December 5, 2012

FACT SHEET

Proposed National Pollutant Discharge Elimination System ("NPDES") General Permit No. CAG280000 for Offshore Oil and Gas Exploration, Development and Production Operations off Southern California.

SUMMARY: The Regional Administrator, EPA, Region 9, is proposing to reissue an NPDES general permit for discharges from oil and gas exploration, development and production operations in Federal waters offshore of the State of California. This general permit was last issued on September 22, 2004 and was modified on November 30, 2009.

When reissued, the proposed permit will establish effluent limitations, prohibitions, and other conditions on discharges from facilities in the general permit area. These conditions are based on the administrative record. EPA regulations and the permit contain a procedure which allows the owner or operator of a point source discharge to apply for an individual permit instead. A total of 23 facilities are covered under the existing general permit. All of the 23 facilities are currently active. The geographic area of coverage for the 2012 proposed permit would be the 49 lease blocks currently considered active by the Bureau of Ocean Energy Management (BOEM) off Southern California; this would be a reduction from the 83 lease blocks considered active in 2004 and included in the 2004 general permit.

For the 2012 proposed permit, Region 9 re-evaluated the reasonable potential of produced water discharges to cause or contribute to exceedances of marine water quality criteria using recent monitoring data submitted by the permittees. The proposed effluent limits and monitoring requirements were revised based on this re-evaluation, which showed fewer instances of constituents exhibiting reasonable potential than the monitoring study required by the 2004 permit. The proposed 2012 permit also includes new whole effluent toxicity (WET) requirements for produced water based on EPA's 2010 Test of Significant Toxicity. In addition, the proposed permit would require an evaluation of the potential impacts of existing cooling water intake structures at the platforms. Finally, the proposed permit includes new requirements related to on-line monitoring devices for oil and grease in produced water discharges. This last requirement is based on the results of an evaluation of the practicality of such devices which was required by the 2004 permit. Otherwise, the proposed requirements of the 2012 permit are similar in most respects to the 2004 permit.

Dates: Comments on the proposed general permit must be received or postmarked no later than .

ADDRESSES: Public comments should be sent to: Environmental Protection Agency, Region 9, Attn: Lisa Honor, NPDES Permits Office (WTR-5), 75 Hawthorne Street, San Francisco, California 94105-3901, or by email to: honor.lisa@epa.gov.

FOR FURTHER INFORMATION CONTACT: Eugene Bromley, EPA Region 9 at the address listed above or telephone (415) 972-3510. Copies of the proposed general permit and fact sheet will be provided upon request, and are also available on Region 9's website at http://www.epa.gov/region09/water/.

ADMINISTRATIVE RECORD: The proposed general permit, fact sheet and other related documents in the administrative record are on file and may be inspected any time between 8:30 a.m. and 4:00 p.m., Monday through Friday, excluding legal holidays, at the following address:

U.S. EPA, Region 9
NPDES Permits Office (WTR-5)
75 Hawthorne Street
San Francisco, CA 94105-3901

SUPPLEMENTARY INFORMATION

Table of Contents

I. Legal Basis 4
II. General Permits and Permit Coverage 4
A. General Permit 4
B. Request for an Individual Permit 4
C. Requesting Coverage Under this Proposed General Permit.....4
D. Requiring an Individual Permit.....5
E. Modification, Revocation, and Termination 5
F. Deadlines for NOI Submittal.....5
G. Effective Date of the Proposed Permit.....5
III. Previous and Current Permits 5
IV. Descriptions of Facilities, Operations and Nature of Discharges.....6
A. Facility Coverage 6
B. Types of Operations 6
C. Types of Discharges Authorized.....7
D. Nature of Discharges.....8
E. Types of Waste Treatment.....11
V. Specific Permit Conditions 11
A. General 11
B. Drilling Fluids and Drill Cuttings 12
C. Produced Water.....17
D. Well Treatment, Completion, and Workover Fluids.....18
E. Deck Drainage 18
F. Domestic and Sanitary Waste 18
G. Miscellaneous Discharges.....19
H. Ocean Discharge Criteria 21
I. Best Management Practices.....33
J. Other Discharge Limitations, Prohibitions, and Conditions 34
VI. Other Legal Requirements.....36
A. Oil Spill Requirements.....36
B. Endangered Species Act.....36
C. Coastal Zone Management Act 37
D. Marine Protection Research and Sanctuaries Act 38
E. Magnuson-Stevens Fishery Conservation and Management Act.....38
F. Annex V of MARPOL.....40
G. Paperwork Reduction Act 40
H. Regulatory Flexibility Act 41

Appendix A - Procedure for Reasonable Potential Evaluation in NPDES Permit CAG280000
Appendix B – Map of OCS Lease Blocks and Platform Locations

I. LEGAL BASIS

Section 301(a) of the Clean Water Act ("CWA" or "the Act"), 33 USC 1311(a), provides that the discharge of pollutants is unlawful except in accordance with the terms of a National Pollutant Discharge Elimination System ("NPDES") permit. CWA Section 402, 33 USC 1342, authorizes EPA to issue NPDES permits allowing discharges on condition they will meet certain requirements, including CWA Sections 301, 304, 401, and 403, 33 USC 1311, 1314, 1341, 1343. These statutory provisions require that NPDES permits include effluent limitations requiring that authorized discharges (1) meet standards reflecting levels of technological capability, (2) comply with EPA-approved state water quality standards, (3) comply with other state requirements adopted under authority retained by states under CWA Section 510, 33 USC 1370 and (4) cause no unreasonable degradation to the territorial seas, waters of the contiguous zone or the oceans.

Two types of technology-based effluent limitations are included in the proposed permit. With regard to conventional pollutants, i.e., pH, biochemical oxygen demand ("BOD"), oil and grease, total suspended solids ("TSS") and fecal coliform, CWA Section 301(b)(2)(E) requires effluent limitations based on "best conventional pollution control technology" ("BCT"). With regard to nonconventional and toxic pollutants, CWA Sections 301(b)(2)(A), (C), and (D) require effluent limitations based on "best available pollution control technology economically achievable" ("BAT"). Final effluent guidelines specifying BCT and BAT for the Offshore Subcategory of the Oil and Gas Extraction Point Source Category (40 CFR 435, Subpart A) were issued January 15, 1993 and were published at 58 FR 12454 on March 4, 1993. CWA Section 301 requires compliance with BCT and BAT no later than March 31, 1989, 33 USC 1311(2)(C).

II. GENERAL PERMITS AND PERMIT COVERAGE

A. General Permit. The Regional Administrator has determined that oil and gas facilities operating in the areas described in the proposed general NPDES permit are more appropriately and effectively controlled by a general permit than by individual permits. This decision is based on 40 CFR 122.28, and 40 CFR 125 (Subpart M) and EPA's previous permit decisions on the Pacific Outer Continental Shelf ("OCS"), offshore California.

B. Request for an Individual Permit. Any operator authorized to discharge under a general permit may request to be excluded from coverage under the general permit by applying for an individual permit as provided by 40 CFR 122.28(b)(3). The operator shall submit an application together with the reasons supporting the request to the Director, Water Division, EPA, Region 9 ("Director").

C. Requesting Coverage Under this Proposed General Permit. Procedures for requesting coverage for a general permit are provided by NPDES regulations at 40 CFR 122.28. In accordance with these regulations, all dischargers requesting coverage under the permit shall submit a Notice of Intent ("NOI"). Information to be provided includes the legal name and address of the owner or operator, the facility name and location, type of facility and discharges, lease block, previous permits, and the receiving water. All NOIs shall be signed in accordance with 40 CFR 122.22.

D. Requiring an Individual Permit. The Director may require any person authorized by this permit to apply for and/or obtain an individual NPDES permit. Any interested person may petition the Director to take action under this paragraph. Where the Director requires a discharger authorized to discharge under this permit to apply for an individual NPDES permit, the Director shall notify the discharger in writing that an individual permit application is required. Coverage under this general permit shall automatically terminate on the effective date of the issuance or denial of the individual permit.

E. Modification, Revocation, and Termination. Procedures for modification, revocation, termination, and processing of NPDES permits are provided by 40 CFR 122.62-122.64.

F. Deadlines for NOI Submittal. For the production platforms in existence in the permit area as of the effective date of this proposed permit, NOIs shall be submitted no later than 30 days after the effective date of the permit. For new mobile exploratory drilling operations, NOIs shall be submitted not later than 30 days prior to commencement of discharges.

G. Effective Date of the Proposed Permit. To ensure smooth transition and allow current operators time to apply and prepare for new requirements, the effective date of this permit is proposed as the first day of the month that begins at least 45 days after the California Coastal Commission ("CCC") concurs with the certification provided by EPA that the discharges authorized by this permit are consistent with the approved California Coastal Zone Management Program ("CZMP").

III. PREVIOUS AND CURRENT PERMITS

Region 9's current general permit authorizing discharges from offshore oil and gas facilities in Federal waters off Southern California was issued on September 22, 2004 (69 FR 56761) and modified on November 30, 2009 (74 FR 64074). There are currently 23[1] production platforms located in Southern California Federal waters and all are operating under the 2004 general permit. Although the expiration date of the general permit was December 1, 2009, the permit has been administratively extended pursuant to 40 CFR 122.6 for the existing platforms and continues to authorize discharges from the platforms.

The general permit was originally issued in 1982 and reissued in 1983 and 14 production platforms were covered by the general permit. Nine individual permits were also issued between 1978 and 1993 covering nine additional platforms. The operators of all 23 platforms elected to seek coverage under the 2004 general permit.

IV. DESCRIPTION OF FACILITIES, OPERATIONS, AND NATURE OF DISCHARGES

[1] The fact sheet for the 2004 permit indicated there are 22 (rather than 23) existing platforms; this is a result of previously considering two platforms in the Beta Unit (Platforms Elly and Ellen which are connected) to be one facility. Based on a BOEM recommendation, these Beta Unit platforms are now being counted as two platforms, which increases the count of platforms to 23.

A. Facility Coverage. Like the 2004 general permit, the proposed general permit would apply to existing development and production platforms, and new exploratory drilling operations in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category, located in and discharging to specified lease blocks in Federal waters on the Pacific Outer-Continental Shelf ("OCS"), offshore Southern California. The OCS consists of the seafloor beyond three miles from shore. Facilities located within the California Territorial Seas are covered under separate permits issued by California Regional Water Quality Control Boards.

The 23 existing development and production platforms which would be covered by the proposed permit are: Platforms A, B, C, Edith, Ellen, Elly, Eureka, Gail, Gilda, Gina, Grace, Habitat, Harmony, Harvest, Henry, Heritage, Hermosa, Hillhouse, Hidalgo, Hogan, Hondo, Houchin and Irene. Additional platforms (such as Platforms Heather and Julius which have been proposed in the past) would not be eligible for coverage under the proposed permit unless Region 9 determines that they are not new sources based on information submitted with the NOI. Such additional platforms would be considered new sources if they meet the definition at 40 CFR 435.11(q). However, EPA is not making any new source determinations at this time, since additional platforms are not anticipated to be installed during the term of this permit. Individual permits would be required for platforms not eligible for coverage under the proposed general permit.

The proposed general permit would authorize discharges on the 49 lease blocks currently considered active by the Bureau of Ocean Energy Management (BOEM) from Federal Lease Sale Nos. 35, 48, 53, 68, 73, 80 and the 1966 and 1968 Federal Lease sales. The 2004 general permit had authorized discharges on the 83 lease blocks considered active as of 2004. Since 2004, many of the 83 lease blocks have expired or been terminated leaving only 49 lease blocks currently actively. Since the 49 active leases in 2012 are all among the 83 lease blocks which were covered by the 2004 general permit, the proposed general permit would authorize discharges in the same general area as the 2004 permit, but the total area covered would be reduced by approximately 40% given the smaller number of active lease blocks in 2012. Appendix B provides a map showing the locations of the active lease blocks and the platform locations.

B. Types of Operations. "Exploratory" operations involve drilling to determine the nature of potential hydrocarbon reserves. "Development" operations involve the drilling and completion of production wells. Development operations may occur prior to, or simultaneously with, "production" operations, which involve the active recovery of hydrocarbons from producing formations. These operations are described in more detail in EPA's Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Offshore Subcategory of the Oil and Gas Extraction Point Source Category (EPA 821-R-93-003, January, 1993) ("Development Document").

New mobile exploratory drilling operations are not considered "new sources" under the NPDES permit program (40 CFR 122.2) with further explanation at 58 FR 12457, March 4, 1993; however, they are considered "new dischargers" when they operate in areas of biological

concern. Areas of biological concern are determined by considering the ten factors in the Ocean Discharge Criteria regulations (40 CFR 125 Subpart M).

EPA would also like to clarify that for existing production platforms, the proposed permit would authorize discharges from exploratory wells drilled from the platform as well as production wells, provided the maximum discharge limits established for each platform are not exceeded. In some circumstances, it may be possible to drill an exploratory well from an existing platform rather than bringing in an exploratory drilling vessel. A separate NOI would not be required for such an exploratory well. EPA believes this approach is appropriate since the processes and discharges resulting from an exploratory well are basically the same as for a production well.

The question has also been raised as to whether additional production wells from existing platforms would ever be considered new sources. Industry commenters have pointed out that with advances in drilling technology, it is possible to drill greater and greater distances from existing platforms. In response, the preamble to the final effluent limitations guidelines (58 FR 12457) clarifies that such wells would not be considered new sources. This is a consequence of the fact that for an existing platform, significant site preparation work for the platform as defined at 40 CFR Part 435.11(w)(1)(ii) would also have occurred prior to promulgation of the guidelines. All subsequent development and production activities from such platforms would not be considered new sources.

C. Types of Discharges Authorized. The proposed general permit would authorize the same discharges as the 2004 general permit (subject to the terms and conditions of the permit) in all areas of coverage. These discharges are: drilling fluids and drill cuttings; produced water; well treatment, completion and workover fluids; deck drainage; domestic and sanitary waste; blowout preventer fluid; desalination unit discharge; fire control system test water; non-contact cooling water; ballast and storage displacement water; bilge water; boiler blowdown; test fluids; diatomaceous earth filter media; bulk transfer material overflow; uncontaminated freshwater; water flooding discharges; laboratory wastes; excess cement slurry; hydrotest water; and hydrogen sulfide gas processing waste water. Definitions and descriptions of these discharges are provided below and in Part V of the proposed permit. Operators of existing facilities are encouraged to consider whether the above discharge categories will cover all discharges at their facilities. If additional categories are necessary, notification should be given to EPA during the public comment period.

EPA considers it appropriate to include discharges from exploratory operations with development and production discharges in this permit because, although some development and production discharges do not result from exploratory operations, all exploratory discharges are a subset of those occurring in development and production.

Concern has been previously expressed that the precise location of future exploratory drilling operations are not known at the present time, and the terms of the proposed permit may be inadequate in some situations. As noted above in section II.D, EPA will require an individual NPDES permit when the terms of the general permit are inappropriate. The procedures for

initiating exploratory operations include other opportunities for public involvement and comment. Operators who wish to initiate exploratory operations must submit Exploration Plans to BOEM for approval, in accordance with 30 CFR 250, Subpart B. These Plans are required to cover all aspects of the exploration process. Once a plan is accepted for review, the BOEM sends the exploration plan to the Governor and the Coastal Zone Management Act ("CZMA") agency (which is the California Coastal Commission ("CCC")) of the affected state for comment. The BOEM considers comments received as part of the exploration plan's technical and environmental review and approval process. Similarly, the CCC considers comments received during the public review/comment period associated with its consistency review of the exploration plan.

During these two review processes (BOEM and CCC), issues may be identified that will require analysis of the appropriate NPDES permitting mechanism and requirements. If all approvals are granted, then the operator will submit an application to EPA, requesting permit coverage. BOEM and CCC will provide direction to EPA regarding any special permit conditions necessary to protect coastal and marine resources and public health. During the review process, site-specific concerns such as impacts to hard bottom habitat and or to other sensitive areas such as the Channel Islands Marine Sanctuary will be evaluated.

The last exploratory well drilled in the Southern California OCS occurred in 1989, and it is unclear whether any such drilling would occur during the term of the proposed permit.

D. Nature of Discharges. The following discharges would be authorized by the proposed permit. Not every facility will have each discharge and some of the discharges may be combined at one disposal pipe. The proposed permit contains provisions requiring the more stringent monitoring and effluent limitations for the combined wastestreams. The most common combinations are some of the smaller discharges such as deck drainage routed through the oil and water separator and discharged along with the produced water.

Discharge 001 - Drilling Fluids and Cuttings. "Drilling fluid" means the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. A water-based drilling fluid is the conventional drilling mud in which water is the continuous phase and the suspended medium for solids, whether or not oil is present. An oil-based drilling fluid has diesel oil, mineral oil, or some other oil as its continuous phase with water as the dispersed phase.

"Drill cuttings" refers to the particles generated by drilling into subsurface geologic formations and carried to the surface with the drilling fluid.

Discharge 002 - Produced Water. "Produced water" refers 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.

Discharge 003 - Well Treatment, Completion, and Workover Fluids. "Well treatment" is a fluid used to restore or improve productivity by chemically or physically altering hydrocarbon-bearing strata after a well has been drilled. "Well completion" fluids are 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. "Workover fluids" means salt solutions, weighted brines, polymers, or other specialty additives used in a producing well to allow safe repair and maintenance or abandonment procedures.

Discharge 004 - Deck Drainage. "Deck drainage" refers to any waste resulting from deck washing spillage, rain water and runoff from gutters and drains including drip pans and work areas within the facilities subject to this subpart.

Discharge 005 - Domestic and Sanitary Wastes. "Domestic waste" refers to materials discharged from sinks, showers, laundries, safety showers, eyewash stations, and galleys located within facilities subject to this subpart. "Sanitary waste" refers to human body waste discharged from toilets and urinals located within facilities subject to this subpart.

Discharge 006 - Blowout Preventer ("BOP") Fluid. These are fluids used to actuate the hydraulic equipment on blowout preventers.

Discharge 007 - Desalination Unit Wastes. This is wastewater associated with the process of creating fresh water from saltwater.

Discharge 008 - Fire Control System Test Water. This is seawater which is released during the training of personnel in fire protection and the testing and maintenance of fire protection equipment. The seawater may be treated with chlorine or other biocide to control fouling of the piping.

Discharge 009 - Non-contact Cooling Water. This is water which circulates across crude oil or produced water tanks, power generators or other machinery for the purpose of cooling. As implied by the name, this water does not come in contact with product, produced water or the machinery it cools, although it may be treated with biocide to prevent fouling in heat exchangers.

Discharge 010 - Ballast and Storage Displacement Water. This is seawater added or removed to maintain proper draft for the purpose of drilling vessel stabilization.

Discharge 011 - Bilge Water. This is seawater which collects in the lower internal parts of a drilling vessel's hull and may be contaminated with oil and grease or rust. Bilge water is directed to an oil/water separator before discharge, which occurs intermittently.

Discharge 012 - Boiler Blowdown. This is the discharge of circulation water and minerals from boilers necessary to minimize solids build-up in the boilers. This is another intermittent discharge.

Discharge 013 - Test Fluids. "Test fluids" are discharges that would occur if hydrocarbons are located during exploratory drilling and tested for formation pressure and content.

Discharge 014 - Diatomaceous Earth Filter Media. Diatomaceous earth is used on some production platforms to filter seawater which is subsequently used to make completion fluid. The completion fluid itself may also be filtered to remove suspended contaminants picked up in the well. Discharge 014 may include diatomaceous earth, contaminants removed from seawater, other materials removed from completion fluids, and filter backwash water.

Discharge 015 - Bulk Transfer Material Overflow. This discharge refers to bulk materials such as barite or cement which may be discharged during transfer operations from supply ships to the offshore facilities. Often this takes the form of excess "dust", composed of small particles of the bulk material, being blown through the loading system into the sea.

Discharge 016 - Uncontaminated Freshwater. Uncontaminated freshwater discharges come from wastes such as air conditioning condensate or potable water during transfer or washing operations.

Discharge 017 - Waterflooding Discharges. These discharges are associated with the treatment of seawater prior to its injection into a hydrocarbon-bearing formation to improve the flow of hydrocarbons from production wells. Seawater is taken aboard and treated to remove solids and dissolved oxygen; additional treatment may include flocculants, scale inhibitors, oxygen scavengers, and biocides. This wastestream also includes strainer and filter backwash water and excess treated water not injected.

Discharge 018 - Laboratory Wastes. This discharge includes small volumes of discharges associated with laboratory testing occurring on the offshore facilities. Given the small volume of the waste stream, it is not expected to pose significant environmental risks. The discharge may include freon, but because freon is highly volatile, it does not remain in aqueous state for long.

Discharge 019 - Excess Cement Slurry. This wastestream is excess mixed cement, including additives and wastes from equipment washdown after a cementing operation.

Discharge 020 - Drilling Muds, Cuttings and Cement at the Seafloor. These wastes result from marine riser disconnect and well abandonment and plugging and riserless drilling during, for example, the setting of new well conductors. Compared to discharge of fluids and cuttings (Discharge 001), these volumes are small.

Discharge 021 - Hydrotest Water. - This is water used in the testing of the structural integrity of piping and other components on an offshore platform. This discharge may include chemicals such as corrosion inhibitors, oxygen scavengers or bactericide as necessary to protect the pipelines and other platform components.

Discharge 022 - H2S Gas Processing Wastewater. - This is wastewater generated from a treatment process used by some platforms for the removal of sulfur from oil and gas.

EPA has established from extensive data review, as discussed in the Development Document, that drilling fluids and cuttings are the major pollutant sources discharged from exploratory and developmental drilling operations. Produced water and well treatment fluids are the major pollutant sources discharged from production operations.

Part I.A.5 of the proposed permit clarifies that discharges other than those listed above, including pollutants which are not ordinarily present in the discharges, are not authorized by the permit. The types of pollutants which are "ordinarily present" in the discharges were analyzed in EPA's Development Document and guidelines studies for the industry. Pollutants or classes of pollutants which are consistent with those recognized in the Development Document would be authorized by the permit.

In developing the proposed permit conditions, EPA has evaluated the concentrations of these pollutants relative to the levels allowed under Federal regulations. The pollutants and discharge parameters limited in each waste stream are summarized in Section V.A, and discussed in Sections V.B - V.J.

E. Types of Waste Treatment. The type of waste treatment utilized for the major discharges from offshore oil and gas operations is discussed in EPA's Development Document. A summary of the treatment received by the major discharges follows below.

For produced water, a number of alternative treatment processes are available including gas flotation, plate coalescers and gravity separators. Reinjection of produced water is also practiced by a number of platforms. Drilling mud toxicity is largely controlled through product substitution (i.e., the use of low toxicity materials in place of higher toxicity materials). When the toxicity limit or another drilling mud effluent limitation cannot be met, the mud is taken ashore for disposal. Sanitary waste treatment includes physical/chemical and biological treatment. Physical/chemical treatment includes evaporation-incineration, maceration-chlorination, and chemical addition. Biological treatment systems include aerobic digestion or extended aeration processes.

V. SPECIFIC PERMIT CONDITIONS

A. General. The determination of appropriate conditions for each discharge was accomplished through: (1) consideration of technology-based effluent limitations to control conventional pollutants under Best Conventional Pollutant Control Technology ("BCT"); (2) consideration of technology-based effluent limitations to control toxic and nonconventional pollutants under Best Available Treatment Economically Achievable ("BAT"); and (3) an evaluation of the Ocean Discharge Criteria regulations assuming BAT and BCT were in place. Among other requirements, the Ocean Discharge Criteria regulations require a consideration of marine water quality criteria developed pursuant to Section 304(a)(1) of the Act. The technology-based requirements are discussed below in Sections V.B through V.G of this fact sheet. Limitations

based on Ocean Discharge Criteria and water quality-based effluent limitations are found in Section V.H below. Best management practice requirements and other discharge limitations and prohibitions are discussed in Section V.I and V.J.

Section 301(b)(2)(A), (C) and (D) of the CWA requires by March 31, 1989, the application of BAT for toxic pollutants (40 CFR 401.15) and nonconventional pollutants, and BCT for conventional pollutants (pH, BOD, oil and grease, suspended solids, and fecal coliform under 40 CFR 401.16). Since the deadline for compliance with BAT/BCT effluent limitations has passed, the permit must require immediate compliance with appropriate BAT/BCT limitations.

BAT and BCT effluent limitations guidelines were promulgated by EPA on March 4, 1993 (58 FR 12454) for the Offshore Subcategory of the Oil and Gas Extraction Point Source Category. These regulations establish BAT and BCT effluent limitations for drilling muds and cuttings, produced water, produced sand, well treatment, completion and workover fluids, deck drainage, and sanitary and domestic wastes. BAT and BCT effluent limitations have been included in the proposed permit for the affected discharges.

Effluent limitations guidelines were not promulgated, however, for discharges 006 through 022 above. In the absence of promulgated effluent limitations guidelines for a particular discharge, permit conditions must be established using Best Professional Judgement ("BPJ") procedures (40 CFR 122.43, 122.44, and 125.3). This proposed permit incorporates BAT and BCT effluent limitations based on BPJ for discharges 006 through 022, as discussed in Section V.G.

Permits for discharges to state waters must ensure compliance with water quality standards and limitations imposed by the State as part of its certification of NPDES permits under Section 401 of the Act. Although today's proposed permit does not authorize discharges into state waters, and thus the California Regional Water Quality Control Boards will not be certifying this permit, potential effects and standards need to be considered. Potential impacts to state waters are considered as part of the coastal zone consistency certification requirements of the Coastal Zone Management Act, discussed below, and part of the CWA Section 403(c) and 40 CFR 125, Subpart M (Ocean Discharge Criteria) analysis. Although CWA 401 certification will not be sought from the California Regional Water Quality Control Boards which are charged with water quality activities, EPA will carefully consider any comments from the Regional Water Quality Control Boards.

B. Drilling Fluids and Drill Cuttings (Discharge No. 01)

1. Free oil & oil-based fluids. No free oil is permitted from the discharge of drilling mud, and drill cuttings, based on BCT effluent guidelines. The discharge of oil-based drilling fluids is prohibited since oil-based fluids would violate the BCT effluent limitations of no discharge of free oil. Compliance with the free oil limitation will be monitored by weekly use of the Static Sheen Test whenever drilling is occurring (daily when drilling through a hydrocarbon producing zone due to the higher risks of oil contamination) and before bulk discharges.

2. Diesel oil. The discharge of drilling fluids and cuttings which have been contaminated by diesel oil is prohibited by the proposed permit, in accordance with the BAT effluent guidelines. Diesel oil, which is sometimes added to a water-based mud system, is a complex mixture of petroleum hydrocarbons, known to be highly toxic to marine organisms and to contain numerous toxic and nonconventional pollutants. The pollutant "diesel oil" is being used as an "indicator" of the listed toxic pollutants present in diesel oil which are controlled through compliance with the effluent limitation (i.e., no discharge). An "indicator" pollutant is a parameter the presence and control of which correlates well with other pollutants which are intended to be controlled via the indicator pollutant. The technology basis for this limitation is product substitution of less toxic mineral oil for diesel oil. Compliance with this limit must be certified by the operator based on the drilling fluids inventory.

3. Mercury and cadmium in barite. In accordance with the BAT effluent guidelines, the proposed permit contains limitations of 1 mg/kg mercury and 3 mg/kg cadmium in barite. Barite is a major constituent of drilling fluids. These restrictions are designed to limit the discharge of mercury, cadmium, and other potentially toxic metals which can occur as contaminants in some sources of barite. The justification for the limitation under BAT is product substitution. Operators can substitute "clean" barite, which meets the above limitations, for contaminated barite, which does not meet the limitations.

As a part of the effluent guidelines development, EPA investigated the availability of domestic and foreign supplies of barite to meet the cadmium and mercury limits. EPA considered the potential for the increased demand for clean barite stocks resulting from this rule to cause a rise in the cost of barite. (See the Development Document and also the document entitled "Economic Impact Analysis of Final Effluent Limitations Guidelines and Standards of Performance for the Offshore Oil and Gas Industry" (EPA 821-R-93-004, January, 1993) for a detailed discussion on the availability and economic achievability.) EPA concluded that "there are sufficient supplies of barite capable of meeting the limits of this rule to meet the needs of offshore drilling operations" (58 FR 12480, March 4, 1993).

The proposed permit allows the operator several alternative reporting methods to determine compliance with the cadmium and mercury limitation. The operators may have the barite tested using atomic absorption spectrophotometry or provide certification from the supplier documenting that the stock barite does not exceed concentrations of mercury and cadmium. Compliance with limitations, if tested, shall be reported on the Well Discharge Monitoring Report ("DMR") or certifications attached to the DMR, if provided by the supplier.

It should also be noted that the 1992 individual permits for Exxon's Platforms Harmony and Heritage included a limit of 2 mg/kg for cadmium based on BPJ. To ensure compliance with Section 402(o) of the Act (anti-backsliding), this limit was included in the 2004 general permit, and would be retained in the 2012 proposed permit (to again ensure compliance with anti-backsliding requirements). All other dischargers would be subject to the 3 mg/kg limit for cadmium in barite.

4. Toxicity of drilling fluids and cuttings. EPA is proposing a toxicity limit of 30,000 ppm on the Suspended Particulate Phase ("SPP") (a 96-hour LC50) on discharged drilling fluids as a technology-based control on toxicity and toxic and nonconventional pollutants. The numeric effluent limit is based on the BAT effluent guidelines. Compliance with the drilling mud toxicity limit will be monitored when the end-of-well is reached (at least 80% of well footage permitted by BSEE. In cases where mineral oil pills are used near the end-of-well, the Region will accept the bioassay reports required for pills as the end-of-well report (see permit Part II.A.1). A mineral oil pill is a specially formulated portion of drilling mud system usually used to free stuck pipe.

It is important to note the inverse relationship between the 96-hr LC50 value of 30,000 ppm SPP and toxicity. The 30,000 ppm limit is the concentration (of mud in the suspended particulate phase) at which 50% mortality of the tested organisms (*Mysidopsis bahia*) occurs. As the concentration where 50% mortality increases, this implies a less toxic drilling mud because less dilution is required to prevent 50% mortality; in other words, toxicity decreases as 96-hr LC50 values increase. Thus, the permit limit of 30,000 ppm SPP (96-hr LC50) is actually the minimum LC50 value which limits the maximum allowed toxicity for drilling mud discharges.

The proposed permit requires permittees to maintain a mud inventory for each well drilled. Under the existing general permit, EPA has approved numerous specialty additives based on bioassay data and informed offshore operators of these determinations. This regulatory approach (the "clearinghouse" approach) has allowed operators to use these approved additives in drilling operations without conducting additional bioassays.

After review of the various issues regarding the use of the clearinghouse approach, EPA has decided to continue using the clearinghouse on a limited scale for drilling muds and additives. This limited clearinghouse has been in use for previous NPDES permits issued by EPA Region 9 for offshore platforms. The proposed permit requires a demonstration of compliance with the overall toxicity limit for each mud system which is used and discharged. The term "mud system" refers to the major types of drilling muds which are used during the drilling of a single well. For example, drilling would probably commence with a spud mud for the first several hundred feet. Then a seawater gel mud might be used to a depth about 1,000 feet. Subsequently, a lightly treated lignosulfonate mud might be used to a depth of around 5,000 feet. Finally, a freshwater lignosulfonate system might be used for the remainder of the drilling operation to a depth of about 15,000 feet.

Typically a bulk discharge of 1,000 to 2,000 barrels of mud occurs when the mud system is changed. It is at these times (when these bulk discharges occur) that compliance with the permit's toxicity limit must be demonstrated. The bulk discharges are the highest volume mud discharges and will include all specialty mud components added to each mud system. As such, EPA believes that the bulk discharges are the most appropriate discharges for which to require a demonstration of compliance with the toxicity limit. In the above example, four such demonstrations would be required for the drilling of the well.

Except for the final mud system used at the time maximum well depth is reached, this demonstration may make use of the clearinghouse that EPA Region 9 has already implemented and is discussed further below. However, a bioassay is required for the final mud discharge irrespective of mud composition. This is the time when the maximum mud toxicity is likely to be reached due to the increased need for specialty additives at greater depths. Given the uncertainties of the methods for estimating mud toxicity, EPA believes that at least one actual bioassay per well should be required. Also, the Response to Comments accompanying the final effluent limitations guidelines points out that the NPDES permit program is based on "end-of-pipe" accountability (58 FR 12496, March 4, 1993). Only an actual bioassay can truly demonstrate compliance with the mud toxicity limit. There, a minimum of 1 bioassay is required per well.

As discussed in the Development Document, EPA has determined that there are eight basic formulations of water based drilling muds in use for offshore drilling operations. These muds have been termed "generic drilling muds" and commonly referred to as muds 1 through 8. The lower 95% confidence limit LC_{50} (worst-case bioassay result) for the generic muds, as determined by testing at EPA's Gulf Breeze Laboratory[2], occurred at 30,000 ppm. Therefore, the toxicity limit represents the most stringent 96 hour LC_{50} which would allow each generic mud to be discharged. Specialty mud additives (such as biocides, lubricants or defoamers) are often added to the basic generic muds to deal with particular drilling problems which may arise. Generic muds including such additives may be discharged as long as the overall mud toxicity does not exceed the permit limit.

One drawback of the clearinghouse approach to mud additive regulation is the possibility that operators might combine several moderately toxic additives (individually approvable) in one mud and thereby exceed the permit's overall toxicity limit. In order to limit the possibility of such occurrences, EPA mud additive clearinghouse provides two levels of approval for specialty additives, general and conditional:

a. Additives with LC_{50}>100,000 ppm (SPP) when tested in a reference mud at the maximum usage rate would be listed as acceptable for general use and discharge. The reference mud to be used for these tests is the lightly treated lignosulfonate mud (generic mud #7) which has been the most commonly used reference mud to date.

b. Additives where the LC_{50} is greater than 30,000 ppm and less than 100,000 ppm would be conditionally listed as acceptable, contingent upon the additive's not being used in conjunction with other additives which in combination could result in violation of the permit's overall toxicity limit.

[2] Duke, Thomas W. and Patrick R. Parrish. 1984. Results of the Research Program Sponsored by the Gulf Breeze Environmental Laboratory, 1976-1984, and their Application to Hazard Assessment, Environmental Research Laboratory, Gulf Breeze, Florida, June, 1984.

In all instances, regardless of whether an additive is listed as acceptable for general use or is conditionally accepted, the discharger is responsible for demonstrating compliance with the whole mud toxicity limit.

The above regulatory approach to mud additive regulation offers the following advantages: 1) because the LC50 of most specialty additives is greater than 100,000 ppm, general listing of acceptability for discharge, following an initial bioassay, could be given for most additives to be discharged, thus providing desirable flexibility for operators, and 2) it is unlikely that violations of the permit's whole mud toxicity limit (minimum of 30,000 ppm) would result from the combination of additives acceptable for general use and discharge. For example, if it is assumed that (a) LC50 of the reference mud = 500,000 ppm, (b) mud constituent toxicity is additive according to equation (1) below, and (c) additive usage by weight is small relative to the basic mud constituents, four specialty additives with LC50 = 100,000 ppm each used at its maximum concentration (an unlikely scenario) would be necessary to produce a mud with an overall toxicity limit approximating the permit limit of 30,000 ppm. A review of muds and additives typically used offshore Southern California shows that such a combination would be very unlikely. Listing and toxicity information for mud additives may be obtained from Region 9.

It should also be noted that the above provisions pertaining to specialty additives would apply only to generic muds #2-#8. The overall mud toxicity limit in the permit is based on the toxicity of mud #1 with no specialty additives included. However, this does not preclude the use of specialty additives in mud#1. Such additive could be included in mud #1 if the additives did not increase the toxicity of the mud (i.e., the toxicity of the additive is lower than the toxicity of the mud which would be replaced), or if the basic components of mud #1 where used at concentrations lower than the maximum allowed concentration to offset the effects of specialty additives.

Estimates of joint toxicity of muds containing conditionally accepted additives may be made using equation (1) from the report entitled "Separate and Joint Toxicity to Rainbow Trout of Substance Used in Drilling Fluids for Oil Exploration" (Sprague and Logan, *Environmental Pollution*, Volume 19, No. 4, August, 1979):

$$(1) \qquad \frac{10^6}{LCt} = \frac{Cg}{LCg} + \sum_{i=1}^{N} \frac{Ci}{LCi}$$

where LCt is the 96 hour LC50 of the generic mud including mud additives in ppm and
Ci is the concentration of the ith additive in ppm
LCi is the 96 hour LC50 of the ith additive in ppm
Cg is the concentration of the generic mud in ppm
LCg is the 96 hour LC50 of the generic mud in ppm

5. Synthetic-based drilling fluids ("SBFs"). In response to its performance needs and regulatory requirements, the oil and gas extraction industry has developed SBFs. The new

drilling fluids are used in cases, such as deep water or directional drilling, where use of water based fluids is not practical and traditional oil-based drilling fluids would have been used. EPA promulgated final effluent limitations guidelines for SBFs (66 FR 6850, January 22, 2001). However, during the issuance of the 2004 general permit, the industry indicated that it had no immediate plans to use SBFs on the California OCS and the 2004 general permit did not authorize discharges associated with the use of SBFs. Similarly, the proposed 2012 general permit does not authorize such discharges. In recent discussions with Region 9, one operator indicated some interest in using SBFs on the California OCS, possibly during the term of this permit. However, given the limited interest, Region 9 believes any discharges associated with the use of SBFs would best be authorized under an individual permit issued to a specific platform.

6. Other. In addition to the other monitoring requirements discussed above, the proposed permit requires that the permittee monitor and report the total volume of muds and cuttings discharged as well as the number of days each is discharged. The volumes of muds and cuttings and the number of days discharged shall be monitored and reported separately.

C. Produced Water (Discharge No. 002)

1. Oil and Grease. The proposed general permit would require that oil and grease concentrations in produced water discharges from all facilities not exceed 29 mg/l monthly average and 42 mg/l maximum daily. These oil and grease limits were promulgated as BAT for offshore facilities (40 CFR 435.13) as indicators of toxic and nonconventional pollutants. The proposed 2012 permit would also require weekly monitoring for oil and grease in produced water discharges to demonstrate compliance with the effluent limits (which is the same monitoring frequency as the 2004 general permit).

Prior to the 2004 general permit, the sampling method for oil and grease in the permits of OCS oil and gas facilities off Southern California specified the collection four samples in a 24-hour period that were analyzed separately and the values averaged. For the 2004 general permit, EPA allowed, as an alternative, the use of only one grab sample instead of four; the new proposed 2012 general permit would continue to provide this alternative. Sampling for oil and grease becomes compromised when samples are re-poured into additional containers because the oil and grease sticks to the sides of the containers.

Region 9 does recommend the use of four separately analyzed grab samples as this reduces the likelihood of an individual sample being the sole sample indicating an exceedance of the permit limit. Using four samples allows for an averaging of the potentially high sample. Region 9 believes that the authors of the test method did not intend for the samples to be compromised by re-pouring individual samples into one container (possibly reducing the final concentration of oil and grease), and therefore Region 9 will allow the collection and analysis of one sample, which may more accurately reflect the total concentration of oil and grease in the discharge.

2. Flow Rate. Measurement of the produced water flow rate is required daily. This requirement serves to determine compliance with, or the possible future need for, effluent limitations in the permit. The basis for this requirement is Section 308 of the Act.

3. Test Method for Oil and Grease Analysis. In 1999, EPA finalized a new test method (Method 1664, N-Hexane) for oil and grease analysis, which replaced the Freon Extraction Method (EPA Method Number 413.1) (64 FR 26315). The regulations became effective June 14, 1999. On March 12, 2007 (72 FR 11199), EPA withdrew method 413.1 from its list of approved test methods at 40 CFR 136 (with an effective date of April 11, 2007). The 2004 general permit had allowed either test method for oil and grease to be used, with a preference for method 1664. The proposed general permit would require the use of method 1664 given the withdrawal in 2007 of method 413.1 from the list of approved test methods.

D. Well Treatment, Workover and Completion Fluids ("TWCs") (Discharge No. 003)

1. Free oil: In accordance with BCT effluent limitations guidelines, the discharge of free oil would be prohibited in TWCs discharged in accordance with this proposed permit. The test method for determining compliance with this limit would be the Static Sheen Test (Appendix 1 to 40 CFR Part 435, Subpart A).

2. Oil and grease: Although oil and grease is a conventional pollutant subject to BCT, it is also an indicator of toxic pollutants (and it thus limited under BAT as well). Promulgated (offshore) BAT limitations for oil and grease in TWC are 29 mg/l monthly average and 42 mg/l daily maximum (58 FR 12506, March 4, 1993). These limits have been included in the proposed permit in accordance with the effluent limitations guidelines. Monitoring for oil and grease is required once per job (which would consist of the short-term use of one of these materials). In addition, monitoring for free oil is required once per discharge using the static sheen test.

3. Discharge Volume: Based on Section 308 of the Act, the proposed permit requires estimated discharge volumes to be reported on a per job basis.

E. Deck Drainage (Discharge No. 004). In accordance with BCT/BAT effluent limitations guidelines for this industry, the proposed permit requires that there be no free oil in discharges of deck drainage. Visual observations of the receiving waters would be required to determine compliance with this limit. In addition, a monthly estimate of the flow rate is required.

F. Domestic and Sanitary Waste (Discharge No. 005).

1. Floating Solids. In accordance with BCT effluent limitations guidelines, no floating solids would be allowed in the discharges of sanitary wastes for facilities intermittently manned, or for facilities permanently manned by nine or fewer persons. This limit also applies to domestic wastes for all facilities. Prohibition on floating solids is equivalent to the current level of control for sanitary wastes in existing permits. Visual observations of the receiving waters in the vicinity of the discharges must be conducted each day during daylight hours to monitor compliance with this limit.

Any facility using a Marine Sanitation Device ("MSD") that complies with pollution control standards and regulations under Section 312 of the Act is considered to be in compliance with the prohibition of floating solids.

2. Foam. The BAT effluent guidelines for domestic wastes require no discharge of foam. Visual observations of the receiving waters in the vicinity of the discharges must be conducted each day during daylight hours to monitor compliance with this limit.

3. Chlorine. Chlorine is added to the sanitary waste stream to control fecal coliform in the discharge. The proposed permit includes the BCT effluent limitation guideline of at least 1 mg/l Total Residual Chlorine ("TRC") (to be maintained as close as possible to this concentration) for facilities permanently manned by 10 or more persons. Any facility using a MSD that complies with pollution control standards and regulations under Section 312 of the Act is considered to be in compliance with the TRC limitation. Monthly monitoring of this discharge is required to demonstrate compliance with this limit.

4. U.S. Coast Guard Regulations at 33 CFR 151. In accordance with the BCT effluent guidelines, the proposed permit requires that permittees comply with U.S. Coast Guard regulations at 33 CFR 151 with regards to discharges of domestic wastes other than floating solids. This condition is intended primarily to incorporate the U.S. Coast Guard regulations concerning discharges of garbage and plastics.

G. Miscellaneous Discharges (Discharge Nos. 006-022). Discharges 006-022 are miscellaneous discharges which often accompany offshore oil and gas operations and would be authorized and regulated by the proposed permit. These discharges were also authorized in the 2004 permit, and the proposed discharge limitations and monitoring requirements for the 2012 permit are very similar to the requirements of the 2004 permit.

1. BPJ Effluent Limitations. Neither the promulgated Offshore nor the Coastal effluent guidelines address wastestreams 006 through 022 described above in Section IV.D of this fact sheet. EPA's basis for not addressing these wastestreams in either guideline is that they are more appropriately controlled by regionally issued NPDES permits such as the one proposed today. In the absence of promulgated effluent limitations guidelines, permit conditions must be established using BPJ procedures (40 CFR 122.43, 122.44 and 125.3). Effluent limitations developed through BPJ for these discharges are discussed below.

2. Floating Solids. EPA has determined that the BCT effluent guideline of no discharge of floating solids from the discharge of sanitary wastes should apply to discharges 006 through 022 as well. These types of discharges have been subject to this limitation in previous permits and past practices have not resulted in violations of this limitation. No technology performance data available to EPA indicate that a more stringent standard is appropriate at this time. Therefore, EPA is proposing to include this BCT effluent limitation on floating solids in the proposed permit for discharges 006 through 022. Visual observations of the receiving waters in

the vicinity of the discharges must be conducted each day during daylight hours to monitor compliance with this limit.

3. Foam. EPA has determined that the BAT effluent guideline of no discharge of foam in domestic wastes should apply to discharges 006 through 022 as well. These types of discharges have been subject to this limitation in previous permits and past practices have not resulted in violations of this limitation. No technology performance data available to EPA indicate that a more stringent standard is appropriate at this time. Therefore, EPA is proposing to include this BAT effluent limitation for foam in the proposed permit for discharges 006 through 022. Visual observations of the receiving waters in the vicinity of the discharges must be conducted each day during daylight hours to monitor compliance with this limit.

4. Flow Monitoring. The proposed permit would also require monitoring of the flow rate for certain miscellaneous discharges including noncontact cooling water, ballast and storage displacement, bilge water, test fluids, excess cement slurry, hydrotest water, and H2S gas processing wastewater.

5. Cooling Water Intake Structure Requirements. Section 316(b) of the CWA requires that the location, design, construction and capacity of cooling water intake structures ("CWIS") reflect the application of the best technology available to minimize adverse environmental impacts. EPA is promulgating regulations implementing Section 316(b) in three phases.[3] On June 16, 2006 (71 FR 35006), EPA promulgated final regulations for new offshore oil and gas facilities. As noted previously, however, the proposed permit does not authorize discharges from new sources; as such, the production platforms which would be covered by the proposed permit (which are all existing sources) would not be subject to the 2006 regulations.

Region 9 also believes the 2006 regulations would not apply to discharges from mobile exploratory drilling rigs operating in Region 9. The 2006 regulations apply to "new facilities" as defined at 40 CFR 125.83, which are facilities that commence construction after July 17, 2006, and withdraw more than 2 million gallons per day of water from waters of the U.S., of which at least 25% is used for cooling. The definition of "new facility" includes "new dischargers" and for offshore oil and gas exploratory operations, the definition of "new discharger" at 40 CFR 122.2 includes exploratory operations when they discharge in an area identified in the permit as an area of biological concern. Since Region 9 has not designated any such areas within the 49 lease blocks covered by the proposed general permit, the regulations would not apply.

Although the 2006 regulations did not include requirements for existing offshore oil and gas facilities, the preamble for the promulgation notes that requirements for existing facilities may be developed on a case-by-case basis using BPJ (71 FR 35006). The preamble also notes there is a potential for adverse environmental impacts from CWIS at offshore oil and gas facilities, especially given the tendency of some species to congregate around the platforms (71 FR 35013). However, little information is available quantifying the potential impacts (71 FR

[3] Additional information is available at: http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/index.cfm..

35013). Given this uncertainty, Region 9 is proposing a study requirement for the 2012 general permit which would require the following for all platforms with cooling water discharges:

- description of current CWIS and existing measures to minimize entrainment/impingement
- assessment of the environmental impacts from entrainment/impingement given current practices
- practicality of additional measures to reduce environmental impacts from entrainment/impingement

A report of the study findings would be due within one year of the permit effective date; one report may be submitted jointly by all permittees or separate reports may be submitted by individual permittees. The permit also includes a reopener clause which provides that the permit may be reopened and modified to include additional effluent limits or monitoring requirements depending on the findings of the study.

EPA anticipates that the above study would not necessarily involve additional field work, but could consist of an assessment based on existing literature information. However, if the submittal is inadequate to address the concerns noted above, the permit may be reopened (in accordance with Part I.A.4) to require additional analyses as appropriate.

H. Ocean Discharge Criteria. Section 403 of the Act requires that an NPDES permit for a discharge into marine waters located seaward of the inner boundary of the territorial seas be issued in accordance with guidelines for determining the potential degradation of the marine environment. These guidelines, referred to as the Ocean Discharge Criteria (40 CFR Part 125, Subpart M) and Section 403 of the Act are intended to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition of discharge, if necessary, to ensure this goal" (49 FR 65942, October 3, 1980).

If EPA determines that the discharge will cause unreasonable degradation, an NPDES permit will not be issued. If a determination of unreasonable degradation cannot be made because of a lack of sufficient information, EPA must then determine whether a discharge will cause irreparable harm to the marine environment and whether there are reasonable alternatives to on-site disposal. To assess the probability of irreparable harm, EPA is required to make a determination that the discharger, operating under appropriate permit conditions, will not cause permanent and significant harm to the environment. If data gathered through monitoring indicate that continued discharge may cause unreasonable degradation, the discharge must be halted or additional permit limitations established.

The determination of unreasonable degradation must be based on the following ten factors (40 CFR 125.122(a)): 1) quantities, composition, and potential for bioaccumulation or persistence of the pollutants discharged; 2) potential transport of such pollutants; 3) the composition and vulnerability of biological communities exposed to such pollutants; 4) the importance of the receiving water area to the surrounding biological community; 5) the existence

of special aquatic sites; 6) potential impacts on human health; 7) impacts on recreational and commercial fishing; 8) applicable requirements of approved Coastal Zone Management Plans; 9) marine water quality criteria developed pursuant to Section 304(a)(1) of the CWA; and 10) other relevant factors.

To support the issuance of the 2004 general permit, Region 9 prepared an Ocean Discharge Criteria Evaluation ("ODCE")[4] which evaluated the proposed discharges in relation to the requirements of the Ocean Discharge Criteria regulations. In addition, Region 9 reviewed numerous other studies and documents including: 1) BOEM Environmental Impact Statement for the "Outer Continental Shelf Oil and Gas Leasing Program: 1997-2002," August 1996, 2) BOEM-funded report "Disturbance of Deep-Water Communities by Exploratory Oil and Gas Operations in the Santa Maria Basin and Santa Barbara Channel," September 1995, 3) BOEM-funded report entitled "California OCS Phase II Monitoring Program", 1991, 4) Offshore Operators Committee-funded report "Gulf of Mexico Produced Water Bioaccumulation Study," April 1997, 5) Western States Petroleum Association-funded study "Potential for Bioaccumulation of Metals and Organic Chemicals from Produced Water Discharges Offshore in the Santa Barbara Channel, California: A Review," August 1997, and 6) BOEM-funded report entitled "Monitoring Assessment of Long-Term Changes in Biological Communities in the Santa Maria Basin: Phase III," November 1995.

After review of the ODCE, the studies noted above, and other available data in the administrative record for the permit, Region 9 concluded that the discharges authorized by the 2004 general permit would not cause unreasonable degradation of the marine environment. For the proposed 2012 permit reissuance, Region 9 re-evaluated this conclusion through a review of new study results which have become available subsequent to the 2004 permit issuance. The environmental studies program conducted by the Pacific OCS Office of BOEM is particularly useful since the studies are designed to address offshore oil and gas issues for the Southern California OCS specifically. As noted above, many earlier studies conducted by BOEM's Pacific OCS Office had been considered for the 2004 general permit. Studies completed subsequent to 2004 can be found on BOEM's website at: http://www.boem.gov/studies. The new studies address a wide variety of issues associated with the offshore oil and gas industry, but for the proposed permit, Region 9 focused on reports addressing the potential impacts of the discharges to the marine environment. However, after review of the new studies, we continue to believe that the discharges would not cause unreasonable degradation of the marine environment. The administrative record for the permit includes a list of studies that were reviewed.

Since some of the platforms on the Pacific OCS are nearing the end of their useful lives, the potential effects of platform removal (and removal of the habitat a platform provides) has been a frequent study topic, and some of these studies also provide information concerning effects of the discharges regulated by the proposed general permit. One such study[5] investigated

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[4] Science Applications International Corporation. 2000. Ocean Discharge Criteria Evaluation South and Central California for NPDES Permit No. CAG28000, Submitted to U.S. EPA Region 9, September 29, 2000.

[5] Minerals Management Service. 2009. Reproductive Ecology and Body Burden of Resident Fish Prior to Decommissioning", OCS Study MMS 2009-019, October 2009.

the body burden of various contaminants in fish near offshore platforms prior to decommissioning; however, significant adverse impacts from the discharges were not detected by the study. Another study[6] investigated differences in small invertebrate populations (which may provide prey for fish) at platforms versus natural reefs. Previous studies had shown differences in fish populations between platforms and natural reefs; the new study showed differences in the invertebrate populations as well. Again, significant adverse effects of platform discharges were not observed. A new study published in July 2010[7] provides an update concerning knowledge of the Pacific Coast, including a broad range of topics including physical oceanography, species information, ecosystem interrelationships, and an updated assessment of the effects of the discharges from offshore oil and gas platforms. Although the study notes continuing data gaps in some areas, Region 9 found no new information suggesting that the discharges would cause unreasonable degradation of the marine environment.

Other BOEM Regional Offices (such as those which oversee offshore oil and gas activity in the Gulf of Mexico and Alaska) conduct environmental study programs similar to the Pacific OCS Office; technical reports from these other BOEM Regional Offices are also available on BOEM's website at http://www.boem.gov/Studies. Region 9 reviewed selected reports from these other Regional Offices for any new information which would be relevant to the proposed discharges on Pacific OCS. At the outset, it should be noted that the environments in the Gulf of Mexico and especially in the Alaskan Arctic differ from the California OCS thereby making extrapolation of study results somewhat tenuous. Again, however, we found no new information which would affect our previous conclusion about the effects of the discharges. The administrative record includes a list of studies that were reviewed.

Other organizations (such as the Southern California Coastal Water Research Program, UCSB's Marine Science Institute and the California Cooperative Oceanic Fisheries Investigations) conduct oceanographic research along the Southern California coast and while their research agenda is broad-based, discharges from offshore oil and gas platforms are sometimes addressed. Technical reports from these organizations are available on their websites at: http://www.sccwrp.org/Homepage.aspx, http://www.msi.ucsb.edu and http://calcofi.org. Region 9 reviewed the websites for any new information concerning the effects of the discharges, but again found no new information which would change our previous overall conclusion. The administrative record includes a list of studies that were reviewed.

In summary, after considering the above information and other information in the administrative record for the 2012 permit, Region 9 again concludes that the proposed discharges from the platforms would not cause unreasonable degradation of the marine environment. However, this conclusion will be re-evaluated based on comments received on the proposed permit.

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[6] Minerals Management Service. 2007. Trophic Links and Condition of a Temperate Reef Fish: Comparisons among Offshore Oil Platforms and Natural Reef Habitats", OCS Study MMS 2005-005, January 2007.

[7] Bureau of Ocean Energy Management Regulation and Enforcement. 2010. Updated Summary of Knowledge: Selected Areas of the Pacific Coast Final Report, OCS Study BOEMRE 2010-014. July 2010.

As in the 2004 general permit, Region 9 has included a variety of technology-based and Section 403-based requirements in the proposed 2012 general permit to ensure compliance with the Ocean Discharge Criteria regulations. These requirements include: discharge restrictions (volume and nature of discharge) on drilling fluids, cuttings and produced water, requirement for the use of barite with low trace metal contaminant levels for drilling fluids, limitations on the discharge of oil-based muds and diesel oil as a mud additive, an oil and grease limitation for produced water, a "no free oil" limitation on numerous discharges from the offshore facilities, the static sheen test for detection of free oil before discharges occur, and limitations on solids and chlorine for sanitary waste discharges. Additional requirements are discussed below:

1. Water Quality-Based Effluent Limitations for Produced Water.

a. Reasonable Potential Monitoring Study in the 2004 Permit. Among other factors, the Ocean Discharge Criteria regulations require a consideration of marine water quality criteria for discharges to the ocean permitted under the NPDES permit program. In considering these criteria, particularly in determining permit conditions that would be needed to support a determination that produced water discharges will not cause unreasonable degradation of the marine environment, the 2004 general permit included a study requirement using the statistical procedures that EPA uses in determining the need for water quality-based effluent limits ("WQBELs") for point source discharges to waters of the United States, including the territorial seas. The study, captioned the "reasonable potential monitoring study" was required in order to determine whether the discharges regulated under the permit would cause, or had the reasonable potential to cause, or contribute to non-attainment of marine water quality criteria at the boundary of the mixing zone, which is the location identified in the Ocean Discharge Criteria regulations at 40 CFR 125.123(d)(1).

The Ocean Discharge Criteria at 40 CFR 125.121(c) allow a 100-m (330-ft) radius mixing zone for initial dilution of discharges. At the edge of the mixing zone, marine water quality criteria shall be met. The determination of whether a discharge meets water quality criteria at the edge of a mixing zone requires the computation of the amount of dilution that occurs in the mixing zone between the discharge location and the edge of the mixing zone. This calculation of dilution is usually accomplished through modeling. The 2004 general permit specified the use of EPA's PLUMES UM model and the 2012 proposed general permit would retain this requirement. More information concerning EPA dilution models, including PLUMES UM, is available on EPA's Office of Research and Development (ORD) website at: http://www.epa.gov/CEAM/.

The permit's statistical procedures were derived from EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD) (EPA/505/2-90-001). A separate document entitled "Procedure for Reasonable Potential Evaluation in NPDES Permit CAG280000" (Appendix A) was prepared which sets forth in detail the specific mathematical procedures for evaluating reasonable potential.

The constituents of concern for the monitoring study were 26 pollutants that Region 9 had identified as potentially present in the discharges; these pollutants are: ammonia, arsenic,

cadmium, copper, cyanide, lead, manganese, mercury, nickel, selenium, silver, zinc, benzene, benzo (a) anthracene, benzo (a) pyrene, chrysene, benzo (k) fluoranthene, benzo (b) fluoranthene, dibenzo (a,h) anthracene, hexavalent chromium, phenolic compounds, toluene, ethylbenzene, naphthalene, 2,4-dimethylphenol, and undissociated sulfide.

The 2004 general permit required monthly monitoring during the first year of the permit for the 26 pollutants list above. For cooling water and fire control system test water, monitoring was also required monthly during the first year for total residual chlorine which is used at some platforms as an anti-fouling agent. EPA also explained that if a discharge demonstrated the reasonable potential to cause non-attainment of a marine water quality criterion at the boundary of the mixing zone, then the permit could be reopened and modified to include additional effluent limitations and monitoring requirements to ensure compliance with the water quality criteria. In 2009, the permit was modified to include additional requirements based on the reasonable potential study results (see section H.1.b below for more information).

For the values for the marine water quality criteria for Federal waters on the Southern California OCS, EPA used the more stringent of its chronic marine water quality criteria[8] and California Ocean Plan ("COP") objectives[9]. These criteria are found in Table 1 below. As EPA explained in the 2009 modification of the general permit, EPA concluded that the use of the more stringent criteria would be necessary to ensure that the discharges did not cause unreasonable degradation of the marine environment.

Table 1 - Water Quality Criteria (in ug/l) for Produced Water Reasonable Potential Determination

Constituent	Aquatic Life Criteria		Human Health Criteria	
	EPA Criteria	COP 6-Month Median	EPA Criteria	COP 30-Day Average
Ammonia	1,300	600		
Arsenic	36	8		
Cadmium	8.8	1		
Copper	3.1	3		
Cyanide	1	1		
Lead	8.1	2		
Manganese			100	
Mercury	0.051	0.04		
Nickel	8.2	5		
Selenium	71	15		
Silver	1.9	0.7		

[8] EPA criteria are available at: http://water.epa.gov/scitech/swguidance/standards/current/index.cfm.
[9] State Water Resources Control Board. 2005. Water Quality Control Plan, Ocean Waters of California, 2005.

Zinc	81	20		
Benzene			51	5.9
Benzo (a) Anthracene			0.018	
Benzo (a) Pyrene			0.018	
Chrysene			0.018	
Benzo (k) Fluoranthene			0.018	
Benzo (b) Fluoranthene			0.018	
Dibenzo (a,h) Anthracene			0.018	
Hexavalent Chromium	50	2		
Phenol			1,700,000	
Toluene			15,000	85,000
Ethylbenzene			2,100	4,100
Naphthalene	not available		not available	
2,4-Dimethylphenol			2,300	
Undissociated Sulfides	2			

For most parameters in Table 1, the COP aquatic life water criteria are expressed in terms of a 6-month median whereas EPA's criteria are expressed in terms of a criterion continuous concentration (which is a four-day average), and it is not entirely clear which criteria would be more stringent. To answer that question, EPA developed a mathematical procedure[10] for comparing the stringency of a 6-month median and a four-day average, which was used in the reasonable potential analysis.

With regards to the human health criteria in Table 1, there are three parameters for which EPA and COP criteria are both specified (benzene, ethylbenzene and toluene). However, the EPA criteria and the COP objectives for these parameters are both considered long-term criteria (despite the COP objective being labeled a 30-day average) and therefore it is appropriate to compare them directly for stringency.

The 2004 general permit included the study requirement because at the time of the issuance insufficient data were available to evaluate the reasonable potential for the discharges of produced water, cooling water and fire control system test water to cause or contribute to exceedances of the marine water quality criteria for the pollutants of concern.

[10] The procedure is found in the document entitled "Procedure for Comparing California Ocean Plan 6-Month Median and a 4-Day Average for NPDES Permit No. CAG280000" dated August 16, 2001,

b. 2009 General Permit Modification.

The reasonable potential study results were submitted in a timely manner by the permittees in 2006. As noted above, the 2004 general permit provided that if a discharge demonstrated the reasonable potential to cause non-attainment of a marine water quality criterion at the boundary of the mixing zone, then the permit could be reopened and modified to include additional effluent limitations and monitoring requirements to ensure compliance with the water quality criteria. In April 2009, EPA proposed a permit modification to incorporate additional effluent limitations and monitoring requirements based on the study results. On November 30, 2009 Region 9 issued the final permit modification (74 FR 64074), which is available at: http://www.epa.gov/region09/water/. The new effluent limitations and monitoring requirements resulting from the study are found in Appendices C and D which were added to the 2004 general permit.

Although the general permit authorizes discharges from 23 offshore platforms, only 15 of the platforms may discharge produced water. The reasonable potential study showed that 13 of the platforms had reasonable potential to exceed applicable marine water quality criteria for one or more of the 26 pollutants monitored in produced water. One of the platforms (Platform Irene) rarely discharges produced water and the operator had not collected the minimum number of samples (which is ten samples) recommended by the TSD to do a reasonable potential analysis. Moreover, the discharges measured for this platform were from small scale pilot tests of potential produced water treatment systems which may not be representative of future discharges resulting from the treatment system ultimately installed. Thus, Region 9 deferred action on this platform until the general permit reissuance (see section V.H.1.c below).

Seven of the 23 platforms use chlorine in cooling water or fire control system test water. Six of the seven platforms showed a reasonable potential to cause non-attainment of the marine water quality criteria for chlorine.

c. Proposed Requirements for the 2012 General Permit

Region 9 has re-evaluated the reasonable potential of produced water discharges (and cooling water and fire control system test water discharges) using monitoring data collected in 2009-2012. The 2006 reasonable potential submittal was based on monitoring data collected in 2005 and in years prior to 2005 (which are included in the administrative record for the new proposed permit for comparison purposes). For several constituents, reasonable potential (and WQBELs in the 2009 permit modification) resulted simply from the detection limit the laboratory was able to achieve (particularly for the polycyclic aromatic hydrocarbons in produced water). This was the result of application of the "Procedure for Reasonable Potential Evaluation in NPDES Permit CAG280000" (which is attached to this Fact Sheet in Appendix A) used to determine the need for permit limits. Specifically the equation under Step 5 requires use of the higher of either the highest measured concentration or the highest detection limit of the constituent at issue.

In recent years, laboratories have achieved lower detection limits which now show that the constituents are at a lower concentration that does not trigger reasonable potential. Accordingly, Region 9 believes a re-evaluation is appropriate in light of this new information. The 2012 re-evaluation used the same procedure, including the Step 5 equation, and found no reasonable potential for several constituents. Thus, eight platforms no longer have WQBELs and the rest of the platforms have fewer such limits. For such constituents, however, Region 9 is proposing an annual monitoring requirement to ensure no unreasonable degradation of the marine environment pursuant to section 403 of the CWA. Quarterly monitoring (as in the existing permit) would continue for constituents for which an effluent limit was determined to be appropriate based on the updated reasonable potential analysis. Appendix B of the proposed 2012 general permit sets forth the proposed effluent limitations and monitoring requirements based on the re-evaluation.

For chlorine in cooling water and fire control system test water discharges, the analysis showed that many of the previous effluent limits would still be needed, and are included in Appendix C of the 2012 permit. For platforms that continue to have effluent limits, quarterly monitoring would be required as in the existing permit; for platforms without effluent limits, annual monitoring would be required to ensure no unreasonable degradation of the marine environment. Appendix C also includes new effluent limits and monitoring requirements for Platforms Eureka, Ellen and Elly, which began adding chlorine to cooling water in 2011. These effluent limits are based on monitoring data submitted by Beta Offshore on October 18, 2012 and a reasonable potential analysis conducted by Region 9. For Platforms Eureka and Ellen, there are two discharge scenarios – cooling water only and cooling water mixed with excess chlorinated seawater. The chlorine concentration is the same for both scenarios, but the flow rate is somewhat higher for the combined discharge, which reduces the dilution in the mixing zone. The reasonable potential analysis showed that effluent limits are needed in both scenarios, and the post-dilution effluent limits would be the same. For the combined discharge, however, the required chlorine concentration at the discharge outfall will be somewhat lower, given the decreased dilution in the mixing zone for this scenario. The proposed permit requires monitoring of either of the discharges (since the chlorine concentrations are the same), but a demonstration of compliance with the post-dilution effluent limits for both scenarios.

Region 9 believes the removal of the effluent limits noted above would not be inconsistent with the anti-backsliding requirements of the CWA. Sections 402(o)(2) provides certain exceptions to the general prohibition on backsliding, including an exception for "new information" (CWA section 402(o)(2)(B)(i)). Region 9 believes the updated reasonable potential analysis, based on more accurate measurements and the monitoring data submitted by the permittees, would constitute appropriate "new information" which would justify removal of the limits consistent with the requirements of the CWA.

For Platform Irene (which rarely discharges produced water), Region 9 still does not have the minimum number of samples (10) recommended by the TSD to do a reasonable potential analysis. As such, Region 9 is again deferring action on this platform. As in the 2009 permit modification, Platform Irene would continue to be subject to effluent limits in its previous individual permit, and when discharges occur, the platform would continue to conduct

monitoring for all 26 of the pollutants of concern listed in the 2004 general permit. When the minimum number of samples is collected, Region 9 would reopen and modify the permit to include additional effluent limits and monitoring requirements, as appropriate (similar to the 2009 permit modification described above). This procedure is described in Appendix D of the 2012 proposed permit.

2. Whole Effluent Toxicity ("WET"). The whole effluent toxicity approach to toxics control for the protection of aquatic life involves the use of acute and chronic toxicity tests to measure the toxicity of wastewaters. WET is a useful parameter for assessing and protecting against impacts on water quality and designated uses caused by the aggregate toxic effects of the different pollutants in a discharge. WET tests employ the use of standardized, surrogate freshwater or marine plants, invertebrates, and vertebrates. EPA has published extensive protocols listing numerous marine and freshwater species for toxicity testing.

WET tests are used to measure the acute and/or chronic toxicity of an effluent. Chronic toxicity measures a sublethal effect (e.g., reduced growth, reproduction) in an effluent compared to that of the control organism. When conducting a chronic toxicity test, the highest concentration of an effluent at which no adverse effects are observed on the aquatic test organisms is defined as the No Observed Effect Concentration ("NOEC"). Chronic toxicity units (TU_c) are defined as 100/NOEC.

The 2004 general permit required chronic toxicity testing for produced water discharges. Given the variety of pollutants in produced water, EPA believed that WET toxicity was appropriate to measure the aggregate toxic effects of these materials. The 2004 permit required monthly testing (for the first year of the permit) using the red abalone (*Haliotis rufescens*) larval development test, and then annual screening with a plant (giant kelp, *Macrocystis pyrifera*), a vertebrate (topsmelt, *Atherinops affinis*) and an invertebrate (red abalone). The chronic toxicity of the effluent was estimated as specified in "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms," EPA/600/R-95/136, August 1995.

In 2010, EPA published a new guidance manual[11] which Region 9 believes improves regulatory decision-making with regards to WET test results. The new method is based on comparing the mean response of the test organisms in the control and at the instream waste concentration ("IWC") (which is the concentration at the edge of the 100 meter mixing zone for the offshore platforms).

Although the 2004 general permit was issued before the 2010 manual was published, Region 9 believes it is still possible to draw certain conclusions using the 2010 procedure with the data collected under the 2004 permit. The 2004 permit did not require a toxicity test exactly at the IWC, but test data were collected at concentrations above and below the IWC, thus bracketing the IWC, and in any event reasonably close to the IWC.

[11] U.S. EPA. 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document , EPA 833-R-10-003, June 2010.

The 2010 manual also includes a procedure for evaluating the reasonable potential of a discharge to cause toxicity in the receiving waterbody. Region 9 used the procedure in the 2010 manual to evaluate the toxicity test results collected during the term of the 2004 permit. The vast majority of test results for all species tested (red abalone, giant kelp and topsmelt) were "pass", i.e., the discharge did not cause toxicity. However, for the giant kelp and the topsmelt, reasonable potential to cause toxicity was demonstrated for several platforms using the 2010 procedure.

Where reasonable potential was demonstrated at a concentration below the IWC (i.e., more dilute), Region 9 believes this would indicate reasonable potential would also be present at the IWC, and that a WET permit effluent limit would be appropriate[12], along with an annual monitoring requirement. Otherwise, Region 9 believes that a continuation of chronic toxicity testing would be appropriate to ensure no unreasonable degradation of the marine environment, and is proposing annual chronic toxicity screening using the three above species, using the 2010 protocol. Table 4 in the proposed permit summarizes which platforms have permit effluent limits (for cases where reasonable potential was demonstrated) or "permit triggers" (where reasonable potential was not demonstrated). Depending on the WET test results, the proposed permit also specifies certain follow-up actions, such as additional WET tests and a toxicity reduction evaluation to identify and correct the cause of any observed toxicity. The follow-up actions are the same for both permit effluent limits and permit triggers. The only difference between a permit effluent limit and a permit trigger is that exceedance of a permit trigger only requires the follow-up actions, while exceedance of a permit effluent limit would also be a violation of the permit. The 2010 manual provides model NPDES permit language which Region 9 adapted for the 2012 proposed permit in Part II.B.2.

3. Adequacy of the BAT Mud Toxicity Limit in Complying with CWA Section 403(c) Requirements. EPA believes that the BAT toxicity limit for drilling mud (96 hour LC50 of 30,000 ppm) will also ensure that no unreasonable degradation occurs as a result of the discharges. For the original general permit issued in 1982, EPA had determined, based on a dilution analysis, that a 96 hour LC50 of 20,000 ppm would be adequate to comply with the permit limitations. Dischargers operated under this limitation until the 2004 permit reissuance, and EPA is not aware of any data which would indicate that this limit has been insufficient to ensure "no unreasonable degradation" of the marine environment. For example, such degradation was not detected in the BOEM-funded studies in the Santa Maria Basin which were discussed above. Because the proposed drilling mud toxicity limit is more stringent than the previous limit, the proposed limit should also be adequate to ensure no unreasonable degradation.

[12] WET effluent limit is appropriate for consistency with NPDES regulations at 40 CFR 122.44(d)(1)(iv).

4. Maximum Concentration of Chlorine in Sanitary Wastes. The proposed permit would retain the maximum concentration limit of 10 mg/l which was included in the 2004 general permit and the individual permits which EPA issued in 1993. EPA concluded that this limit should be achievable through better operation and housekeeping of existing facilities and would minimize the potential effects of chlorine in the discharge. As noted above, the BCT effluent guidelines require a minimum chlorine concentration of 1 mg/l, maintained as close to this concentration as possible.

5. Chemical Inventory. The proposed 2012 general permit retains the requirement in the 2004 general permit that permittees maintain (and submit with the DMRs) information concerning chemicals such as corrosion inhibitors, oxygen scavengers and other materials added to hydrotest water, fire control system test water, noncontact cooling water, test fluids and water flooding discharges. EPA does not believe that these discharges will cause unreasonable degradation of the marine environment; however, the requirement to submit such information will ensure that EPA is kept informed of the nature of materials which are being used. As discussed below, the proposed permit includes a reopener clause which would allow EPA to reopen and modify the permit to include additional restrictions on the use of chemicals in the discharges as necessary to ensure no unreasonable degradation of the marine environment.

6. Maximum Discharge Rates. The proposed general permit would limit the maximum annual quantities of drilling muds, cuttings, excess cement and produced water which could be discharged from all production platforms. These limits were also included in the 2004 general permit in response to public comments on previous permits; the limits will more clearly define the maximum environmental impacts of the discharges as recommended by the commenters. The limits themselves are the maximum amounts which the platform operators expect may occur on an annual basis during the term of the permit.

7. No Discharge of Chrome Lignosulfonate. The 2004 general permit prohibited the discharge of chrome lignosulfonate in order to prevent the discharge of the toxic pollutant chromium. EPA believes it to be appropriate to continue this prohibition of chrome lignosulfonate in the 2012 permit since substitutes are available and its prohibition is an appropriate limit to prevent unreasonable degradation of the marine environment.

8. Barging of Muds to Shore. When the effluent limitations guidelines for drilling fluids were promulgated in 1993, EPA pointed out that various non-water quality factors (such as air emissions, energy use and solid waste management) must be considered in developing the guidelines. The air emissions stemming from the barging of fluids to shore was one factor cited in support of the decision to allow the fluids to the discharged beyond 3 miles from the coast. However, for the 2004 permit, one party recommended that with the advent of lower emissions vessels, EPA should reconsider this decision.

In response, EPA stated that the emissions from barges still constituted a valid argument for the proposed authorization of drilling fluids discharges in ocean waters. Industry also provided data showing that the emissions levels for vessels used in the Santa Barbara Channel

are comparable to the emissions levels for the vessels considered by EPA in the development of the offshore effluent guidelines.

Therefore, EPA did not incorporate modified effluent limitations for drilling fluids in the 2004 general permit on this basis. However, EPA did include a requirement in the permit that permittees operating under the permit submit (jointly or individually) a report to EPA within two years of the effective date of the permit which re-evaluated alternatives to direct disposal of drilling fluids and cuttings at the disposal site (such as onshore disposal, increased recycling and reuse, ocean dumping off-site, and reinjection). Two reports were submitted by permittees[13,14] in December 2006; Region 9 believes they support the requirements included in the 2004 general permit. Accordingly, Region 9 proposes to include these requirements (i.e., authorization to discharge drilling fluids subject to permit's effluent limits and monitoring requirements) in the 2012 general permit reissuance as well.

9. Reopener Clause. The Ocean Discharge Criteria regulations require that the re-opener clause found at 40 CFR 125.123(d)(4) be included in permits issued to pursuant to 40 CFR 125.123(c) (no irreparable harm). As noted above, EPA concluded that no unreasonable degradation would occur. Thus, the reopener clause would be optional. However, Region 9 is including the re-opener clause in the proposed permit to ensure that any necessary permit modifications may be made if new information should unexpectedly indicate that the discharges could cause unreasonable degradation of the marine environment. Further, the reopener was modified to specifically provide that the permit may be reopened if increased discharges may cause unreasonable degradation, or if additional conditions are needed to protect special aquatic sites. EPA believes that these changes are reasonable since the criteria for determining unreasonable degradation at 40 CFR 125.122(a)(1) generally include a consideration of these factors. In addition, the reopener provides that the permit may be modified based on new requirements which are determined to be necessary to prevent unreasonable degradation of the marine environment.

10. On-Line Oil and Grease Monitors. The 2004 general permit required each permittee (jointly or separately) to investigate and submit a report evaluating the availability and practicality of on-line monitoring devices for oil and grease in produced water discharges. To a considerable degree, the impetus for this requirement was the CCC which believed these devices would improve compliance with effluent limits by the platforms, and thereby enhance protection of the marine environment, consistent with the California Coastal Management Plan.[15] The practicality of such devices for produced water was unclear at the time of the 2004 general permit issuance, but it was Region 9's intent to re-evaluate this matter when the permit was reissued. If practical, these devices have the potential to provide more timely information concerning upset conditions and potential exceedances of permit limits, and thereby provide

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[13] DCOR, LLC. 2006. Discharge Alternatives Study, Submitted to EPA Region 9, December 15, 2006.

[14] Western States Petroleum Association. 2006. Final Report, Discharge Alternatives Feasibility Study, Submitted to EPA Region 9, December 21, 2006.

[15] California Coastal Commission. 2000. Staff Report and Recommendation on Consistency Certification, Consistency Certification No. CC-126-00, December 12, 2000.

improved protection of the marine environment by allowing more timely corrective actions by the permittee.

The permittees submitted three different reports[16,17,18] evaluating this matter, and Region 9 believes they show the technology is now available and practical for use at California offshore platforms. Furthermore, as discussed with operators and as noted in the reports, some platforms have already installed devices of this nature. As such, the proposed 2012 general permit would require within one year of the permit's effective date that operators do either of the following:

a. Install on-line monitoring equipment capable of providing the operator with rapid information concerning potential noncompliance with the effluent limits for oil and grease for produced water in this permit, or

b. Provide information to Region 9 demonstrating that the operator has already installed monitoring equipment which meets the above objective.

The submitted reports note that various monitoring devices are available, and the most appropriate device may vary with the platform. Some devices provide instantaneous information while others involve taking a sample which is subsequently analyzed (analysis takes about 10 minutes). One operator with such a system indicated they perform this test once/hour, 24 hours a day. As long as "rapid" information is provided to the operator concerning a potential upset (real time, or with a brief lag time such as one hour), the operator will have complied with the permit condition.

The reports stress (and Region 9 agrees) that the on-line monitoring devices are not suitable for precise compliance determinations with the oil and grease limit in produced water (29 mg/l monthly average and 42 mg/l daily maximum) in the proposed permit. Compliance determinations would still made using method 1664. However, Region 9 believes the devices are worthwhile in that they provide permittees with more rapid information concerning upset conditions or potential exceedances of permit limits.

I. Best Management Practices. Best Management Practices ("BMPs"), in addition to numerical effluent limitations, may be required to control or abate the discharge of pollutants in accordance with 40 CFR 122.44(k).

The proposed permit requires the discharge of surfactants, dispersants, and detergents to be minimized except as necessary to comply with the safety requirements of the Occupational Health and Safety Administration and BSEE. These products contain primarily nonconventional

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[16] Western States Petroleum Association. 2008. Assessment of On-Line Oil in Water Monitors, Prepared by Maxoil Process Solutions, November 2008.

[17] DCOR, LLC and Pacific Operators Offshore. 2008. Feasibility Study, On Line Oil and Grease Monitoring, NPDES Permit No. CAG28000, November 2008.

[18] Pacific Energy Resources. 2008. NPDES Permit CAG28000, Offshore California Produced Water Oil and Grease Online Monitor Study, Prepared by LTS Environmental, September 25, 2008.

pollutants. This provision also appeared in the 2004 general permit for Southern California OCS oil and gas facilities.

J. Other Discharge Limitations, Prohibitions and Conditions

1. Produced Sands. In the proposed permit, EPA prohibits the discharge of produced sands (formerly called "produced solids") as a BAT limit based on EPA's effluent guidelines for the Offshore subcategory. Promulgated BAT for produced sand is "no discharge" based on EPAs determination that these "sands" may be sent to shore on barge trips during regularly scheduled maintenance trips.

In 1993, the promulgated Offshore rule (40 CFR 435.11) defined "produced sand" as slurried particles used in hydraulic fracturing, the accumulated formation sands and scales particles generated during production, desander discharge from the produced water wastestream, and blowdown of the water phase from the produced water treatment system.

2. No Halogenated Phenol Discharges. No halogenated phenols shall be discharged in accordance with a BSEE operations order.

3. Tracer Materials. Radioactive tracer concentration above the background in the parent, discharged waste stream shall be limited as given in 10 CFR 20 Appendix B, Table II, Column 2, Effluent Concentrations, Water.

4. Standard Permit Conditions

NPDES Regulations at 40 CFR 122.41 and 122.42 require that certain standard conditions be included in all NPDES permits. These conditions have been included in Part IV of the proposed permit. For the 2004 general permit, industry commenters expressed concerns regarding the meaning of some of these conditions and suggested certain revisions, which are discussed below:

a. References to Sludge. A few standard conditions include references to sewage sludge which only apply to publicly owned treatment works (POTWs). Industry commenters suggested that such references be removed since they would not apply to offshore facilities. In response, EPA would point out that such references are relatively few, and EPA would prefer to not modify the standard conditions since it should be obvious that they do not apply to offshore facilities.

b. Duty to Reapply. NPDES regulations at 40 CFR 122.41(b) require that permittees reapply and obtain a new NPDES permit to continue discharges after expiration of an existing permit. Industry commenters have expressed concern that this standard condition might conflict with Part I.A.6.c of the proposed general permit. In response, EPA disagrees that there is a conflict. For the proposed general permit, the notice of intent is the mechanism by which a permittee reapplies for coverage.

c. Reporting Requirements. NPDES regulations at 40 CFR 122.41(l)(1)(ii) require that permittees provide notice when physical changes are planned for a permitted facility which would "significantly change the nature or increase the quantity of pollutants discharged." Industry commenters have raised the issue of whether the word "significantly" modifies only the word "change", or both the words "change" and "increase." The commenters indicated that their interpretation would be that both words are modified. EPA concurs with this interpretation.

d. Permittee Transfers. NPDES regulations at 40 CFR 122.41(l)(3) include certain mandatory requirements pertaining to transfer of permit coverage from one permittee to another. Industry commenters have recommended some revised language which would make transfers automatic provided a permittee transfer agreement is developed. In response, EPA believes that the standard language of 40 CFR 122.41(l)(3) should be retained. In transferring a permit from one permittee to another, EPA must consider whether the terms of the permit are appropriate for the new permittee. For example, the capability of the new permittee to comply with the terms of the permit may be different for the new permittee than for the previous permittee. As such, the proposed permit retains the standard condition from 40 CFR 122.41(l)(3). However, this is not to say that permittee transfer could not be accomplished as a minor permit modification in accordance with 40 CFR 122.63. EPA may also consider BOEM findings in its decision on a change of operator of record.

e. Compliance Schedules. NPDES regulations at 40 CFR 122.41(l)(5) include a reference to compliance schedules which industry commenters recommended be removed. The industry commenters contended that general permits do not include compliance schedules and there could be a conflict with the TIE/TRE conditions of Part II.B.4 of the permit. In response, EPA has retained the condition for consistency with NPDES regulations. Further, the TIE/TRE requirements would constitute a compliance schedule and 40 CFR 122.41(l)(5) simply requires that the permittees report the TIE/TRE results in a timely manner.

f. 24-Hour Reporting Requirements. NPDES regulations at 40 CFR 122.44(g) require a list in the permit of any specific pollutants for which 24-hour reporting of violations of daily maximum discharge limitations will be required. Industry commenters recommended that this condition be deleted from the proposed permit since no specific pollutants have been listed. EPA, however, prefers to retain the condition for consistency with NPDES regulations.

g. Duty to Comply. NPDES regulations at 40 CFR 122.41(a)(1) require compliance with effluent standards which may be established under section 307(a) of the Clean Water Act in the time frame which is established even if a permit has not been modified to incorporate the requirements. Industry commenters suggested that this condition be removed and replaced with alternate language indicating that the permit would be modified to include any effluent standards established under section 307(a). In response, EPA again believes that the condition should be retained exactly as found at 40 CFR 122.41(a)(1) for consistency with the regulations. The alternative suggested by industry would be inappropriate in that it would not clarify that compliance would be required in the time frame established by the regulations regardless of whether the permit had been modified.

VI. OTHER LEGAL REQUIREMENTS

A. Oil Spill Requirements. Oil spill requirements in the proposed permit reflect Executive Order 12777 which implements provisions of the Oil Pollution Act of 1990. Executive Order 12777 removed offshore facilities from jurisdiction under EPA and placed them under the jurisdiction of the Department of Interior, BSEE. Offshore operators are required to submit Oil Spill Response Plans to BSEE for review in accordance with 30 CFR 254.

The effect of the Oil Pollution Act of 1990 and Executive Order 12777 is that operators in state or Federal waters are no longer required by Section 311 of the Clean Water Act to develop Spill Prevention, Control and Contingency ("SPCC") plans.

B. Endangered Species Act. The Endangered Species Act ("ESA") allocates authority to and administers requirements upon Federal agencies regarding threatened or endangered species of fish, wildlife, or plants and habitat of such species that have been designated as critical. Its implementing regulations (50 CFR Part 402) require EPA to ensure, in consultation with the Secretary of the Interior or Commerce, that any action authorized, funded or carried out by EPA is not likely to jeopardize the continued existence of any threatened or endangered species or adversely affect its critical habitat (40 CFR 122.49(c)).

Implementing regulations for the ESA establish a process by which Federal agencies consult with one another to ensure that the concerns of both the U.S. Fish and Wildlife Service ("USFWS") and the National Marine Fisheries Service ("NMFS")(collectively "Services") are addressed. In compliance with Section 7 of the ESA, for the 2004 general permit, EPA obtained lists of critical habitat areas and threatened and endangered species from the Ventura Field Office of the USFWS and the Long Beach office of NMFS.

EPA prepared separate biological assessments (BAs)[19,20] to assess the potential impacts of the 2004 permit issuance on listed species under the jurisdiction of the USFWS and NMFS. Both BAs concluded that there would be no effect on listed species. During the permit issuance process for the 2004 general permit, EPA provided copies of the draft general permit and fact sheet along with the appropriate BA to the Long Beach office of the NMFS and the Ventura Field Office of the USFWS for review and comment on EPA's conclusions concerning the effects of the discharges which would be authorized by the draft permit on listed species. No comments were received from either agency.

For the 2012 general permit reissuance, Region 9 reconsidered the potential effects of the discharges on listed species and critical habitat. Both NMFS and the USFWS maintain updated lists of threatened and endangered species and critical habitat for these species at

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[19] Science Applications International Corporation. 2000. Biological Assessment for Endangered Species in Outer Continental Shelf Waters of South and Central California for Consultation with the National Marine Fisheries Service, Submitted to EPA, February 10, 2000.

[20] Science Applications International Corporation. 2000. Biological Assessment for Endangered Species in Outer Continental Shelf Waters of South and Central California for Consultation with the Unites States Fish and Wildlife Service, Submitted to EPA, February 10, 2000.

http://www.nmfs.noaa.gov/pr/species/esa/ and http://ecos.fws.gov/tess_public/. These lists[21] have changed only slightly from the lists considered in the BAs prepared for the 2004 general permit. A few species considered for the 2004 general permit have been delisted as a result of recovery of the species (e.g. bald eagle and brown pelican). However, there are now two species of abalone (which are present offshore Southern California) which were listed by NMFS subsequent to the preparation of the BA for the species under the jurisdiction of NMFS. The black abalone was listed as endangered on January 14, 2009 (74 FR 1937), and the white abalone was listed as endangered on May 29, 2001 (66 FR 29046). In addition, critical habitat was designated for the black abalone on October 27, 2011 (76 FR 66806). However, the principal threats to these species appear to be factors (such as overharvesting and disease) other than the regulated discharges from offshore oil and gas platforms. NMFS's 2009 status report[22] for the black abalone mentions major oil spills as a likely threat to the black abalone, but the discharges which would be authorized by the proposed general permit were not mentioned as a threat. Similarly, for the white abalone, NMFS's 2008 recovery plan[23] does not mention regulated discharges from offshore oil and gas platforms as a threat to the species.

NMFS finalized critical habitat for the leatherback turtle along the Pacific Coast on January 26, 2012 (77 FR 4170). The leatherback turtle had been listed as endangered throughout its range in 1970 (35 FR 8491). This species was also considered by the previous BA prepared for the 2004 general permit, which concluded there would be no effect from the discharges on this species. The critical habitat extends along the California coastline from Point Arena in the north to Point Conception in the south. Only one existing platform would fall within this area which is Platform Irene, and we find no information in the critical habitat designation which would indicate the proposed discharges would affect critical habitat for this species.

NMFS listed the green sturgeon (southern distinct population segment) as threatened on April 7, 2006 (71 FR 17757). In addition, NMFS designated critical habitat for the species on October 9, 2009 (74 FR 52300). However, the southern extremity of the range of the species along the west coast ends about 50 miles north of the northernmost platform (Platform Irene), and about 40 miles north of the northernmost lease block. As such, Region 9 does not expect the proposed discharges to affect this species.

In summary, Region 9 has reconsidered the potential effects of the discharges on listed species (and changes to the list from the issuance date for the 2004 permit) and we believe that the previous conclusion is still valid that the discharges would not affect these species. However, we will forward the draft permit and fact sheet to the Services for any comments they may have on this tentative conclusion.

C. Coastal Zone Management Act. The Coastal Zone Management Act ("CZMA") provides that a Federal license or permit for activities affecting the coastal zone of a state may not be

[21] In letters dated August 29, 2012, Region 9 requested species lists from the Services to ensure that appropriate species are considered for reissuance of the final general permit.
[22] National Marine Fisheries Service. 2009. Status Review Report for Black Abalone. January 2009.
[23] National Marine Fisheries Service. 2008. Final White Abalone Recovery Plan, October 2008.

granted until a state with an approved Coastal Management Plan ("CMP") concurs with a certification that the activities authorized by the permit are consistent with the CMP (CZMA Section 307(c)(3)(A)). In California, the CZMA authority is the CCC. In this case, EPA will be preparing and submitting to the CCC the required certification. Since the necessary consistency concurrence has not been obtained, the proposed permit provides that the permit will not be effective until the required concurrence is obtained.

As a threshold matter, CZMA consistency determination requirements apply not only to federal activities and federal licenses or permits for activities that occur within the coastal zone, but also to federal activities and federal licenses or permits for activities outside the coastal zone that affect any land or water use or natural resource of the coastal zone. Region 9 believes that the proposed permit could affect coastal uses or resources of the coastal zone of State of California. Region 9 also believes that the proposed permit would be consistent with the CMP.

Since the date Region 9 issued general permit No. CAG280000 in 2004, the CZMA regulations specifying Federal agencies' obligations under CZMA sections (c)(1) and (c)(3) have been revised. In accordance with revised regulations implementing the CZMA (71 FR 788, January 5, 2006), the issuance of a general NPDES permit by EPA that does not involve case-by-case or individual issuance of a license or permit is considered a "Federal agency activity" subject to the consistency determination requirements of CZMA section 307(c)(1). 15 CFR 930.31(d). If the relevant state agency's conditions are not incorporated into the general permit or the state agency objects to the general permit, then the general permit is not available for use in that state unless the applicant or person who wants to use the general permit provides the state agency with a consistency determination and the state agency concurs. Essentially, if EPA does not include a state agency's conditions or if the state agency objects, then the applicable CZMA consistency determination requirements shift from those in CZMA section 307(c)(1) into those in CZMA section 307(c)(3).

D. Marine Protection, Research, and Sanctuaries Act. The Channel Islands National Marine Sanctuary was designated in 1980 and encompasses approximately 4,296 km^2 in the Southern California Bight. The sanctuary boundaries include the ocean area extending from the mean high-tide line to a distance of 11.1 km around San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara Islands. The islands themselves are not part of the sanctuary but constitute the emergent portion of the Channel Islands National Park. The seaward boundary of the park extends 1.85 km offshore.

Sanctuary regulations (15 CFR Part 922.71) provide a list of activities that are prohibited and thus unlawful for any person to conduct or to cause to be conducted within the Sanctuary. No operations authorized by this proposed permit are within the Sanctuary boundaries.

E. Magnuson-Stevens Fishery Conservation and Management Act. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth a number of new mandates for NMFS, regional fishery management councils, and Federal agencies to identify and protect important marine and anadromous fish habitat. Regional fishery management councils, with assistance from NMFS, are required to delineate essential fish habitat ("EFH").

The Magnuson-Stevens Act requires that Federal agencies consult with NMFS on all actions undertaken by the agency which may adversely affect EFH. In accordance with these requirements, for the 2004 general permit, EPA prepared an assessment[24] of the effects of the proposed discharges on EFH in the area covered by the permit. The assessment concluded that while there may be effects on EFH from certain discharges near an outfall, these effects should be minor overall given the small area which may be affected relative to the size of the EFH off the Pacific Coast, and the mitigation provided by the various effluent limitations of the permit.

On October 4, 2000, EPA provided a copy of the EFH assessment to NMFS to initiate a consultation. In a letter dated October 20, 2000, NMFS provided its response, which included the following Conservation Recommendations with regards to produced water discharges:

1. Require oil and gas platform operators to evaluate the direct lethal, sublethal, and bioaccumulative effects of produced water on Federally-managed fish species (e.g., blue rockfish, bocaccio rockfish, brown rockfish, olive rockfish and lingcod) at key life stages (e.g., juvenile and adult) occupying the mixing zone of produced water effluent discharges.

2. Model dilution and dispersion plumes from the point of produced water discharge to determine the extent of the area in which Federally-managed fish species may be adversely affected.

3. Develop appropriate mitigation measures (i.e., alter discharge rates or relocate discharge pipes) should information from the two previous recommendations indicate that substantial adverse effects to Federally-managed species or EFH do occur.

The 2004 general permit included a requirement that the permittees prepare and submit to Region 9 within 6 months of the permit effective date a study that addressed the above issues. A final report[25] was submitted by permittees in June 2005. The report concludes that the discharges would not be expected to have a significant adverse effect on EFH. Region 9 forwarded a copy of the report to NMFS in September 2005. NMFS was satisfied that its concerns had been addressed by the report, and the consultation was concluded.

For the 2012 permit reissuance, Region 9 reconsidered the effects of the discharges on EFH. The Southwest Regional Office of NMFS provides updated information concerning EFH on its website at: http://swr.nmfs.noaa.gov/hcd/HCD_webContent/EFH/index_EFH.htm. One such update was the adoption on May 11, 2006 (71 FR 27408) of Amendment 19 (effective June 12, 2006) to the Pacific Coast Groundfish Fishery Management Plan that sets forth certain new requirements for the Plan. While oil production platforms are mentioned in the Amendment, Region 9 found no new requirements or concerns identified which had not been previously

[24] Science Applications International Corporation. 2000. Essential Fish Habitat Assessment for NPDES Permit No. CAG280000, Submitted to EPA Region 9. October 2, 2000.

[25] Western States Petroleum Association. 2005. The Effects of Produced Water Discharges on Federally Managed Fish Species along the California Outer Continental Shelf, Submitted to EPA Region 9, June 2005.

considered. Another new document[26] provides an assessment of nonfishing impacts (including potential impacts from offshore oil platforms) on EFH. During our review of this document, we found no new information that was not already considered in the previous EFH assessment. Two other new documents[27, 28] provide life history information on various species, but we did not find any new information concerning the potential effects of the discharges. Finally, in a memorandum dated February 28, 2011[29], NMFS has invited interested parties to submit any available new information related to EFH on the Pacific Coast; this solicitation may eventually yield new information pertinent to discharges from offshore oil and gas facilities, but for the moment, no additional information is provided.

In summary, Region 9 reviewed the updated EFH information on the NMFS website for any new requirements or information pertaining to the proposed discharges. We found no new information that would change our previous conclusion that the discharges would not have a significant adverse effect on EFH. As such, Region 9 is not reinitiating consultation at this time, but will forward the draft permit and fact sheet to NMFS for any comments on Region 9's tentative conclusion concerning the potential effects on EFH.

F. ANNEX V Of MARPOL (33 CFR 155.73). Under Annex V of the International Convention for the Prevention of Pollution from Ships, the U.S. Coast Guard ("USCG") has issued interim final regulations under 33 CFR 151.73 to control the disposal of garbage and domestic wastes from fixed or floating platforms. These regulations include those platforms involved in the exploration and exploitation of oil and gas resources, such as oil drilling rigs and production platforms. These regulations apply to all such vessels when in navigable waters of the U.S. or within the 200 mile Exclusive Economic Zone. This proposed permit will prohibit the discharge of garbage (as defined at 33 CFR 151) within 12 miles of the nearest land. The term "garbage," as it is applied here, includes operational and maintenance wastes. Further clarification of wastes covered under these regulations can be found at 33 CFR 151. Beyond 12 miles from the nearest land, the discharge of food wastes that are ground so as to pass through a 25 millimeter mesh screen, incinerator ash, and non-plastic clinkers will be permitted. Incinerator ash and non-plastic clinkers that can pass through a 25 millimeter mesh screen will be permitted to be discharged beyond 3 miles from the nearest land. These requirements are already part of the USCG regulations and are incorporated into the permit for consistency.

G. Paperwork Reduction Act. The information collection required by this proposed permit has been approved by Office of Management and Budget ("OMB") under the provisions of the

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[26] Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery, Appendix D, Nonfishing Impacts to Essential Fish Habitat and Recommended Conservation Measures, Pacific Fishery Management Council, November 2005.

[27] Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery, Appendix B. Part 2, Groundfish Life History Descriptions, Pacific Fishery Management Council, November 2005.

[28] HMS FMP Appendix F, U.S. West Coast Highly Migratory Species, Life History Accounts and Essential Fish Habitat Descriptions, Pacific Fishery Management Council, June 2007.

[29] Memo is available at: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish-EFH/Index.cfm.

Paperwork Reduction Act, 44 U.S.C. 3501 *et. seq.*, in submission made for the NPDES permit program and assigned OMB control numbers 2040-0086 (NPDES permit application) and 2040-0004 (discharge monitoring reports).

H. Regulatory Flexibility Act. The Regulatory Flexibility Act, 5 U.S.C. 601 *et seq*, requires that EPA prepare a regulatory flexibility analysis for regulations that have a significant impact on a substantial number of small entities. The permit renewal proposed today is not a ‘‘rule’’ subject to the Regulatory Flexibility Act. EPA prepared a regulatory flexibility analysis, however, on the promulgation of the Offshore Subcategory guidelines on which many of the permit’s effluent limitations are based. That analysis has shown that issuance of this permit would not have a significant impact on a substantial number of small entities.

Appendix A - Procedure for Reasonable Potential Evaluation in NPDES Permit CAG280000

PROCEDURE FOR REASONABLE POTENTIAL EVALUATION IN NPDES PERMIT CAG280000

Introduction

The regulatory basis for establishing water quality-based effluent limitations (WQBELs) is set forth in 40 CFR 122.44(d) of the NPDES regulations. Effluent limitations must be established for pollutants (either conventional, non-conventional, or toxic) that are, or may be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standards established under the Clean Water Act. In Permit CAG28000, applicable water quality criteria are listed in Section II.B.1.a. These criteria apply after dilution at the edge of the 100-meter mixing zone. Appropriate values for pH, temperature and salinity would be used for criteria that are dependent on these factors.

The procedures described in this document for evaluating the reasonable potential for an effluent constituent to exceed an applicable water quality criterion are based on the *Technical Support Document for Water Quality-based Toxics Control* (TSD), March 1991 (EPA/505/2-90-001). EPA recommends finding that a permittee has "reasonable potential" to exceed a receiving water quality criteria if it cannot be demonstrated with a high confidence level that the predicted upper bound of the lognormal distribution of effluent concentrations is below the receiving water criteria (TSD p. 53). Once reasonable potential to exceed any criteria has been established, a WQBEL is required to be calculated for each effluent constituent exhibiting reasonable potential.

The permit requires sampling for reasonable potential and specifies that the evaluation be performed at the 99-percent confidence level and the 99-percent probability basis. The number and type of samples are specified in the permit, as is the sampling frequency. The permit also specifies that the laboratory minimum level (ML) be used to establish the concentrations at which analytical results are reported as not quantifiable.

The calculations used in this reasonable potential evaluation procedure are complex. The sequence of steps necessary to perform the evaluation is explained in detail. Each step of the procedure is referenced to the corresponding row of an example reasonable potential evaluation table (Table 1.). For example, the effluent pollutant or constituent name is found in the first row *[Seq A]* of Table 1 and the reasonable potential multiplying factor is shown in row *[Seq P]* of Table 1. Where equations and assumptions are introduced, the relevant page numbers from the TSD are cited.

A reasonable potential analysis is conducted separately for each constituent reported. To facilitate the explanation, actual discharge data for a single constituent, Nickel, from one discharge location is used as an example in this spreadsheet. The 44 nickel concentration values, as reported by the analytical laboratory, are summarized in Table 2. When results are below the laboratory ML, the laboratory ML is reported in the adjacent column of the table. This table also includes the natural logarithms of the reported concentrations (because the concentrations are assumed to be lognormally distributed) and summary statistics (mean, variance, and maximum values) required for the reasonable potential calculation.

A list of the terms and abbreviations used in the steps of this procedure are summarized in Table 3.

Procedure for the Evaluation of Reasonable Potential

Assumptions

1. As specified in the permit, a series of produced water samples have been collected and analyzed for several constituents. The concentrations are reported either as a numeric value or as not quantifiable or not detected. Non-quantified/non-detected results are all values that cannot be quantified at the required level of confidence, which is the laboratory minimum level (ML).

2. The reported concentrations for each constituent are assumed to be statistically sampled from a population that is log-normally distributed above the laboratory ML and the measurements are independent, uncorrelated observations (TSD p. E-2).

3. If some reported concentrations cannot be quantified (i.e., are below the laboratory ML) or cannot be detected (i.e., are below the laboratory MDL), the distribution is assumed to be "delta-lognormal", in which non-quantified/non-detected values are weighted in proportion to their frequency of occurrence in the sample data set.

Procedure

The column numbers below (e.g., *[Seq B]*) refer to Table 1.

Step 1. From the data set of non-quantified/non-detected and reported concentrations for a single constituent in the discharge (Table 2.), determine:

- the number of samples, k *[Seq B]*
- the maximum measured concentration reported by the laboratory *[Seq E]*
- the maximum laboratory ML below which the parameter is detected but the concentration is not quantifiable *[Seq D]*
- the number of samples for which the concentration is not quantifiable (i.e., concentration is reported below the laboratory ML) *[Seq C]*.

Step 2. Calculate:

- the natural log (ln) of each measured value, i.e., for those concentrations greater than the laboratory ML (these values are calculated on separate worksheets within the RP spreadsheet workbook).
- the mean of the ln values *[Seq F]*.
- the variance of the ln values *[Seq G]*.

Step 3. Calculate the coefficient of variation.

The coefficient of variation is a unitless expression of variability calculated by dividing the sample standard deviation by the sample mean (TSD p. 52). However, in this case, the calculation of the coefficient of variation is complicated by two factors. The first is that the natural logarithms of the concentrations are used; the second is that the distribution of the samples can best be approximated by a special case of the lognormal distribution – the delta-lognormal distribution. The lognormal distribution models the measurements above the laboratory ML. The "delta-" applies to the non-quantified/non-detected values that are modeled with a distribution with discrete probabilities of obtaining observations at or below the laboratory ML (TSD p. E-10).

In this case, the coefficient of variation becomes:

$$c\hat{v} = \frac{\left[\hat{V}(X^*)\right]^{1/2}}{\hat{E}(X^*)} \qquad \textit{[Seq K]}$$

where

$$\hat{V}(X^*) = (1-\delta)\exp(2\hat{\mu}_y + \hat{\sigma}_y^2)\left[\exp(\hat{\sigma}_y^2) - (1-\delta)\right] + \delta(1-\delta)D\left[D - 2\exp(\hat{\mu}_y + 0.5\hat{\sigma}_y^2)\right] \qquad \textit{[Seq J]}$$

$$\hat{E}(X^*) = \delta D + (1-\delta)\exp(\hat{\mu}_y + 0.5\hat{\sigma}_y^2) \qquad \textit{[Seq I]}$$

δ = the sample proportion of non-quantified and non-detected values (number of non-quantified/non-detected values divided by the total number of measurements), i.e.,

δ = r/k, where *[Seq H]*

k = total number of samples
r = number of non-quantifies/non-detected values
k-r = number of values greater than the laboratory ML
D = the highest reported laboratory ML *[Seq D]*
$\hat{\mu}_y$ = mean of the logarithmic transformed measurements greater than the laboratory ML, i.e.,

$$\hat{\mu}_y = \sum(y_i)/(k-r) \qquad r+1 \le i \le k,\ r < k \qquad \textit{[Seq F]}$$

$\hat{\sigma}_y^2$ = variance of the logarithmic transformed measurements greater than the laboratory ML, i.e.,

$$\hat{\sigma}_y^2 = \sum(y_i - \hat{\mu}_y)^2/(k-r-1) \quad r+1 \le i \le k,\ r < k \qquad \textit{[Seq G]}$$

Step 4. Calculate the reasonable potential multiplying factor.

- The coefficient of variation is used as a measure of the variability of the concentration of the constituent. This estimate is combined with a measure of the uncertainty due to a limited number of samples (i.e., a small sample size is used to represent the population) to predict a maximum concentration (TSD p. 52).

- The first step is to determine the percentile of the distribution into which the maximum measured concentration falls. This is calculated as:

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \textit{[Seq L]}$$

For a 99% confidence level and 44 samples (from Table 2),

$$p_n = (1 - 0.99)^{1/44}$$

$$p_n = 90^{th} \text{ percentile}$$

That is, the largest value of 44 measurements of nickel concentrations in the produced water is greater than the 90-percentile value of the population. In other words, there is a 99 percent confidence that for every set of 44 samples collected, the maximum value of the 44 samples will be greater than 90 percent of the population of probable concentrations. USEPA Region 9 has selected a 99 percent confidence level for this permit.

- The second step is to determine the desired upper bound of the constituent concentration. Region 9 has selected the 99th percentile as the acceptable upper bound for this NPDES permit.

- The third step is to determine the ratio of the maximum measured concentration to the upper bound concentration of the distribution of nickel concentrations using the coefficient of variation and Z-score of the normal distribution values for the 99th and (in this example) the 90th percentile distributions.

Using the equations at TSD p. 52;

$$\sigma^2 = \ln\left(c\hat{v}^2 + 1\right) \qquad \textit{[Seq M]}$$

where *cv* is the value calculated in *[Seq K]* above.

The upper bound percentile at the 99-percent basis,

$$c_{99} = \exp\left(z_{99}\sigma_y - 0.5\sigma_y^2\right) = \exp\left(2.326\sigma_y - 0.5\sigma_y^2\right) \qquad \textit{[Seq N]}$$

and the calculated percentile representing the maximum reported concentration (in this example p_{44}) is

$$c_{44} = \exp\left(z_{44}^{*}\,\sigma_y - 0.5\sigma_y^2\right) = \exp\left(1.282\sigma_y - 0.5\sigma_y^2\right) \qquad \textit{[Seq O]}$$

where z* is the standard normal distribution value of the percentile of the distribution determined from the number of samples, k (k = 44 in this example and z* = 1.28155). The value of z* can be obtained from a standard normal distribution table or any statistical program, spreadsheet or calculator that can report quantiles for the standard normal distribution. The value of z* can be calculated from the following:

$$p_n = (1 - \text{confidence level})^{1/n}$$

$$z_{p_n} = 4.91\left[p_n^{0.14} - (1 - p_n)^{0.14}\right] \qquad 3 < n < 50$$

- The reasonable potential multiplying factor is the ratio of the upper bound percentile (99th percentile) to the percentile represented by the maximum reported concentration in the observed data (90th percentile in this example) (TSD p. 52). That is,

$$RP_{mf} = \frac{c_{99}}{c_{44}} = 1.29 \qquad \textit{[Seq P]}$$

Step 5. Calculate the predicted concentration at the edge of the mixing zone:

- The reasonable potential multiplying factor, RP_{mf}, *[Seq P]* is multiplied by the maximum *[Seq Q]* of the highest measured concentration, C_r, *[Seq E]* or the highest reported laboratory ML, D, *[Seq D]* to determine the maximum estimated concentration, C_e, of the constituent (in this example, nickel) in the discharge before dilution in the mixing zone *[Seq Q]*.

  That is,

$$C_e = [\text{Maximum}(Cr_{max}, D)] \times RP_{mf}$$

- The background seawater concentration (if any), C_s, *[Seq T]* is added. Five metals, arsenic, copper, mercury, silver, and zinc, have been determined to have seawater background concentrations high enough to be considered in this evaluation. These background concentrations are specified in Table 1 of Appendix A to the Permit. For the remaining constituents, $C_s = 0$.

- The receiving water concentration at the edge of the mixing zone, C_o, for a single constituent is determined from the following equation from Appendix A of the Permit:

$$Co = \frac{Ce + (Dq \times Cs)}{(Dq + 1)}$$

where,

C_o = the predicted concentration at the edge of the mixing zone *[Seq R]*,
C_e = the estimated maximum end-of-pipe discharge concentration *[Seq Q]*,
C_s = the background seawater concentration (if any, from Table 1 of Appendix A to the Permit) *[Seq T]*, and
D_q = the quarterly dilution value expressed in parts seawater per part wastewater.

Step 6. Compare the predicted concentration at the edge of the mixing zone, C_o, with the appropriate water quality criteria (WQC) listed in the Permit to determine if reasonable potential exists:

- If C_o *[Seq R]* is greater than the WQC *[Seq S]*, the upper bound concentration in the effluent is greater than the WQC after dilution at the edge of the mixing zone (at the 99th percent confidence level).

The results of this comparison appear in *[Seq U]*.

- A "YES" indicates the maximum concentration of the parameter is predicted to exceed the WQC (i.e., $C_o >$ WQC) at the given dilution ratio and reasonable potential has been determined to exist.
- A "n/c" indicates that insufficient measurements were reported to make a statistically valid determination of reasonable potential to exceed the WQC. The number of samples, k, must be equal to or greater than 3 to calculate a statistically valid result.
- A "NO" in this column indicates that the predicted maximum concentration will not exceed the WQC at a 99 percent confidence level and reasonable potential has been determined not to exist.

Step 7. Calculate the minimum dilution necessary to maintain a condition of no reasonable potential to exceed a WQC. This limiting dilution is termed the minimum dilution limit, D_{min}.

- To ensure reasonable potential does not occur, the predicted concentration at the edge of the 100-m mixing zone, C_o, must be less than or equal to the WQC.

That is, the predicted C_o, based on the quarterly dilution value:

$$C_o = \frac{C_e + (D_q \text{ x } C_s)}{(D_q + 1)} \qquad \textit{[Seq R]}$$

where,

Ce	=	the estimated maximum end-of-pipe discharge concentration *[Seq Q]*,	
D_q	=	quarterly dilution value	
WQC	=	permitted water quality criterion	*[Seq S]*
C_s	=	ambient or receiving water background concentration.	*[Seq T]*

- Calculate the minimum dilution limit, D_{min}, by substituting the WQC for the predicted C_o and D_{min} for D_q and rearranging the terms,

$$D_{min} = \frac{C_e - WQC}{WQC - C_s} \qquad \textit{[Seq W]}$$

- Using this equation, reasonable potential to exceed a WQC can be determined from a comparison of the quarterly averaged dilution, D_q, with D_{min}. Any time D_q (actual dilution) falls below D_{min}, (i.e., when $D_q < D_{min}$) reasonable potential to exceed the WQC will exist.

Note: the minimum dilution limit is related to the percent reasonable , %RP, by the following equation:

$$\%RP = \frac{C_o}{WQC} \text{ x } \frac{100}{1} = \frac{D_{min}}{D_q} \qquad \textit{[Seq V]}$$

where the predicted C_o is calculated in *[Seq R]* and includes adjustments for background concentration.

TABLE 1. Example Reasonable Potential Evaluation and Predicted Receiving Water Concentrations of Produced Water Discharge for NPDES Permit CAG280000

Sequence no.	Variable	Value
A	Chemical name	Nickel
B	No. of samples, k	44
C	No. of nondetects, r	15
D	Max reported ML (mg/L)	0.08
E	Max reported concentration (mg/L)	0.14
F	LNMEAN, μ_y	-2.43
G	LNVAR, σ_y^2	0.08
H	δ, the proportion of nonquantified and nodetected values	0.34
I	E(X)	0.088
J	V(X)	0.0005
K	cv(X)	0.247
L	$P_n@_{.99}$	0.901
M	σ^2	0.059
N	C_{99}	1.71
O	C_P	1.33
P	Reasonable potential multiplying factor	1.29
Q	Max of reported effluent conc'n & ML (mg/L)	0.14
R	Predicted max RWC (mg/L) at dilution of 1000	0.00018
S	Water Quality Criteria (mg/L)	0.008
T	Background value (mg/L)	0
U	Exceeds Water Quality Criterion?	no
V	Predicted RWC as % of WQC	2
W	Minimum dilution required to meet criteria	22

Note: The data set of 44 reported concentrations for nickel is shown in Table 2.
The abbreviations and terms used in this table are described in Table 3.

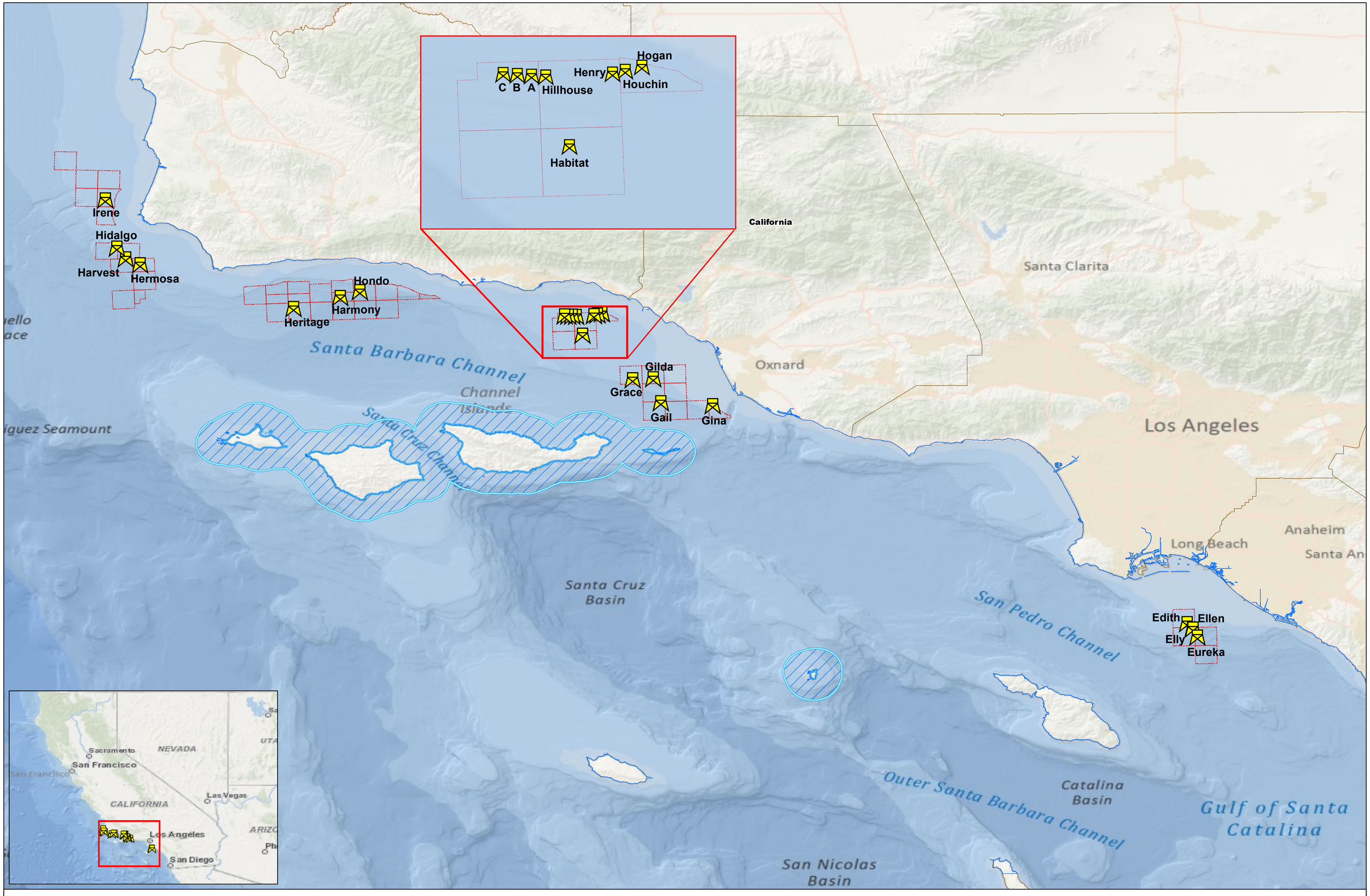
TABLE 2. Example laboratory results for the analysis of nickel in produced water

Sample No.	Measured (ug/L) x_i	ML (ug/L)	Natural Logarithm of Reported Values, y_i	
1	Below ML	0.05		
2	Below ML	0.05		
3	Below ML	0.05		
4	Below ML	0.05		
5	0.13		-2.040	
6	0.07		-2.659	
7	Below ML	0.05		
8	0.05		-2.996	
9	0.08		-2.526	
10	0.12		-2.120	
11	0.09		-2.408	
12	0.14		-1.966	
13	0.09		-2.408	
14	0.06		-2.813	
15	Below ML	0.05		
16	Below ML	0.05		
17	0.06		-2.813	
18	0.07		-2.659	
19	0.07		-2.659	
20	0.09		-2.408	
21	0.06		-2.813	
22	Below ML	0.05		
23	0.07		-2.659	
24	0.1		-2.303	
25	0.08		-2.526	
26	0.14		-1.966	
27	0.13		-2.040	
28	0.11		-2.207	
29	0.09		-2.408	
30	Below ML	0.08		
31	0.087		-2.442	
32	Below ML	0.02		
33	0.14		-1.966	
34	0.09		-2.408	
35	0.081		-2.513	
36	Below ML	0.08		
37	Below ML	0.08		
38	Below ML	0.08		
39	Below ML	0.08		
40	Below ML	0.08		
41	0.087		-2.442	
42	0.099		-2.313	
43	0.088		-2.430	
44	0.08		-2.526	
	15	No. of non-detects (< ML)	-2.429	Mean value, μ
	44	Total no. of samples, k	0.076	Variance, σ^2
	0.14	Max. measured concentration		

TABLE 3. List of Symbols and Abbreviations

δ	The proportion of nonquantified and nodetected values in the sample data set
μ_y	Sample mean of the distribution of the natural log of the concentrations greater than the ML
σ_y^2	Sample variance of the distribution of the natural log of the concentrations greater than the ML
c_{99}	Upper bound at the 99-percent basis of the normal distribution of the reported concententrations of the analyte
C_e	Estimated maximum end-of-pipe discharge concentration $C_e = [Max(C_r, D)] \times RP_{mf}$
c_n	Calculated percentile of the distribution representing the maximum reported concentration
C_o	Predicted concentration at the edge of the mixing zone
C_r	Highest reported concentration
C_s	Background concentration in seawater
cv(X)	Estimate of the coefficient of variation of the delta-lognormal distribution
D	Maximum of the laboratoy MLs for a single analyte
D_{min}	Minimum dilution necessary to maintain a condition of no reasonable potential
D_q	Quarterly dilution value expressed in parts seawater per part wastewater
E(X)	Estimate of the mean of the delta-lognormal distribution
ML	Laboratory minumum limit: the minimum concentration at which the laboratory can report a quantifiable result for an analyte at a high level of confidence
k	Number of values reported by the laboratory for a single analyte
k-r	Number of reported concentrations greater than the ML
p_n	Percentile of the distribution into which the maximum measured concentration falls
r	Number of samples of a single analyte for which the concentrations are not quantifiable, i.e., the number of concentrations reported below the ML
RWC	Receiving water concentration
RP_{mf}	Reasonable potential multipling factor
TSD	Technical Support Document for Water Quality-based Toxics Control. USEPA/505/2-90-001. US Environmental Protection Agency, Office of Water, March 1991
V(X)	Estimate of the variance of the delta-lognormal distribution
WQC	Applicable water quality criterion as defined in the Permit
x_i	Data set of concentrations reported by the laboratory for a single analyte
y_i	Natural logarithm of the reported concentrations, $y_i = \ln(x_i)$
z^*	Standard normal distribution value of the percentile of the distribution determined from the number of samples. z^* can be obtained from a standard normal distribution table or any statistical program, spreadsheet or calculator that can report quantiles for the standard normal distribution

Appendix B – Map of OCS Lease Blocks and Platform Locations in Federal Waters off Southern California



Oil Platforms Off the California Coast

Oil Platforms

BOEM Pacific Lease 2012

NOAA's National Marine Sanctuary

N W E S

0 12.5 25 50 Miles

Source Information:
Oil Platforms & Pacific Leases: The Bureau of Ocean Energy Management (BOEM); 2012.

EPA Region 9 GIS Center

WTR1302056.1 October 03, 2012