

U.S. Environmental Protection Agency Regulatory and Permitting Issues for Produced Water Discharges



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The Clean Water Act

- Established the National Pollutant Discharge Elimination System (NPDES) permitting program
- Prohibits the discharge of pollutants, unless authorized by NPDES permits
- Requires permits to contain limits for:
 - Best Available Technology Economically Achievable (BAT)
 - Effluent Limitations Guidelines (ELGs) have established nationally applicable BAT for many industries
 - Water Quality based limits are added when technology based limits are not sufficient to protect water quality

Oil and Gas Extraction Effluent Limitations Guidelines (ELGs) 40 CFR Part 435

- Onshore Subcategory
 - No discharge
- Stripper Subcategory
 - Produces <10 bbl/day of oil
 - Oil and grease limited to 35 ppm
- Ag and Wildlife (western U.S.)
 - Wastewater must be of Good enough quality for Agriculture or Wildlife uses
- Coastal Subcategory
 - No discharge
- Offshore Subcategory
 - oil and grease 29/42 ppm



Most ELGs are not Recent

1979

- Onshore, Stripper, and Ag. and Wildlife Subcategories

1992

- Offshore Subcategory

1996

- Coastal Subcategory

2000

- Centralized Waste Treatment

Challenges with Current ELGs

- Onshore Subcategory – No pretreatment standards
 - Wastewater was taken to publicly owned treatment works during the shale gas boom
- Agriculture and Wildlife Use Subcategory
 - Produced water discharges must be of “good enough quality”
 - What exactly is good enough quality?
 - Contains no clearly defined limits
- Centralized Waste Treatment Facilities
 - Current regulations do not address oil and gas extraction wastes
 - Subcategories: Metals, Oils, Organics, and Mixed Wastes
 - Example: Oil and Grease limits are 38 ppm avg./127 ppm max.

Agriculture and Wildlife Use Subcategory

- Discharges are currently authorized in some western states
 - Currently mostly from conventional oil extraction
- States vary on what meets the limits of “good enough quality” for use in Agriculture or for wildlife
- TDS limits vary from 150 ppm to 10,000 ppm based on cattle watering
- Whole effluent toxicity limits applied in many cases



Water Quality Based Limits



- Based on levels needed to meet Water Quality Criteria
(protect human health and aquatic life)
 - Often allowed mixing in the receiving water
 - Mixing Zone size defined by State Water Quality Standards for discharges to State waters
 - State Water Quality Standards – State Waters
 - Numeric State Water Quality Standards
 - Aquatic life, fish consumption, water consumption
 - Narrative Standards (whole effluent toxicity or numeric interpretation)

Water Quality Criteria Issues

- Most States have not adopted water quality criteria for total dissolved solids (TDS)
 - Ionic components vary significantly by source
 - Produced water - chlorides
 - Coal Mines/Coal Bed Methane - bicarbonate and sulfate

Current EPA Activities:

- Revising criteria for chloride criteria
- Conductivity as a surrogate for TDS
 - Inexpensive and easy to measure
 - Impact varies with the mix of ions
- Developing tools to address effects of bromide on drinking water supplies - trihalomethane

Pending EPA Actions

- Pretreatment Standards for unconventional oil and gas
 - Proposal in early 2015
- Detailed study of Centralized Waste Treatment facilities accepting oil and gas wastewater
- Discontinued Coal Bed Methane ELG rulemaking
 - Current low level of activity
 - No nationally applicable standard could be developed

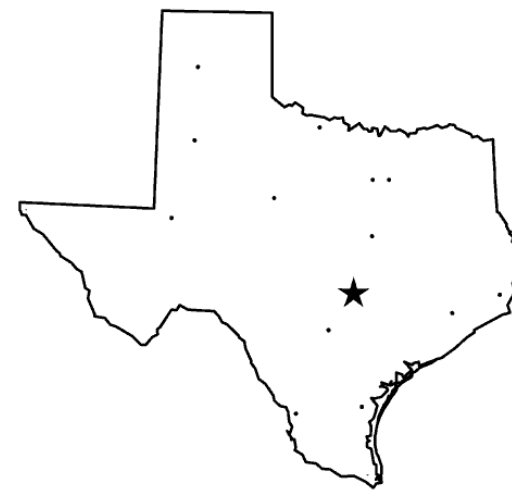
Recent EPA Permitting Actions

Western Gulf of Mexico Outer Continental Shelf (OCS)

- Issued September 2012
- Oil & Grease: 29 ppm avg./42 ppm max
- Chronic Whole Effluent Toxicity limits
 - Produced water characterization study
 - Ten samples per lease area
 - Metals and cyanide
 - Industry study alternative
 - Study Report submitted by 9/2015
- Well treatment completion and workover fluids limited as produced water



7/31/2012 Texas Coastal



- Produced water discharges prohibited
 - except from some stripper wells extracting from the Carrizo-Wilcox, Reklaw, and Bartosh Formations)
- Stripper wells (<10 bbl/day oil produced)
 - Oil and Grease: 25/35 mg/l
 - TDS: <3,000 mg/l
 - 100% Acute toxicity limit
 - Monitoring for discharge to Zn or Hg impaired waters
 - No discharge from new wells to waters impaired for dissolved oxygen (DO)

2/7/2012 Texas Territorial Seas

Few produced water discharges currently being made

Technology Based Limits

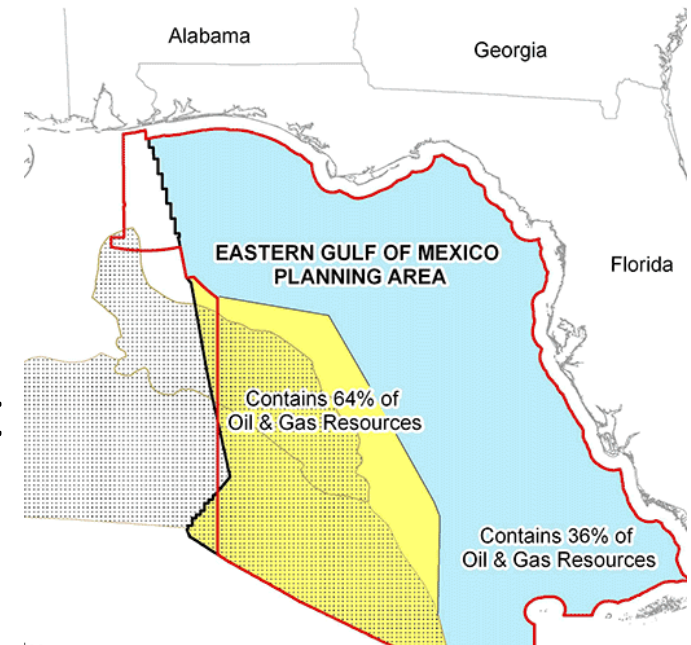
- Oil and Grease 29 mg/l / 42 mg/l

Water Quality Based Requirements

- Toxicity
 - 7-day Chronic limit (growth and reproduction)
 - Critical dilutions were recalculated
 - Texas 24-hr. Acute limit - 100% effluent
- Produced water characterization study
 - Produced water, receiving water, and sediment sampling for metals, benzene, and cyanide

Region 4 – Atlanta

- Eastern GOM OCS general permit
- Expires 3/15/2015
 - Covers facilities in >200 meters depth off Florida and Alabama
 - More extensive notification requirements than in the Western Gulf (Region 6)
 - Bottom surveys
 - Oil & Grease – 29 mg/l / 42 mg/l
 - Whole Effluent Toxicity
- Proposal Expected in mid-2015



Region 9 – San Francisco



California OCS permit issued 12/20/2013

- Oil & Grease Limits – 29 mg/l avg./
42 mg/l max
- Whole Effluent Toxicity
- State water quality standard based limits
 - Removed after analysis of data submitted under the previous permit
- New well treatment fluids chemical inventory and reporting requirements

Region 10 - Alaska



- North Slope general permit
 - No discharge - produced water
 - Issued 1/3/2012
- Arctic general permit Beaufort and Chukchi seas
 - Exploration only - No discharge of produced water
 - Reissued 10/2012
- Cook Inlet general permit - Exploration
 - Expired 5/2012
 - Only covers facilities in Federal waters
 - The discharge of produced water is not authorized
 - Alaska administers the program in state waters
 - is issuing the permit for those existing facilities

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