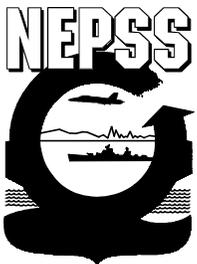




Marine Environmental Update



Streamlining NPDES Program Regulations: Round Two

On June 29, 1995, the Environmental Protection Agency removed some regulatory provisions in the Office of Water program regulations (including certain National Pollutant Discharge Elimination System provisions) that were clearly obsolete (see *Marine Environmental Update*, [Vol. FY97, No. 2](#)). On May 15, 2000, the EPA issued a new rule intended to further streamline NPDES, Resource Conservation and Recovery Act (RCRA), Prevention of Significant Deterioration (PSD), and Underground Injection Control (UIC) permitting procedures, and Federal Water Pollution Control Act (CWA) Section 301(h) variance request procedures. Key elements of this revision include elimination of redundant regulatory language, provide clarification, and remove or streamline unnecessary procedures. Entities regulated under the rule include Federal, State, Local, and Tribal Governments facilities which discharge pollutants to waters under the NPDES program; facilities which discharge pollutants under the RCRA, PSD, and UIC programs; and facilities requesting a CWA §301(h) variance request.

This final rule revises the NPDES program regulations in Title 40, Code of Federal Regulations, Parts 122, 123, 124 and 125 to eliminate redundant requirements, remove superfluous language, provide clarification, and remove or streamline unnecessary procedures which do not provide any environmental benefits. Included in the final rule are revisions which revise the permit appeals process for EPA-issued NPDES permits by replacing the evidentiary hearing procedures found at Part 124, Subpart E with a direct appeal to the Environmental Appeals Board. This is not intended to affect the permit appeal procedures for State-authorized NPDES programs.

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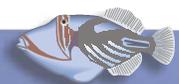
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Main Revisions to Part 122:

- The EPA proposed to streamline the NPDES program definitions found at Parts 122 and 124 by removing redundant or superfluous language. The EPA also proposed amending §122.2 to add references to definitions that are found elsewhere in Parts 122, 123, and 403.
- Under this final rule, the present submittal of information requirements under §122.4(i) is waived for a new source or new discharger where the permitting authority determines that it already has the required information. This revision merely clarifies existing requirements found at §§124.7, 124.8, and 124.56.
- The EPA has decided in the interest of better efficiency to merge the Round II application revisions (§§122.1(d)(1) and 122.22(d)) into the Form 2A/Form 2S rulemaking. All comments concerning that proposed revision have been addressed in the Form 2A/Form 2S final rulemaking.
- Removal of the storm water group permit application provisions which are no longer necessary in light of the wide availability of general permits.
- Revises the NPDES regulations to allow non-storm water general permits to cover more than one point source category or subcategory.
- Effluent guideline limits: this rule requires that permits have limits for all applicable guideline-listed pollutants, but allows for the waiver of sampling requirements for guideline-listed pollutants on a case-by-case basis if the discharger can certify that the pollutant is not present in the discharge or present only at background levels from intake water with no increase due the activities of the discharger. The waiver must be applied for each permit reissuance and is not available for the first permit issued to the discharger.
- Provided a note to §122.44(k) which provides references to available agency guidance on developing and implementing Best Management Practices (BMPs) and a statement in the note to §122.44(k) to indicate that additional BMP documents may also be available from the States and to provide a reference to the Office of Wastewater Management's Internet home page.
- Revises §122.64 to allow the EPA to terminate a NPDES permit by giving notice to the permittee, without following Part 22 or 124 procedures where the permittee has permanently terminated its entire discharge by elimination of its process flow or other discharge components or by redirecting its discharge into a POTW. It also revised the requirements for RCRA permits by eliminating Subpart E (formal hearing procedures) in favor of Part 22 procedures applies only to permit termination proceedings that occur in conjunction with RCRA §3008 enforcement orders.

Main Revisions to Part 123:

- Revises §123.44 to remove references to the Office of Water Enforcement and Permits (OWEP) and its role in commenting on and objecting to State-issued general permits.
- Eliminates the existing procedures for conducting formal evidentiary hearing on NPDES permit conditions contained in Part 124, Subpart E, and further proposed to eliminate the alternative "Non-Adversary Panel Procedures" in Part 124, Subpart F. The EPA has also eliminated





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Appendix A to Part 124 (Guide to Decision making under Part 124) because its role in explaining Subpart E and Subpart F procedures would no longer be meaningful in the absence of those subparts. These revisions do not apply to authorized State NPDES programs.

This rule is effective June 14, 2000. For further information contact Howard Rubin, Water Permits Division (4203), at (202) 260-2051 or Thomas Charlton, Water Permits Division (4203), at (202) 260-6960. The complete text of the final rule is [available from MESO](#) (228 KB Adobe™ Acrobat™ file).

Federal Register, Volume 65, Number 94, Monday, May 15, 2000, pp. 30886-30913.



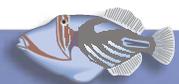
ACOE, EPA to Revise Definitions of “Fill Material,” “Discharge of Fill Material”

On Thursday, April 20, 2000, the Army Corps of Engineers and the Environmental Protection Agency jointly proposed to revise their Federal Water Pollution Control Act (CWA) regulations defining the term “fill material” (see also *Marine Environmental Update*, [Vol. FY99, No. 3](#)). At present, the Corps and EPA definitions of “fill material” differ from each other, and this has resulted in regulatory uncertainty and confusion. The existing Corps definition defines “fill material” as any material used for the primary purpose of replacing an aquatic area with dry land or of changing the bottom elevation of a water body, and specifically excludes from that definition any material discharged into the water primarily to dispose of waste, as that activity is regulated under Section 402 of the CWA. The existing EPA definition defines “fill material” as any pollutant which replaces a portion of the waters of the U.S. with dry land or which changes the bottom elevation of such waters, regardless of the purpose of the discharge. The proposed revisions would amend both the Corps’ and EPA’s definitions of “fill material” to provide a single definition of that term. This proposal also would make a change to the definition of the term “discharge of fill material” in order to provide further clarification of this issue.

The definition of “fill material” at 33 CFR 323.2(e) and at 40 CFR 232.2 would be changed to provide that “fill material” means material that has the effect of replacing any portion of a water of the U.S. with dry land, or changing the bottom elevation of any portion of a water of the U.S. At the same time, it would specifically exclude from the definition of fill material discharges subject to EPA proposed or promulgated effluent limitation guidelines and standards under CWA §§301, 304, and 306, or discharges covered by a National Pollutant Discharge Elimination System permit issued under CWA §402.

Consistent with the above described revisions to the definition of “fill material,” the definition of the term “discharge of fill material” was revised to further clarify the regulations defining the “discharge of fill material” at 33 CFR 323.2(f) and 40 CFR 232.2.

Entities affected by these changes include Federal, State/Tribal and local government agencies or instrumentalities, industrial, commercial, or agricultural entities, and land developers and landowners that discharge material that has the effect of replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of a water of the U.S.





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For information, contact either Mr. Thaddeus Rugiel, U.S. Army Corps of Engineers, at (202) 761-0199 or Mr. John Lishman, U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds (4502F), at (202) 260-9180. Comments will be accepted until July 19, 2000. Send written comments on the proposed rule to the Office of the Chief of Engineers, ATTN CECW-OR, 20 Massachusetts Avenue, Washington, D.C. 20314-1000. The complete text of the proposed rule is [available from MESO](#) (239 KB Adobe™ Acrobat™ file).

Federal Register, Volume 65, Number 77, Thursday, April 20, 2000, pp. 21291-21300.

Federal Register, Volume 65, Number 117, Friday, June 16, 2000, pp. 37738-37739.



Storm Water Phase II Final Rule Made Simple

What Is The Storm Water Phase II Final Rule?

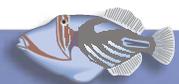
The Storm Water Phase II Final Rule (see *Marine Environmental Update*, [Vol. FY95, No. 4](#); [Vol. FY98, No. 2](#)) is the next step in the Environmental Protection Agency's effort to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. The Phase II program expands the Phase I program (see *Marine Environmental Update*, [Vol. FY96, No. 4](#); [Vol. FY97, No. 1](#)) by requiring additional operators of municipal separate storm sewer systems (MS4s) in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation.

Who's Covered?

The rule "automatically" covers two classes of storm water dischargers on a nationwide basis:

1. Operators of small MS4s located in "urbanized areas" as delineated by the Bureau of the Census (a "small" MS4 is any MS4 not already covered by Phase I of the NPDES storm water program; see Fact Sheets 2.1 and 2.2), and
2. Operators of small construction activities that disturb equal to or greater than 1 (one) and less than 5 (five) acres of land (see Fact Sheet 3.0).

Small MS4s include Federally-owned systems, such as military bases. The Phase I storm water program covers medium and large MS4s. Phase I MS4s were automatically designated nationwide as medium MS4s if they were located in an incorporated place or county with a population between 100,000-249,999 or as large MS4s if located in an incorporated place or county with a population of 250,000 or greater. Many MS4s in areas below 100,000 in population, however, have been individually brought into the Phase I program by NPDES permitting authorities. Only a select sub-set of small MS4s, referred to as



regulated MS4's, is covered by the Phase II rule, either through automatic nationwide designation or designation on a case-by-case basis by the NPDES permitting authority.

What's Required By The Phase II Rule?

Operators of Phase II-designated small MS4s and small construction activity are required to apply for NPDES permit coverage, most likely under a general rather than individual permit, and to implement storm water discharge management controls (Best Management Practices). Specific requirements for each type of discharge are listed below.

Small MS4s:

- A regulated small MS4 operator must develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from their MS4 to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the Federal Water Pollution Control Act (CWA). The rule assumes the use of narrative, rather than numeric, effluent limitations requiring implementation of BMPs.
- The small MS4 storm water management program must include the following six minimum control measures: public education and outreach; public participation/involvement; illicit discharge detection and elimination; construction site runoff control; post-construction runoff control; and pollution prevention/good housekeeping. See Fact Sheets 2.3 through 2.8 for more information on each measure, including BMPs and measurable goals.
- A regulated small MS4 operator must identify its selection of BMPs and measurable goals for each minimum measure in the permit application. The evaluation and assessment of those chosen BMPs and measurable goals must be included in periodic reports to the NPDES permitting authority. See Fact Sheet 2.9 for more information on permitting and reporting.

Small Construction Activity:

- The specific requirements for storm water controls on small construction activity will be defined by the NPDES permitting authority on a State-by-State basis.
- The EPA expects that the NPDES permitting authorities will use their existing Phase I general permits for large construction activity as a guide for their Phase II permits for small construction activity. If this occurs, a storm water pollution prevention plan will likely be required for small construction activity. See Fact Sheet 3.0 for more information on potential program requirements and appropriate BMPs for small construction activity.

The operators of regulated MS4s can choose from as many as three permitting options:

1. **General Permits:** General permits are strongly encouraged by EPA. The Phase II program has been designed specifically to accommodate a general permit approach. General permits prescribe one set of requirements for all applicable permittees. General permits are drafted by the NPDES permitting authority, then published for public comment before being finalized and issued.





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2. Individual Permits: Individual permits are required for Phase I “medium” and “large” MS4s, but not recommended by EPA for Phase II program implementation. For individual coverage under Phase II, the permittee must follow Phase II permit application requirements and provide an estimate of square mileage served by the system and any additional information requested by the NPDES permitting authority. A permittee electing to apply for coverage under the Phase I program must follow the permit application process for the Phase 1 MS4 Program.
3. Modification of a Phase I Individual Permit: A Co-Permittee Option: The operator of a regulated small MS4 could participate as a limited co-permittee in a neighboring Phase I MS4’s storm water management program by seeking a modification of the existing Phase I individual permit. A list of Phase I medium and large MS4s can be obtained from the EPA Office of Wastewater Management (OWM) or downloaded from the OWM web site. The permittee must follow Phase I permit application requirements (with some exclusions) and must comply with the applicable terms of the Phase I individual permit rather than the minimum control measures in the Phase II Final Rule.

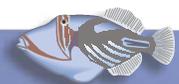
Deadlines For Compliance

- The NPDES permitting authority issues general permits for regulated small MS4s by December 9, 2002.
- Operators of “automatically designated” regulated small MS4s in urbanized areas submit their permit applications within 90 days of permit issuance, no later than March 10, 2003.
- Operators of regulated small MS4s designated by the permitting authority submit their permit applications within 180 days of notice.
- Regulated small MS4 storm water management programs fully developed and implemented by the end of the first permit term, typically a 5-year period.

Federal And State-Operated Small MS4s

Federal and State-operated small MS4s can include universities, prisons, hospitals, roads (*i.e.*, departments of transportation), military bases (*e.g.*, State Army National Guard barracks), parks, and office buildings/complexes. The Phase II rule requires the development and implementation of a storm water management program that includes the six minimum control measures mentioned above (see Fact Sheets 2.3 through 2.8). The EPA encourages State and Federal small MS4 operators to establish cooperative agreements with cities and counties in implementing their storm water programs. Such entities have two options for storm water program implementation:

1. Focus on choosing appropriate BMPs: The EPA expects Phase II permittees to tailor their storm water management plans and their BMPs to fit the particular characteristics and needs of the permittee and the area served by its MS4. Therefore, the Federal or State operator of a regulated storm sewer system can take advantage of the flexibility provided by the rule to utilize the most suitable minimum control measures for its MS4.
2. Work with other entities: In the case of limited capabilities, the permittee can work with neighboring operators of regulated small MS4s, preferably on a watershed basis, to form a shared



storm water management program in which each permittee is responsible for activities that are within individual legal authorities and abilities. The final rule allows the permittee to rely on other entities, with their permission, to implement those minimum measures that the permittee is otherwise unable to implement.

Storm Water Phase II Final Rule fact sheets in Adobe™ Acrobat™ format are available individually at <http://www.epa.gov/owm/sw/phase2/factshts.htm>, or collectively from MESO as a 454 KB [archive file](#).

EPA, Storm Water Phase II Final Rule - An Overview, Fact Sheet 1.0, EPA 833-F-00-001, January 2000.

EPA, Storm Water Phase II Final Rule - Who's Covered? Designations and Waivers of Regulated Small MS4s, Fact Sheet 2.1, EPA 833-F-00-003, January, 2000.

EPA, Storm Water Phase II Final Rule - Permitting and Reporting: The Process and Requirements, Fact Sheet 2.9, EPA 833-F-00-011, January, 2000.

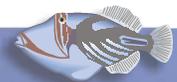
EPA, Storm Water Phase II Final Rule - Federal and State-Operated MS4s: Program Implementation, Fact Sheet 2.10, EPA 833-F-00-012, January, 2000.



EPA Finalizes California Toxics Rule

On May 18, 2000, the Environmental Protection Agency finalized the California Toxics Rule (CTR) (see *Marine Environmental Update Bulletin*, [August 5, 1997](#)) to reinstate water quality criteria for toxic pollutants in the state's rivers, streams, lakes, enclosed bays and estuaries. The EPA promulgated this rule to fill a gap in California water quality standards that was created in 1994 when a State court overturned the State's water quality control plans containing water quality criteria for priority toxic pollutants (see *Marine Environmental Update*, [Vol. FY00, No. 1](#)). Thus, the State of California has been without numeric water quality criteria for many priority toxic pollutants as required by the Federal Water Pollution Control Act (CWA), necessitating this action by the EPA. These Federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA. The final rule promulgated: 1) freshwater and saltwater criteria for 22 toxics; 2) ambient aquatic life criteria for 23 priority toxics; 3) ambient human health criteria for 57 priority toxics; and, 4) a compliance schedule provision which authorizes the State to issue schedules of compliance for new or revised NPDES permit limits based on the federal criteria when certain conditions are met.

The State of California must use the criteria together with the State's existing water quality standards when controlling pollution in inland waters and enclosed bays and estuaries. The numeric water quality criteria contained in the final rule are identical to the EPA's recommended CWA §304(a) criteria for these pollutants published in December 1998 (see [63 FR 68353](#)). However, the EPA did not include the proposed acute and chronic criteria for mercury to protect freshwater and saltwater aquatic life or the proposed acute criteria for selenium to protect freshwater aquatic life. Also, the final rule does not contain numeric criteria for chloroform.





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The CTR will serve as a place holder until the State re-adopts its own numeric criteria. The rule became effective May 18, 2000. The complete text of the final rule is [available from MESO](#) (520 KB Adobe™ Acrobat™ file), or at: <http://www.epa.gov/ost/standards/ctrindex.html>.

Federal Register, Volume 65, Number 97, Thursday, May 18, 2000, pp. 31682-31719.



EPA Outlines Proposed TMDL Rule Changes

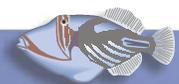
In an [April 5, 2000, letter](#) to Senator Robert Smith (R-N.H.), Chairman of the Senate Environment and Public Works Committee, and Rep. Bud Shuster (R-Pa), Chairman of the House Transportation and Infrastructure Committee, the Environmental Protection Agency has outlined changes it plans to make in the Total Maximum Daily Load program (see *Marine Environmental Update*, [Vol. FY99, No. 4](#)) to cleanup impaired waters of the United States. The changes are derived from the final report of the TMDL Federal Advisory Committee (see *Marine Environmental Update*, [Vol. FY98, No. 4](#)), and focus on three main areas:

1) Enhancing State Flexibility in Managing Polluted Waters:

- Allow States 4 years to develop lists of polluted waters rather than 2 years as under current regulation.
- Allow States to develop TMDLs over a period of up to 15 years, rather than the 8-13 year timeframe of the current program.
- Tailor implementation plan requirements and add flexibility to account for different types of sources causing the water quality problem.
- Give full credit to voluntary or incentive-based programs for reducing polluted runoff through diverse control measures, including best management practices (BMPs).

2) Streamlining the Regulatory Framework:

- Drop the requirement that polluted water lists include “threatened” waters that are expected to become polluted in the near future.
- Drop the proposed requirement that States give top priority to addressing polluted waters that are a source of drinking water or that support endangered species.
- Drop the proposal to provide public petition process for review of lists of impaired waters or TMDL program implementation.
- Drop the proposals to require offsets before new pollution can be discharged to polluted waters prior to the development of a TMDL.
- Clarify that Clean Water Act permits will not be for diffuse runoff from forestry operations under any circumstances and discharges from these operations could be managed by the State forest management programs that are proven effective.





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3) Assuring Adequate Resources for an effective Program:

- Increase funding for State administration of the TMDL program by \$45 million.
- Increase funding for State programs to reduce polluted runoff by \$50 million.
- Sharply increase funding for agricultural conservation programs at the USDA.
- Encourage States to develop TMDLs on a watershed scale, which will be more cost-effective.

Letter from J. Charles Fox, EPA Assistant Administrator of Water, to Rep. Bud Shuster (R-Pa), Chairman of the House Transportation and Infrastructure Committee dated April 5 2000.

Environment Reporter, Volume 31, Number 15, April 14, 2000, pp. 685-686.



Puget Sound Naval Shipyard, EPA Sign Environmental Agreement

The Puget Sound Naval Shipyard (PSNSY) in Bremerton, Washington, has entered into a compliance agreement with the Environmental Protection Agency to address a chronic problem of copper discharges into Puget Sound's Sinclair Inlet, beyond what is allowed under its water discharge permit. The compliance agreement outlines the steps the Navy will take to meet the conditions of its permit and remain in compliance.

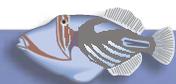
As the largest naval shipyard on the west coast, PSNSY is allowed to discharge wastewater directly into Sinclair Inlet, but only if it meets the EPA-specified permit conditions. Discharge monitoring reports from 1997 to 1999 show the amount of copper released from PSNSY frequently exceeded the permitted levels. Some of the copper in the wastewater comes from dry-blasting paint from Navy vessels.



Puget Sound Naval Shipyard, Bremerton, WA (U.S. Navy photograph).

Under the compliance agreement, the Navy will develop and implement procedures for reducing the amount of copper discharges into Sinclair Inlet including conducting dry-blasting within contained enclosures and operating a collection and treatment system for the wastewater from the dry docks.

EPA Region 10 Press Release 99-009, February 17, 2000.





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FWS Proposes Critical Habitat for the Arroyo Southwestern Toad

On June 8, 2000, the Fish & Wildlife Service proposed the designation of critical habitat for the endangered Arroyo Southwestern Toad (*Bufo microscaphus californicus*) throughout the species' range in the United States (Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Riverside, San Bernardino, Orange, and San Diego Counties, California). The lands proposed for designation are under private, local agency, county, State, Tribal, and Federal ownership, and have been divided into 22 Critical Habitat Units. The proposed units are generally based on geographically distinct river basins. In several instances, a river basin has been broken into two or more units based on human or natural landscape features that effectively separate portions of the basin (e.g., a large reservoir or gorge). Two of the proposed Critical Habitat Units are:



The endangered Arroyo Southwestern Toad, Bufo microscaphus californicus.

- San Mateo and San Onofre Creek Basins, San Diego and Orange counties, of which 78 percent is within the Camp Pendleton Marine Corps Base.
- Lower Santa Margarita basin (De Luz, Roblar, and Sandia Creeks), San Diego County, of which 74 percent is within either the Camp Pendleton Marine Corps Base or the Fallbrook Naval Weapons Station.

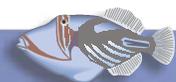
Comments will be accepted until August 7, 2000. For further information, contact Field Supervisor, Ventura Fish & Wildlife Office, 2394 Portola Road, Suite B, Ventura, CA; (805) 644-1766. The complete text of the proposed rule is [available from MESO](#) (621 KB Adobe™ Acrobat™ file).

Federal Register, Volume 65, Number 111, Thursday, June 8, 2000, pp. 36511-36548.



EPA Authority to Identify Waters Impaired Only by Nonpoint Sources Upheld

On April 5, 2000, the U.S. District Court for the Ninth Circuit upheld the Environmental Protection Agency's longstanding interpretation and practice that the EPA and States have the authority to identify which U.S. waterways are polluted only by runoff from urban areas, agriculture and timber harvesting – “nonpoint sources” of pollution – and to identify the maximum amount of pollutants that may enter these waterways. Ruling on a lawsuit challenging the EPA's authority to impose TMDLs on rivers polluted solely by nonpoint sources, the Court found:





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1. Congress intended to include nonpoint source pollution in the Clean Water Act's water quality standards program, and he noted that nonpoint source pollution is the dominant water quality problem in the United States today.
2. Since all rivers and waters regardless of pollution source were included in the universe for which water-quality standards were required, all of them – again regardless of source of pollution – were included in the universe for which listing and TMDLs were required – except only those for which effluent limitations would be sufficient to achieve compliance with standards.
3. While it is true that nonpoint-source pollution was not mentioned in Section 303(d), the reason seems obvious. Any polluted waterway – whether its sources were point, nonpoint or a combination – had to be listed if it would not be cleansed by the new approach.
4. The Ninth Circuit has already gone on record that the TMDL process covers nonpoint as well as point sources.

The plaintiffs have appealed this ruling and are awaiting further action. The full text of the court order is [available from MESO](#) (69.0 KB Adobe™ Acrobat™ file).

EPA Headquarters Press Release, April 5, 2000.



NOAA, EPA Approve CA Coastal NPS Pollution Control Program

On May 1, 2000, the National Oceanic and Atmospheric Administration and the Environmental Protection Agency gave notice of the intent to fully approve the California Coastal Nonpoint Source Pollution Control Program (see *Marine Environmental Update*, [Vol. FY00, No. 2](#)). NOAA and the EPA conditionally approved the California coastal nonpoint program on June 30, 1998. The full text of the notice is [available from MESO](#) (116 KB Adobe™ Acrobat™ file).

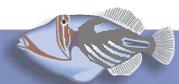
Federal Register, Volume 65, Number 84, Monday, May 1, 2000, p. 25311.



New Marine Environmental Quality Documents Available

Offshore Porewater and Flux Chamber Sampling of San Diego Bay Sediments at Site 9, Naval Air Station, North Island

Previous modeling and measurements indicate Volatile Organic Compounds (VOCs) are migrating into San Diego Bay from groundwater sources originating at Naval Air Station North Island, Installation Restoration (IR) Site 9. IR Site 9 is the location of the former Fiery Marsh, a chemical waste disposal area. Groundwater modeling indicates groundwater flow is directed from IR Site 9 towards the bay, and elevated concentrations of Trichloroethene (TCE), 1,1-Dichloroethene (1,1-DCE), 1,2-Dichloroethene





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(1,2-DCE), and Vinyl Chloride (VC) have been identified in sampling wells located along the western shore of North Island. Sampling in the region offshore from Site 9 shows elevated TCE and DCE levels to the south and inshore from Bravo Pier. Previous seepage meter deployments in this area also indicate a general trend of groundwater flow to the bay at rates of about 0.002 to 2.2 ft/day. The actual concentrations of TCE and DCE in the porewater, defined here as the water in the transition zone between groundwater and bay water, have not been previously established.

The Space and Naval Warfare Systems Center, San Diego has developed technologies for assessing porewater contaminant levels and sediment water exchange of contaminants including in-situ, vacuum-filtration porewater samplers, and flux chambers for measuring the flux of contaminants from sediments. The diver-deployed porewater samplers allow interstitial waters to be extracted from the sediment at selected depths up to about 6 feet below the sediment water interface. The flux chamber technique employs an open bottom chamber sealed into the sediment. To measure the advective component of the flux, the standard flux chamber sampling technique was modified to allow for change in volume caused by groundwater migration. The result produced a time series of seepage measurements combined with a time series of concentrations. From these, the flow rate and concentration of the groundwater discharge at the site were calculated and used to estimate the mass loading of VOCs to the bay over tidal periods.

Twenty sampling sites for porewater analysis were selected based on previous qualitative findings from the activated charcoal samplers and seepage measurements. The locations included a range of conditions for VOCs and seepage. The sites also included locations further to the south than previous sampling efforts to delineate the southern extent of contamination. Based on the high concentrations from the porewater analysis, six sites were chosen for flux chamber sampling.

Porewater measurements at 20 offshore stations at North Island, IR Site 9, indicate that elevated levels of VOCs are present in a tightly restricted area near the southern reach of Bravo Pier. The highest levels were always observed at the deepest measurement points, indicating that the concentrations are significantly attenuated within the sediment before entering the bay. In addition, the primary VOCs observed were 1,1-DCE, 1,2-DCE, and VC, indicating that degradation of the TCE source product is occurring before the material reaches the bay.

Measurement of water seepage and VOC fluxes at six offshore stations where elevated VOCs were measured indicate that fluxes of VOCs to the bay are limited primarily to the areas around stations PW02 and PW03 between Bravo Pier and the shore. Seepage measurements show that the flux is driven largely by a tidal pumping of the porewater in which porewater with elevated VOC levels migrates out during low water, and bay water with undetectable VOC levels returning to the during high water. The flux measurements indicate that overall, the largest VOC flux to the bay is for 1,2-DCE with an estimated total annual input of about 4.6 kg, followed by 1,1-DCE with 1.4 kg, VC with 1.3 kg, and TCE with 0.001 kg (1.2 g).

Based on the low or undetectable levels of VOCs in ambient bay water, the relatively high solubility of the target VOCs, and the close proximity to the mouth of the bay, it appears likely that any materials entering the bay at this site are rapidly flushed to the ocean. However, the potential for localized effects on infaunal organisms near PW02 and PW03 does exist and should be evaluated.





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The document is available at <http://www.spawar.navy.mil/sti/publications/pubs/tr/1799/tr1799.pdf> (4.97 MB Adobe™ Acrobat™ file).

Online Monitoring of Oils in Wastewater Using Ultraviolet Fluorescence and Light Scattering with an Artificial Neural Network

Ultraviolet (UV) fluorescence and light scattering are two analytical methods commonly used in instrumentation for online measurement of oils in water. UV fluorescence-based instruments detect both dissolved and emulsified aromatic constituents of oils. Light-scattering-based sensors measure optical scattering induced by emulsified oil droplets. A major technical challenge for each method is to maintain quantitative accuracy in the presence of chemical and physical interferences, including fluorescent organic compounds (*e.g.*, detergents and natural organic matter), suspended solid particles, dissolved salts, *etc.* To address this issue, a new monitoring system is being developed that simultaneously combines both UV fluorescence and light scattering spectroscopy. Four major types of oils (lube oils 2190 and 9250, diesel fuel marine [DFM], and JP5), each of which had a dozen subtypes of oil samples, were examined to obtain the intensity of both fluorescence and scattering as a function of oil, detergent (Mil-D and Tide®), and seawater concentrations. Both fluorescence and light scattering intensities varied significantly with oil types and subtypes. Both Mil-D and Tide® greatly influenced the fluorescence and scattering of oil samples.

The tremendous variations in fluorescence and scattering intensity with oil types and subtypes, detergents, and seawater make it difficult to calibrate the analytical instrument using traditional methods; hence, a multivariate, nonlinear calibration of instrumental response through an artificial neural network was implemented. It was demonstrated that the simultaneous, combined use of fluorescence and scattering data significantly improves quantitative prediction accuracy. The trained backpropagation neural network was used successfully to predict concentrations of single oils and their mixtures, even in the presence of detergents and seawater, and appears well suited for calibrations of an online oil content monitor. The trained network processes information very quickly and is appropriate for real-time applications. The newly developed technique permits the online monitoring of oil spills, the accurate determination of oil concentrations in wastewater discharged from ships.

The document is available at <http://www.spawar.navy.mil/sti/publications/pubs/tr/1816/tr1816.pdf> (1.98 MB Adobe™ Acrobat™ file).





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