

PART 435—OIL AND GAS EXTRACTION POINT SOURCE CATEGORY

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Subpart A—Offshore Subcategory

SOURCE: 58 FR 12504, Mar. 4, 1993, unless otherwise noted.

§ 435.10 Applicability; description of the offshore subcategory.

The provisions of this subpart are 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 Clean Water Act.

[61 FR 66123, Dec. 16, 1996]

§ 435.11 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in 40 CFR part 401 shall apply to this subpart.

(b) The term *average of daily values for 30 consecutive days* shall be the average of the daily values obtained during any 30 consecutive day period.

(c) The term *daily values* as applied to produced water effluent limitations

and NSPS shall refer to the daily measurements used to assess compliance with the maximum for any one day.

(d) The term *deck drainage* shall refer to any waste resulting from deck washings, spillage, rainwater, and runoff from gutters and drains including drip pans and work areas within facilities subject to this subpart. Within the definition of deck drainage for the purpose of this subpart, the term rainwater for those facilities located on land is limited to that precipitation runoff that reasonably has the potential to come into contact with process wastewater. Runoff not included in the deck drainage definition would be subject to control as storm water under 40 CFR 122.26. For structures located over water, all runoff is included in the deck drainage definition.

(e) The term *development facility* shall mean any fixed or mobile structure subject to this subpart that is engaged in the drilling of productive wells.

(f) The term *diesel oil* shall refer to the grade of distillate fuel oil, as specified in the American Society for Testing and Materials Standard Specification for Diesel Fuel Oils D975-91, that is typically used as the continuous phase in conventional oil-based drilling fluids. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. Copies may be inspected at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. A copy may also be inspected at EPA's Water Docket; Room M2616, 401 M Street SW., Washington, DC 20460.

(g) The term *domestic waste* shall refer to materials discharged from sinks, showers, laundries, safety showers, eye-wash stations, hand-wash stations, fish cleaning stations, and galleys located within facilities subject to this subpart.

(h) The term *drill cuttings* shall refer to the particles generated by drilling into subsurface geologic formations and carried to the surface with the drilling fluid.

(i) The term *drilling fluid* refers to the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. The four classes of drilling fluids are:

(1) A water-based drilling fluid has water as the continuous phase and the suspending medium for solids, whether or not oil is present.

(2) An oil-based drilling fluid has diesel oil, mineral oil, or some other oil, but neither a synthetic material nor enhanced mineral oil, as its continuous phase with water as the dispersed phase.

(3) An enhanced mineral oil-based drilling fluid has an enhanced mineral oil as its continuous phase with water as the dispersed phase.

(4) A synthetic-based drilling fluid has a synthetic material as its continuous phase with water as the dispersed phase.

(j) The term *enhanced mineral oil* as applied to enhanced mineral oil-based drilling fluid means a petroleum distillate which has been highly purified and is distinguished from diesel oil and conventional mineral oil in having a lower polycyclic aromatic hydrocarbon (PAH) content. Typically, conventional mineral oils have a PAH content on the order of 0.35 weight percent expressed as phenanthrene, whereas enhanced mineral oils typically have a PAH content of 0.001 or lower weight percent PAH expressed as phenanthrene.

(k) The term *exploratory facility* shall mean any fixed or mobile structure subject to this subpart that is engaged in the drilling of wells to determine the nature of potential hydrocarbon reservoirs.

(l) The term *maximum* as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings shall mean the maximum concentration allowed as measured in any single sample of the barite.

(m) The term *maximum for any one day* as applied to BPT, BCT and BAT effluent limitations and NSPS for oil and grease in produced water shall mean the maximum concentration allowed as measured by the average of four grab samples collected over a 24-hour period that are analyzed separately. Alternatively, for BAT and

NSPS the maximum concentration allowed may be determined on the basis of physical composition of the four grab samples prior to a single analysis.

(n) The term *minimum* as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings shall mean the minimum 96-hour LC50 value allowed as measured in any single sample of the discharged waste stream. The term minimum as applied to BPT and BCT effluent limitations and NSPS for sanitary wastes shall mean the minimum concentration value allowed as measured in any single sample of the discharged waste stream.

(o) The term *M9IM* shall mean those offshore facilities continuously manned by nine (9) or fewer persons or only intermittently manned by any number of persons.

(p) The term *M10* shall mean those offshore facilities continuously manned by ten (10) or more persons.

(q) The term *new source* means any facility or activity of this subcategory that meets the definition of “new source” under 40 CFR 122.2 and meets the criteria for determination of new sources under 40 CFR 122.29(b) applied consistently with all of the following definitions:

(1) The term *water area* as used in the term “site” in 40 CFR 122.29 and 122.2 shall mean the water area and ocean floor beneath any exploratory, development, or production facility where such facility is conducting its exploratory, development or production activities.

(2) The term *significant site preparation work* as used in 40 CFR 122.29 shall mean the process of surveying, clearing or preparing an area of the ocean floor for the purpose of constructing or placing a development or production facility on or over the site. “New Source” does *not* include facilities covered by an existing NPDES permit immediately prior to the effective date of these guidelines pending EPA issuance of a new source NPDES permit.

(r) The term *no discharge of free oil* shall mean that waste streams may not be discharged when they would cause a film or sheen upon or a discoloration of the surface of the receiving water or fail the static sheen test defined in Appendix 1 to 40 CFR part 435, subpart A.

(s) The term *produced sand* shall refer to slurried particles used in hydraulic fracturing, the accumulated formation sands and scales particles generated during production.

Produced sand also includes desander discharge from the produced water waste stream, and blowdown of the water phase from the produced water treating system.

(t) The term *produced water* shall refer to the water (brine) brought up from the hydrocarbon-bearing strata during the extraction of oil and gas, and can include formation water, injection water, and any chemicals added downhole or during the oil/water separation process.

(u) The term *production facility* shall mean any fixed or mobile structure subject to this subpart that is either engaged in well completion or used for active recovery of hydrocarbons from producing formations.

(v) The term *sanitary waste* shall refer to human body waste discharged from toilets and urinals located within facilities subject to this subpart.

(w) The term *static sheen test* shall refer to the standard test procedure that has been developed for this industrial subcategory for the purpose of demonstrating compliance with the requirement of no discharge of free oil. The methodology for performing the static sheen test is presented in appendix 1 to 40 CFR part 435, subpart A.

(x) The term *synthetic material* as applied to synthetic-based drilling fluid means material produced by the reaction of specific purified chemical feedstock, as opposed to the traditional base fluids such as diesel and mineral oil which are derived from crude oil solely through physical separation processes. Physical separation processes include fractionation and distillation and/or minor chemical reactions such as cracking and hydro processing. Since they are synthesized by the reaction of purified compounds, synthetic materials suitable for use in drilling fluids are typically free of polycyclic aromatic hydrocarbons (PAH's) but are sometimes found to contain levels of PAH up to 0.001 weight percent PAH expressed as phenanthrene. Poly(alpha olefins) and vegetable esters are two examples of synthetic materials used

by the oil and gas extraction industry in formulating drilling fluids. Poly(alpha olefins) are synthesized from the polymerization (dimerization, trimerization, tetramerization, and higher oligomerization) of purified straight-chain hydrocarbons such as C₆-C₁₄ alpha olefins. Vegetable esters are synthesized from the acid-catalyzed esterification of vegetable fatty acids with various alcohols. The mention of these two branches of synthetic fluid base materials is to provide examples, and is not meant to exclude other synthetic materials that are either in current use or may be used in the future. A synthetic-based drilling fluid may include a combination of synthetic materials.

(y) The term *toxicity* as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings shall refer to the bioassay test procedure presented in Appendix 2 of 40 CFR part 435, subpart A.

(z) The term *well completion fluids* shall refer to salt solutions, weighted brines, polymers, and various additives used to prevent damage to the well bore during operations which prepare the drilled well for hydrocarbon production.

(aa) The term *well treatment fluids* shall refer to any fluid used to restore or improve productivity by chemically or physically altering hydrocarbon-bearing strata after a well has been drilled.

(bb) The term *workover fluids* shall refer to salt solutions, weighted brines, polymers, or other specialty additives used in a producing well to allow for maintenance, repair or abandonment procedures.

(cc) The term *96-hour LC50* shall refer to the concentration (parts per million) or percent of the suspended particulate phase (SPP) from a sample that is lethal to 50 percent of the test organisms exposed to that concentration of the SPP after 96 hours of constant exposure.

[61 FR 66124, Dec. 16, 1996]

§ 435.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30-32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available:

BPT EFFLUENT LIMITATIONS—OIL AND GREASE
[In milligrams per liter]

Pollutant parameter waste source	Maximum for any 1 day	Average of values for 30 consecutive days shall not exceed	Residual chlorine minimum for any 1 day
Produced water	72	48	NA
Deck drainage	(¹)	(¹)	NA
Drilling muds	(¹)	(¹)	NA
Drill cuttings	(¹)	(¹)	NA
Well treatment fluids	(¹)	(¹)	NA
Sanitary:			
M10	NA	NA	≥ 1
M9IM ³	NA	NA	NA
Domestic	NA	NA	NA

¹ No discharge of free oil.

² Minimum of 1 mg/l and maintained as close to this concentration as possible.

³ There shall be no floating solids as a result of the discharge of these wastes.

§ 435.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30-32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

BAT EFFLUENT LIMITATIONS

Waste source	Pollutant parameter	BAT effluent limitation
Produced water	Oil & grease	The maximum for any one day shall not exceed 42 mg/l; the average of daily values for 30 consecutive days shall not exceed 29 mg/l.
Drilling fluids and drill cuttings: (A) For facilities located within 3 miles from shore.	.....	No discharge. ¹
(B) For facilities located beyond 3 miles from shore.	Toxicity	Minimum 96-hour LC50 of the SPP shall be 3% by volume. ²
	Free oil	No discharge. ³
	Diesel oil	No discharge.
	Mercury	1 mg/kg dry weight maximum in the stock barite.
	Cadmium	3 mg/kg dry weight maximum in the stock barite.
Well treatment, completion, and work-over fluids.	Oil and grease.	The maximum for any one day shall not exceed 42 mg/l; the average of daily values for 30 consecutive days shall not exceed 29 mg/l.
Deck drainage	Free oil	No discharge. ⁴
Produced sand .....	.....	No discharge.
Domestic Waste	Foam	No discharge.

¹ All Alaskan facilities are subject to the drilling fluids and drill cuttings discharge limitations for facilities located beyond 3 miles offshore.

² As determined by the toxicity test (appendix 2).

³ As determined by the static sheen test (appendix 1).

⁴ As determined by the presence of a film or sheen upon or a discoloration of the surface of the receiving water (visual sheen).

§ 435.14 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30–32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

BCT Effluent Limitations

Waste source	Pollutant parameter	BCT effluent limitation
Produced water	Oil & grease	The maximum for any one day shall not exceed 72 mg/l; the average of values for 30 consecutive days shall not exceed 48 mg/l.
Drilling fluids and drill cuttings: (A) For facilities located within 3 miles from shore.	.....	No discharge. ¹
(B) For facilities located beyond 3 miles from shore.	Free oil	No discharge. ²
Well treatment, completion and work-over fluids.	Free oil	No discharge. ²
Deck drainage	Free oil	No discharge. ³
Produced sand .....	.....	No discharge.
Sanitary M10	Residual chlorine.	Minimum of 1 mg/l and maintained as close to this concentration as possible.
Sanitary M91M	Floating solids.	No discharge.
Domestic Waste	Floating solids.	No discharge.
	All other domestic waste.	See 33 CFR part 151.

¹ All Alaskan facilities are subject to the drilling fluids and drill cuttings discharge limitations for facilities located more than 3 miles offshore.

² As determined by the static sheen test (appendix 1).

³ As determined by the presence of a film or sheen upon or a discoloration of the surface of the receiving water (visual sheen).

§ 435.15 Standards of performance for new sources (NSPS).

Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

NEW SOURCE PERFORMANCE STANDARDS

Waste source	Pollutant parameter	NSPS
Produced water	Oil and grease.	The maximum for any one day shall not exceed 42 mg/l; the average of daily values for 30 consecutive days shall not exceed 29 mg/l.
Drilling fluids and drill cuttings: (A) For facilities located within 3 miles from shore.	.....	No discharge. ¹
(B) For facilities located more than 3 miles from shore.	Toxicity	Minimum 96-hour LC50 of the SPP shall be 3 percent by volume. ²

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NEW SOURCE PERFORMANCE STANDARDS— Continued

Waste source	Pollutant parameter	NSPS
Well treatment, completion, and workover fluids.	Free oil	No discharge. ³
	Diesel oil	No discharge.
	Mercury	1 mg/kg dry weight maximum in the stock barite.
	Cadmium	3 mg/kg dry weight maximum in the stock barite.
	Oil and grease.	The maximum for any one day shall not exceed 42 mg/l; the average of daily values for 30 consecutive days shall not exceed 29 mg/l.
Deck drainage	Free oil	No discharge. ⁴
Produced sand .....	.....	No discharge.
Sanitary M10	Residual chlorine.	Minimum of 1 mg/l and maintained as close to this as possible.
Sanitary M9IM	Floating solids.	No discharge.
Domestic Waste	Floating solids.	No discharge.
	Foam	No discharge.
	All other domestic wastes.	See 33 CFR part 151.

¹ All Alaskan facilities are subject to the drilling fluids and drill cuttings discharge standards for facilities located more than three miles offshore.

² As determined by the toxicity test (appendix 2).

³ As determined by the static sheen test (appendix 1).

⁴ As determined by the presence of a film or sheen upon or a discoloration of the surface of the receiving water (visual sheen).

APPENDIX 1 TO SUBPART A OF PART 435—STATIC SHEEN TEST

1. Scope and Application

This method is to be used as a compliance test for the “no discharge of free oil” requirement for discharges of drilling fluids, drill cuttings, produced sand, and well treatment, completion and workover fluids. “Free oil” refers to any oil contained in a waste stream that when discharged will cause a film or sheen upon or a discoloration of the surface of the receiving water.

2. Summary of Method

15-mL samples of drilling fluids or well treatment, completion, and workover fluids, and 15-g samples (wet weight basis) of drill cuttings or produced sand are introduced into ambient seawater in a container having an air-to-liquid interface area of 1000 cm² (155.5 in²). Samples are dispersed within the container and observations made no more than one hour later to ascertain if these materials cause a sheen, iridescence, gloss, or increased reflectance on the surface of the test seawater. The occurrence of any of these

visual observations will constitute a demonstration that the tested material contains “free oil,” and therefore results in a prohibition of its discharge into receiving waters.

3. Interferences

Residual “free oil” adhering to sampling containers, the magnetic stirring bar used to mix the sample, and the stainless steel spatula used to mix the sample will be the principal sources of contamination problems. These problems should only occur if improperly washed and cleaned equipment are used for the test. The use of disposable equipment minimizes the potential for similar contamination from pipettes and the test container.

4. Apparatus, Materials, and Reagents

4.1 Apparatus

4.1.1 Sampling Containers: 1-liter polyethylene beakers and 1-liter glass beakers.

4.1.2 Graduated cylinder: 100-mL graduated cylinder required only for operations where predilution of mud discharges is required.

4.1.3 Plastic disposable weighing boats.

4.1.4 Triple-beam scale.

4.1.5 Disposable pipettes: 25-mL disposable pipettes.

4.1.6 Magnetic stirrer and stirring bar.

4.1.7 Stainless steel spatula.

4.1.8 Test container: Open plastic container whose internal cross-section parallel to its opening has an area of 1000 cm²±50 cm² (155.5 ±7.75 in²), and a depth of at least 13 cm (5 inches) and no more than 30 cm (11.8 inches).

4.2 Materials and Reagents.

4.2.1 Plastic liners for the test container: Oil-free, heavy-duty plastic trash can liners that do not inhibit the spreading of an oil film. Liners must be of sufficient size to completely cover the interior surface of the test container. Permittees must determine an appropriate local source of liners that do not inhibit the spreading of 0.05 mL of diesel fuel added to the lined test container under the test conditions and protocol described below.

4.2.2 Ambient receiving water.

5. Calibration

None currently specified.

6. Quality Control Procedures

None currently specified.

7. Sample Collection and Handling

7.1 Sampling containers must be thoroughly washed with detergent, rinsed a minimum of three times with fresh water, and allowed to air dry before samples are collected.

7.2 Samples of drilling fluid to be tested shall be taken at the shale shaker after

cuttings have been removed. The sample volume should range between 200 mL and 500 mL.

7.3 Samples of drill cuttings will be taken from the shale shaker screens with a clean spatula or similar instrument and placed in a glass beaker. Cuttings samples shall be collected prior to the addition of any washdown water and should range between 200 g and 500 g.

7.4 Samples of produced sand must be obtained from the solids control equipment from which the discharge occurs on any given day and shall be collected prior to the addition of any washdown water; samples should range between 200 g and 500 g.

7.5 Samples of well treatment, completion, and workover fluids must be obtained from the holding facility prior to discharge; the sample volume should range between 200 mL and 500 mL.

7.6 Samples must be tested no later than 1 hour after collection.

7.7 Drilling fluid samples must be mixed in their sampling containers for 5 minutes prior to the test using a magnetic bar stirrer. If predilution is imposed as a permit condition, the sample must be mixed at the same ratio with the same prediluting water as the discharged muds and stirred for 5 minutes.

7.8 Drill cuttings must be stirred and well mixed by hand in their sampling containers prior to testing, using a stainless steel spatula.

8. Procedure

8.1 Ambient receiving water must be used as the "receiving water" in the test. The temperature of the test water shall be as close as practicable to the ambient conditions in the receiving water, not the room temperature of the observation facility. The test container must have an air-to-liquid interface area of 1000 ± 50 cm². The surface of the water should be no more than 1.27 cm (.5 inch) below the top of the test container.

8.2 Plastic liners shall be used, one per test container, and discarded afterwards. Some liners may inhibit spreading of added oil; operators shall determine an appropriate local source of liners that do not inhibit the spreading of the oil film.

8.3 A 15-mL sample of drilling fluid or well treatment, completion, and workover fluids must be introduced by pipette into the test container 1 cm below the water surface. Pipettes must be filled and discharged with test material prior to the transfer of test material and its introduction into test containers. The test water/test material mixture must be stirred using the pipette to distribute the test material homogeneously throughout the test water. The pipette must be used only once for a test and then discarded.

8.4 Drill cuttings or produced sand should be weighed on plastic weighing boats; 15-g samples must be transferred by scraping test material into the test water with a stainless steel spatula. Drill cuttings shall not be prediluted prior to testing. Also, drilling fluids and cuttings will be tested separately. The weighing boat must be immersed in the test water and scraped with the spatula to transfer any residual material to the test container. The drill cuttings or produced sand must be stirred with the spatula to an even distribution of solids on the bottom of the test container.

8.5 Observations must be made no later than 1 hour after the test material is transferred to the test container. Viewing points above the test container should be made from at least three sides of the test container, at viewing angles of approximately 60° and 30° from the horizontal. Illumination of the test container must be representative of adequate lighting for a working environment to conduct routine laboratory procedures. It is recommended that the water surface of the test container be observed under a fluorescent light source such as a dissecting microscope light. The light source shall be positioned above and directed over the entire surface of the pan.

8.6 Detection of a "silvery" or "metallic" sheen or gloss, increased reflectivity, visual color, iridescence, or an oil slick on the water surface of the test container surface shall constitute a demonstration of "free oil." These visual observations include patches, streaks, or sheets of such altered surface characteristics. If the free oil content of the sample approaches or exceeds 10%, the water surface of the test container may lack color, a sheen, or iridescence, due to the increased thickness of the film; thus, the observation for an oil slick is required. The surface of the test container shall not be disturbed in any manner that reduces the size of any sheen or slick that may be present.

If an oil sheen or slick occurs on less than one-half of the surface area after the sample is introduced to the test container, observations will continue for up to 1 hour. If the sheen or slick increases in size and covers greater than one-half of the surface area of the test container during the observation period, the discharge of the material shall cease. If the sheen or slick does not increase in size to cover greater than one-half of the test container surface area after one hour of observation, discharge may continue and additional sampling is not required.

If a sheen or slick occurs on greater than one-half of the surface area of the test container after the test material is introduced, discharge of the tested material shall cease. The permittee may retest the material causing the sheen or slick. If subsequent tests do

not result in a sheen or slick covering greater than one-half of the surface area of the test container, discharge may continue.

APPENDIX 2 TO SUBPART A OF PART 435—DRILLING FLUIDS TOXICITY TEST

I. Sample Collection

The collection and preservation methods for drilling fluids (muds) and water samples presented here are designed to minimize sample contamination and alteration of the physical or chemical properties of the samples due to freezing, air oxidation, or drying.

I-A Apparatus

(1) The following items are required for water and drilling mud sampling and storage:

- Acid-rinsed linear-polyethylene bottles or other appropriate noncontaminating drilling mud sampler.
- Acid-rinsed linear-polyethylene bottles or other appropriate noncontaminating water sampler.
- Acid-rinsed linear-polyethylene bottles or other appropriate noncontaminated vessels for water and mud samples.
- Ice chests for preservation and shipping of mud and water samples.

I-B. Water Sampling

(1) Collection of water samples shall be made with appropriate acid-rinsed linear-polyethylene bottles or other appropriate non-contaminating water sampling devices. Special care shall be taken to avoid the introduction of contaminants from the sampling devices and containers. Prior to use, the sampling devices and containers should be thoroughly cleaned with a detergent solution, rinsed with tap water, soaked in 10 percent hydrochloric acid (HCl) for 4 hours, and then thoroughly rinsed with glass-distilled water.

I-C. Drilling Mud Sampling

(1) Drilling mud formulations to be tested shall be collected from active field systems. Obtain a well-mixed sample from beneath the shale shaker after the mud has passed through the screens. Samples shall be stored in polyethylene containers or in other appropriate uncontaminated vessels. Prior to sealing the sample containers on the platform, flush as much air out of the container by filling it with drilling fluid sample, leaving a one inch space at the top.

(2) Mud samples shall be immediately shipped to the testing facility on blue or wet ice (do not use dry ice) and continuously maintained at 0-4° C until the time of testing.

(3) Bulk mud samples shall be thoroughly mixed in the laboratory using a 1000 rpm high shear mixer and then subdivided into

individual, small wide-mouthed (e.g., one or two liter) non-contaminating containers for storage.

(4) The drilling muds stored in the laboratory shall have any excess air removed by flushing the storage containers with nitrogen under pressure anytime the containers are opened. Moreover, the sample in any container opened for testing must be thoroughly stirred using a 1000 rpm high shear mixer prior to use.

(5) Most drilling mud samples may be stored for periods of time longer than 2 weeks prior to toxicity testing provided that proper containers are used and proper condition are maintained.

II. Suspended Particulate Phase Sample Preparation

(1) Mud samples that have been stored under specified conditions in this protocol shall be prepared for tests within three months after collection. The SPP shall be prepared as detailed below.

II--A Apparatus

(1) The following items are required:

- Magnetic stir plates and bars.
- Several graduated cylinders, ranging in volume from 10 mL to 1 L.
- Large (15 cm) powder funnels.
- Several 2-liter graduated cylinders.
- Several 2-liter large mouth graduated Erlenmeyer flasks.

(2) Prior to use, all glassware shall be thoroughly cleaned. Wash all glassware with detergent, rinse five times with tap water, rinse once with acetone, rinse several times with distilled or deionized water, place in a clean 10-percent (or stronger) HCl acid bath for a minimum of 4 hours, rinse five times with tap water, and then rinse five times with distilled or deionized water. For test samples containing mineral oil or diesel oil, glassware should be washed with petroleum ether to assure removal of all residual oil.

NOTE: If the glassware with nytex cups soaks in the acid solution longer than 24 hours, then an equally long deionized water soak should be performed.

II-B Test Seawater Sample Preparation

(1) Diluent seawater and exposure seawater samples are prepared by filtration through a 1.0 micrometer filter prior to analysis.

(2) Artificial seawater may be used as long as the seawater has been prepared by standard methods or ASTM methods, has been properly "seasoned," filtered, and has been diluted with distilled water to the same specified 20±2 ppt salinity and 20±2° C temperature as the "natural" seawater.

II-C Sample Preparation

(1) The pH of the mud shall be tested prior to its use. If the pH is less than 9, if black

spots have appeared on the walls of the sample container, or if the mud sample has a foul odor, that sample shall be discarded. Subsample a manageable aliquot of mud from the well-mixed original sample. Mix the mud and filtered test seawater in a volumetric mud-to-water ratio of 1 to 9. This is best done by the method of volumetric displacement in a 2-L, large mouth, graduated Erlenmeyer flask. Place 1000 mL of seawater into the graduated Erlenmeyer flask. The mud subsample is then carefully added via a powder funnel to obtain a total volume of 1200 mL. (A 200 mL volume of the mud will now be in the flask).

The 2-L, large mouth, graduated Erlenmeyer flask is then filled to the 2000 mL mark with 800 mL of seawater, which produces a slurry with a final ratio of one volume drilling mud to nine volumes water. If the volume of SPP required for testing or analysis exceeds 1500 to 1600 mL, the initial volumes should be proportionately increased. Alternatively, several 2-L drill mud/water slurries may be prepared as outlined above and combined to provide sufficient SPP.

(2) Mix this mud/water slurry with magnetic stirrers for 5 minutes. Measure the pH and, if necessary, adjust (decrease) the pH of the slurry to within 0.2 units of the seawater by adding 6N HCl while stirring the slurry. Then, allow the slurry to settle for 1 hour. Record the amount of HCl added.

(3) At the end of the settling period, carefully decant (do not siphon) the Suspended Particulate Phase (SPP) into an appropriate container. Decanting the SPP is one continuous action. In some cases no clear interface will be present; that is, there will be no solid phase that has settled to the bottom. For those samples the entire SPP solution should be used when preparing test concentrations. However, in those cases when no clear interface is present, the sample must be remixed for five minutes. This insures the homogeneity of the mixture prior to the preparation of the test concentrations. In other cases, there will be samples with two or more phases, including a solid phase. For those samples, carefully and continuously decant the supernatant until the solid phase on the bottom of the flask is reached. The decanted solution is defined to be 100 percent SPP. Any other concentration of SPP refers to a percentage of SPP that is obtained by volumetrically mixing 100 percent SPP with seawater.

(4) SPP samples to be used in toxicity tests shall be mixed for 5 minutes and must not be preserved or stored.

(5) Measure the filterable and unfilterable residue of each SPP prepared for testing. Measure the dissolved oxygen (DO) and pH of the SPP. If the DO is less than 4.9 ppm, aerate the SPP to at least 4.9 ppm which is 65 percent of saturation. Maximum allowable

aeration time is 5 minutes using a generic commercial air pump and air stone. Neutralize the pH of the SPP to a pH 7.8 ± 1 using a dilute HCl solution. If too much acid is added to lower the pH saturated NaOH may be used to raise the pH to 7.8 ± 1 units. Record the amount of acid or NaOH needed to lower/raise to the appropriate pH. Three repeated DO and pH measurements are needed to insure homogeneity and stability of the SPP. Preparation of test concentrations may begin after this step is complete.

(6) Add the appropriate volume of 100 percent SPP to the appropriate volume of seawater to obtain the desired SPP concentration. The control is seawater only. Mix all concentrations and the control for 5 minutes by using magnetic stirrers. Record the time; and, measure DO and pH for Day 0. Then, the animals shall be randomly selected and placed in the dishes in order to begin the 96-hour toxicity test.

III. Guidance for Performing Suspended Particulate Phase Toxicity Tests Using *Mysidopsis bahia*

III-A Apparatus

(1) Items listed by Borthwick [1] are required for each test series, which consists of one set of control and test containers, with three replicates of each.

III-B Sample Collection Preservation

(1) Drilling muds and water samples are collected and stored, and the suspended particulate phase prepared as described in section I-C.

III-C Species Selection

(1) The Suspended Particulate Phase (SPP) tests on drilling muds shall utilize the test species *Mysidopsis bahia*. Test animals shall be 3 to 6 days old on the first day of exposure. Whatever the source of the animals, collection and handling should be as gentle as possible. Transportation to the laboratory should be in well-aerated water from the animal culture site at the temperature and salinity from which they were cultured. Methods for handling, acclimating, and sizing bioassay organisms given by Borthwick [1] and Nimmo [2] shall be followed in matters for which no guidance is given here.

III-D Experimental Conditions

(1) Suspended particulate phase (SPP) tests should be conducted at a salinity of 20 ± 2 ppt. Experimental temperature should be $20 \pm 2^\circ\text{C}$. Dissolved oxygen in the SPP shall be raised to or maintained above 65 percent of saturation prior to preparation of the test concentrations. Under these conditions of temperature and salinity, 65 percent saturation is a DO of 5.3 ppm. Beginning at Day 0 before the animals are placed in the test containers

DO, temperature, salinity, and pH shall be measured every 24 hours. DO should be reported in milligrams per liter.

(2) Aeration of test media is required during the entire test with a rate estimated to be 50–140 cubic centimeters/minute. This air flow to each test dish may be achieved through polyethylene tubing (0.045-inch inner diameter and 0.062-inch outer diameter) by a small generic aquarium pump. The delivery method, surface area of the aeration stone, and flow characteristics shall be documented. All treatments, including control, shall be the same.

(3) Light intensity shall be 1200 microwatts/cm² using cool white fluorescent bulbs with a 14-hr light and 10-hr dark cycle. This light/dark cycle shall also be maintained during the acclimation period and the test.

III-E Experimental Procedure

(1) Wash all glassware with detergent, rinse five times with tap water, rinse once with acetone, rinse several times with distilled or deionized water, place in a clean 10 percent HCl acid bath for a minimum of 4 hours, rinse five times with tap water, and then rinse five times with distilled water.

(2) Establish the definitive test concentration based on results of a range finding test. A minimum of five test concentrations plus a negative and positive (reference toxicant) control is required for the definitive test. To estimate the LC-50, two concentrations shall be chosen that give (other than zero and 100 percent) mortality above and below 50 percent.

(3) Twenty organisms are exposed in each test dish. Nytex® cups shall be inserted into every test dish prior to adding the animals. These "nylon mesh screen" nytex holding cups are fabricated by gluing a collar of 363-micrometer mesh nylon screen to a 15-centimeter wide Petri dish with silicone sealant. The nylon screen collar is approximately 5 centimeters high. The animals are then placed into the test concentration within the confines of the Nytex cups.

(4) Individual organisms shall be randomly assigned to treatment. A randomization procedure is presented in section V of this protocol. Make every attempt to expose animals of approximately equal size. The technique described by Borthwick [1], or other suitable substitutes, should be used for transferring specimens. Throughout the test period, mysids shall be fed daily with approximately 50 *Artemia* (brine shrimp) nauplii per mysid. This will reduce stress and decrease cannibalism.

(5) Cover the dishes, aerate, and incubate the test containers in an appropriate test chamber. Positioning of the test containers holding various concentrations of test solution should be randomized if incubator arrangement indicates potential position dif-

ference. The test medium is not replaced during the 96-hour test.

(6) Observations may be attempted at 4, 6 and 8 hours; they must be attempted at 0, 24, 48, and 72 hours and must be made at 96 hours. Attempts at observations refers to placing a test dish on a light table and visually counting the animals. Do not lift the "nylon mesh screen" cup out of the test dish to make the observation. No unnecessary handling of the animals should occur during the 96 hour test period. DO and pH measurements must also be made at 0, 24, 48, 72, and 96 hours. Take and replace the test medium necessary for the DO and pH measurements outside of the nytex cups to minimize stresses on the animals.

(7) At the end of 96 hours, all live animals must be counted. Death is the end point, so the number of living organisms is recorded. Death is determined by lack of spontaneous movement. All crustaceans molt at regular intervals, shedding a complete exoskeleton. Care should be taken not to count an exoskeleton. Dead animals might decompose or be eaten between observations. Therefore, always count living, not dead animals. If daily observations are made, remove dead organisms and molted exoskeletons with a pipette or forceps. Care must be taken not to disturb living organisms and to minimize the amount of liquid withdrawn.

IV. Methods for Positive Control Tests (Reference Toxicant)

(1) Sodium lauryl sulfate (dodecyl sodium sulfate) is used as a reference toxicant for the positive control. The chemical used should be approximately 95 percent pure. The source, lot number, and percent purity shall be reported.

(2) Test methods are those used for the drilling fluid tests, except that the test material was prepared by weighing one gram sodium lauryl sulfate on an analytical balance, adding the chemical to a 100-milliliter volumetric flask, and bringing the flask to volume with deionized water. After mixing this stock solution, the test mixtures are prepared by adding 0.1 milliliter of the stock solution for each part per million desired to one liter of seawater.

(3) The mixtures are stirred briefly, water quality is measured, animals are added to holding cups, and the test begins. Incubation and monitoring procedures are the same as those for the drilling fluids.

V. Randomization Procedure

V-A Purpose and Procedure

(1) The purpose of this procedure is to assure that mysids are impartially selected and randomly assigned to six test treatments (five drilling fluid or reference toxicant concentrations and a control) and impartially counted at the end of the 96-hour

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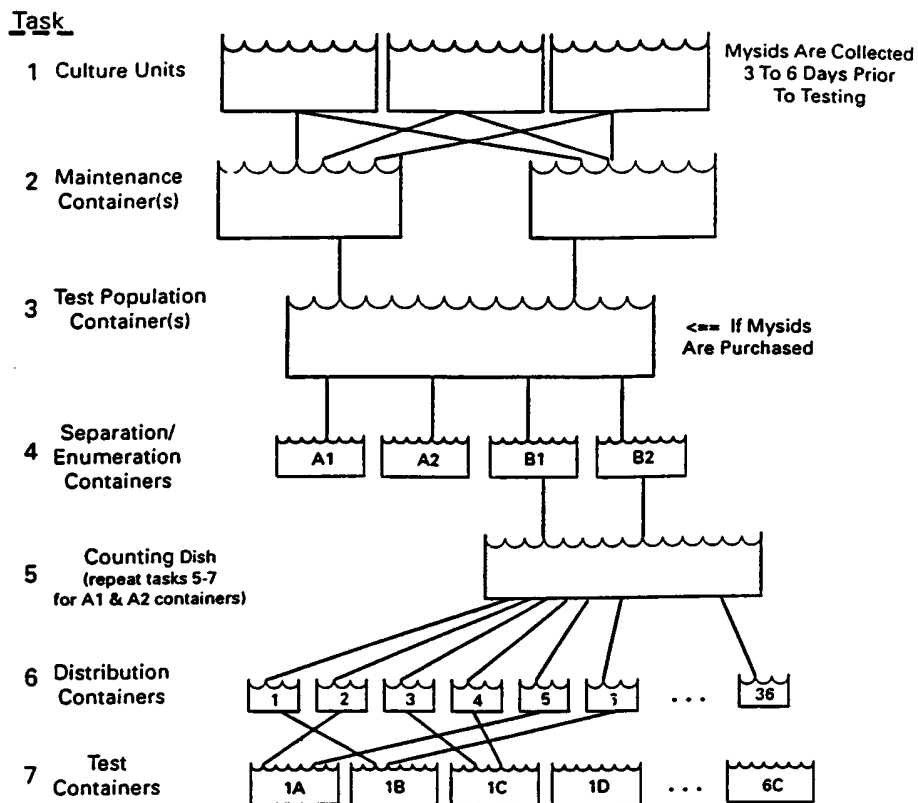
test. Thus, each test setup, as specified in the randomization procedure, consists of 3 replicates of 20 animals for each of the six treatments, i.e., 360 animals per test. Figure 1 is a flow diagram that depicts the procedure schematically and should be reviewed to understand the over-all operation. The following tasks shall be performed in the order listed.

(2) Mysids are cultured in the laboratory in appropriate units. If mysids are purchased, go to Task 3.

(3) Remove mysids from culture tanks (6, 5, 4, and 3 days before the test will begin, i.e. Tuesday, Wednesday, Thursday, and Friday if the test will begin on Monday) and place them in suitably large maintenance containers so that they can swim about freely and be fed.

NOTE: Not every detail (the definition of suitably large containers, for example) is provided here. Training and experience in aquatic animal culture and testing will be required to successfully complete these tests.

Figure 1
Mysid Randomization Procedure



(4) Remove mysids from maintenance containers and place all animals in a single container. The intent is to have homogeneous test population of mysids of a known age (3–6 days old).

(5) For each toxicity test, assign two suitable containers (500-milliliter (mL) beakers are recommended) for mysid separation/enumeration. Label each container (A1, A2, B1, B2, and C1, C2, for example, if two drilling fluid tests and a reference toxicant test are to be set up on one day). The purpose of this task is to allow the investigator to obtain a close estimate of the number of animals available for testing and to prevent unnecessary crowding of the mysids while they are being counted and assigned to test containers. Transfer the mysids from the large test population container to the labeled separation and enumeration containers but do not place more than 200 mysids in a 500-mL beaker. Be impartial in transferring the mysids; place approximately equal numbers of animals (10–15 mysids is convenient) in each container in a cyclic manner rather than placing the maximum number each container at one time.

NOTE: It is important that the animals not be unduly stressed during this selection and assignment procedure. Therefore, it will probably be necessary to place all animals (except the batch immediately being assigned to test containers) in mesh cups with flowing seawater or in large volume containers with aeration. The idea is to provide the animals with near optimal conditions to avoid additional stress.

(6) Place the mysids from the two labeled enumeration containers assigned to a specific test into one or more suitable containers to be used as counting dishes (2-liter Carolina dishes are suggested). Because of the time required to separate, count, and assign mysids, two or more people may be involved in completing this task. If this is done, two or more counting dishes may be used, but the investigator must make sure that approximately equal numbers of mysids from each labeled container are placed in each counting dish.

(7) By using a large-bore, smooth-tip glass pipette, select mysids from the counting dish(es) and place them in the 36 individually numbered distribution containers (10-ml beakers are suggested). The mysids are assigned two at a time to the 36 containers by using a randomization schedule similar to the one presented below. At the end of selection/assignment round 1, each container will contain two mysids; at the end of round 2, they will contain four mysids; and so on until each contains ten mysids.

EXAMPLE OF A RANDOMIZATION SCHEDULE

Selection/assignment round (2 mysids each)	Place mysid in the numbered distribution containers in the random order shown
1	8, 21, 6, 28, 33, 32, 1, 3, 10, 9, 4, 14, 23, 2, 34, 22, 36, 27, 5, 30, 35, 24, 12, 25, 11, 17, 19, 26, 31, 7, 20, 15, 18, 13, 16, 29.
2	35, 18, 5, 12, 32, 34, 22, 3, 9, 16, 26, 13, 20, 28, 6, 21, 24, 30, 8, 31, 7, 23, 2, 15, 25, 17, 1, 11, 27, 4, 19, 36, 10, 33, 14, 29.
3	7, 19, 14, 11, 34, 21, 25, 27, 17, 18, 6, 16, 29, 2, 32, 10, 4, 20, 3, 9, 1, 5, 28, 24, 31, 15, 22, 13, 33, 26, 36, 12, 8, 30, 35, 23.
4	30, 2, 18, 5, 8, 27, 10, 25, 4, 20, 26, 15, 31, 36, 35, 23, 11, 29, 16, 17, 28, 1, 33, 14, 9, 34, 7, 3, 12, 22, 21, 6, 19, 24, 32, 13.
5	34, 28, 16, 17, 10, 12, 1, 36, 20, 18, 15, 22, 2, 4, 19, 23, 27, 29, 25, 21, 30, 3, 9, 33, 32, 6, 14, 11, 35, 24, 26, 7, 31, 5, 13, 8.

(8) Transfer mysids from the 36 distribution containers to 18 labeled test containers in random order. A label is assigned to each of the three replicates (A, B, C) of the six test concentrations. Count and record the 96 hour response in an impartial order.

(9) Repeat tasks 5–7 for each toxicity test. A new random schedule should be followed in Tasks 6 and 7 for each test.

NOTE: If a partial toxicity test is conducted, the procedures described above are appropriate and should be used to prepare the single test concentration and control, along with the reference toxicant test.

V-B. Data Analysis and Interpretation

(1) Complete survival data in all test containers at each observation time shall be presented in tabular form. If greater than 10 percent mortality occurs in the controls, all data shall be discarded and the experiment repeated. Unacceptably high control mortality indicates the presence of important stresses on the organisms other than the material being tested, such as injury or disease, stressful physical or chemical conditions in the containers, or improper handling, acclimation, or feeding. If 10 percent mortality or less occurs in the controls, the data may be evaluated and reported.

(2) A definitive, full bioassay conducted according to the EPA protocol is used to estimate the concentration that is lethal to 50 percent of the test organisms that do not die naturally. This toxicity measure is known as the median lethal concentration, or LC-50. The LC-50 is adjusted for natural mortality or natural responsiveness. The maximum likelihood estimation procedure with the adjustments for natural responsiveness as given by D.J. Finney, in *Probit Analysis* 3rd edition, 1971, Cambridge University Press, chapter 7, can be used to obtain the probit model estimate of the LC-50 and the 95 percent fiducial (confidence) limits for the LC-50. These estimates are obtained using the logarithmic transform of the concentration. The heterogeneity factor (Finney 1971, pages 70-72) is not used. For a test material to pass the toxicity test, according to the requirements stated in the offshore oil and gas extraction industry BAT effluent limitations and NSPS, the LC-50, adjusted for natural responsiveness, must be greater than 3 percent suspended particulate phase (SPP) concentration by volume unadjusted for the 1 to 9 dilution. Other toxicity test models may be used to obtain toxicity estimates provided the modeled mathematical expression for the lethality rate must increase continuously with concentration. The lethality rate is modeled to increase with concentration to reflect an assumed increase in toxicity with concentration even though the observed lethality may not increase uniformly because of the unpredictable animal response fluctuations.

(3) The range finding test is used to establish a reasonable set of test concentrations in order to run the definitive test. However, if the lethality rate changes rapidly over a narrow range of concentrations, the range finding assay may be too coarse to establish an adequate set of test concentrations for a definitive test.

(4) The EPA Environmental Research Laboratory in Gulf Breeze, Florida prepared a Research and Development Report entitled Acute Toxicity of Eight Drilling Fluids to Mysid Shrimp (*Mysidopsis bahia*), May 1984 EPA-600/3-84-067. The Gulf Breeze data for drilling fluid number 1 are displayed in Table 1 for purposes of an example of the probit analysis described above. The SAS Probit Procedure (SAS Institute, Statistical Analysis System, Cary, North Carolina, 1982) was used to analyze these data. The 96-hour LC50 adjusted for the estimated spontaneous mortality rate is 3.3 percent SPP with 95 percent limits of 3.0 and 3.5 percent SPP with the 1 to 9 dilution. The estimated spontaneous mortality rate based on all of the data is 9.6 percent.

TABLE 1.—LISTING OF ACUTE TOXICITY TEST DATA (AUGUST 1983 TO SEPTEMBER 1983) WITH EIGHT GENERIC DRILLING FLUIDS AND MYSID SHRIMP

[fluid N2=1]

Percent concentration	Number exposed	Number dead (96 hours)	Number alive (96 hours)
0	60	3	57
1	60	11	49
2	60	11	49
3	60	25	35
4	60	48	12
5	60	60	0

V-C. The Partial Toxicity Test for Evaluation of Test Material

(1) A partial test conducted according to EPA protocol can be used economically to demonstrate that a test material passes the toxicity test. The partial test cannot be used to estimate the LC-50 adjusted for natural response.

(2) To conduct a partial test follow the test protocol for preparation of the test material and organisms. Prepare the control (zero concentration), one test concentration (3 percent suspended particulate phase) and the reference toxicant according to the methods of the full test. A range finding test is not used for the partial test.

(3) Sixty test organisms are used for each test concentration. Find the number of test organisms killed in the control (zero percent SPP) concentration in the column labeled X_0 of Table 2. If the number of organisms in the control (zero percent SPP) exceeds the table values, then the test is unacceptable and must be repeated. If the number of organisms killed in the 3 percent test concentration is less than or equal to corresponding number in the column labeled X_1 then the test material passes the partial toxicity test. Otherwise the test material fails the toxicity test.

(4) Data shall be reported as percent suspended particulate phase.

TABLE 2

X_0	X_1
0	22
1	22
2	23
3	23
4	24
5	24
6	25

VI. References

1. Borthwick, Patrick W. 1978. Methods for acute static toxicity tests with mysid

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shrimp (*Mysidopsis bahia*). Bioassay Procedures for the Ocean Disposal Permit Program, [EPA-600/9-78-010:] March.

2. Nimmo, D.R., T.L. Hamaker, and C.A. Somers. 1978. Culturing the mysid (*Mysidopsis bahia*) in flowing seawater or a static system. Bioassay Procedures for the Ocean Disposal Permit Program, [EPA-600/9-78-010:] March.

3. American Public Health Association et al. 1980. Standard Methods for the Examination of Water and Wastewater. Washington, DC, 15th Edition: 90-99.

4. U.S. Environmental Protection Agency, September 1991. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. EPA/600/4-90/027. Washington, DC, 4th Edition.

5. Finney, D.J. Probit Analysis. Cambridge University Press; 1971.

6. U.S. Environmental Protection Agency, May 1984. Acute Toxicity of Eight Drilling Fluids to Mysid Shrimp (*Mysidopsis bahia*). EPA-600/3-84-067.

Subpart B—[Reserved]

Subpart C—Onshore Subcategory

§ 435.30 Applicability; description of the onshore subcategory.

The provisions of this subpart are applicable to those facilities engaged in the production, field exploration, drilling, well completion and well treatment in the oil and gas extraction industry which are located landward of the inner boundary of the territorial seas as defined in 40 CFR 125.1(gg) and which are not included within subpart D, E, or F, *Provided, however*, That the applicability of this subpart to (a) facilities in existence on April 13, 1979 or thereafter engaged in the production, field exploration, drilling, well completion and well treatment in the oil and gas extraction industry which are located on land and which would have been considered "coastal" as defined under the interim final regulations for this industry (40 CFR 435.41, 41 FR 44942, October 13, 1976) or which are (b) located in the Santa Maria Basin of California is suspended.

(Secs. 301, 304(b) and 501 of the Clean Water Act as amended, 33 U.S.C. 1251 *et seq.*)

[44 FR 22075, Apr. 13, 1979, as amended at 47 FR 31555, July 21, 1982]

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§ 435.31 Specialized definitions.

For the purpose of this subpart:

(a) The general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 shall apply to this subpart.

§ 435.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Except as provided in §§ 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT): there shall be no discharge of waste water pollutants into navigable waters from any source associated with production, field exploration, drilling, well completion, or well treatment (i.e., produced water, drilling muds, drill cuttings, and produced sand).

[60 FR 33966, June 29, 1995]

Subpart D—Coastal Subcategory

SOURCE: 61 FR 66125, Dec. 16, 1996, unless otherwise noted.

§ 435.40 Applicability; description of the coastal subcategory.

The provisions of this subpart are 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." The term "coastal" shall mean:

(a) Any location in or on a water of the United States landward of the inner boundary of the territorial seas; or

(b)(1) Any location landward from the inner boundary of the territorial seas and bounded on the inland side by the line defined by the inner boundary of the territorial seas eastward of the point defined by 89°45' West Longitude and 29°46' North Latitude and continuing as follows west of that point:

Direction to west longitude	Direction to north latitude
West, 89°48'	North, 29°50'.

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Direction to west longitude	Direction to north latitude
West, 90°12'	North, 30°06'.
West, 90°20'	South, 29°35'.
West, 90°35'	South, 29°30'.
West, 90°43'	South, 29°25'.
West, 90°57'	North, 29°32'.
West, 91°02'	North, 29°40'.
West, 91°14'	South, 29°32'.
West, 91°27'	North, 29°37'.
West, 91°33'	North, 29°46'.
West, 91°46'	North, 29°50'.
West, 91°50'	North, 29°55'.
West, 91°56'	South, 29°50'.
West, 92°10'	South, 29°44'.
West, 92°55'	North, 29°46'.
West, 93°15'	North, 30°14'.
West, 93°49'	South, 30°07'.
West, 94°03'	South, 30°03'.
West, 94°10'	South, 30°00'.
West, 94°20'	South, 29°53'.
West, 95°00'	South, 29°35'.
West, 95°13'	South, 29°28'.
East, 95°08'	South, 29°15'.
West, 95°11'	South, 29°08'.
West, 95°22'	South, 28°56'.
West, 95°30'	South, 28°55'.
West, 95°33'	South, 28°49'.
West, 95°40'	South, 28°47'.
West, 96°42'	South, 28°41'.
East, 96°40'	South, 28°28'.
West, 96°54'	South, 28°20'.
West, 97°03'	South, 28°13'.
West, 97°15'	South, 27°58'.
West, 97°40'	South, 27°45'.
West, 97°46'	South, 27°28'.
West, 97°51'	South, 27°22'.
East, 97°46'	South, 27°14'.
East, 97°30'	South, 26°30'.
East, 97°26'	South, 26°11'.

(2) East to 97°19' West Longitude and Southward to the U.S.-Mexican border.

§ 435.41 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in 40 CFR part 401 shall apply to this subpart.

(b) The term *average of daily values for 30 consecutive days* shall be the average of the daily values obtained during any 30 consecutive day period.

(c) The term *Cook Inlet* refers to coastal locations north of the line between Cape Douglas on the West and Port Chatham on the east.

(d) The term *daily values* as applied to produced water effluent limitations and NSPS shall refer to the daily measurements used to assess compliance with the maximum for any one day.

(e) The term *deck drainage* shall refer to any waste resulting from deck washings, spillage, rainwater, and runoff from gutters and drains including

drip pans and work areas within facilities subject to this subpart.

(f) The term *development facility* shall mean any fixed or mobile structure subject to this subpart that is engaged in the drilling of productive wells.

(g) The term *dewatering effluent* means wastewater from drilling fluids and drill cuttings dewatering activities (including but not limited to reserve pits or other tanks or vessels, and chemical or mechanical treatment occurring during the drilling solids separation/recycle/disposal process).

(h) The term *diesel oil* shall refer to the grade of distillate fuel oil, as specified in the American Society for Testing and Materials Standard Specification for Diesel Fuel Oils D975-91, that is typically used as the continuous phase in conventional oil-based drilling fluids. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. Copies may be inspected at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. A copy may also be inspected at EPA's Water Docket; Room M2616, 401 M Street SW., Washington, DC 20460.

(i) The term *domestic waste* shall refer to materials discharged from sinks, showers, laundries, safety showers, eye-wash stations, hand-wash stations, fish cleaning stations, and galleys located within facilities subject to this subpart.

(j) The term *drill cuttings* shall refer to the particles generated by drilling into subsurface geologic formations and carried to the surface with the drilling fluid.

(k) The term *drilling fluid* refers to the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counter-balance formation pressure. The four classes of drilling fluids are:

(1) A water-based drilling fluid has water as the continuous phase and the suspending medium for solids, whether or not oil is present.

(2) An oil-based drilling fluid has diesel oil, mineral oil, or some other oil,

but neither a synthetic material nor enhanced mineral oil, as its continuous phase with water as the dispersed phase.

(3) An enhanced mineral oil-based drilling fluid has an enhanced mineral oil as its continuous phase with water as the dispersed phase.

(4) A synthetic-based drilling fluid has a synthetic material as its continuous phase with water as the dispersed phase.

(l) The term *enhanced mineral oil* as applied to enhanced mineral oil-based drilling fluid means a petroleum distillate which has been highly purified and is distinguished from diesel oil and conventional mineral oil in having a lower polycyclic aromatic hydrocarbon (PAH) content. Typically, conventional mineral oils have a PAH content on the order of 0.35 weight percent expressed as phenanthrene, whereas enhanced mineral oils typically have a PAH content of 0.001 or lower weight percent PAH expressed as phenanthrene.

(m) The term *exploratory facility* shall mean any fixed or mobile structure subject to this subpart that is engaged in the drilling of wells to determine the nature of potential hydrocarbon reservoirs.

(n) The term *garbage* means all kinds of virtual, domestic, and operational waste, excluding fresh fish and parts thereof, generated during the normal operation of coastal oil and gas facility and liable to be disposed of continuously or periodically, except dishwater, graywater, and those substances that are defined or listed in other Annexes to MARPOL 73/78. A copy of MARPOL may be inspected at EPA's Water Docket; Room M2616, 401 M Street SW, Washington, DC 20460.

(o) The term *maximum* as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings shall mean the maximum concentration allowed as measured in any single sample of the barite.

(p) The term *maximum for any one day* as applied to BPT, BCT and BAT effluent limitations and NSPS for oil and grease in produced water shall mean the maximum concentration allowed as measured by the average of four grab samples collected over a 24-hour period that are analyzed separately. Alter-

natively, for BAT and NSPS, the maximum concentration allowed may be determined on the basis of physical composition of the four grab samples prior to a single analysis.

(q) The term *minimum* as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings shall mean the minimum 96-hour LC50 value allowed as measured in any single sample of the discharged waste stream. The term minimum as applied to BPT and BCT effluent limitations and NSPS for sanitary wastes shall mean the minimum concentration value allowed as measured in any single sample of the discharged waste stream.

(r) The term *M9IM* shall mean those coastal facilities continuously manned by nine (9) or fewer persons or only intermittently manned by any number of persons.

(s) The term *M10* shall mean those coastal facilities continuously manned by ten (10) or more persons.

(t)(1) The term *new source* means any facility or activity of this subcategory that meets the definition of "new source" under 40 CFR 122.2 and meets the criteria for determination of new sources under 40 CFR 122.29(b) applied consistently with all of the following definitions:

(i) The term *water area* as used in the term "site" in 40 CFR 122.29 and 122.2 shall mean the water area and water body floor beneath any exploratory, development, or production facility where such facility is conducting its exploratory, development or production activities.

(ii) The term *significant site preparation work* as used in 40 CFR 122.29 shall mean the process of surveying, clearing or preparing an area of the water body floor for the purpose of constructing or placing a development or production facility on or over the site.

(2) "New Source" does not include facilities covered by an existing NPDES permit immediately prior to the effective date of these guidelines pending EPA issuance of a new source NPDES permit.

(u) The term *no discharge of free oil* shall mean that waste streams may not be discharged when they would cause a film or sheen upon or a discoloration of the surface of the receiving water or

fail the static sheen test defined in appendix 1 to 40 CFR part 435, subpart A.

(v) The term *produced sand* shall refer to slurried particles used in hydraulic fracturing, the accumulated formation sands and scales particles generated during production. Produced sand also includes desander discharge from the produced water waste stream, and blowdown of the water phase from the produced water treating system.

(w) The term *produced water* shall refer to the water (brine) brought up from the hydrocarbon-bearing strata during the extraction of oil and gas, and can include formation water, injection water, and any chemicals added downhole or during the oil/water separation process.

(x) The term *production facility* shall mean any fixed or mobile structure subject to this subpart that is either engaged in well completion or used for active recovery of hydrocarbons from producing formations. It includes facilities that are engaged in hydrocarbon fluids separation even if located separately from wellheads.

(y) The term *sanitary waste* shall refer to human body waste discharged from toilets and urinals located within facilities subject to this subpart.

(z) The term *static sheen test* shall refer to the standard test procedure that has been developed for this industrial subcategory for the purpose of demonstrating compliance with the requirement of no discharge of free oil. The methodology for performing the static sheen test is presented in appendix 1 to 40 CFR part 435, subpart A.

(aa) The term *synthetic material* as applied to synthetic-based drilling fluid means material produced by the reaction of specific purified chemical feedstock, as opposed to the traditional base fluids such as diesel and mineral oil which are derived from crude oil solely through physical separation processes. Physical separation processes include fractionation and distillation and/or minor chemical reactions such as cracking and hydro processing. Since they are synthesized by the reaction of purified compounds, synthetic materials suitable for use in drilling fluids are typically free of polycyclic aromatic hydrocarbons (PAH's) but are sometimes found to contain levels of

PAH up to 0.001 weight percent PAH expressed as phenanthrene. Poly(alpha olefins) and vegetable esters are two examples of synthetic used by the oil and gas extraction industry in formulating drilling fluids. Poly(alpha olefins) are synthesized from the polymerization (dimerization, trimerization, tetramerization, and higher oligomerization) of purified straight-chain hydrocarbons such as C₆-C₁₄ alpha olefins. Vegetable esters are synthesized from the acid-catalyzed esterification of vegetable fatty acids with various alcohols. The mention of these two branches of synthetic fluid base materials is to provide examples, and is not meant to exclude other synthetic materials that are either in current use or may be used in the future. A synthetic-based drilling fluid may include a combination of synthetic materials.

(bb) The term *toxicity* as applied to BAT effluent limitations and NSPS for drilling fluids and drill cuttings shall refer to the bioassay test procedure presented in appendix 2 of 40 CFR part 435, subpart A.

(cc) The term *well completion fluids* shall refer to salt solutions, weighted brines, polymers, and various additives used to prevent damage to the well bore during operations which prepare the drilled well for hydrocarbon production.

(dd) The term *well treatment fluids* shall refer to any fluid used to restore or improve productivity by chemically or physically altering hydrocarbon-bearing strata after a well has been drilled.

(ee) The term *workover fluids* shall refer to salt solutions, weighted brines, polymers, or other specialty additives used in a producing well to allow for maintenance, repair or abandonment procedures.

(ff) The term *96-hour LC50* shall refer to the concentration (parts per million) or percent of the suspended particulate phase (SPP) from a sample that is lethal to 50 percent of the test organisms exposed to that concentration of the SPP after 96 hours of constant exposure.

[61 FR 66125, Dec. 16, 1996; 62 FR 1681, Jan. 13, 1997]

§ 435.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30–125.32, any existing point source sub-

ject to this Subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

BPT EFFLUENT LIMITATIONS—OIL AND GREASE
[In milligrams per liter]

Pollutant parameter waste source	Maximum for any 1 day	Average of values for 30 consecutive days shall not exceed	Residual chlorine minimum for any 1 day
Produced water	72	48	NA
Deck drainage	(¹)	(¹)	NA
Drilling fluid	(¹)	(¹)	NA
Drill cuttings	(¹)	(¹)	NA
Well treatment, workover, and completion fluids	(¹)	(¹)	NA
Sanitary:			
M10	NA	NA	≥ 1
M9IM ³	NA	NA	NA
Domestic ³	NA	NA	NA
Produced sand	Zero discharge	Zero discharge	NA

¹ No discharge of free oil.

² Minimum of 1 mg/l and maintained as close to this concentration as possible.

³ There shall be no floating solids as a result of the discharge of these wastes.

§ 435.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30–125.32, any existing point source sub-

ject to this Subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

BAT EFFLUENT LIMITATIONS

Stream	Pollutant parameter	BAT effluent limitations
Produced Water:		
(A) All coastal areas except Cook Inlet .....	.....	No discharge.
(B) Cook Inlet	Oil & Grease	The maximum for any one day shall not exceed 42 mg/l, and the 30-day average shall not exceed 29 mg/l.
Drilling Fluids, Drill Cuttings, and Dewatering Effluent: ¹		
(A) All coastal areas except Cook Inlet .....	.....	No discharge.
(B) Cook Inlet	Free Oil ²	No discharge.
	Diesel Oil	No discharge.
	Mercury	1 mg/kg dry weight maximum in the stock barite.
	Cadmium	3 mg/kg dry weight maximum in the stock barite.
	Toxicity	Minimum 96-hour LC50 of the SPP shall be 3 percent by volume. ⁴
Well Treatment, Workover and Completion Fluids:		
(A) All coastal areas except Cook Inlet .....	.....	No discharge.
(B) Cook Inlet	Oil & Grease	The maximum for any one day shall not exceed 42 mg/l, and the 30-day average shall not exceed 29 mg/l.
Produced Sand .....	.....	No discharge.
Deck Drainage	Free Oil ³	No discharge.

BAT EFFLUENT LIMITATIONS—Continued

Stream	Pollutant parameter	BAT effluent limitations
Domestic Waste	Foam	No discharge.

¹ BAT limitations for dewatering effluent are applicable prospectively. BAT limitations in this rule are not applicable to discharges of dewatering effluent from reserve pits which as of the effective date of this rule no longer receive drilling fluids and drill cuttings. Limitations on such discharges shall be determined by the NPDES permit issuing authority.

² As determined by the static sheen test (see appendix 1 to 40 CFR Part 435, subpart A).

³ As determined by the presence of a film or sheen upon or a discoloration of the surface of the receiving water (visual sheen).

⁴ As determined by the toxicity test (see appendix 2 of 40 CFR Part 435, subpart A).

[61 FR 66125, Dec. 16, 1996; 62 FR 1681, Jan. 13, 1997]

§ 435.44 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30–125.32, any existing point source sub-

ject to this Subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

BCT EFFLUENT LIMITATIONS

Stream	Pollutant parameter	BCT effluent limitations
Produced Water (all facilities)	Oil & Grease	The maximum for any one day shall not exceed 72 mg/l and the 30-day average shall not exceed 48 mg/l.
Drilling Fluids and Drill Cuttings and Dewatering Effluent: ¹		
All facilities except Cook Inlet		No discharge.
Cook Inlet	Free Oil	No discharge. ²
Well Treatment, Workover and Completion Fluids.	Free Oil	No discharge. ²
Produced Sand		No discharge.
Deck Drainage	Free Oil	No discharge. ³
Sanitary Waste:		
Sanitary M10	Residual Chlorine	Minimum of 1 mg/l maintained as close to this concentration as possible.
Sanitary M91M	Floating Solids	No discharge.
Domestic Waste	Floating Solids and garbage	No discharge of Floating Solids or garbage.

¹ BCT limitations for dewatering effluent are applicable prospectively. BCT limitations in this rule are not applicable to discharges of dewatering effluent from reserve pits which as of the effective date of this rule no longer receive drilling fluids and drill cuttings. Limitations on such discharges shall be determined by the NPDES permit issuing authority.

² As determined by the static sheen test (see appendix 1 to 40 CFR part 435, subpart A).

³ As determined by the presence of a film or sheen upon or a discoloration of the surface of the receiving water (visual sheen).

[61 FR 66125, Dec. 16, 1996; 62 FR 1682, Jan. 13, 1997]

§ 435.45 Standards of performance for new sources (NSPS).

Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

NSPS EFFLUENT LIMITATIONS

Stream	Pollutant parameter	NSPS effluent limitations
Produced Water:		
(A) All coastal areas except Cook Inlet		No discharge.
(B) Cook Inlet	Oil & Grease	The maximum for any one day shall not exceed 42 mg/l, and the 30-day average shall not exceed 29 mg/l.
Drilling Fluids, Drill Cuttings, and Dewatering Effluent: ¹		
(A) All coastal areas except Cook Inlet		No discharge.
(B) Cook Inlet	Free Oil ²	No discharge.

NSPS EFFLUENT LIMITATIONS—Continued

Stream	Pollutant parameter	NSPS effluent limitations
Well Treatment, Workover and Completion Fluids:	Diesel Oil	No discharge.
	Mercury	1 mg/kg dry weight maximum in the stock barite.
	Cadmium	3 mg/kg dry weight maximum in the stock barite.
	Toxicity	Minimum 96-hour LC50 of the SPP shall be 3 percent by volume. ⁴
	(A) All coastal areas except Cook Inlet	No discharge.
(B) Cook Inlet	Oil & Grease	The maximum for any one day shall not exceed 42 mg/l, and the 30-day average shall not exceed 29 mg/l.
Produced Sand	Free Oil ³	No discharge.
Deck Drainage	Residual Chlorine	No discharge.
Sanitary Waste	Floating Solids	Minimum of 1 mg/l and maintained as close to this concentration as possible.
Sanitary M10	Floating Solids, Garbage and Foam	No discharge.
Sanitary M9IM		No discharge of floating solids or garbage or foam.
Domestic Waste		

¹ NSPS limitations for dewatering effluent are applicable prospectively. NSPS limitations in this rule are not applicable to discharges of dewatering effluent from reserve pits which as of the effective date of this rule no longer receive drilling fluids and drill cuttings. Limitations on such discharges shall be determined by the NPDES permit issuing authority.

² As determined by the static sheen test (see appendix 1 to 40 CFR Part 435, subpart A).

³ As determined by the presence of a film or sheen upon or a discoloration of the surface of the receiving water (visual sheen).

⁴ As determined by the toxicity test (see appendix 2 of 40 CFR Part 435, subpart A).

[61 FR 66125, Dec. 16, 1996; 62 FR 1682, Jan. 13, 1997]

§ 435.46 Pretreatment standards of performance for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source with discharges subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR part 403 and achieve the following pretreatment standards for existing sources (PSES).

PSES EFFLUENT LIMITATIONS

Stream	Pollutant parameter	PSES effluent limitations
Produced Water	No discharge.
Drilling Fluids and Drill Cuttings Well Treatment.	No discharge.
Workover and Completion Fluids.	No discharge.
Produced Sand	No discharge.
Deck Drainage	No discharge.

§ 435.47 Pretreatment standards of performance for new sources (PSNS).

Except as provided in 40 CFR 403.7 and 403.13, any new source with discharges subject to this subpart that introduces pollutants into a publicly owned treatment works must comply

with 40 CFR part 403 and achieve the following pretreatment standards for new sources (PSNS).

PSNS EFFLUENT LIMITATIONS

Stream	Pollutant parameter	PSNS effluent limitations
Produced Water (all facilities).	No discharge.
Drilling fluids and Drill Cuttings.	No discharge.
Well Treatment, Workover and Completion Fluids.	No discharge.
Produced Sand	No discharge.
Deck Drainage	No discharge.

Subpart E—Agricultural and Wildlife Water Use Subcategory

§ 435.50 Applicability; description of the beneficial use subcategory.

The provisions of this subpart are applicable to those onshore facilities located in the continental United States and west of the 98th meridian for which the produced water has a use in agriculture or wildlife propagation when discharged into navigable waters. These facilities are engaged in the production, drilling, well completion, and

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well treatment in the oil and gas extraction industry.

§ 435.51 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 shall apply to this subpart.

(b) The term “onshore” shall mean all land areas landward of the territorial seas as defined in 40 CFR 125.1(gg).

(c) The term “use in agricultural or wildlife propagation” means that the produced water is of good enough quality to be used for wildlife or livestock watering or other agricultural uses and that the produced water is actually put to such use during periods of discharge.

§ 435.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Except as provided in §§ 125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

(a) There shall be no discharge of waste pollutants into navigable waters from any source (other than produced water) associated with production, field exploration, drilling, well completion, or well treatment (i.e., drilling muds, drill cuttings, and produced sands).

(b) Produced water discharges shall not exceed the following daily maximum limitation:

Effluent characteristics: Effluent limitation (mg/l).

Oil and Grease: 35.

[44 FR 22075, Apr. 13, 1979, as amended at 60 FR 33967, June 29, 1995]

Subpart F—Stripper Subcategory

§ 435.60 Applicability; description of the stripper subcategory.

The provisions of this subpart are applicable to those onshore facilities 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 industry.

§ 435.61 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR part 401 shall apply to this subpart.

(b) The term “onshore” shall mean all land areas landward of the inner boundary of the territorial seas as defined in 40 CFR 125.1(gg).

(c) The term “well” shall mean crude oil producing wells and shall not include gas wells or wells injecting water for disposal or for enhanced recovery of oil or gas.

(d) The term “gas well” shall mean any well which produces natural gas in a ratio to the petroleum liquids produced greater than 15,000 cubic feet of gas per 1 barrel (42 gallons) of petroleum liquids.

Subpart G—General Provisions

SOURCE: 61 FR 66129, Dec. 16, 1996, unless otherwise noted.

§ 435.70 Applicability.

(a) *Purpose.* This subpart is intended to prevent oil and gas facilities, for which effluent limitations guidelines and standards, new source performance standards, or pretreatment standards have been promulgated under this part, from circumventing the effluent limitations guidelines and standards applicable to those facilities by moving effluent produced in one subcategory to another subcategory for disposal under less stringent requirements than intended by this part.

(b) *Applicability.* The effluent limitations and standards applicable to an oil and gas facility shall be determined as follows:

(1) An Oil and Gas facility, operator, or its agent or contractor may move its wastewaters from a facility located in one subcategory to another subcategory for treatment and return it to

a location covered by the original subcategory for disposal. In such case, the effluent limitations guidelines, new source performance standards, or pretreatment standards for the original subcategory apply.

(2) An Oil and Gas facility, operator, or its agent or contractor may move its wastewaters from a facility located in one subcategory to another subcategory for disposal or treatment and disposal, provided:

(i) If an Oil and Gas facility, operator or its agent or contractor moves wastewaters from a wellhead located in one subcategory to another subcategory where oil and gas facilities are governed by less stringent effluent limitations guidelines, new source performance standards, or pretreatment standards, the more stringent effluent limitations guidelines, new source performance standards, or pretreatment standards applicable to the subcategory where the wellhead is located shall apply.

(ii) If an Oil and Gas facility, operator or its agent moves effluent from a wellhead located in one subcategory to another subcategory where oil and gas facilities are governed by more stringent effluent limitations guidelines, new source performance standards, or pretreatment standards, the more stringent effluent limitations guidelines, new source performance standards, or pretreatment standards applicable at the point of discharge shall apply.

PART 436—MINERAL MINING AND PROCESSING POINT SOURCE CATEGORY

Subpart A—Dimension Stone Subcategory [Reserved]

Subpart B—Crushed Stone Subcategory

Sec.

436.20 Applicability; description of the crushed stone subcategory.

436.21 Specialized definitions.

436.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Subpart C—Construction Sand and Gravel Subcategory

436.30 Applicability; description of the construction sand and gravel subcategory.

436.31 Specialized definitions.

436.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Subpart D—Industrial Sand Subcategory

436.40 Applicability; description of the industrial sand subcategory.

436.41 Specialized definitions.

436.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Subpart E—Gypsum Subcategory

436.50 Applicability; description of the gypsum subcategory.

436.51 Specialized definitions.

436.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Subpart F—Asphaltic Mineral Subcategory

436.60 Applicability; description of the asphaltic mineral subcategory.

436.61 Specialized definitions.

436.62 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Subpart G—Asbestos and Wollastonite Subcategory

436.70 Applicability; description of the asbestos and wollastonite subcategory.

436.71 Specialized definitions.

436.72 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Subpart H—Lightweight Aggregates Subcategory [Reserved]

Subpart I—Mica and Sericite Subcategory [Reserved]

Subpart J—Barite Subcategory

436.100 Applicability; description of the barite subcategory.