 | 8134 |
| Thallium | 5.50 | 6.68 |
| Toluene | N/A | N/A |
| Toxaphene | 0.263 | 0.319 |
| 2,4,5-TP [Silvex] | 8828 | 10719 |
| 1,1,1-Trichloroethane | 18765081 | 22786170 |
| 1,1,2-Trichloroethane | 3971 | 4822 |
| Trichloroethylene [Trichloroethene] | 1720 | 2088 |
| 2,4,5-Trichlorophenol | 44666 | 54237 |
| TTHM [Sum of Total Trihalomethanes] | N/A | N/A |
| Vinyl Chloride | 394 | 479 |

# Appendix C: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #5 - BAY OR WIDE TIDAL RIVER - STANDARD DILUTIONS USING EPA HORIZONTAL JET PLUME MODEL AT DISCHARGES LESS THAN 10 MGD INTO THE GULF OF MEXICO

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Saltwater Aquatic Life

Table 2, 2018 Texas Surface Water Quality Standards for Human Health

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/22/2020 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | Gulf of Mexico |
| Segment No: | 2501 |
| TSS (mg/L): | 12 |
| Effluent Flow for Aquatic Life (MGD) | <10 |
| % Effluent for Chronic Aquatic Life (Mixing Zone): | 8 |
| % Effluent for Acute Aquatic Life (ZID): | 30 |
| Oyster Waters? | **Yes** |
| Effluent Flow for Human Health (MGD): | <10 |
| % Effluent for Human Health: | 4 |

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 | 11830.13 | 0.876 |  | 1.00 | Assumed |
| Lead | 6.06 | -0.85 | 138897.98 | 0.375 |  | 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 | 115187.64 | 0.420 |  | 1.00 | Assumed |
| Zinc | 5.36 | -0.52 | 62925.37 | 0.570 |  | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***SW Acute Criterion (µg/L)*** | ***SW Chronic Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***WLAc (µg/L)*** | ***LTAa (µg/L)*** | ***LTAc (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Acrolein | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Aldrin | 1.3 | N/A | 4.33 | N/A | 1.39 | N/A | 2.03 | 4.31 |
| Aluminum | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Arsenic | 149 | 78 | 497 | 975 | 159 | 595 | 233 | 494 |
| Cadmium | 40.0 | 8.75 | 133 | 109 | 42.7 | 66.7 | 62.7 | 132 |
| Carbaryl | 613 | N/A | 2043 | N/A | 654 | N/A | 961 | 2033 |
| Chlordane | 0.09 | 0.004 | 0.300 | 0.0500 | 0.0960 | 0.0305 | 0.0448 | 0.0948 |
| Chlorpyrifos | 0.011 | 0.006 | 0.0367 | 0.0750 | 0.0117 | 0.0458 | 0.0172 | 0.0364 |
| Chromium (trivalent) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Chromium (hexavalent) | 1090 | 49.6 | 3633 | 620 | 1163 | 378 | 555 | 1176 |
| Copper | 13.5 | 3.6 | 51.4 | 51.4 | 16.4 | 31.3 | 24.1 | 51.1 |
| Copper (oyster waters) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Cyanide (free) | 5.6 | 5.6 | 18.7 | 70.0 | 5.97 | 42.7 | 8.78 | 18.5 |
| 4,4'-DDT | 0.13 | 0.001 | 0.433 | 0.0125 | 0.139 | 0.00763 | 0.0112 | 0.0237 |
| Demeton | N/A | 0.1 | N/A | 1.25 | N/A | 0.763 | 1.12 | 2.37 |
| Diazinon | 0.819 | 0.819 | 2.73 | 10.2 | 0.874 | 6.24 | 1.28 | 2.71 |
| Dicofol [Kelthane] | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dieldrin | 0.71 | 0.002 | 2.37 | 0.0250 | 0.757 | 0.0153 | 0.0224 | 0.0474 |
| Diuron | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Endosulfan I (*alpha*) | 0.034 | 0.009 | 0.113 | 0.113 | 0.0363 | 0.0686 | 0.0533 | 0.112 |
| Endosulfan II (*beta*) | 0.034 | 0.009 | 0.113 | 0.113 | 0.0363 | 0.0686 | 0.0533 | 0.112 |
| Endosulfan sulfate | 0.034 | 0.009 | 0.113 | 0.113 | 0.0363 | 0.0686 | 0.0533 | 0.112 |
| Endrin | 0.037 | 0.002 | 0.123 | 0.0250 | 0.0395 | 0.0153 | 0.0224 | 0.0474 |
| Guthion [Azinphos Methyl] | N/A | 0.01 | N/A | 0.125 | N/A | 0.0763 | 0.112 | 0.237 |
| Heptachlor | 0.053 | 0.004 | 0.177 | 0.0500 | 0.0565 | 0.0305 | 0.0448 | 0.0948 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.16 | N/A | 0.533 | N/A | 0.171 | N/A | 0.250 | 0.530 |
| Lead | 133 | 5.3 | 1182 | 177 | 378 | 108 | 158 | 335 |
| Malathion | N/A | 0.01 | N/A | 0.125 | N/A | 0.0763 | 0.112 | 0.237 |
| Mercury | 2.1 | 1.1 | 7.00 | 13.8 | 2.24 | 8.39 | 3.29 | 6.96 |
| Methoxychlor | N/A | 0.03 | N/A | 0.375 | N/A | 0.229 | 0.336 | 0.711 |
| Mirex | N/A | 0.001 | N/A | 0.0125 | N/A | 0.00763 | 0.0112 | 0.0237 |
| Nickel | 118 | 13.1 | 393 | 164 | 126 | 99.9 | 146 | 310 |
| Nonylphenol | 7 | 1.7 | 23.3 | 21.3 | 7.47 | 13.0 | 10.9 | 23.2 |
| Parathion (ethyl) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Pentachlorophenol | 15.1 | 9.6 | 50.3 | 120 | 16.1 | 73.2 | 23.6 | 50.0 |
| Phenanthrene | 7.7 | 4.6 | 25.7 | 57.5 | 8.21 | 35.1 | 12.0 | 25.5 |
| Polychlorinated Biphenyls [PCBs] | 10 | 0.03 | 33.3 | 0.375 | 10.7 | 0.229 | 0.336 | 0.711 |
| Selenium | 564 | 136 | 1880 | 1700 | 602 | 1037 | 884 | 1870 |
| Silver | 2 | N/A | 15.9 | N/A | 5.08 | N/A | 7.47 | 15.8 |
| Toxaphene | 0.21 | 0.0002 | 0.700 | 0.00250 | 0.224 | 0.00153 | 0.00224 | 0.00474 |
| Tributyltin [TBT] | 0.24 | 0.0074 | 0.800 | 0.0925 | 0.256 | 0.0564 | 0.0829 | 0.175 |
| 2,4,5 Trichlorophenol | 259 | 12 | 863 | 150 | 276 | 91.5 | 134 | 284 |
| Zinc | 92.7 | 84.2 | 542 | 1847 | 174 | 1127 | 255 | 539 |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***Fish Only Criterion (µg/L)*** | ***WLAh (µg/L)*** | ***LTAh (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Acrylonitrile | 115 | 2875 | 2674 | 3930 | 8315 |
| Aldrin | 1.147E-05 | 0.000287 | 0.000267 | 0.000392 | 0.000829 |
| Anthracene | 1317 | 32925 | 30620 | 45011 | 95228 |
| 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 | 42010 |
| Benzidine | 0.107 | 2.68 | 2.49 | 3.65 | 7.73 |
| Benzo(*a*)anthracene | 0.025 | 0.625 | 0.581 | 0.854 | 1.80 |
| Benzo(*a*)pyrene | 0.0025 | 0.0625 | 0.0581 | 0.0854 | 0.180 |
| Bis(chloromethyl)ether | 0.2745 | 6.86 | 6.38 | 9.38 | 19.8 |
| Bis(2-chloroethyl)ether | 42.83 | 1071 | 996 | 1463 | 3096 |
| Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate] | 7.55 | 189 | 176 | 258 | 545 |
| Bromodichloromethane [Dichlorobromomethane] | 275 | 6875 | 6394 | 9398 | 19884 |
| Bromoform [Tribromomethane] | 1060 | 26500 | 24645 | 36228 | 76645 |
| Cadmium | N/A | N/A | N/A | N/A | N/A |
| Carbon Tetrachloride | 46 | 1150 | 1070 | 1572 | 3326 |
| Chlordane | 0.0025 | 0.0625 | 0.0581 | 0.0854 | 0.180 |
| Chlorobenzene | 2737 | 68425 | 63635 | 93543 | 197905 |
| Chlorodibromomethane [Dibromochloromethane] | 183 | 4575 | 4255 | 6254 | 13232 |
| Chloroform [Trichloromethane] | 7697 | 192425 | 178955 | 263064 | 556550 |
| Chromium (hexavalent) | 502 | 12550 | 11672 | 17157 | 36298 |
| Chrysene | 2.52 | 63.0 | 58.6 | 86.1 | 182 |
| Cresols [Methylphenols] | 9301 | 232525 | 216248 | 317884 | 672532 |
| Cyanide (free) | N/A | N/A | N/A | N/A | N/A |
| 4,4'-DDD | 0.002 | 0.0500 | 0.0465 | 0.0683 | 0.144 |
| 4,4'-DDE | 0.00013 | 0.00325 | 0.00302 | 0.00444 | 0.00939 |
| 4,4'-DDT | 0.0004 | 0.0100 | 0.00930 | 0.0136 | 0.0289 |
| 2,4'-D | N/A | N/A | N/A | N/A | N/A |
| Danitol [Fenpropathrin] | 473 | 11825 | 10997 | 16165 | 34201 |
| 1,2-Dibromoethane [Ethylene Dibromide] | 4.24 | 106 | 98.6 | 144 | 306 |
| *m*-Dichlorobenzene [1,3-Dichlorobenzene] | 595 | 14875 | 13834 | 20335 | 43022 |
| *o*-Dichlorobenzene [1,2-Dichlorobenzene] | 3299 | 82475 | 76702 | 112751 | 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 | 76.5 | 161 |
| 1,2-Dichloroethane | 364 | 9100 | 8463 | 12440 | 26319 |
| 1,1-Dichloroethylene [1,1-Dichloroethene] | 55114 | 1377850 | 1281401 | 1883658 | 3985155 |
| Dichloromethane [Methylene Chloride] | 13333 | 333325 | 309992 | 455688 | 964075 |
| 1,2-Dichloropropane | 259 | 6475 | 6022 | 8851 | 18727 |
| 1,3-Dichloropropene [1,3-Dichloropropylene] | 119 | 2975 | 2767 | 4067 | 8604 |
| Dicofol [Kelthane] | 0.30 | 7.50 | 6.98 | 10.2 | 21.6 |
| Dieldrin | 2.0E-05 | 0.000500 | 0.000465 | 0.000683 | 0.00144 |
| 2,4-Dimethylphenol | 8436 | 210900 | 196137 | 288321 | 609986 |
| Di-*n*-Butyl Phthalate | 92.4 | 2310 | 2148 | 3158 | 6681 |
| Dioxins/Furans [TCDD Equivalents] | 7.97E-08 | 0.0000020 | 0.0000019 | 0.0000027 | 0.0000058 |
| Endrin | 0.02 | 0.500 | 0.465 | 0.683 | 1.44 |
| Epichlorohydrin | 2013 | 50325 | 46802 | 68799 | 145554 |
| Ethylbenzene | 1867 | 46675 | 43408 | 63809 | 134998 |
| Ethylene Glycol | 1.68E+07 | 420000000 | 390600000 | 574182000 | 1214766000 |
| Fluoride | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.0001 | 0.00250 | 0.00233 | 0.00341 | 0.00723 |
| Heptachlor Epoxide | 0.00029 | 0.00725 | 0.00674 | 0.00991 | 0.0209 |
| Hexachlorobenzene | 0.00068 | 0.0170 | 0.0158 | 0.0232 | 0.0491 |
| Hexachlorobutadiene | 0.22 | 5.50 | 5.12 | 7.51 | 15.9 |
| Hexachlorocyclohexane (*alpha*) | 0.0084 | 0.210 | 0.195 | 0.287 | 0.607 |
| Hexachlorocyclohexane (*beta*) | 0.26 | 6.50 | 6.05 | 8.88 | 18.7 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.341 | 8.53 | 7.93 | 11.6 | 24.6 |
| Hexachlorocyclopentadiene | 11.6 | 290 | 270 | 396 | 838 |
| Hexachloroethane | 2.33 | 58.3 | 54.2 | 79.6 | 168 |
| Hexachlorophene | 2.90 | 72.5 | 67.4 | 99.1 | 209 |
| 4,4'-Isopropylidenediphenol [Bisphenol A] | 15982 | 399550 | 371582 | 546224 | 1155618 |
| Lead | 3.83 | 255 | 237 | 349 | 738 |
| Mercury | 0.0250 | 0.625 | 0.581 | 0.854 | 1.80 |
| Methoxychlor | 3.0 | 75.0 | 69.8 | 102 | 216 |
| Methyl Ethyl Ketone | 9.92E+05 | 24800000 | 23064000 | 33904080 | 71729040 |
| Methyl *tert*-butyl ether [MTBE] | 10482 | 262050 | 243707 | 358248 | 757927 |
| Nickel | 1140 | 28500 | 26505 | 38962 | 82430 |
| Nitrate-Nitrogen (as Total Nitrogen) | N/A | N/A | N/A | N/A | N/A |
| Nitrobenzene | 1873 | 46825 | 43547 | 64014 | 135431 |
| N-Nitrosodiethylamine | 2.1 | 52.5 | 48.8 | 71.7 | 151 |
| N-Nitroso-di-*n*-Butylamine | 4.2 | 105 | 97.7 | 143 | 303 |
| Pentachlorobenzene | 0.355 | 8.88 | 8.25 | 12.1 | 25.6 |
| Pentachlorophenol | 0.29 | 7.25 | 6.74 | 9.91 | 20.9 |
| Polychlorinated Biphenyls [PCBs] | 6.4E-04 | 0.0160 | 0.0149 | 0.0218 | 0.0462 |
| 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 | 17.3 |
| 1,1,2,2-Tetrachloroethane | 26.35 | 659 | 613 | 900 | 1905 |
| Tetrachloroethylene [Tetrachloroethylene] | 280 | 7000 | 6510 | 9569 | 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 | 0.375 | 0.795 |
| 2,4,5-TP [Silvex] | 369 | 9225 | 8579 | 12611 | 26681 |
| 1,1,1-Trichloroethane | 784354 | 19608850 | 18236231 | 26807258 | 56714676 |
| 1,1,2-Trichloroethane | 166 | 4150 | 3860 | 5673 | 12003 |
| Trichloroethylene [Trichloroethene] | 71.9 | 1798 | 1672 | 2457 | 5198 |
| 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 | 563 | 1193 |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Acrolein | N/A | N/A |
| Aldrin | 1.42 | 1.73 |
| Aluminum | N/A | N/A |
| Arsenic | 163 | 198 |
| Cadmium | 43.9 | 53.3 |
| Carbaryl | 672 | 817 |
| Chlordane | 0.0313 | 0.0381 |
| Chlorpyrifos | 0.0120 | 0.0146 |
| Chromium (trivalent) | N/A | N/A |
| Chromium (hexavalent) | 389 | 472 |
| Copper | 16.9 | 20.5 |
| Copper (oyster waters) | N/A | N/A |
| Cyanide (free) | 6.14 | 7.46 |
| 4,4'-DDT | 0.00784 | 0.00952 |
| Demeton | 0.784 | 0.952 |
| Diazinon | 0.898 | 1.09 |
| Dicofol [Kelthane] | N/A | N/A |
| Dieldrin | 0.0156 | 0.0190 |
| Diuron | N/A | N/A |
| Endosulfan I (*alpha*) | 0.0373 | 0.0453 |
| Endosulfan II (*beta*) | 0.0373 | 0.0453 |
| Endosulfan sulfate | 0.0373 | 0.0453 |
| Endrin | 0.0156 | 0.0190 |
| Guthion [Azinphos Methyl] | 0.0784 | 0.0952 |
| Heptachlor | 0.0313 | 0.0381 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.175 | 0.213 |
| Lead | 110 | 134 |
| Malathion | 0.0784 | 0.0952 |
| Mercury | 2.30 | 2.79 |
| Methoxychlor | 0.235 | 0.285 |
| Mirex | 0.00784 | 0.00952 |
| Nickel | 102 | 124 |
| Nonylphenol | 7.68 | 9.32 |
| Parathion (ethyl) | N/A | N/A |
| Pentachlorophenol | 16.5 | 20.1 |
| Phenanthrene | 8.45 | 10.2 |
| Polychlorinated Biphenyls [PCBs] | 0.235 | 0.285 |
| Selenium | 619 | 751 |
| Silver | 5.22 | 6.35 |
| Toxaphene | 0.00156 | 0.00190 |
| Tributyltin [TBT] | 0.0580 | 0.0705 |
| 2,4,5 Trichlorophenol | 94.1 | 114 |
| Zinc | 178 | 216 |

| **Human Health** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Acrylonitrile | 2751 | 3340 |
| Aldrin | 0.000274 | 0.000333 |
| Anthracene | 31508 | 38260 |
| Antimony | 25622 | 31113 |
| Arsenic | N/A | N/A |
| Barium | N/A | N/A |
| Benzene | 13899 | 16878 |
| Benzidine | 2.55 | 3.10 |
| Benzo(*a*)anthracene | 0.598 | 0.726 |
| Benzo(*a*)pyrene | 0.0598 | 0.0726 |
| Bis(chloromethyl)ether | 6.56 | 7.97 |
| Bis(2-chloroethyl)ether | 1024 | 1244 |
| Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate] | 180 | 219 |
| Bromodichloromethane [Dichlorobromomethane] | 6579 | 7988 |
| Bromoform [Tribromomethane] | 25359 | 30793 |
| Cadmium | N/A | N/A |
| Carbon Tetrachloride | 1100 | 1336 |
| Chlordane | 0.0598 | 0.0726 |
| Chlorobenzene | 65480 | 79512 |
| Chlorodibromomethane [Dibromochloromethane] | 4378 | 5316 |
| Chloroform [Trichloromethane] | 184144 | 223604 |
| Chromium (hexavalent) | 12009 | 14583 |
| Chrysene | 60.2 | 73.2 |
| Cresols [Methylphenols] | 222519 | 270202 |
| Cyanide (free) | N/A | N/A |
| 4,4'-DDD | 0.0478 | 0.0581 |
| 4,4'-DDE | 0.00311 | 0.00377 |
| 4,4'-DDT | 0.00956 | 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] | 14234 | 17285 |
| *o*-Dichlorobenzene [1,2-Dichlorobenzene] | 78926 | 95838 |
| *p*-Dichlorobenzene [1,4-Dichlorobenzene] | N/A | N/A |
| 3,3'-Dichlorobenzidine | 53.5 | 65.0 |
| 1,2-Dichloroethane | 8708 | 10574 |
| 1,1-Dichloroethylene [1,1-Dichloroethene] | 1318561 | 1601109 |
| Dichloromethane [Methylene Chloride] | 318982 | 387335 |
| 1,2-Dichloropropane | 6196 | 7524 |
| 1,3-Dichloropropene [1,3-Dichloropropylene] | 2846 | 3457 |
| Dicofol [Kelthane] | 7.17 | 8.71 |
| Dieldrin | 0.000478 | 0.000581 |
| 2,4-Dimethylphenol | 201824 | 245073 |
| Di-*n*-Butyl Phthalate | 2210 | 2684 |
| Dioxins/Furans [TCDD Equivalents] | 0.0000019 | 0.0000023 |
| Endrin | 0.478 | 0.581 |
| Epichlorohydrin | 48159 | 58479 |
| Ethylbenzene | 44666 | 54237 |
| Ethylene Glycol | 401927400 | 488054700 |
| Fluoride | N/A | N/A |
| Heptachlor | 0.00239 | 0.00290 |
| Heptachlor Epoxide | 0.00693 | 0.00842 |
| Hexachlorobenzene | 0.0162 | 0.0197 |
| Hexachlorobutadiene | 5.26 | 6.39 |
| Hexachlorocyclohexane (*alpha*) | 0.200 | 0.244 |
| Hexachlorocyclohexane (*beta*) | 6.22 | 7.55 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 8.15 | 9.90 |
| Hexachlorocyclopentadiene | 277 | 336 |
| Hexachloroethane | 55.7 | 67.6 |
| Hexachlorophene | 69.3 | 84.2 |
| 4,4'-Isopropylidenediphenol [Bisphenol A] | 382357 | 464291 |
| Lead | 244 | 296 |
| Mercury | 0.598 | 0.726 |
| Methoxychlor | 71.7 | 87.1 |
| Methyl Ethyl Ketone | 23732856 | 28818468 |
| Methyl *tert*-butyl ether [MTBE] | 250773 | 304511 |
| Nickel | 27273 | 33117 |
| 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 | 6.93 | 8.42 |
| Polychlorinated Biphenyls [PCBs] | 0.0153 | 0.0185 |
| 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] | 6698 | 8134 |
| Thallium | 5.50 | 6.68 |
| Toluene | N/A | N/A |
| Toxaphene | 0.263 | 0.319 |
| 2,4,5-TP [Silvex] | 8828 | 10719 |
| 1,1,1-Trichloroethane | 18765081 | 22786170 |
| 1,1,2-Trichloroethane | 3971 | 4822 |
| Trichloroethylene [Trichloroethene] | 1720 | 2088 |
| 2,4,5-Trichlorophenol | 44666 | 54237 |
| TTHM [Sum of Total Trihalomethanes] | N/A | N/A |
| Vinyl Chloride | 394 | 479 |

# Appendix D: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #5 - BAY OR WIDE TIDAL RIVER - USING TCEQ DEVELOPED CORMIX MODELING FOR DISCHARGE RATE OF 3000 BARREL/DAY (0.126 MGD) INTO THE GULF OF MEXICO

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Saltwater Aquatic Life

Table 2, 2018 Texas Surface Water Quality Standards for Human Health

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 6/27/2021 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | Gulf of Mexico |
| Segment No: | 2501 |
| TSS (mg/L): | 12 |
| Effluent Flow for Aquatic Life (MGD) | 0.126 |
| % Effluent for Chronic Aquatic Life (Mixing Zone): | 1.1 |
| % Effluent for Acute Aquatic Life (ZID): | 1.4 |
| Oyster Waters? | **Yes** |
| Effluent Flow for Human Health (MGD): | 0.126 |
| % Effluent for Human Health: | 0.9 |

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 | 11830.13 | 0.876 |  | 1.00 | Assumed |
| Lead | 6.06 | -0.85 | 138897.98 | 0.375 |  | 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 | 115187.64 | 0.420 |  | 1.00 | Assumed |
| Zinc | 5.36 | -0.52 | 62925.37 | 0.570 |  | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

| ***Parameter*** | ***SW Acute Criterion (µg/L)*** | ***SW Chronic Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***WLAc (µg/L)*** | ***LTAa (µg/L)*** | ***LTAc (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Acrolein | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Aldrin | 1.3 | N/A | 92.9 | N/A | 29.7 | N/A | 43.6 | 92.4 |
| Aluminum | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Arsenic | 149 | 78 | 10643 | 7091 | 3406 | 4325 | 5006 | 10591 |
| Cadmium | 40.0 | 8.75 | 2857 | 795 | 914 | 485 | 713 | 1509 |
| Carbaryl | 613 | N/A | 43786 | N/A | 14011 | N/A | 20596 | 43575 |
| Chlordane | 0.09 | 0.004 | 6.43 | 0.364 | 2.06 | 0.222 | 0.326 | 0.689 |
| Chlorpyrifos | 0.011 | 0.006 | 0.786 | 0.545 | 0.251 | 0.333 | 0.369 | 0.781 |
| Chromium (trivalent) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Chromium (hexavalent) | 1090 | 49.6 | 77857 | 4509 | 24914 | 2751 | 4043 | 8554 |
| Copper | 13.5 | 3.6 | 1101 | 374 | 352 | 228 | 335 | 709 |
| Copper (oyster waters) | 3.6 | N/A | 374 | N/A | 120 | N/A | 175 | 371 |
| Cyanide (free) | 5.6 | 5.6 | 400 | 509 | 128 | 311 | 188 | 398 |
| 4,4'-DDT | 0.13 | 0.001 | 9.29 | 0.0909 | 2.97 | 0.0555 | 0.0815 | 0.172 |
| Demeton | N/A | 0.1 | N/A | 9.09 | N/A | 5.55 | 8.15 | 17.2 |
| Diazinon | 0.819 | 0.819 | 58.5 | 74.5 | 18.7 | 45.4 | 27.5 | 58.2 |
| Dicofol [Kelthane] | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dieldrin | 0.71 | 0.002 | 50.7 | 0.182 | 16.2 | 0.111 | 0.163 | 0.344 |
| Diuron | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Endosulfan I (*alpha*) | 0.034 | 0.009 | 2.43 | 0.818 | 0.777 | 0.499 | 0.733 | 1.55 |
| Endosulfan II (*beta*) | 0.034 | 0.009 | 2.43 | 0.818 | 0.777 | 0.499 | 0.733 | 1.55 |
| Endosulfan sulfate | 0.034 | 0.009 | 2.43 | 0.818 | 0.777 | 0.499 | 0.733 | 1.55 |
| Endrin | 0.037 | 0.002 | 2.64 | 0.182 | 0.846 | 0.111 | 0.163 | 0.344 |
| Guthion [Azinphos Methyl] | N/A | 0.01 | N/A | 0.909 | N/A | 0.555 | 0.815 | 1.72 |
| Heptachlor | 0.053 | 0.004 | 3.79 | 0.364 | 1.21 | 0.222 | 0.326 | 0.689 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.16 | N/A | 11.4 | N/A | 3.66 | N/A | 5.37 | 11.3 |
| Lead | 133 | 5.3 | 25334 | 1285 | 8107 | 784 | 1152 | 2437 |
| Malathion | N/A | 0.01 | N/A | 0.909 | N/A | 0.555 | 0.815 | 1.72 |
| Mercury | 2.1 | 1.1 | 150 | 100 | 48.0 | 61.0 | 70.5 | 149 |
| Methoxychlor | N/A | 0.03 | N/A | 2.73 | N/A | 1.66 | 2.44 | 5.17 |
| Mirex | N/A | 0.001 | N/A | 0.0909 | N/A | 0.0555 | 0.0815 | 0.172 |
| Nickel | 118 | 13.1 | 8429 | 1191 | 2697 | 726 | 1067 | 2259 |
| Nonylphenol | 7 | 1.7 | 500 | 155 | 160 | 94.3 | 138 | 293 |
| Parathion (ethyl) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Pentachlorophenol | 15.1 | 9.6 | 1079 | 873 | 345 | 532 | 507 | 1073 |
| Phenanthrene | 7.7 | 4.6 | 550 | 418 | 176 | 255 | 258 | 547 |
| Polychlorinated Biphenyls [PCBs] | 10 | 0.03 | 714 | 2.73 | 229 | 1.66 | 2.44 | 5.17 |
| Selenium | 564 | 136 | 40286 | 12364 | 12891 | 7542 | 11086 | 23455 |
| Silver | 2 | N/A | 340 | N/A | 109 | N/A | 160 | 338 |
| Toxaphene | 0.21 | 0.0002 | 15.0 | 0.0182 | 4.80 | 0.0111 | 0.0163 | 0.0344 |
| Tributyltin [TBT] | 0.24 | 0.0074 | 17.1 | 0.673 | 5.49 | 0.410 | 0.603 | 1.27 |
| 2,4,5 Trichlorophenol | 259 | 12 | 18500 | 1091 | 5920 | 665 | 978 | 2069 |
| Zinc | 92.7 | 84.2 | 11621 | 13435 | 3719 | 8195 | 5466 | 11565 |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR HUMAN HEALTH PROTECTION:

| ***Parameter*** | ***Fish Only Criterion (µg/L)*** | ***WLAh (µg/L)*** | ***LTAh (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| --- | --- | --- | --- | --- | --- |
| Acrylonitrile | 115 | 12778 | 11883 | 17468 | 36957 |
| Aldrin | 1.147E-05 | 0.00127 | 0.00119 | 0.00174 | 0.00368 |
| Anthracene | 1317 | 146333 | 136090 | 200052 | 423239 |
| Antimony | 1071 | 119000 | 110670 | 162684 | 344183 |
| Arsenic | N/A | N/A | N/A | N/A | N/A |
| Barium | N/A | N/A | N/A | N/A | N/A |
| Benzene | 581 | 64556 | 60037 | 88253 | 186714 |
| Benzidine | 0.107 | 11.9 | 11.1 | 16.2 | 34.3 |
| Benzo(*a*)anthracene | 0.025 | 2.78 | 2.58 | 3.79 | 8.03 |
| Benzo(*a*)pyrene | 0.0025 | 0.278 | 0.258 | 0.379 | 0.803 |
| Bis(chloromethyl)ether | 0.2745 | 30.5 | 28.4 | 41.6 | 88.2 |
| Bis(2-chloroethyl)ether | 42.83 | 4759 | 4426 | 6505 | 13764 |
| Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate] | 7.55 | 839 | 780 | 1146 | 2426 |
| Bromodichloromethane [Dichlorobromomethane] | 275 | 30556 | 28417 | 41772 | 88375 |
| Bromoform [Tribromomethane] | 1060 | 117778 | 109533 | 161014 | 340648 |
| Cadmium | N/A | N/A | N/A | N/A | N/A |
| Carbon Tetrachloride | 46 | 5111 | 4753 | 6987 | 14782 |
| Chlordane | 0.0025 | 0.278 | 0.258 | 0.379 | 0.803 |
| Chlorobenzene | 2737 | 304111 | 282823 | 415750 | 879580 |
| Chlorodibromomethane [Dibromochloromethane] | 183 | 20333 | 18910 | 27797 | 58810 |
| Chloroform [Trichloromethane] | 7697 | 855222 | 795357 | 1169174 | 2473559 |
| Chromium (hexavalent) | 502 | 55778 | 51873 | 76253 | 161326 |
| Chrysene | 2.52 | 280 | 260 | 382 | 809 |
| Cresols [Methylphenols] | 9301 | 1033444 | 961103 | 1412821 | 2989031 |
| Cyanide (free) | N/A | N/A | N/A | N/A | N/A |
| 4,4'-DDD | 0.002 | 0.222 | 0.207 | 0.303 | 0.642 |
| 4,4'-DDE | 0.00013 | 0.0144 | 0.0134 | 0.0197 | 0.0417 |
| 4,4'-DDT | 0.0004 | 0.0444 | 0.0413 | 0.0607 | 0.128 |
| 2,4'-D | N/A | N/A | N/A | N/A | N/A |
| Danitol [Fenpropathrin] | 473 | 52556 | 48877 | 71848 | 152006 |
| 1,2-Dibromoethane [Ethylene Dibromide] | 4.24 | 471 | 438 | 644 | 1362 |
| *m*-Dichlorobenzene [1,3-Dichlorobenzene] | 595 | 66111 | 61483 | 90380 | 191213 |
| *o*-Dichlorobenzene [1,2-Dichlorobenzene] | 3299 | 366556 | 340897 | 501118 | 1060188 |
| *p*-Dichlorobenzene [1,4-Dichlorobenzene] | N/A | N/A | N/A | N/A | N/A |
| 3,3'-Dichlorobenzidine | 2.24 | 249 | 231 | 340 | 719 |
| 1,2-Dichloroethane | 364 | 40444 | 37613 | 55291 | 116977 |
| 1,1-Dichloroethylene [1,1-Dichloroethene] | 55114 | 6123778 | 5695113 | 8371816 | 17711802 |
| Dichloromethane [Methylene Chloride] | 13333 | 1481444 | 1377743 | 2025282 | 4284781 |
| 1,2-Dichloropropane | 259 | 28778 | 26763 | 39342 | 83233 |
| 1,3-Dichloropropene [1,3-Dichloropropylene] | 119 | 13222 | 12297 | 18076 | 38242 |
| Dicofol [Kelthane] | 0.30 | 33.3 | 31.0 | 45.5 | 96.4 |
| Dieldrin | 2.0E-05 | 0.00222 | 0.00207 | 0.00303 | 0.00642 |
| 2,4-Dimethylphenol | 8436 | 937333 | 871720 | 1281428 | 2711049 |
| Di-*n*-Butyl Phthalate | 92.4 | 10267 | 9548 | 14035 | 29694 |
| Dioxins/Furans [TCDD Equivalents] | 7.97E-08 | 0.0000089 | 0.0000082 | 0.0000121 | 0.0000256 |
| Endrin | 0.02 | 2.22 | 2.07 | 3.03 | 6.42 |
| Epichlorohydrin | 2013 | 223667 | 208010 | 305774 | 646911 |
| Ethylbenzene | 1867 | 207444 | 192923 | 283597 | 599991 |
| Ethylene Glycol | 1.68E+07 | 1866666667 | 1736000000 | 2551920000 | 5398960000 |
| Fluoride | N/A | N/A | N/A | N/A | N/A |
| Heptachlor | 0.0001 | 0.0111 | 0.0103 | 0.0151 | 0.0321 |
| Heptachlor Epoxide | 0.00029 | 0.0322 | 0.0300 | 0.0440 | 0.0931 |
| Hexachlorobenzene | 0.00068 | 0.0756 | 0.0703 | 0.103 | 0.218 |
| Hexachlorobutadiene | 0.22 | 24.4 | 22.7 | 33.4 | 70.7 |
| Hexachlorocyclohexane (*alpha*) | 0.0084 | 0.933 | 0.868 | 1.27 | 2.69 |
| Hexachlorocyclohexane (*beta*) | 0.26 | 28.9 | 26.9 | 39.4 | 83.5 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 0.341 | 37.9 | 35.2 | 51.7 | 109 |
| Hexachlorocyclopentadiene | 11.6 | 1289 | 1199 | 1762 | 3727 |
| Hexachloroethane | 2.33 | 259 | 241 | 353 | 748 |
| Hexachlorophene | 2.90 | 322 | 300 | 440 | 931 |
| 4,4'-Isopropylidenediphenol [Bisphenol A] | 15982 | 1775778 | 1651473 | 2427665 | 5136082 |
| Lead | 3.83 | 1135 | 1055 | 1551 | 3282 |
| Mercury | 0.0250 | 2.78 | 2.58 | 3.79 | 8.03 |
| Methoxychlor | 3.0 | 333 | 310 | 455 | 964 |
| Methyl Ethyl Ketone | 9.92E+05 | 110222222 | 102506667 | 150684800 | 318795733 |
| Methyl *tert*-butyl ether [MTBE] | 10482 | 1164667 | 1083140 | 1592215 | 3368565 |
| Nickel | 1140 | 126667 | 117800 | 173166 | 366358 |
| Nitrate-Nitrogen (as Total Nitrogen) | N/A | N/A | N/A | N/A | N/A |
| Nitrobenzene | 1873 | 208111 | 193543 | 284508 | 601919 |
| N-Nitrosodiethylamine | 2.1 | 233 | 217 | 318 | 674 |
| N-Nitroso-di-*n*-Butylamine | 4.2 | 467 | 434 | 637 | 1349 |
| Pentachlorobenzene | 0.355 | 39.4 | 36.7 | 53.9 | 114 |
| Pentachlorophenol | 0.29 | 32.2 | 30.0 | 44.0 | 93.1 |
| Polychlorinated Biphenyls [PCBs] | 6.4E-04 | 0.0711 | 0.0661 | 0.0972 | 0.205 |
| Pyridine | 947 | 105222 | 97857 | 143849 | 304334 |
| Selenium | N/A | N/A | N/A | N/A | N/A |
| 1,2,4,5-Tetrachlorobenzene | 0.24 | 26.7 | 24.8 | 36.4 | 77.1 |
| 1,1,2,2-Tetrachloroethane | 26.35 | 2928 | 2723 | 4002 | 8468 |
| Tetrachloroethylene [Tetrachloroethylene] | 280 | 31111 | 28933 | 42532 | 89982 |
| Thallium | 0.23 | 25.6 | 23.8 | 34.9 | 73.9 |
| Toluene | N/A | N/A | N/A | N/A | N/A |
| Toxaphene | 0.011 | 1.22 | 1.14 | 1.67 | 3.53 |
| 2,4,5-TP [Silvex] | 369 | 41000 | 38130 | 56051 | 118584 |
| 1,1,1-Trichloroethane | 784354 | 87150444 | 81049913 | 119143372 | 252065230 |
| 1,1,2-Trichloroethane | 166 | 18444 | 17153 | 25215 | 53346 |
| Trichloroethylene [Trichloroethene] | 71.9 | 7989 | 7430 | 10921 | 23106 |
| 2,4,5-Trichlorophenol | 1867 | 207444 | 192923 | 283597 | 599991 |
| TTHM [Sum of Total Trihalomethanes] | N/A | N/A | N/A | N/A | N/A |
| Vinyl Chloride | 16.5 | 1833 | 1705 | 2506 | 5302 |

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

| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Acrolein | N/A | N/A |
| Aldrin | 30.5 | 37.1 |
| Aluminum | N/A | N/A |
| Arsenic | 3504 | 4255 |
| Cadmium | 499 | 606 |
| Carbaryl | 14417 | 17507 |
| Chlordane | 0.228 | 0.277 |
| Chlorpyrifos | 0.258 | 0.314 |
| Chromium (trivalent) | N/A | N/A |
| Chromium (hexavalent) | 2830 | 3436 |
| Copper | 234 | 284 |
| Copper (oyster waters) | 123 | 149 |
| Cyanide (free) | 131 | 159 |
| 4,4'-DDT | 0.0570 | 0.0692 |
| Demeton | 5.70 | 6.92 |
| Diazinon | 19.2 | 23.3 |
| Dicofol [Kelthane] | N/A | N/A |
| Dieldrin | 0.114 | 0.138 |
| Diuron | N/A | N/A |
| Endosulfan I (*alpha*) | 0.513 | 0.623 |
| Endosulfan II (*beta*) | 0.513 | 0.623 |
| Endosulfan sulfate | 0.513 | 0.623 |
| Endrin | 0.114 | 0.138 |
| Guthion [Azinphos Methyl] | 0.570 | 0.692 |
| Heptachlor | 0.228 | 0.277 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 3.76 | 4.56 |
| Lead | 806 | 979 |
| Malathion | 0.570 | 0.692 |
| Mercury | 49.3 | 59.9 |
| Methoxychlor | 1.71 | 2.07 |
| Mirex | 0.0570 | 0.0692 |
| Nickel | 747 | 907 |
| Nonylphenol | 97.0 | 117 |
| Parathion (ethyl) | N/A | N/A |
| Pentachlorophenol | 355 | 431 |
| Phenanthrene | 181 | 219 |
| Polychlorinated Biphenyls [PCBs] | 1.71 | 2.07 |
| Selenium | 7760 | 9423 |
| Silver | 112 | 136 |
| Toxaphene | 0.0114 | 0.0138 |
| Tributyltin [TBT] | 0.422 | 0.512 |
| 2,4,5 Trichlorophenol | 684 | 831 |
| Zinc | 3826 | 4646 |

| **Human Health** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| --- | --- | --- |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Acrylonitrile | 12227 | 14848 |
| Aldrin | 0.00121 | 0.00148 |
| Anthracene | 140036 | 170044 |
| Antimony | 113879 | 138282 |
| Arsenic | N/A | N/A |
| Barium | N/A | N/A |
| Benzene | 61777 | 75015 |
| Benzidine | 11.3 | 13.8 |
| Benzo(*a*)anthracene | 2.65 | 3.22 |
| Benzo(*a*)pyrene | 0.265 | 0.322 |
| Bis(chloromethyl)ether | 29.1 | 35.4 |
| Bis(2-chloroethyl)ether | 4554 | 5529 |
| Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate] | 802 | 974 |
| Bromodichloromethane [Dichlorobromomethane] | 29240 | 35506 |
| Bromoform [Tribromomethane] | 112709 | 136861 |
| Cadmium | N/A | N/A |
| Carbon Tetrachloride | 4891 | 5939 |
| Chlordane | 0.265 | 0.322 |
| Chlorobenzene | 291025 | 353387 |
| Chlorodibromomethane [Dibromochloromethane] | 19458 | 23628 |
| Chloroform [Trichloromethane] | 818422 | 993798 |
| Chromium (hexavalent) | 53377 | 64815 |
| Chrysene | 267 | 325 |
| Cresols [Methylphenols] | 988975 | 1200898 |
| Cyanide (free) | N/A | N/A |
| 4,4'-DDD | 0.212 | 0.258 |
| 4,4'-DDE | 0.0138 | 0.0167 |
| 4,4'-DDT | 0.0425 | 0.0516 |
| 2,4'-D | N/A | N/A |
| Danitol [Fenpropathrin] | 50294 | 61071 |
| 1,2-Dibromoethane [Ethylene Dibromide] | 450 | 547 |
| *m*-Dichlorobenzene [1,3-Dichlorobenzene] | 63266 | 76823 |
| *o*-Dichlorobenzene [1,2-Dichlorobenzene] | 350782 | 425950 |
| *p*-Dichlorobenzene [1,4-Dichlorobenzene] | N/A | N/A |
| 3,3'-Dichlorobenzidine | 238 | 289 |
| 1,2-Dichloroethane | 38704 | 46997 |
| 1,1-Dichloroethylene [1,1-Dichloroethene] | 5860271 | 7116044 |
| Dichloromethane [Methylene Chloride] | 1417697 | 1721490 |
| 1,2-Dichloropropane | 27539 | 33440 |
| 1,3-Dichloropropene [1,3-Dichloropropylene] | 12653 | 15364 |
| Dicofol [Kelthane] | 31.8 | 38.7 |
| Dieldrin | 0.00212 | 0.00258 |
| 2,4-Dimethylphenol | 896999 | 1089214 |
| Di-*n*-Butyl Phthalate | 9824 | 11930 |
| Dioxins/Furans [TCDD Equivalents] | 0.0000085 | 0.0000102 |
| Endrin | 2.12 | 2.58 |
| Epichlorohydrin | 214042 | 259908 |
| Ethylbenzene | 198518 | 241057 |
| Ethylene Glycol | 1786344000 | 2169132000 |
| Fluoride | N/A | N/A |
| Heptachlor | 0.0106 | 0.0129 |
| Heptachlor Epoxide | 0.0308 | 0.0374 |
| Hexachlorobenzene | 0.0723 | 0.0877 |
| Hexachlorobutadiene | 23.3 | 28.4 |
| Hexachlorocyclohexane (*alpha*) | 0.893 | 1.08 |
| Hexachlorocyclohexane (*beta*) | 27.6 | 33.5 |
| Hexachlorocyclohexane (*gamma*) [Lindane] | 36.2 | 44.0 |
| Hexachlorocyclopentadiene | 1233 | 1497 |
| Hexachloroethane | 247 | 300 |
| Hexachlorophene | 308 | 374 |
| 4,4'-Isopropylidenediphenol [Bisphenol A] | 1699366 | 2063515 |
| Lead | 1086 | 1318 |
| Mercury | 2.65 | 3.22 |
| Methoxychlor | 318 | 387 |
| Methyl Ethyl Ketone | 105479360 | 128082080 |
| Methyl *tert*-butyl ether [MTBE] | 1114551 | 1353383 |
| Nickel | 121216 | 147191 |
| Nitrate-Nitrogen (as Total Nitrogen) | N/A | N/A |
| Nitrobenzene | 199156 | 241832 |
| N-Nitrosodiethylamine | 223 | 271 |
| N-Nitroso-di-*n*-Butylamine | 446 | 542 |
| Pentachlorobenzene | 37.7 | 45.8 |
| Pentachlorophenol | 30.8 | 37.4 |
| Polychlorinated Biphenyls [PCBs] | 0.0680 | 0.0826 |
| Pyridine | 100694 | 122271 |
| Selenium | N/A | N/A |
| 1,2,4,5-Tetrachlorobenzene | 25.5 | 30.9 |
| 1,1,2,2-Tetrachloroethane | 2801 | 3402 |
| Tetrachloroethylene [Tetrachloroethylene] | 29772 | 36152 |
| Thallium | 24.4 | 29.6 |
| Toluene | N/A | N/A |
| Toxaphene | 1.16 | 1.42 |
| 2,4,5-TP [Silvex] | 39235 | 47643 |
| 1,1,1-Trichloroethane | 83400360 | 101271866 |
| 1,1,2-Trichloroethane | 17650 | 21433 |
| Trichloroethylene [Trichloroethene] | 7645 | 9283 |
| 2,4,5-Trichlorophenol | 198518 | 241057 |
| TTHM [Sum of Total Trihalomethanes] | N/A | N/A |
| Vinyl Chloride | 1754 | 2130 |

# Appendix E: Water Quality-Based Effluent Limitations Calculations

TEXTOX MENU #5 - BAY OR WIDE TIDAL RIVER - USING TCEQ DEVELOPED CORMIX MODELING FOR DISCHARGE RATE OF 3000 BARREL/DAY (0.126 MGD) INTO THE GULF OF MEXICO SPECIFIC FOR BARIUM AND MANGANESE

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

Table 1, 2014 Texas Surface Water Quality Standards (30 TAC 307) for Saltwater Aquatic Life

Table 2, 2018 Texas Surface Water Quality Standards for Human Health

"Procedures to Implement the Texas Surface Water Quality Standards," TCEQ, June 2010

PERMIT INFORMATION

|  |  |
| --- | --- |
| Permittee Name: | TPDES Oil and Gas General Permit |
| TCEQ Permit No: | TXG310000 |
| Outfall No: | N/A |
| Prepared by: | Water Quality Division |
| Date: | 9/16/2021 |

DISCHARGE INFORMATION

|  |  |
| --- | --- |
| Receiving Waterbody: | Gulf of Mexico |
| Segment No: | 2501 |
| TSS (mg/L): | 12 |
| Effluent Flow for Aquatic Life (MGD) | 0.126 |
| % Effluent for Chronic Aquatic Life (Mixing Zone): | 1.1 |
| % Effluent for Acute Aquatic Life (ZID): | 1.4 |
| Oyster Waters? | **Yes** |
| Effluent Flow for Human Health (MGD): | 0.126 |
| % Effluent for Human Health: | 0.9 |

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*** |
| Barium | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |
| Manganese | N/A | N/A | N/A | 1.00 | Assumed | 1.00 | Assumed |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR AQUATIC LIFE PROTECTION:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Parameter*** | ***SW Acute Criterion (µg/L)*** | ***SW Chronic Criterion (µg/L)*** | ***WLAa (µg/L)*** | ***WLAc (µg/L)*** | ***LTAa (µg/L)*** | ***LTAc (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| Barium | 150,000 | 25,000 | 10,714,286 | 2,272,727 | 3,428,571 | 1,386,364 | 2,037,955 | 4,311,591 |

CALCULATED DAILY AVERAGE AND DAILY MAXIMUM EFFLUENT LIMITATIONS FOR HUMAN HEALTH PROTECTION:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Parameter*** | ***Fish Only Criterion (µg/L)*** | ***WLAh (µg/L)*** | ***LTAh (µg/L)*** | ***Daily Avg. (µg/L)*** | ***Daily Max. (µg/L)*** |
| Manganese | 100 | 11,111 | 10,333 | 15,190 | 32,137 |

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

|  |  |  |
| --- | --- | --- |
| **Aquatic Life** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Barium | 1,426,568 | 1,732,261 |

|  |  |  |
| --- | --- | --- |
| **Human Health** | ***70% of Daily Avg.*** | ***85% of Daily Avg.*** |
| ***Parameter*** | ***(µg/L)*** | ***(µg/L)*** |
| Manganese | 10,633 | 12,912 |

# Appendix F: pH Screening

Freshwater pH Screening

Saltwater pH Screening