Marine Environmental Update

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EPA Issues New Multi-Sector Storm Water Permit

On September 29, 1995, the EPA issued a final permit to 29 industry sectors to control industrial sources of "storm water," the polluted runoff that gets into rivers, lakes and estuaries when it rains or snows. Storm water is one of the three leading causes of pollution of the nation's waters, and permits are required under the Clean Water Act. The new permit is relevant to most of American industry and gives flexibility for businesses to choose the most sensible methods of controlling water pollution from each of their numerous facilities (see also related article on Page 2).

Instead of taking a "one-size-fits-all" approach, the permit entrusts each facility with finding the important sources of pollution and implementing practices to minimize the pollution to the water. The permit also has built-in performance incentives. For example, if a facility improves its operations and adequately reduces pollution going into the water, the facility can reduce its monitoring. The permit also includes innovative pollution prevention controls applicable to most American industries. To obtain coverage, facilities need only submit a single application form.

Industries and other interested parties provided extensive information and data allowing this permit to account for the special circumstances of each industrial sector. It is based

ALSO IN THIS ISSUE:

on site-specific information received from approximately 700 groups representing 44,000 industrial facilities across the country. The EPA considered 3,000 written public comments and held numerous meetings with interested parties when preparing the permit. The multi-sector permit is available to facilities that meet eligibility requirements in the following areas: Arizona, Florida, Idaho, Louisiana, Maine, Massachusetts, New Hampshire, New Mexico, Oklahoma, Texas, six territories, the District of Columbia, federal facilities in five states and certain Indian reservations where EPA is the permitting authority.

Industrial facilities have the option of using the EPA's previously issued baseline industrial storm water general permit if they wish, or they may use this permit. Regardless, today's permit is open to all eligible industries, not just those that participated in group applications. The EPA expects many of the 40 states with responsibility for the permit program to incorporate the same concepts in future permits. The EPA is currently working intensively with an advisory committee of interested parties to gain advice on how best to improve all of its programs dealing with pollution during wet weather, including the storm water permit program. The final rule was published in the Federal Register on September 29, 1995.

Copies of the permit are now available from the Government Printing Office and through the PIPES Bulletin Board at *http://pipes.ehsg.saic.com/pipes.htm*. It is also available from the EPA's Water Resource Center at (202) 260-7786.

EPA Press Release, Friday, October 20, 1995.

Impact Of EPA Storm Water Multi-Sector Permit On Naval Installations

The EPA has published their final regulations on the National Pollution Discharge Elimination System Storm Water Multi-Sector General Permit for Industrial Activities (Federal Register, Vol. 60, No. 189, Friday, September 29, 1995, pp. 50804-51319). This permit applies to all Federal installations located in states without NPDES permitting programs, and those in The District of Columbia, Delaware, Vermont, and Washington. The permit covers storm water discharges associated with industrial activity to waters of the United States. Installations in the affected states will have 90 days to decide if they will follow these new regulations or remain subject to the broader baseline general permit that was issued by the EPA on September 9, 1992.

All Naval installations in the following states are affected by this rule: Florida, Louisiana, Maine, Massachusetts, New Hampshire, and Texas. In addition, the EPA is encouraging states with

responsibility over their water pollution programs to use the multi-sector permit as a model. The industrial facilities covered by this permit include:

- Primary metals facilities;
- Hazardous waste treatment, storage, or disposal facilities;
- Scrap and waste recycling facilities;
- Vehicle maintenance or equipment cleaning areas at motor freight transportation facilities, petroleum bulk oil stations and terminals, and rail transportation facilities;
- Vehicle maintenance areas and/or equipment cleaning operations at water transportation facilities;
- Ship and boat building or repairing yards;
- Treatment Works;
- Facilities that manufacture transportation equipment, industrial, or commercial machinery; and
- Facilities that manufacture electronic and electrical equipment and components.

According to Michael Cook, director of the EPA Office of Waste Water Management, the industries would face fewer requirements under the final multi-sector permit than under the baseline general permit. In most instances, facilities are still required to develop and implement storm water pollution prevention programs. These plans are designed to identify sources of pollution potentially affecting storm water quality, and describe and ensure implementation of practices to minimize contamination of storm water discharges. A major difference is within the monitoring, testing, and reporting requirements in the multi-sector permit. These requirements are more specific to each industry, exclude irrelevant monitoring and replace it with more appropriate testing requirements.

The permit addresses storm water discharges from industrial activities co-located at an industrial facility. Co-located industrial activities occur when activities being conducted on site meet more than one of the descriptions in the permit (e.g. a ship and boat building or repairing yard and a Hazardous waste treatment, storage, or disposal facility). The requirements for co-located facilities are applied to the entire facility, including sampling and monitoring requirements. Numerous Naval facilities have co-located activities and will have to examine the permit on a site-specific basis.

Included in the permit is a general discussion over monitoring requirements. After a review of results from Part 1 and Part 2 of the EPA group applications, monitoring requirements were focused on pollutants of concern for each industry. These monitoring requirements are based on industry exceedances of EPA established "benchmark" values. The benchmarks are the pollutant concentrations above which the EPA determined represent a level of concern. The level of concern is a concentration at which a storm water discharge could potentially impair, or contribute to impairing water quality or affect human health from ingestion of water or fish. The benchmarks are also viewed by the EPA as a level that, if below, a facility represents little potential for water quality concern. As such, the benchmarks also provide an appropriate level to determine whether a facility's storm water pollution prevention measures

are successfully implemented. The success of a facility's storm water pollution prevention plan is the focus of the new general storm water permit issued. In most cases, the analytical monitoring requirements are significantly reduced from the General Industrial Permit. According to the permit, "[the] EPA believes that industries may reduce the level of pollutants in storm water runoff from their sites through the development and proper implementation of a storm water pollution prevention plan."

60 FR 189, Friday, September 29, 1995.
Environment Reporter, Volume 26, No. 22, October 6, 1995.

EPA Establishes Whole Effluent Toxicity Test Guidelines

The Environmental Protection Agency has amended the "Guidelines Establishing Test Procedures for the Analysis of Pollutants," 40 CFR Part 136, to add whole effluent toxicity (WET) testing methods to the list of Agency approved methods in Tables IA and II, under the Clean Water Act. This action amends 40 CFR 136.3 (Tables 1A and II) by adding methods for measuring the acute and short-term chronic toxicity of effluents and receiving waters. The overall benefit of this rulemaking is that it will reduce costs and eliminate the confusion caused by the multiple versions of any one test method currently in use. For example, currently, an industry with facilities in six different states may be required to conduct six different versions of the same test method.

The EPA estimates that standardizing these approved methods could save the regulated community up to 20% of the current test method costs, which range from $160.00-$2240.00, depending upon the test method. This will also reduce the current resource burden in the States because they will no longer need to justify the inclusion of WET monitoring or WET limits in National Pollution Discharge Elimination System (NPDES) permits on a case-by-case basis.

This rule incorporates three technical documents by reference. A listing of these documents can be found in section VIII of the preamble. Methods for measuring mutagenicity (changes in genes or chromosomes)or for monitoring viruses in wastewaters and sludges that were included in the December 1989 proposal are not included in this final rule. When better scientific methods for measuring mutagenicity and viruses become available, the Agency will evaluate them for possible inclusion in 40 CFR part 136. The methods for marine chronic toxicity in today's rule do not apply to discharges into marine waters of the Pacific Ocean. Methods addressing such discharges will be proposed at a later date.

For further information contact: Ms. Margarete A. Heber, Health and Ecological Criteria Division, Office of Science and Technology, (Mail Code 4304) US Environmental Protection Agency, 401 M St. SW.,

Washington, DC 20460 or call (202) 260-0658; or Ms. Teresa Norberg-King, Environmental Research Laboratory, US Environmental Protection Agency, 6201 Congdon Boulevard, Duluth, MN 55804.

Federal Register, Vol. 60, No. 199, October 16, 1995, Rules and Regulations, pp. 53529-53544.

Beyond Conventional Pollution Controls

The Environmental Protection Agency is encouraging voluntary creative efforts that go well beyond current regulations in controlling environmental pollution through "Project XL." Project XL, which signifies excellence and leadership, is a "common-sense program" that gives the regulated community a chance to gain greater regulatory flexibility in exchange for a commitment to a higher level of environmental results. A Project XL proposal might combine all federal and state pollution control requirements for an industry into a single, integrated final project agreement. Projects also might propose development of enforceable best management practices for pollution prevention.

Projects that are accepted by the EPA will be operating under "no-action assurances," meaning that the EPA will create an environmental agreement, and lay out alternative requirements, with which a company must comply. Although the EPA will not pursue enforcement actions automatically, the agency retains its power to enforce an existing statute if a company is not making a good faith effort to comply with project terms. The EPA plans to implement about 50 XL projects submitted by industry and federal, state, and local agencies. Proposals must include a plan to allow communities, citizens, and environmental groups and others having an interest to participate in the XL projects. The EPA also will determine project eligibility using the following criteria:

- Environmental Results: Projects should be able to achieve environmental performance that is superior to what would be achieved through conventional treatment. Cleaner results can be achieved directly through the environmental performance of the project or through the reinvestment of the project's cost savings in activities that produce greater environmental results. Explicit definitions and measures of cleaner results should be included in the project agreement.
- Cost Savings and Paperwork Reduction: The project should produce cost savings or economic opportunity, and/or result in a decrease in paperwork.
- Stakeholder Support: The extent to which project proponents have sought and achieved the support of parties that have a stake in the environmental impacts of the project is an important factor. Stakeholders may include communities, local/state governments, businesses, or other similar entities.
- Innovation/Multi-Media Pollution Prevention: The EPA is looking for projects that test innovative strategies for achieving environmental results. These strategies may include processes, technologies,

or management practices. The EPA has a preference for protecting the environment by preventing the generation of pollution rather than by controlling pollution once it has been created. Projects should reflect this preference.

- Transferability: The projects are intended to test new approaches that conceivably could be incorporated into the agency's programs or in other industries, or other facilities in the same industry. The EPA is most interested in pilot projects that test new approaches that one day could be applied more broadly.
- Feasibility: The project should be technically and administratively feasible and the project participants must have the financial capability to carry it out.
- Monitoring, Reporting, and Evaluation: Project participants should identify how to make information about the project easily available to stakeholders. Projects should have clear objectives and requirements that will be measurable in order to allow the EPA and the public to evaluate its success and enforce its terms. The project sponsor should be clear about the time frame within which results will be achievable.

For further information, contact Jon Kessler at (202) 260-4034. Project proposals and all comments should be sent to: Regulatory Reinvention Pilot Projects, FRL-5197-9, Water Docket, Mail Code 4101, US EPA, 401 M Street SW, Washington, DC 20460. Send four copies of all materials.

Air & Water Pollution Control, Vol. 8, No. 17, August 16, 1995, p. 5.

EPA Proposes Alternatives For Excluding Low-Risk HW From Stringent Controls

The Environmental Protection Agency announced a common-sense, cost-effective proposal to streamline the regulation and management of low-risk hazardous wastes. One option included in the proposal could save industry up to $80 million by providing flexibility while still fully protecting human health and the environment. Current regulations require all hazardous waste to meet the same management standards and do not tailor standards to the nature or degree of risk posed by particular wastes. The proposed Hazardous Waste Identification Rule is an effort to better target private industry and government resources toward high-risk environmental problems related to hazardous waste management. It provides strong incentives for industry to practice waste minimization and pollution prevention and use innovative waste treatment technologies.

The proposal considers regulatory options for waste management that take into account such factors as site-specific conditions and existing state programs. The proposed rule establishes a risk-based "floor" or

threshold to hazardous waste listing. Under this proposal, generators of listed hazardous wastes that comply with self-implementing exemption for certain hazardous waste will no longer be subject to the hazardous waste management system under the Resource Conservation and Recovery Act (RCRA). Companies will be required to notify the applicable state environmental agency, meet other administrative requirements and comply with on-going sampling and analysis conditions of the exemption.

The proposal establishes thresholds using an innovative risk assessment that evaluates potential exposure pathways or routes by which people are exposed to toxins from both direct and indirect sources such as waste piles and holding ponds or surface impoundments. The self-implementing nature of the proposal enables these wastes to leave the hazardous waste management system without having to be formally "delisted," as required by the current system.

Current RCRA regulations stipulate that listed waste, mixtures of solid and listed wastes, and materials derived from treatment, storage or disposal of listed waste, remain regulated as "hazardous" unless "delisted" by petition. The current regulatory structure does not allow for dilute mixtures of solid and listed wastes and treatment residuals from listed wastes to become reclassified except through full rulemaking on a "delisting" petition. Unless "delisted," these wastes must be managed as hazardous under RCRA regardless of the concentrations and mobilities of their hazardous constituents.

The Federal Register Notice and a fact sheet will be available electronically through the EPA Public Access Server at *gopher.epa.gov*. For the text of the rule choose: Rules, Regulations and Legislation; and then FR-Waste. For additional information, or to order paper copies of the notice, call the RCRA/Superfund Hotline at (800) 424-9346 or (703) 535-0202.

EPA Press Release, November 21, 1995.

Draft Ecological Risk Guidelines Released By EPA

On November 29, 1995, the Environmental Protection Agency released its first draft ecological risk assessment guidelines. These draft guidelines both replace and expand upon the *Framework for Ecological Risk Assessment* (EPA/630/R-92-001) published in February, 1992. The risk guidelines will be used by the EPA to evaluate the likelihood of adverse ecosystem effects as a result of exposure to one or more stressors (a chemical, physical, or biological entity that can induce adverse effects). The document contains general principles for conducting ecological risk assessments, with case illustrations and other examples. The guidelines address the analysis of data in the risk assessment process, rather

than on specific data collection techniques and models, and a three-step process of problem formulation, analysis, and risk characterization is included.

To obtain a copy of the draft guidelines, EPA/630/R-95/002, contact the Center for Environmental Research Information, US EPA, 26 West Martin Luther King Drive, Cincinnati, Ohio 45268; telephone (513) 569-7562; facsimile (513) 569-7566.

Environment Reporter, Vol. 26, No. 31, December 8, 1995, p. 1372.

EPA Regulatory Agenda Available

The Environmental Protection Agency recently released the October 1995 issue of its Regulatory Agenda. The EPA publishes the agenda each April and October to serve as a semiannual summary of current and planned rulemakings, reviews of existing regulations, and Agency actions completed since the previous publication of the agenda. By providing the public with current and advance information about regulatory actions scheduled to take place within the following year, the Agency hopes to encourage public participation in the regulatory process. The rules and schedules presented reflect the EPA's plans based on the best current information. However, the public should understand that legislative and budgetary proposals now under consideration by the Congress may affect the Agency's authority to undertake or capacity to complete any activity listed in the agenda within the schedule presented. To be placed on the agenda mailing list, either write to US EPA/NCEPI at PO Box 42419, Cincinnati, Ohio 45242, or fax your request to (513) 489-8695. If you need confirmation that your request was received, you may call (513) 489-8190.

RI/FS Not Subject To CWA, RCRA Judicial Review

The US Court of Appeals for the Ninth Circuit ruled that remedial investigation/feasibility studies constitute superfund "remedial or removal actions" and, thus, are not subject to pre-enforcement review (*Razore v. Tulalip Tribes*, CA, 9, No. 94-36244, 9/19/95). Affirming a district court's dismissal of Clean Water Act and Resource Conservation and Recovery Act claims, the Court of Appeals agreed that the claims directly challenged an ongoing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigation and remediation effort, thereby invoking CERCLA's jurisdictional ban against suits that "challenge" or "delay" superfund response actions.

The appeals court rejected the plaintiffs' argument that CERCLA's prohibition against judicial review is pre-empted by CERCLA Section 302(d), which preserves state and federal obligations and liabilities arising from releases addressed by CERCLA removals. The court ruled that reading the savings clause this way would eviscerate Section 113(h). Following the majority of federal circuit courts, the court read the two sections together to temporarily bar citizen enforcement suits without changing the defendants' "obligations or liabilities" under other statutes. This delay does not extinguish the defendants' liability under the CWA and RCRA or undermine the merits of plaintiffs' claims; the CWA and RCRA actions are merely postponed.

Environment Reporter, Vol. 26, No. 23, October 13, 1995, p. 1056-1057.

Supreme Court Lets Decision On Regulation Of Isolated Wetlands Stand

The US Supreme Court announced on October 30, 1995, that it will not overturn a federal appeals court ruling that found isolated wetlands are subject to regulation under the Clean Water Act (*Cargill, Inc. v. US*, US SupCt, No. 95-73, 10/30/95). The high court's action leaves standing a May decision by the US Court of appeals for the Ninth Circuit that found Cargill, Inc. was subject to civil penalties for its unpermitted activities involving man-made, isolated, and seasonally dry wetlands areas a predecessor had used for producing salt.

Environment Reporter, Vol. 26, No. 26, November 3, 1995, p. 1163.

Chromium Standard For Sewage Sludge Withdrawn By EPA

Standards for chromium in sewage sludge were withdrawn on October 25, 1995, by the Environmental Protection Agency (60 FR 54764). The EPA determined that its cumulative loading limit of 3,000 kilograms per hectare was not justified since the chromium in sludge was primarily in the trivalent form, which has a much lower potential for plant and human injury than hexavalent chromium. The limits for chromium were deleted from all four tables in the regulation (40 CFR 503.13(b)).

More information is available from Robert M. Southworth, biosolids manager, Health and Ecological Criteria Division (4303), Office of Science and Technology, US EPA, 401 M Street SW, Washington, DC 20460; telephone (202) 260-7157.

Environment Reporter, Vol. 26, No. 25, October 27, 1995, p. 1135.

States And EPA Forge Alliance To Control Nonpoint Source Pollution

Ten states and the Environmental Protection Agency have formed an alliance in an effort to improve the federal program to control polluted runoff. The federal nonpoint pollution program has come under fire in the past because of what some groups have called ineffective regulations, lack of pollution control techniques, and questionable funding priorities. The group has been considering "what we can accomplish better under current funding and legislative authority" rather than waiting for Congress to reauthorize the federal Clean Water Act. The group expects to make final in October recommendations on improving the nonpoint source program, and plans to hold a series of meetings before that time to address concerns. The states participating in the effort are Vermont, New York, Pennsylvania, Florida, Wisconsin, Wyoming, Louisiana, Missouri, California, and Idaho. For more information on the group or its plans, contact Geoffery Grubbs; (202) 260-7040.

Air & Water Pollution Control, Vol. 8, No. 19, September 13, 1995, p. 7.

Point Loma Environmental Reserve Agreement Signed

On November 28, 1995, five San Diego-area US Navy commands, the National Park Service, the US Coast Guard, the City of San Diego, and the Veterans Administration signed a Memorandum of Understanding to establish the Point Loma Ecological Reserve Area in San Diego, California. The memorandum establishes an ecological reserve on 640 acres of biologically significant land on the Point Loma peninsula at the entrance to San Diego Bay.

The effort began in April 1993 when the five commanding officers, representing their Navy commands at the Point Loma complex, signed a letter of agreement to conserve the wildlife and habitats on the Point

Loma peninsula. The management plan for the reserve calls for the acreage to remain undisturbed in perpetuity.

NRaD Outlook, December 1, 1995, p. 3.

MESO Newsletter And NRaD Environmental Quality Science & Technology On-Line

The *Marine Environmental Update* joins recently published information about current environmental quality science and technology efforts of the Environmental Sciences Division at NCCOSC RDT&E Division (NRaD) on the World Wide Web (or "WWW," the only acronym which takes longer to say, and is more difficult to pronounce, than the original words) at the same time that the printed copy is being distributed. The new format of this issue reflects the need to provide greater "commonality" between the hard copy and the electronic version. Back issues will also be uploaded as time and resources permit. This issue can be seen by pointing your browser software (such as Mosaic™ or Netscape™) to *http://environ.nosc.mil/html/meso/fy96_no1.html*. Current research and development effort summaries are listed, in no particular order, below. You may access information on the internet by using the Uniform Resource Locator (URL) "address," or contact MESO directly for further information.

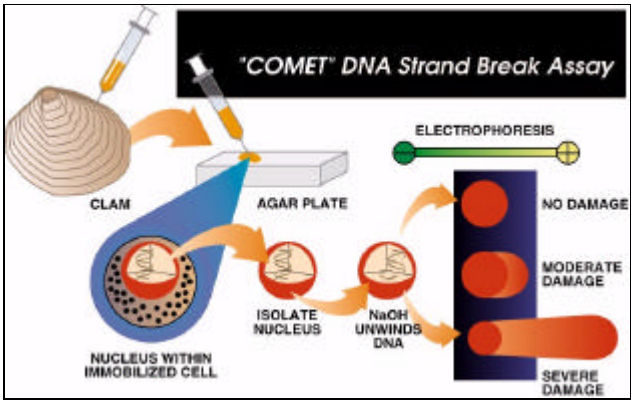
Ecological Risk Assessment Employing Modeling and Field Sampling: San Diego Bay Case Study - The Environmental Sciences Division at NRaD is using San Diego Bay as a case study for evaluating ecological risk assessment methods. The contaminants of primary concern for San Diego Bay and the outlying ocean exchange zone are aromatic hydrocarbons and heavy metals emanating from commercial, recreational, and naval facilities. The transport of these contaminants is governed by tidal- and wind-driven water currents, as well as movements of sediments to which they are adsorbed. The potentially impacted populations include all organisms in the bay, but those in eel grass and kelp bed communities are of particular interest. *http://www.spawar.navy.mil/sti/td/2791/ecorisk.html*

Biomonitoring for Navy Effluents - Simple, alternate cost-effective toxicity assays to support National Pollutant Discharge Elimination System (NPDES) permits and general environmental risk assessment at reduced cost are under development. Acceptance of the Qwik-Lite bioassay (see also *Marine Environmental Update*, Vol. FY94 No. 1; Vol. FY94 No. 3) as an alternative to traditional methods is the ultimate objective. *http://www.spawar.navy.mil/sti/td/2786/sensor.html*

Remediation Research Laboratory: Harbor Sediment Remediation - The Remediation Research Laboratory (RRL) focuses on science and technology issues relevant to the enhancement and development of remedial approaches for contaminated soils and marine sediments. While studies have been carried out to look at the remediation of soils and seawater, the current focus is on developing treatment trains for contaminated marine sediments. The RRL is a group of scientist and engineers with diverse backgrounds, from marine chemistry to electronics. Together, they work as a team to address the multidisciplinary problems that affect remediation, with extensive interaction and collaboration with other agencies and organizations. *http://www.spawar.navy.mil/sti/td/2757/*

Slurry Bioreactor for Decontamination of Navy Hazardous Waste - Slurry bioreactor remediation approaches are being refined and validated for fine-grained soils and sediments contaminated with Navy-specific fuels. Methods to increase the rate and efficacy of bioremediation of clay-rich soils not amenable to *in situ* biotreatment are emphasized. *http://www.spawar.navy.mil/sti/td/2757/slurry.html*

Metalyzer 5000ä : Portable Instrument for Automated Field Metals Analyses - NRaD has developed a new prototype analytical instrument for the measurement of trace metals in water. The system is based on the electrochemical method known as Potentiometric Stripping Analysis (PSA) and has application in both environmental quality and industrial process monitoring. Initially, the instrument provides an on-site measurement capability for lead, copper, cadmium, and zinc. The method is ultimately capable of measuring 45 different metals. The system features the ability to perform single, multiple, continuous, or unattended measurements at preprogrammed intervals over extended periods-with no sample preparation. Analysis times are typically 3 minutes per sample at a sensitivity of approximately 1 ppb for the listed metals in drinking water, groundwater, or seawater. *http://www.spawar.navy.mil/sti/td/2756/metal.html*

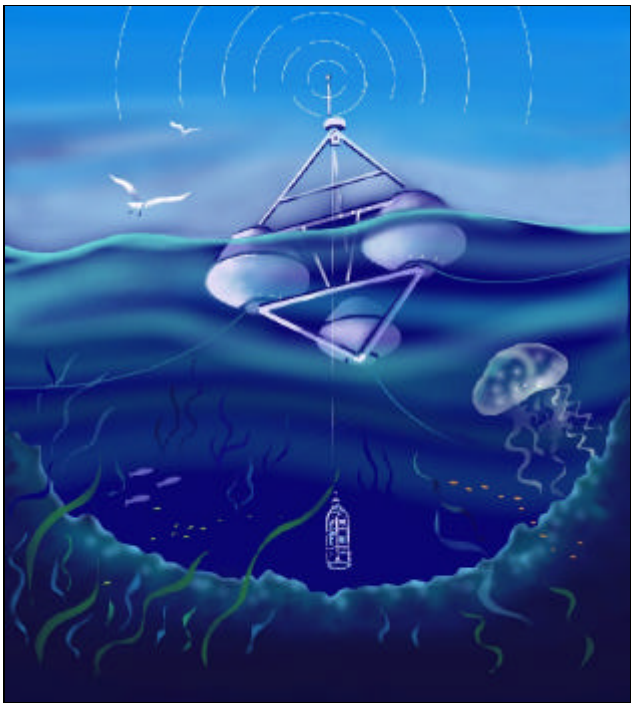


Biochemical Assessment of Environmental Contamination: Biomarkers - The goal of the biomarker approach is to develop a hierarchical series of sensitive molecular measures that will allow the rapid determination of an organism's general level of challenge and then progressively establish the character of the toxicant to which the organism is responding. The current suite of molecular biomarkers under study require the processing of very a small number of cells (10^3 to 10^6); therefore, determinations can be made for multiple tissues from a single organism. In most cases, a subset of these small samples can be easily archived, making them available for future inquiries. The biomarker method currently employed can determine the incidence of genotoxic exposure, increases in cytotoxicity, and concentrations of cellular stress proteins, measuring the induction of proteins essential for the survival of cells under adverse conditions. *http://www.spawar.navy.mil/sti/td/2781/bio.html*

Portable Microcosm for Environmental Testing (POMFRET) - POMFRET is a system that can be deployed at specific aquatic sites to evaluate the chronic effects of pollutants on resident marine organisms. The core of the system consists of 12 outdoor 100-gallon aquaria (microcosms) capable of maintaining low- to medium-diversity assemblages of organisms for periods of several months. The microcosms are provided with continuous unfiltered seawater and are exposed to normal sunlight. As such, they are linked energetically to the natural world, receiving input of ambient sunlight and nutrients, and are colonized by larval organisms entering the water supply. *http://www.spawar.navy.mil/sti/td/2758/pomfret.html*

The Biological Effects Program (BEP) Bioassay Facility - The biological effects program was established to test new and innovative ship hull-coatings proposed for use in the US Navy. As the Navy moves the use of metal-based hull coatings (copper, organotin) to safer, more environmentally benign materials, new coatings must be tested for any potential toxicity to marine organisms. The bioassay trailer is plumbed with freshly filtered seawater and EPA approved static renewal bioassays are conducted. Sediment tests were added to evaluate contaminated sediment issues in San Diego Bay. The BEP bioassay facility is equipped with six water trays for conducting static or flow-through tests, 30 feet of counter space for chemical and biological preparations, a dissecting microscope, and a lab oven to assess tissue weights. By keeping diversified, BEP can conduct standard EPA bioassays including the more innovative and cutting edge bioassay tools being developed. *http://www.spawar.navy.mil/sti/td/2788/bep.html*

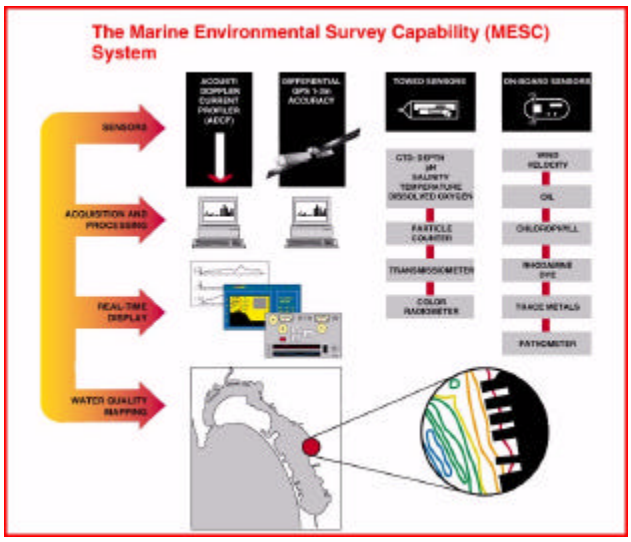
***In Situ* Measurement and Speciation Modeling of Copper in Marine Environments** - Copper antifouling paints from marine vessels impact bays and harbors. A chemical form of copper, the free ion, correlates directly with the toxicity of unicellular algae. A sensor, known as a copper ion selective electrode (ISE), measures pCu, the form of copper that relates to algal toxicity. Use of the copper ISE in conjunction with voltammetry allows researchers to distinguish among various forms of copper. NRaD is developing speciation criteria using the ISE and voltammetric techniques for on-site instrumentation. The objective is to be able to perform tests for speciation remotely and autonomously from "smart" buoys strategically placed in harbors. An idealized buoy deployment is illustrated at right.
http://www.spawar.navy.mil/sti/td/2782/situ.html



"Inside-Out" Nuclear Magnetic Resonance Sensor - Adapting the emerging "Inside-Out" Nuclear Magnetic Resonance (NMR) technique of compound identification to rapid site screening of hazardous waste sites is under way. This technique allows a well-defined volume of soil surrounding the sensor to be analyzed without collection of samples. Recent developments in the area of high-energy density magnets will allow for a significant reduction in the physical size of this type of sensor. With proper design and calibration, the proposed sensor apparatus will be capable of accurate in situ identification and quantification of various subterranean chemical compounds containing hydrogen, fluorine, phosphorous, or thallium at hazardous-waste sites.
http://www.spawar.navy.mil/sti/td/2759/inside.html

Sensor Development for *In Situ* Measurement - The Sensor Development program at NRaD is building on the success and experience gained from developing and fielding the Laser-Induced Fluorescence (LIF) sensor for petroleum, oil and lubricants. The Sensor Development group at NRaD is focusing on expanding the sensor capability for *in situ* detection of subsurface contaminants in soils and aquifer materials, measurement of geotechnical properties related to modeling fluid flow and contaminant migration, and measurement of chemical constituents in the marine environment. Ongoing developments are aimed at specific classes of contaminants of

major environmental concern including: petroleum hydrocarbons, halogenated hydrocarbons, metals and other organic compounds. *http://www.spawar.navy.mil/sti/td/2744/cover.html.*

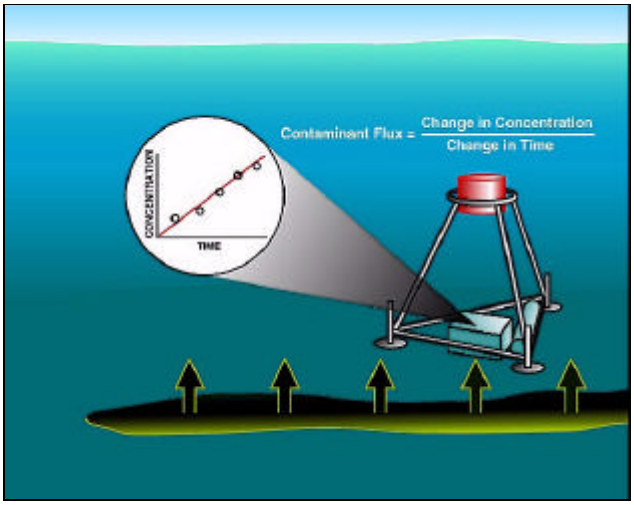


Marine Environmental Survey Capability - To meet the needs for marine environmental monitoring, the Navy has developed the Marine Environmental Survey Capability (MESC). The MESC integrates state-of-the-art sensors, computer systems, and navigation equipment to determine spatial and temporal variability of physical and chemical water quality characteristics from a moving vessel. The MESC system was developed by the Navy to address water quality issues related to the operation of ships and facilities in the coastal environment. The MESC technology provides significant potential for cost reduction and cost avoidance by reducing per-sample cost, minimizing the number of samples for laboratory analysis, and providing more detailed results. *http://www.spawar.navy.mil/sti/td/2789/cover.html*

Portable PCB Monitor for Solid Materials on Ships - The evaluation of detection techniques in the laboratory will result in a simple hand-held PCB monitoring device to be demonstrated in the laboratory and onboard ships. *Under construction.*

Ship Effluent Risk Assessment - Monitoring and assessment surveys for contaminants related to shipboard bilge-water effluents were performed on board US Navy ships and in the receiving waters of San Diego Bay. These surveys are being used to determine base-line levels and relative inputs of Navy vs. non-Navy sources, characterize the effluents, and to identify potential reductions in chemical concentration and toxicity due to Navy pollution control strategies. *Under construction.*

Benthic Flux Sampling Device - The Benthic Contaminant Flux Sampling Device (BFSD) measures the release of contaminants from sediment in support of aquatic HW risk assessments. It provides one of the few methods for direct evaluation of contaminant migration, subsequent exposure levels, and provides unique insight into the cycling and degradation of contaminants. The BFSD has been developed to monitor the exchange rates of contaminants and other biochemical compounds across the sediment water interface. Results from a series of test deployments indicate that this system can quantify these exchange rates at realistic levels for coastal and inshore sediments using a two- to four-day sampling period. *Under construction.*



Chlorinated Hydrocarbon Detector for Cone Penetrometer System - The Cone Penetrometer System, when equipped with this detector, will allow for rapid and cost effective screening of proven and suspect chlorinated hydrocarbon waste sites by determining the boundaries and depth of the contaminant plume before and after site remediation efforts. *Under construction.*

Investigation Into the Use of Fuzzy Logic to Choose and Apply Soil Characteristic Dependent Calibration Curves for Environmental Measurements in the Field - This technology provides a significant enhancement to the Cone Penetrometer capability that could lower costs for characterization and monitoring, and further speed cleanup efforts by providing more quantitative maps of chemical data to the decision makers in near-real time. *Under construction.*

Field Analytical Methods for Metals at HW Sites - This system is expected to rapidly map the extent of a hazardous waste site for metals, monitor remediation efforts at that site, and limit analytical costs by delineating those samples that would require more detailed and more expensive conventional analysis to comply with EPA requirements. *Under construction.*

ABOUT THE *MARINE ENVIRONMENTAL UPDATE*

This newsletter is produced quarterly by the Marine Environmental Support Office (MESO), and is dedicated specifically to inform the Navy about marine environmental issues that may influence how the Navy conducts its operations. MESO is located at the Naval Command, Control and Ocean Surveillance Center Research, Development, Test and Evaluation Division (NRaD) in San Diego, California. The mission of MESO is to provide Navy-wide technical and scientific support on marine environmental science, protection and compliance issues. This support covers a broad spectrum of activities, including routine requests for data and information, technical review and consultation, laboratory and field studies, comprehensive environmental assessments, and technology transfer. Significant developments in marine law, policy, and scientific advancements will be included in the newsletter, along with references and points of contact for further information. The Marine Environmental Support Office may be reached at:

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