Gulf of Mexico Produced Water Discharge Requirements

is published for the benefit of our friends and clients. If you have any questions about this article please contact us at 281-398-5781
info@gateinc.com

Requirements for Gulf of Mexico Discharge of Produced Water

Produced water discharges must meet both a daily maximum of 42 mg/l and a monthly average of 29 mg/l for oil and grease.

- Samples for oil and grease monitoring shall be collected and analyzed a minimum of once per month.
- In addition, a produced water sample shall be collected within two hours of when a sheen is observed, or within two hours after startup of the system if it is shut down following a sheen discovery, and analyzed for oil and grease.
- Samples for oil and grease monitoring shall be collected prior to the addition of any seawater to the produced water waste stream.

The 7-day average minimum and monthly average minimum No Observable Effect Concentration (NOEC) must be equal or greater than the critical dilution concentration.

- Samples for NOEC monitoring shall be collected following the addition of any seawater to the produced water waste stream.
- NOEC requirements are shown in the left-hand column overleaf.

As of October 1, 2012, the Environmental Protection Agency (EPA) Region 6 has enacted an update to their National Pollutant Discharge Elimination System (NPDES) general permit for new and existing sources in the western portion of the Outer Continental Shelf (OCS) in the Gulf of Mexico (GoM). The issue date of this GATEKEEPER has been postponed a little to cover this issue, due to the profound impact of environmental discharge legislation on production and water discharge activities.

This general permit sets the requirements for all controlled discharges from drilling and production units in the GoM from October 1, 2012, to September 30, 2017. However, Operators have until January 31, 2013 to align their procedures with the new requirements and file a Notice of Intent to the EPA for discharges covered by the permit.

The objective of this article is to summarize the main requirements of the permit, identify changes from the previous permit, and call out edits between the draft and final issue of the permit as these pertain to the discharge of produced waters and other treated waters from offshore production and water injection facilities.

Principal Requirements of the NPDES Permit for Produced Water Discharge

The main point of note with respect to the 2012 permit is that all major provisions for the discharge of produced water and chemically treated seawater remain as they were in the previous permit issued in 2007. These are summarized in the summary (see column to the left of this page).

Major Changes to Produced Water Discharge Requirements

Significant changes to the current produced water discharge requirements are as follows:

- It is noted that produced water generated from mono-ethylene glycol (MEG) reclamation processes, including salt slurries generated from salt centrifuge units, are regulated as produced water. If this salt slurry is discharged without mixing with the bulk produced water stream, then it is treated as a separate discharge point, and must meet any and all requirements associated with produced water.
- Capacity for calculating critical dilution factors for discharge systems with multiple ports is now included. This enables the equivalent diameter of all openings to be calculated using the following formula so that tis can be used to calculate critical dilution factors for a single total discharge volume:

  Equivalent Diameter = $\sqrt{(A_{total}*4/\pi)}$, where A_{total} is the total area of all openings.
- An entirely new requirement for the characterization of produced water discharges from active leases has been added. This requires that Operators conduct an individual study of at least one produced water from each active lease block or, perhaps preferably, participate in a joint survey that analyses a minimum of ten samples from active leases in each lease area (e.g. Green Canyon, Mississippi Canyon, etc.).

  As a minimum, the water samples shall be analyzed for dissolved arsenic, dissolved cadmium, dissolved chromium (VI), dissolved copper, free cyanide, dissolved lead, dissolved mercury, dissolved nickel, dissolved selenium, dissolved silver, and dissolved zinc.

  Submission of produced water discharge characterizations is required within 3 years of the effective date of the permit (i.e. by October 1, 2015).

Major Changes to Miscellaneous Discharge Requirements

Changes to the miscellaneous discharge category have been made to specifically include brines used as piping or equipment preservation fluids and to include hydrate control fluids discharged with produced water. A similar distinction is also made in the miscellaneous discharges or chemically-treated seawater section for seawater that is used as a piping or preservation fluid. Full details of these changes are detailed overleaf.

No Observable Effect Concentration (NOEC) Testing Requirements

7-Day Chronic NOEC Marine Limits:

- The permittee shall utilize the *mysidopsis bahia* (Mysid shrimp) and *menidia beryllina* (Inland Silverside minnow) chronic static renewal 7-day survival and growth test.
- A minimum of five replicates with eight organisms per replicate must be used in the control and in each effluent dilution.
- The NOEC is defined as the greatest effluent dilution which does not result in a lethal or sub-lethal effect that is statistically different from the control test at the 95% confidence level.

Test Acceptance:

- The toxicity test control must have survival equal to or greater than 80%.
- The percent coefficient of variation between replicates shall be 40% or less in the control for both growth rate and survival.
- The percent coefficient of variation between replicates shall be 40% or less in the critical dilution.

Upstream engineering for offshore oil and gas specializing in:

- Chemical Systems Engineering
- Materials & Corrosion
- Flow Assurance
- Waterflood
- Commissioning & Startup

Major Changes to Miscellaneous Discharge Requirements (Cont'd)

Major changes in this section of the permit are as follows:

- Leak tracer fluids made from a powder dye are now exempt from the requirement for a 7-day NOEC test value of no less than 50 mg/l that is applied to all other subsea preservation fluids, control fluids, storage fluids, leak tracer fluids and riser tensioning fluids. However, it is still necessary for the product to pass the 7-day NOEC test at the as-supplied concentration.
- A significant change to prior regulations is that hydrate control fluids are specifically identified as requiring toxicity testing during discharge. The new requirements are as follows:
  - When hydrate control fluids are discharged with produced water, the toxicity limitation established for produced water shall assess the overall impact caused by hydrate control fluids.
  - If the hydrate control fluid is discharged with other miscellaneous discharges, a representative sample shall be used for the toxicity test for the miscellaneous discharge.
  - In situations where a discharge of hydrate control fluids is not monitored by the toxicity testing of either produced water or miscellaneous discharge, then a 7-day chronic toxicity test for that specific hydrate control fluid must be undertaken prior to discharge, and the final concentration in the discharge must not exceed the NOEC at the applicable critical dilution at the edge of 100 meters from the point of discharge.

  The restrictions above do not apply if the total discharge volume of methanol within a 7-day period is less than 20 bbl or the total discharge volume of ethylene glycol within a 7-day period is less that 200 bbl.
- Brines used for pipeline and equipment preservation must meet three criteria prior to their use as preservation fluids; no free oil, oil and grease content below 29 mg/l, and no content of priority pollutants except in trace amounts. The concentration representing a trace amount is not defined.

Changes Between Preliminary and Final Permit

A number of changes have been made to the final NPDES permit from the draft version that was issued for industry consultation. In the majority of cases, these represent clarifications based on comments received by the EPA through the review process, where those directly impacting fluid discharges are summarized as follows:

- A requirement to undertake characterization studies prior to the use of water-based drilling muds was included.
- The respective exemption volumes for methanol and ethylene glycol of 20 bbl and 200 bbl in a 7-day period were added.
- Chlorine and bromine were added to the list of chemicals that are excluded from toxicity testing requirements.
- An amendment was made to allow biocides to be added to sump and drain systems, where this was otherwise prohibited in the earlier draft.

Conclusions

Although the preceding discussion does not identify each and every change in the Region 6 NPDES general permit, the changes presented can be broadly characterized as representing a clarification of existing regulations, rather than a substantial overhaul of discharge requirements. This is important, because although there is a substantial effort across the industry to minimize discharges to sea, the further restriction of discharge limits for existing assets would compromise their original design intent and in many cases would require result in the abandonment of recoverable reserves due to the commercial and physical restrictions of the process and equipment upgrades this would necessarily entail.