Master Plan for Environmental Education

U.S. DEPARTMENT OF THE NAVY
DAVID TAYLOR RESEARCH CENTER

in cooperation with
National Steel and Shipbuilding Company
San Diego, California

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FINAL REPORT

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MASTER PLAN FOR ENVIRONMENTAL EDUCATION

Prepared by

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For
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In behalf of
SNAME Ship Production Committee Panel SP-1
on
Facilities and Environmental Effects

Under the
National Shipbuilding Research Program

NSRP Task No. SP1-91-1

October 1992

PREFACE

The National Shipbuilding Research Program seeks to improve productivity within the shipyard industry. An important part of this Program is carried out by SNAME Ship Production Committee Panel SP-I on Facilities and Environmental Effects. The research effort reported herein is identified as NSRP Task SP1-91-1.

This Task investigated the general question of environmental education from the standpoint of the shipyard industry. Personal interviews were conducted with environmental managers in several shipyards, with the academic community, and with representatives of related industries. Conclusions and recommendations based on analysis of the findings are included in the Report.

The Task was conducted by Rodney A. Robinson, Vice President of Robinson-Page-McDonough and Associates, Inc. The work, under NASSCO Purchase Order MU17104O-D, began in May 1991 and was completed in October 1992.

EXECUTIVE SUMMARY

This Task investigated the area of environmental education from the standpoint of the shipyard industry. The Report contains a listing of the environmental regulations and statutes that bear on environmental education. The listing is long and extensive, and reveals the broad extent of the interlacing requirements. Personal interviews were conducted with environmental managers in several shipyards to determine what programs were currently underway, and what additional programs were needed in order to ensure the attainment and maintenance of a strong environmental posture. The academic community was canvassed to determine what environmental programs and specific courses were available that might be of help. Related industries were surveyed to see how they handle similar needs for environmental education within their compliment of companies.

Analysis of the findings suggests that environmental education programs in most shipyards are limited to what is required by the regulations. Little or no additional environmental education is being conducted. This situation is inconsistent with the need for shipyards to become so environmentally capable and responsive that they can enjoy a competitive position in the international marketplace despite the cost of responding to the environmental demands placed upon them. One key to achieving this capability is expanded and in-depth environmental training and education, especially for those shipyard personnel who regularly face conditions that demand a comprehensive understanding of the environmental regulations and how best to meet the challenges of compliance. The Report describes representative academic offerings currently available, at both undergraduate and graduate levels. The Report also identifies 10 training modules covering specific environmental topics that were identified as needing treatment, but missing from the current arsenal of training materials. These modules are recommended for development under the NSRP through sponsorship of SPC Panels SP-1 and/or SP-9.

The Report encourages participation by the shipyard industry in the Partnership for Environmental Technology Education (PETE), a new and growing program designed to treat environmental issues and needs at the levels of concern commonly found in the shipyard community. This promising program establishes a partnership of government, industry, and academia toward the enhancement of science and mathematics education, including science and technology. It will link the technical resources of the DOE, EPA, and NASA laboratories, and private industry, with participating community colleges to assist in the development and presentation of curricula for training environmental hazardous material technicians. It will also encourage transfer students to pursue studies in environmental science at four-year institutions. The shipyard community, through SPC Panels SP-1 and/or SP-9 should actively participate in PETE during the formative stages of this program, which promises to provide substantial assistance to shipyards in the area of environmental education for operating personnel and their management.

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for
NSRP PROJECT SP1-91-1

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MASTER PLAN FOR ENVIRONMENTAL EDUCATION

BACKGROUND

The shipyard industry in the United States faces a vast and ever-growing array of environmental requirements. There has been no centrally directed and cooperatively supported program for identifing, organizing, and teaching the environmental requirements and regulations that arre of vital interest to shipyard people. Each shipyard activity has had to separately ferret out and endeavor to understand those portions of the multitudinous environmental regulations and requirements that impact their operations, and then set about the task of training their people in compliance techniques. Many valuable lessons have been learned the hard way by several shipyards that have already wrestled with these matters, but no vehicle has existed whereby those lessons might be shared with others just now facing similar situations.

Under the National Shipbuilding Research Program, SNAME Ship Production Committee Panel SP-1 on Facilities and Environmental Effects has sponsored this Project to establish a framework and operating procedures for a comprehensive industry-wide environmental education plan. (Actual implementation of the plan would be a separate follow-on effort under the sponsorship of Panel SP-1 sometime in the near future.) This Project would determine the characteristics of a comprehensive environmental education program from the point of view of the users, determine the best techniques for presenting the necessary information at the several levels of interest that exist in the shipyard community, find out how other industries are handling similar requirements, and design a workable program in full view of these matters.

TECHNICAL APPROACH

The Project was planned and conducted in five segments, as follows:

Subtask 1: Survey of Shipyard Environmental Training

The overall training needs of the shipyard community in the dynamic area of environmental requirements was studied through on-site interviews with personnel in selected representative shipyards. Input was solicited from those shipyards where major

advances have been achieved, either toward compliance, or toward meaningful challenge and modification of the rules. Seven commercial shipyards were included in the survey. In addition, the environmental training initiatives being prosecuted by the Naval Shipyards, under the overall coordination of the Norfolk Naval Shipyard, was investigated in considerable detail.

The on-site surveys utilized a questionnaire and an interview with each person involved. This technique ensured that a full and faithful exchange of information took place. The survey determined the general types of information needed at each of the several levels of audience interest in a shipyard, such as senior management, middle management, operational supervision, production workers, generator personnel, engineering groups, facilities personnel, material suppliers, etc. Also explored was whether training should be extended to include ship owners/operators, community leaders, regulatory people, and similar groups that interface with the shipyard industry. The survey information was assembled and analyzed, yielding a clear indication of industry sentiment on this matter.

Subtask 2: Educational Facility Investigation

Investigation was conducted to determine the types and frequencies of educational opportunities that might be suitable for this program. Items sought were regional workshops, lectures, on-site discussion groups, trade and technical society presentations, periodic publications and newsletters, video tapes, tiormational hotline and bulletin board options, and similar activities aligned with the interests of the shipyard community. Also, formal academic opportunities at selected colleges and universities were canvassed to see what courses and programs might be available to satisy the on-going needs of shipyard people.

Subtask 3: Related Industries Survey

Other industries were surveyed to see how they were solving the same or similar environmental education problems. Candidates for this survey were solicited during the shipyard interviews in Subtask 1.

Subtask 4: Program Development

All of the information collected was analyzed, leading to a determination of how best to approach the matter of environmental education in behalf of the shipyard community, given the current situation and the assistance available.

Subtask 5: Final Report

This Final Report was developed to express the activities, the findings, and the recommendations of this Project.

DETAILED DISCUSSION

SUMMARY OF ENVIRONMENTAL STATUTES AND REGULATIONS

In order to fully understand and appreciate the magnitude of the environmental statutes and regulations facing the shipyard community, it is perhaps appropriate to review a listing of those Federal Environmental Statutes which may be of concern to the shipyard community from a training standpoint. The list is alphabetical by acronym.

APP	Act to Prevent Pollution from Ships
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations - several parts; see listing at end of table
CWA	Clean Water Act - See FWPCA
CZMA	Coastal Zone Management Act
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FWPCA	Federal Water Pollution Control Act (Clean Water Act)
HMTA	Hazardous Materials Transportation Act
HSWA	Hazardous and Solid Waste Amendments
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection Research and Sanctuaries Act
NCA	Noise Control Act
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act (amendment to Public Health Service Act)
SWDA	Solid Waste Disposal Act
TSCA	Toxic Substances Control Act
WRPA	Water Resources Planning Act

Each of these Statutes is discussed separately in *Appendix B*, in the same order as listed above.

CFR - CODE OF FEDERAL REGULATIONS

This listing includes those parts of the Code of Federal Regulations which may be of concern to the shipyard community from a training standpoint. Each of these parts may not be applicable to all shipyards, but should be considered during a comprehensive analysis of environmental training matters.

15 CFR 930	Federal Consistency with Approved Coastal Management Programs
29 CFR 1910	occupational Safety and Health Standards
29 CFR 1910.120	occupational Safety and Health Administration Regulations on Hazardous Waste and Emergency Response
29 CFR 1910.1200	occupational Safety and Health Administration Hazard Communication Standard
32 CFR 229	Natural Resources Management Program
32 CFR 265	Natural Resources Management Program
33 CFR 154	Oil Pollution Prevention Regulations for Marine Oil Transfer Facilities
36 CFR 800+	National Historic Preservation Act Regulations for the Protection of Historic Properties
40 CFR 6	EPA Regulations on Implementation of National Environmental Policy Act Procedures
40 CFR 50	EPA Regulations on National Primary and Secondary Ambient Air Quality Standards
40 CFR 56	EPA Regulation on Regional Consistency Under the Clean Air Act
40 CFR 58	EPA Ambient Air Quality Surveillance Regulations
40 CFR 60	EPA Regulations on New Source Performance Standard
40 CFR 62	EPA Regulations on State Plans for Designated Facilities and Pollutants
40 CFR 65	EPA Regulations on Delayed Compliance Orders Under the Clean Air Act
40 CFR 66	EPA Regulations for Assessment and Collection of Noncompliance Penalties
40 CFR 69	EPA Special Exemptions from Requirements of the Clean Air Act
40 CFR 81	EPA Regulations Designating Areas for Air Quality Planning
40 CFR 82	EPA Stratospheric Ozone Protection Regulations
40 CFR 104	EPA Regulations on Public Hearings on Effluent Standards for Toxic Pollutants
140 CFR 109	EPA Regulations on Criteria for State, Local, and Regional Oil Removal Contingency Plans
40 CFR 110	EPA Regulations on Discharge of Oil
40 CFR 112	EPA Regulations on Oil Pollution Prevention
40 CFR 113	EPA Regulations on Liability for Small Onshore Oil Storage Facilities
40 CFR 116-117	EPA Regulations on Hazardous Substances
40 CFR 112-124	EPA Regulations Implementing the Resource Conservation and Recovery Act (RCRA)
40 CFR 125	EPA Regulations on Criteria and Standards for the National Pollutant Discharge Elimination System
40 CFR 129	EPA Toxic Pollutant Effluent Standards
40 CFR 130	EPA Requirements for Water Quality Planning and Management

40 CFR 141-143	EPA National Drinking Water Regulations
40 CFR 148	EPA Regulations on Hazardous Waste Disposal Restrictions for Class I Wells
40 CFR 150-186	EPA Regulations for Pesticide Programs
40 CFR 230	EPA Interim Regulations on Discharge of Dredged or Fill Material into Navigable Waters
40CFR231	EPA Regulations on Disposal Site Determination Under the Clean Water Act
40 CFR 240-241	EPA Guidelines for the Thermal Processing of Solid Wastes and for the Land Disposal of Solid Wastes
40 CFR 243	EPA Guidelines for Solid Waste Storage and Collection
40 CFR 245	EPA Guidelines for Resource Recovery Facilities
40 CFR 247	EPA Guidelines for Procurement of Products that Contain Recycled Material
40 CFR 255	EPA Guidelines for Identification of Regions and Agencies for Solid Waste Management
40 CFR 257	EPA Regulations on Criteria for Classification of Solid Waste Disposal Facilities and Practices
40 CFR 259	EPA Medical Waste Regulations
40 CFR 260-270	EPA Regulations Implementing the Resource Conservation and Recovery Act (RCRA)
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
40 CFR 300	EPA National Oil and Hazardous Substances Pollution Contingency Plan Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980
40 CFR 302	EPA Designation Reportable Quantities and Notification Requirements for Hazardous Substances under (CERCLA)
40 CFR 350	Trade Secrecy Claims for Emergency Planning and Community Right-To-Know Information and Trade Secret Disclosures to Health Professionals
40 CFR 355	EPA Regulations for Emergency Planning and Notification under CERCLA
40 CFR 370	EPA Hazardous Chemical Reporting and Community Right-To-Know Requirements
40 CFR 372	EPA Toxic Chemical Release Reporting Regulations
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 413	EPA Effluent Guidelines and Standards for Electroplating
40 CFR 414	EPA Effluent Guidelines and Standards for Organic Chemicals
40 CFR 415	EPA Guidelines and Standards for Inorganic Chemicals
40 CFR 417	EPA Effluent Guidelines and Standards for Soaps and Detergents
40 CFR 433	EPA Effluent Guidelines and Standards for Metal Finishing
40 CFR 504	State Sludge Management Program Regulations

40 CFR 760-761	EPA Regulations for Controlling PCBs
40 CFR 1500-1508	Council on Environmental Quality Regulations on Implementing National Environmental Policy Act (NEPA) Procedure
49 CFR 100-199	Department of Transportation Hazardous Materials Regulations
50 CFR 10	Regulation Concerning Marine Mammals
50 CFR 17.11	,Fish and Wildlife Service List of Endangered and Threatened Wildlife
50 CFR 18,216,228	Regulations Concerning Marine Mammals
50 CFR 402	Interagency Cooperation - Endangered Species Act of 1973

It is readily apparent that the quantity of Federal regulations and requirements which may affect or impact environmental training is quite large, and that this massive collection of detailed pronouncements is dynamic in nature with amendments and additions appearing on almost a daily basis. To this body of concern must be ADDED the environmental requirements imposed by *regional, State, and local activities*. It is clearly impractical to list those requirements here, but the reader should realize that they exist and that they must be considered in any overall assessment of environmental demands facing the various segments of the shipyard community.

SUBTASK 1: SURVEY OF SHIPYARD ENVIRONMENTAL TRAINING

Several representative shipyards were surveyed to determine the current posture of environmental training in the industry. Specifically, 2 large, 3 medium-sized, and 2 small commercial shipyards were included in the survey. An on-site interview with each Environmental Manager provided information on (1) the environmental training being conducted at that shipyard, (2) the type of training needed, but not readily available to that shipyard, and (3) the extent to which shipyard environmental management personel were active in regional, State, or local environmental groups and activities. A questionnaire *(Appendix A)* was used during the interviews. In addition, the environmental training initiatives being prosecuted by the Naval Shipyards, under the overall coordination of the Norfolk Naval Shipyard, was investigated in considerable detail. This extensive effort may well prove to be the environmental training pattern for all shipyards; it is comprehensive, aggressive, and promising.

Environmental Training Currently Underway

The survey results suggest that shipyards have made their own individual arrangements to satisfy the major regulatory environmental training requirements, principally those of RCRA but also those of the CWA, FWPCA SDWA SARA and TSCA. An outline of the mandatory training associated with the environmental statutes and regulations is as follows:

Description of Training	Reference
Regulatory Overview	
Clean Air Act	CAA
Clean Water Act	CWA
Hazardous Waste Communications	RCRA
Hazardous Waste Minimization	RCRA
Installation Restoration	CERCLA
National Environmental Policy Act	NEPA
Polychlorinated Biphenyls	TSCA
Resource Recovery and Conservation Act	RCRA
Safe Drinking Water Act	SDWA
Emergency Response	CWA, RCRA, SARA
Hazardous Waste Management Facility Operations	RCRA
Transportation of Hazardous Materials, Hazardous Waste, Hazardous Substances	RCRA TSCA
Shipment of Hazardous Materials, Hazardous Waste, Hazardous Substances	RCRA TSCA
Process Operations	
Analytical Techniques	
Best Management Practices	CWA, CAA, RCRA
Cross-connection and Backflow Prevention	SDWA
Drydock Management	
Hazardous Waste Minimization Specifics	RCRA
Manifesting Hazardous Material, Hazardous Waste, Hazardous Substances	RCRA TSCA
Oily and Hazardous Waste	RCRA, APP
Packaging/Labeling/Turning In Hazardous Material, Hazardous Waste	RCRA
Paint Solvents	RCRA
Pesticide Management	FIFRA
Polychlorinated Biphenyls Cleanup, Inspection	TSCA
Volatile Organic Compounds	
Sampling Techniques and Proficiency	
Resource Conservation and Recovery Act	RCRA
National Pollutant Discharge Elimination System	FWPCA
Safe Drinking Water Act	SDWA
Polychlorinated Biphenyls	TSCA

Hazardous Waste Minimization Overview	**RCRA**
Hazardous Waste/Environmental Coordinators	**RCRA**
Solid Waste Management	**SDWA**

New Employee Indoctrination

The training in place is aligned with the regulatory requirements for environmental training in each area of concern. However, little effort is evident toward establishing and conducting environmental training to address the many other regulatory requirements that are related to shipyard practices and procedures. That is, most of the training noted in place during the survey was limited to what was specifically required. Clearly, the shipyard community needs to broaden and amplify its training activities to produce more comprehensive coverage of environmental matters.

The Naval Shipyard community is pursuing a broad scope initiative to provide comprehensive environmental training for literally all personel affected by or involved in environmental matters. This effort is being coordinated by the Norfolk Naval Shipyard. with the other Naval Shipyards each contributing selected portions of the training materials. The Naval Shipyards face all of the statutes and regulations cited above, together with regional, State, and local considerations. In addition, however, the Naval Shipyards must comply with a battery of Executive Orders, Office of Management and Budget requirements, Department of Defense Directives and Instructions, Department of the Navy Directives and Instructions, and the pronouncements of any other Federal entity which explicitly or implicitly mandates training necessary to effect environmental compliance. It is understandable that they have decided to treat this problem area as completely and comprehensively as possible. The programs that will emerge from this massive effort may hold the key to future success in satisfying the environmental training needs of the entire shipyard community.

Involvement in Regional/State/Local Environmental Groups and Activities

The survey disclosed conclusively that Environmental Managers are, indeed, active in regional/State/local environmental activities and groups. In each instance, the Environmental Manager (and often his staff members as well) was a regular member of several such groups, and was involved in community matters relating to environmental issues. There was no indication of isolationism, but instead a strong indication of genuine concern for the environmental interests of the community, region, State, and Nation. A Sampling of the organizations to which Environmental Managers were found to belong are listed below.

Air and Waste Management Association
American Institute of Plant Engineers (environmental sub-group)
Association of Maine Environmental Laboratories

Certified Hazardous Waste Managers
Connecticut Business and Industry Association
Hazardous Material Users Group (local to San Diego)
Industrial Environmental Association (local to San Diego)
Maine Chamber of Commerce and Industry - Environmental Committee
National Association of Environmental Managers
Old Dominion Research Foundation - Environmental Committee
Pollution Awareness Committee of the Oceans Awareness Committee
San Diego Bay Interagency Water Committee
San Diego Ship Repair Association - Environmental Committee
Southern California Air Quality Alliance (under California Manufacturer's Association)
Virginia Manufacturer's Association
Virginia State Advisory Board (advisors to the Air Pollution Control Board)
Virginia State Air Pollution Control Board (appointed by the Governor)
Virginia State Chamber of Commerce - Environmental Committee
Virginia State Water Control Board

The number of environmental groups and associations continues to grow as awareness of the environmental consequences of industrial activities becomes stronger. Shipyard Environmental Managers are well represented in these bodies, and are continuing to make important contributions to the overall environmental welfare of our Country. Each Environmental Manager contacted during this survey expressed an interest in, and concern for, the overall environmental well-being of our Nation; in no case was apathy or disregard evident. This situation bodes well for the future, because a collective effort that will marshal all of our resources is clearly needed in order to meet the ever-growing challenges incident to preserving and improving our global environment.

SUBTASK 2: EDUCATIONAL FACILITY INVESTIGATION

Several colleges and universities were contacted by telephone to determine what courses and programs were available in the environmental area that might be specifically of interest to shipyard people. The larger institutions were found to offer a growing number of courses on environmental matters, at both undergraduate and graduate levels. A sampling of the programs offered is as follows:

Penn State University

An undergraduate program in Civil Engineering with specialization in Environmental Engineering. This program would include:

Introduction to Environmental Engineering
Environmental Sanitation
Water Pollution Control Processes
Water Quality Management
Management of Water Pollution Control Processes
Water Quality Chemistry

Solid Waste Management
Industrial Hazardous and Residual Waste Management
Environmental Microbiology Laboratory

A Master of Science degree program in Environmental Engineering. This program would include:

Environmental Aquatic Chemistry
Physical-Chemical Treatment Processes
Biological Treatment Processes
Fate and Transport of Hazardous Chemicals
Laboratory Analyzes in Water Quality Control
Industrial Waste Treatment
Treatment Plant Design
Environmental Pollution Microbiology
Stream and Estuarine Analysis
Pavement Management and Rehabilitation

University of Michigan

A wide variety of courses and programs in the environmental area, particularly at the graduate level.

The College of Engineering, Department of Civil and Environmental Engineering, offers a graduate program on Environmental and Water Resources Engineering, leading to a Master of Science and Doctor of Philosophy in Environmental Engineering. This program would include six major concentration areas:

Environmental Chemistry and Microbiology
Hazardous Substance and Solid Waste Engineering
Hydraulics and Fluid Mechanics
Management Policy and Economics
Surface and Groundwater Hydrology
Water Quality Engineering

The College of Engineering, Department of Atmospheric, Oceanographic and Space Sciences, offers a undergraduate/graduate program in Ocean Science for those particularly interested in physical oceanography, and a undergraduate/graduate program in Atmospheric Science (Meteorology). Both programs include specialized environmental courses.

The School of Natural Resources offers courses associated with the natural resource aspects of environmental matters, such as:

The Social Context of Environmental Policy Processes
Ecological Issues
Aquatic Ecology
Global Environment: Systems, Issues, and Perspectives

Ecology of Fishes
Stream Ecology
Great Lakes Limnology
Environmental Education and Natural Resources
Risk and Benefit Analysis in Environmental Engineering

The School of Public Health, Department of Environmental and Industrial Health, offers graduate programs in Environmental and Industrial Health. Specifically, instruction is offered in three program areas: Environmental Health Sciences; Occupational Health; and Toxicology.

Environmental Health Sciences includes the following core courses:

Biostatistics
Computer Applications and Modeling
Environmental Chemistry and Physics
Environmental Impact Assessment
Epidemiology
Ecological Toxicology

and instruction in six areas of specialization:

Air Quality
Environmental Chemistry
Environmental Health Management
Hazardous Waste
Radiological Health
Water Quality

Occupational Health includes the following core courses:

Biostatistics
Strategies and Uses of Epidemiology
Essentials of Toxicology
Occupational Ergonomics
Industrial Health Research
Seminars on Industrial Health
Occupational Diseases
Legal Aspects & Occupational Law

and two specific tracks of additional study: Industrial Hygiene, for persons seeking certification as Industrial Hygienists; and Occupational Medicine, for physicians seeking Occupational Physician certification.

Toxicology includes the following core courses:

Introduction to Biochemistry
Applied Biostatistics
Principles of Toxicology
General Pathology
Principles of Drug Action

Human Physiology

and specific instruction in either experimental toxicology, or in public health policy and the regulatory aspects of toxicology.

University of Washington

The Civil Engineering Department has an environmental subsection which offers an Environmental Engineering and Science Program, covering both air and water issues. Also, the Department of Environmental Health offers the following options:

Industrial Hygiene
Environmental Health/Technology
Environmental Health/Toxicology
Environmental Health/Occupational Medicine

Other Colleges, Universities, and Trade Schools

Some specialized courses were found which satisfy OSHA-required training for certain personnel, such as hazardous waste operators; training certificates would accompany satisfactory completion of the courses. Trade schools were found to offer an increasing number of courses for hands-on personnel. These training opportunities are being utilized by the shipyard community in each local area whenever appropriate courses become available. Regular additions to the curricula are beginning to appear through cooperative arrangements with specific elements of the shipyard industry. However, NO single source was located where a focused program on environmental matters of particular interest to the shipyard industry was currently available. One promising endeavor was discovered, however, and it is discussed below.

Partnership for Environmental Technology Education (PETE)

This five-year regional program has been established in the five western states of Arizona, California, Hawaii, Nevada, and Utah through a partnership of government, industry, and academia. It is directed toward the enhancement of science and mathematics education, including environmental science and technology. It is designed to link the technical resources of the DOE, EPA, and NASA Laboratories, and private industry, with participating community colleges to assist in the development and presentation of curricula for training Environmental-Hazardous Materials Technicians. It also seeks to encourage more transfer students to pursue studies in environmental science at four-year institutions. This methodology is presently being extended nationally. A PROGRAM SUMMARY is provided as ***Appendix C***

Review of the material in Appendix C suggests that PETE might be consistent with the current need for a program to address specific environmental needs of the shipyard industry. Discussions with Mr. Paul R. Dickinson of the Lawrence Livermore National Laboratory reveal his interest in understanding environmental needs from the standpoint of the shipyard industry, and his desire to explore satisfying those needs through PETE.

Clearly, this program has a National focus, an environment orientation, and is designed to treat environmental issues and needs at the levels of concern commonly found in the shipyard community, all of which suggests that further involvement with PETE should be actively considered.

Other Training Opportunities

The survey disclosed that a growing number of regional activities, lectures, and discussion groups are becoming available to shipyard people. In addition, the numbers and extent of periodic publications and newsletters, video tapes, bulletin boards, and information hotlines are increasing. However, these opportunities do not treat only matters of interest to the shipyard community. Rather, the shipyard items are a small portion of the whole, requiring time and effort to extract them from the total package. Surely these programs provide some advantage to the shipyard industry, but would be even more valuable if only shipyard matters were addressed. This prospect may accrue as environmental issues become more visible and better understood, but may take several years to develop.

One exception to this overall situation is the NSRP Environmental Bulletin Board, an electronic communications system designed and operated for the purpose of providing timely information on environmental issues affecting the shipbuilding and ship repair industry. This service is currently maintained by Collier, Shannon and Scott, a firm of Attorneys-at-Law, 3050 K Street, N.W., Washington, DC. 20007. The System Operator for this service is Rick Maas, who can be reached by telephone at (202) 342-8570 during normal business hours. A User's Manual is available. There is currently no charge for this service, which is designed to provide the most current information on a wide variety of environmental regulations and issues of concern to the shipyard industry.

SUBTASK 3: RELATED INDUSTRIES SURVEY

Candidate locations for a survey of related industries were solicited during the interviews with shipyard Environmental Managers. The following were selected for investigation:

American Chemical Society
American Coke and Coal Chemicals Institute
American Iron and Steel Institute
American Petroleum Institute
Chemical Manufacturing Association
Dow Chemical (Midland, MI)

American Chemical Society

There was no industry-wide environmental training effort or focus here. Training in the chemical industry was individualistic and local only. Several areas of the Country have local alliances and partnerships, some quite active, but not with a clear-cut

environmental focus. Support for such local activities was by the Triangle Coalition for Science and Technology Education, located in College Park MD. (Director: John Fowler, phone (301) 220-0872).

The discussion did disclose that a DOE-sponsored effort was underway at the Lawrence Livermore National Laboratory in Livermore, CA, and that this effort has an environmental training focus on such matters as hazardous materials handling and cleanup operations (see discussion of PETE under Subtask 2). In the 1970's there was a flurry of activities in the environmental area, but these activities were political and specialized; in fact, too specialized. A stronger scientific background would be needed to cope with the future demands placed on students. Technician training was begun in 2-year colleges, with emphasis on hazardous materials. "Tech Prep" as it applies in the 1990 Vocational Education Act was predicted to play a major role in VocTech activities as a way to prepare students for the future. The expectation was that students might pursue training at the college level later on. The bulk of the effort would be in the technician area, since only a few professionals would be needed in the chemical industry if there are adequate numbers of trained monitors and operators. This situation led directly to PETE, as a way to treat this area of growing need that appears to be quite similar to that of the shipyard industry.

American Coke and Coal Chemicals Institute

The purpose of this Institute is to represent the interests of the coke and coal chemicals industry by communicating positions to legislative and regulatory officials, cooperating with all Government agencies having jurisdiction over the industry, providing a forum for the exchange of information and discussion of problems, collecting statistics relating to the industry, and promoting the use of coke and its by-products in the marketplace. Discussions with the Director of Regulatory Affairs disclosed that the individual companies do their own education, and handle their own regulatory responses, with the Institute providing industry representation and common treatment of information on regulatory requirements. The Institute operates on a Committee basis. During the discussions the Director quickly recognized the merits of a program to bring the shipyards into concert on environmental training matters, even though his Institute had not attempted to arrange a similar setup.

American Iron and Steel Institute

A brief discussion with the Vice President of Engineering and Environment disclosed that a video tape was being prepared for release soon on the subject of safety in this industry. However, no central focus on environmental training was present.

American Petroleum Institute

This Institute was established in 1919 as the first national trade association in the United States to encompass all branches of the petroleum industry. Within this

framework. industry personnel today continue to work toward the advancement of the petroleum industry in the, interest of the general public. Discussions with a representative of the Fire and Safety Department of the Institute disclosed that there is no national school for the petroleum industry. There are many schools to which people go, such as Howell Training in Houston for those doing the actual work, the University of Texas which offers a Petroleum Extension Service including safety training, and the University of Kentucky. These are the schools most often utilized by the larger companies like Chevron, BP, and Amoco.

The Institute offers an extensive library at the Headquarters location in Washington DC. This library was visited to see what might be available of interest to the shipyard industry. A catalog of publications is published annually, with quarterly supplements. (A copy of the catalog may be obtained by calling API Publications at (202) 682-8375.) Review of the materials and publications in the library revealed a strongly legal tone to the articles on environmental issues, with much attention to the technical details of the petroleum industry. Publications in the area of Health and Environmental Sciences were divided into the following categories:

Air Quality
Biomonitoring
Emissions
Fuels
Groundwater
Hazardous Wastes/Substances
Marine Environmental Effects
Ozone
Water Quality

The personnel at the library were courteous and helpful. This source of information should be actively considered by shipyard personnel who suspect that the petroleum industry might have encountered a problem similar to theirs. The charge for a publication is nominal, and many are free.

Chemical Manufacturing Association

Discussions with the Head of Education for this Association revealed that the chemical manufacturing industry has no industry-wide consolidated training in the environmental area. Each of the companies may do their own training. The CMA does some technical training in behalf of the entire industry, but not with any environmental focus. Contact was suggested with Dow Chemical in Midland, MI as representative of the chemical companies. This contact also pointed to PETE as a fertile opportunity for gaining information on environmental training.

Dow Chemical (Midland, MI)

Discussions with the Director, Corporate Global Issues (of which environmental is one), confirmed that there is no industry-wide focused environmental program for employees. Individual companies have adequate personnel qualified in environmental health and safety who can provide training tailor-made to the workplace. There has been no effort to come up with a generic environmental education program. The closest would be training on issues outside of the workplace. An example of this is "Ambassador" training for all employees at a facility; a one-day course on the environmental issues that are impacting that site - regulations, ordinances, laws, etc. The aim is to make the employees more active in their community, and more active politically through contacts with their State and local representatives. Centralized training activities were in the political and lobbying arenas stressing advocacy, but not education per se. While there were endeavors like the Environmental Health and Safety Semites Program conducted by DuPont in Wilmington, DE, it was questionable whether any of this might be of benefit to the shipyard industry.

SUBTASK 4: PROGRAM DEVELOPMENT

The survey results, and the current situation in the shipyard industry, suggest the following program for environmental education within the shipyard industry:

Overall Approach to Environmental Training

In view of (1) the massive quantity and depth of environmental regulations that affect the shipyard community, (2) the degree to which these regulations overlap and interlace each other, and are intertwined in their tenacious and demanding requirements, and (3) the dynamic nature of this large body of information which is growing/changing almost daily, it is clearly NOT appropriate to design the elements of shipyard environmental training around each regulation individually. Rather, training elements should be aligned with the specific types or groups of personnel that exist in the shipyard community, and with the specific tasks that they perform on a regular basis. Training content should reflect the collective regulations that bear on each specific area of operations or type/group of performing personnel. This arrangement will allow those being trained to confront ALL of the environmental requirements that affect their area of involvement, regardless of which specific regulations apply to each point of concern.

While traceability to each applicable and binding regulation may be of interest to the student, the training itself should not be constrained by dwelling on such a tie; rather, the training should address those actions and considerations that are needed in order to maintain a favorable environmental posture, regardless of the legal or regulatory force that is driving those actions. The reason for this observation is quite simple. There are many training courses available that treat the legal and penal aspects of environmental regulations, and the consequences of non-compliance. There are all too few training

opportunities that address HOW to comply with the regulations, and WHAT operational adjustments are needed in order for a shipyard, or a worker in that shipyard, to gain a sensible and effective environmental posture. The shipyard community needs environmental training with a positive and responsive attitude, and must avoid the trap of allowing that training to drift onto the legal seas which engulf this difficult and demanding subject. Application of appropriate operational measures and implementation of promising ideas for compliance should be stressed, rather than the consequences of non-compliance. Shipyard workers generally *WANT* to take environmentally proper actions, if only they can understand what those actions are, and can see how to carry them out.

Potential Recipients of Environmental Training

The following types and categories of personnel are likely to need environmental training of some description. Note the many <u>different types</u> of people who must be considered for some kind of environmental training.

All employees
Senior Management
Supervisors
Administrative/Support Personnel
Contract Administrators
Emergency Responder Personnel
Engineering / Design Personnel
Facility Designers
Hazardous Material Coordinators
Hazardous Waste Coordinators
Hazardous Waste Minimization Coordinators
Inspectors/Auditors (Fire, Safety, Environmental)
Non-Emergency Cleanup Personnel
Pest Control Personnel
Production Planners / Schedulers
Specialized Environmental Instructors
Specialized Environmental Personnel
Specialized Safety/Health Personnel
Transporters (off the shipyard)
Transporters (within the shipyard)
Treatment, Storage, or Disposal Operators
Wastewater Treatment Operators
Water Treatment Plant Operators
Generator Personnel
    Air Conditioning Equipment Mechanic
    Automotive Mechanic
    Boiler Plant Operator
    Boilermaker
    Burner / Machine

Cabinet Maker
Carpenter
Chemist
Cleaner
Coating Specialist
Coppersmith
Crane Operator
Die Sinker
Electrician
Electronics Mechanic
Electroplater
Engine or Pump Operator
Engraved Plate Maker
Equipment Cleaner
Fabric Worker
Fiberglasser
Fuel Distribution Worker
Industrial Equipment Mechanic
Instrument Maker
Insulator
Janitor
Laminator
Lofter
Machinist
Marine Machinery Mechanic
Metal Forger Metallurgist
Oiler
Painter
Patternmaker
Pipefitter
Plasterer
Plastic Fabricator
Production Machinery Mechanic
Rigger
Router Operator
Sandblaster
Sheet Metal Mechanic
Shipfitter
Shipwright
Small Craft Operator
Storekeeper /Hazardous Waste
Test Technician
Tile and Plate Setter
Tire Repairer
Toolmaker

Vehicle Operator
Welder :
Other Production or Production Support Personnel
New Employees

This listing emphasizes how broad certain elements of an environmental training program must be, while illustrating the types of personnel who will need specific and detailed training on some environmental considerations.

Recommended Master Plan for Environmental Education

Based on the considerations discussed above, and the results of the several surveys conducted to gain related information, the following three-element program for environmental training is recommended for the shipyard industry.

Step 1: Develop the Following Specific Training Modules

During the survey several specific training topics were identified as needing treatment, but missing from the current arsenal of training materials. These topics are candidates for individual NSRP environmental training projects to be carried out under the auspices of SPC Panel SP-1 on Facilities and Environmental Effects, or SPC Panel SP-9 on Education, or both Panels working in concert with one another. Although the Module listing below is in priority order according to the sentiments of those surveyed, the members of SPC Panel SP-1 should review this priority arrangement and make changes and adjustments to it as they see fit.

During development of each Module, the full range of environmental regulations that bear on the content of that Module should be considered, and the projected audience should be kept in careful focus. In several cases, members of SPC Panel SP-1 will be quite able to participate directly in Module development. In fact, much information is already available for use as Module content, requiring only the transformation of that information into the selected training medium.

Module 1- General Environmental Awareness

Content: Overview of ALL environmental statutes and regulations affecting shipyards, including responsibilities for compliance (both civil and criminal). Include an overview and explanation of environmental processes - how laws are formulated, the roles of environmental groups, consultants, advisers. This module would consider environmental requirements at the level of the regulations themselves. Discussion of criminal and civil liability for non-compliance. Could include a strategy to gain a market advantage from environmental requirements, for individual shipyards and also for the shipyard community as a whole. Could be tailored to broad categories of workload: commercial new construction, commercial repair, Navy/Coast Guard ship repair/overhaul or new construction.

Recipients: Senior Management. This Module could also be shown to community leaders, regulatory people, ship owners/operators, and similar groups that interface with the shipyard industry.

Size and Frequency: 2 hours, annually.

Style Options: Video tapes; presentation for luncheon/dinner meeting; annual seminar.

Module 2 - Technical Overview of Environmental Statutes and Regulations

Content: A general but in-depth overview of all environmental statutes and regulations with a focus on shipyard interests, and emphasis on the ~~techincal~~ aspects of the requirements.

Recipients: Environmental Managers and staff personnel.

Size and Frequency: 3 hours, annually.

Style Options: Video tapes; annual seminar; presentation at professional society meeting.

Module 3- Good Environmental Practices

Content: Craft/trade-specific training on items they must deal with on a regular basis - material handling, labeling, waste generation/minimization, requirements awareness.

Recipients: New employees on arrival, and existing workers as a refresher.

Size and Frequency: 8 hours, annually (not all at once, but 1 to 2 hours a day until the material is adequately covered).

Style Options: Library of video tapes, with handout materials; lesson plans for presentation as a part of new employee indoctrination or existing worker refresher training.

Module 4- Environmental Requirements of Concern to Shipyards

Content: General overview of ALL requirements as they apply to shipyards. Emphasis on technical aspects and actions needed for compliance, rather than on the penalties for non-compliance. Include overall strategy for developing a strong environmental posture.

Recipients: Senior Management, Supervisors, Generator Personnel; all workers who interface with environmental matters.

Size and Frequency: 1 hour, annually.

Style Options: Video tape; lesson plan for incorporation into regular training/briefing practices.

Module 5- Environmental Practices for Specific Craft/Trade Groups

Content: Specific training on air, water, hazardous materials, waste minimization, and related environmental considerations, with a focus on the generator personnel and their individual practices and procedures. Emphasis on those personnel likely to encounter a high incidence of problems during their regular duties.

Recipients: Specific craft/trade groups of workers.

Size and Frequency: 4 to 8 hours, annually.

Style Options: Library of video tapes; lesson plans for use during worker training programs.

Module 6- Generation/Treatment/Minimization of Hazardous Waste

Content: Discussion of regulatory requirements and statutes that apply to shipyard hazardous waste activities. Stress the high points of the laws, and how to satisfy them. Include overview of training provided to hazardous waste operators.

Recipients: Middle-level Managers.

Size and Frequency: 8 hours, annually.

Style Options: Video tapes with handouts; lesson plans for manager training programs.

Module 7- Hazardous Waste Operator Training

Content: Detailed training on practices and procedures performed by hazardous waste operators. Include reclamation techniques, safe handling practices. labeling/marking, inventory control, hazard minimization. Focus on the 'dirty hands' personnel who actually perform the hazardous waste operations.

Recipients: Hazardous Waste Operators; helpers and assistants.

Size and Frequency: 24 hours, initially 8 hours, annually.

Style Options: Video tapes with handouts; lesson plans for incorporation into existing training programs.

Module 8- Environmental Incident Response Training

Content: Detailed presentation of response requirements specified by OSHA, RCRA, SARA. Characteristics of an effective response capability. Basic ingredients of a viable program for a shipyard, along with details of what is required and how to reach a satisfactory state of readiness. Include specific duties of all participants, and how to ensure coordination and a common focus. This Module will provide the shipyards with an in-house capability for conducting this important training.

Recipients: Environmental Manager, Environmental Staff Personnel, Safety Engineer, Safety Personnel, Fire Department Personnel, Laboratory Staff and Technicians, Emergency Response Coordinator, Medical Personnel.

Size and Frequency 24 hours, initially; 8 hours, annually (at operational level).

Style Options: Formal presentation utilizing lesson plans, video tapes, handouts, worksheets, reference materials, practice sessions.

Module 9- Training for Hazardous Site Workers

Content: Safe operating practices and procedures for personnel actually involved in cleanup of hazardous chemical spills, storage/treatment/reclamation of hazardous materials, performance of activities covered by 29 CFR 1910.120 on safety of hazardous site workers. This Module will provide for in-house training on the basic aspects of safe practices.

Recipients: Hazardous Site Workers, helpers, assistants.

Size and Frequency: 24 hours, initially; 8 hours, annually.

Style Options: Formal presentations with lesson plans, handouts, practice sessions, video tapes, and reference materials.

Module 10- Environmental Training for Subcontractor Personnel

Content: Briefing on environmental requirements and considerations applicable to all Subcontractor Personnel entering a shipyard environment. Include recent legislation, upcoming requirements, and the standing shipyard procedures for ensuring compliance with environmental regulations in an industrial atmosphere. Design training to provide a high level of awareness regarding environmental matters. This Module will relieve the shipyards of having to deal individually with this area.

Recipients: Subcontractor Personnel; visitors to a shipyard; transient personnel such as delivery agents, auditors, and oversight personnel.

Size and Frequency: 1 hour, as a part of visitor indoctrination.

Style Options: Video tape; add-on to information normally provided to visitors.

Step 2: Establish an Alliance with PETE

The advantages to be gained from a cooperative endeavor between the shipyard industry and the Partnership for Environmental Technology Education (PETE) appear to be large and inviting. The goals of PETE seem sufficiently aligned with the needs of the shipyard industry for environmental education that a cooperative arrangement should be cultivated. The dimensions of the overall environmental training problem facing the shipyard industry are so large that an effort as extensive and organized as PETE will be needed to treat it. PETE promises to grow nationally, with all regions of the EPA eventually becoming involved in the program. The opportunities to be gained from mutual involvement in this common concern are evident. Even with the resources of PETE directed to also serve the interests of the shipyard industry, however, it will take several years before meaningful benefits can be realized.

SPC Panel SP-1 should establish an Ad Hoc Committee to pursue this matter promptly. Preliminary discussions incidental to this project have disclosed that PETE may be quite receptive to such a venture, which would ensure that matters of interest to the shipyard industry are included in the program while it is still in the formative stages.

Step 3: Encourage Local Training by Individual Shipyards

The grass-roots environmental training being done by the individual shipyards must continue to grow in scope and effectiveness. Maintaining the status quo will not suffice. Requirements are growing more rapidly than training programs. A pro-active approach is absolutely essential to success. One of the purposes of the National Shipbuilding Research Program is to provide a forum for technical and operational discussions of interest to the shipyard participants. Training is a vital element of the shipyard business, and it must be considered and nurtured on every convenient occasion.

SPC Panel SP-1 can play a key role in the encouragement of environmental training initiatives. Each Panel Meeting should deliberately include time for discussion of some training issue, perhaps by a shipyard where a new and promising idea is under development or being tried. By inviting and encouraging presentations that will allow the sharing of accomplishments as well as concerns, Panel SP- 1 attendees can assist the local shipyards by becoming a sounding board, a source of comments and suggestions, a panel of experts who will help to illuminate the rocks and shoals as well as the strong points of training efforts. This aspect of shipyard operations is often neglected in favor of more lofty discussions of environmental issues, but must not be allowed to lie unrecognized and untreated. The consequences of inadequate environmental training are large and unpleasant, and must be avoided through deliberate and dedicated training of those in whose hands the environmental success of the shipyard industry resides.

Similarly, a close relationship with the academic community must be maintained by SPC Panel SP-1. This should include panel meeting presentations on specific courses and programs offered by colleges and universities. It should also include presentations by panel members for the academic community so that the latter can better understand the environmental training and educational needs of the shipyard industry. This approach might assist the academic community in becoming better aligned with the practical needs of the shipyard industry and the people in it.

CONCLUSIONS AND RECOMMENDATIONS

This Project has provided a snapshot of environmental training needs and activities within the shipyard industry. It has illuminated the wide array of environmental requirements that influence this important function. The following conclusions and associated recommendations were reached:

Conclusion 1: Environmental training currently in place within the shipyard community is aligned principally with that required by the regulations, with only minimal training beyond those requirements. This situation undoubtedly reflects the depressed condition of the shipyard industry, and the lack of a cooperative and focused environmental training effort within the industry. This creates a dilemma, because the long-term interests of our National shipyard community depend on efficient handling of environmental demands to the extent that the additional costs involved do not obviate competitive proposals in the international market place. Other shipbuilders outside of the United States may not face environmental measures like those imposed on our shipyard community. It is therefore essential that we become so environmentally capable that competition with international shipyards is viable despite an unbalanced playing field. One vital element of this process is progressive and comprehensive environmental education and training for shipyard personnel.

Recommendation 1: The resources of the National Shipbuilding Research Program should by utilized to develop and promote environmental training for shipyard personnel

beyond that specifically required by the regulations. The shipyard industry should seek a pro-active posture in this important area.

Conclusion 2: Certain specific environmental training modules are missing from the 'tools' currently available to shipyard management. Development of such modules is within the charter of the National Shipbuilding Research Program, under sponsorship of SPC Panel SP-1 and/or SP-9.

Recommendation 2: The specific training Modules identified in Step 1 of the Recommended Master Plan for Environmental Education (see page 19) should be developed and made available to the shipyard community. SPC Panel SP-1 and/or SP-9 should sponsor this activity as rapidly as NSRP research finding will allow.

Conclusion 3: The overall and continuing problem of environmental education for industrial personnel in our Country has been recognized as requiring a cooperative effort among government, industry, and academia. Such a program has been initiated, and is growing in scope and capability. The Partnership for Environmental Technology Education (PETE) contains features that can substantially assist the shipyard industry in meeting future demands for environmental education at the level of workers, environmental technicians, and their management.

Recommendation 3: SPC Panel SP-1 should establish an Ad Hoc Committee to work with PETE to ensure that shipyard interests are included in this important program (see Step 2 of the Recommended Master P1an for Environmental Education on page 22). Such a cooperative venture will pay dividends for both parties, and also illustrate to the EPA the desire of the shipyard community to be involved in, and contribute to, the common advantage in treating the challenge of environmental education and training for industrial personnel.

Conclusion 4: Some environmental education opportunities are available in the colleges and universities, particularly at the graduate level in the larger schools. While the number and types of such opportunities are growing as environmental requirements and issues become more fully understood, improved communications are needed between the shipyard community and the academic community in order to better satisfy the needs of both.

Recommendation 4: SPC Panel SP-1 should implement the actions outlined in Step 3 of the Recommended Master Plan for Environmental Education (see page 22), toward a closer and more effective collaboration with the academic community, and toward more Panel activities in the environmental training area. This action will encourage local shipyard training efforts, and will help to stimulate more involvement in educational opportunities through improved intelligence of what is available.

APPENDIX A

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MASTER PLAN FOR ENVIRONMENTAL EDUCATION

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QUESTIONNAIRE AND WORKSHEET

NSRP Task No. SP1-91-1

MASTER PLAN FOR ENVIRONMENTAL EDUCATION
NSRP Task No. SP1-91-1
- - -
Questionnaire and Worksheet

Date_____

Shipyard Coded Ident _____
Note: Shipyard identity will not be revealed in the published report.

General Information

Shipyard Name_____
Location _____
_____

Main Person Contacted_____
Position/Title _____
Address _____
_____
Phone No. ( ) _____ Fax No. ( ) _____

Shipyard Size (#) _____ Production Workers (#) _____
Ship Types _____
_____

New Construction (Y/N) _____ Repair (Y/N) _____ Union (Y/N) _____

Current Workload Size _____
_____

Other Persons Contacted _____
_____
_____
Comments _____
_____
_____

Affilliations: NSRP _____ SP-1 _____ ECB/SPC _____ SCA _____ Other _____

Shipyard Code _____ Page _____ of _____

Educational and Training Information (itemize for each training need)

Subject/Description _____
_____
_____
_____

Source of Requirement _____
_____

Is training available now? (Y/N) _____ Source _____
_____

Who Should Receive (general) _____
_____
_____

Specific needs:

Level 1 _____ # _____ hrs _____ freq _____

Level 2 _____ # _____ hrs _____ freq _____

Level 3 _____ # _____ hrs _____ freq _____

Level 4 _____ # _____ hrs _____ freq _____

Level 5 _____ # _____ hrs _____ freq _____

Level 6 _____ # _____ hrs _____ freq _____

(Y/N) _____ Do you need an in-house training capability for this material?
(Y/N) _____ Would training content be considered proprietary to your Shipyard?
(Y/N) _____ Would you attend a regional workshop/seminar with other shipyards?
(Y/N) _____ Would you expect private training for your shipyard (due to size)?

Shipyard Code _____ Page _____ of _____

Funding comments _____

_____

Survey candidates in other Industries? _____

_____

_____

APPENDIX B

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MASTER PLAN FOR ENVIRONMENTAL EDUCATION

+ + +

LISTING OF

ENVIRONMENTAL STATUTES AND REGULATIONS

NSRP Task No. SP1-91-1

APPENDIX B

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ENVIRONMENTAL STATUTES AND REGULATIONS

This listing includes those Federal Environmental Statutes which may be of concern to the shipyard community from a training standpoint. The list is alphabetical by acronym.

APP	Act to Prevent Pollution from Ships
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations - several parts; see listing at end of table
CWA	Clean Water Act - See FWPCA
CZMA	Coastal Zone Management Act
EPCRAl	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FWPCA	Federal Water Pollution Control Act (Clean Water Act)
HMTA	Hazardous Materials Transportation Act
HSWA	Hazardous and Solid Waste Amendments
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection Research and Sanctuaries Act
NCA	Noise Control Act
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act (amendment to Public Health Service Act)
SWDA	Solid Waste Disposal Act
TSCA	Toxic Substances Control Act
WRPA	Water Resources Planning Act

Each of these Statutes will be discussed separately, in the same order as listed above.

APP - Act to Prevent Pollution from Ships, as amended

Reference: PL-96-478, 33 U.S.C. 1901, as amended by PL-100-220

Discussion: This is the enabling legislation that implements the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973. Annex I of the Protocol was designed to decrease the potential for accidental oil spills, and eliminate operational oil discharges from ships at sea and in coastal waters. It

contains requirements affecting the design, construction, operation, inspection, and certification of new and existing ships. Annex V was implemented in PL- 100-200, Title II, "Marine Plastic Pollution Research and Control Act of 1987". The law amends PL-96-478 to include regulations pertaining to the disposal of solid waste. Requirements are included to eliminate the discharge of all plastic and plastic items, and to regulate the discharge of garbage.

CAA - Clean Air Act, as amended

Reference: 42 U.S.C 7401 et seq.

Discussion: This is the major legislation concerning control of the Nation's air quality. The Act requires the setting of ambient air quality standards, and the development of Federal and State programs to achieve these standards through the control of air pollution sources. The Act provides for the delegation of authority to the States for the conduct of air pollution programs.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended

Reference: 42 U.S.C 9601 et seq.

Discussion: This legislation was enacted to deal with present day and future environmental hazards caused by past hazardous waste management practices. It requires that the Environmental Protection Agency (EPA) be notified of any release (spill, leaking) of hazardous materials. It sets up a "superfund" to enable the rapid cleanup of releases when present owners are unable or unwilling to do the clean up. It also provides for emergency planning and notification through an emergency response commission. While RCRA regulates the current practices of handling hazardous waste, CERCLA (or the Superfund Amendments and Reauthorization Act - SARA) deals with the cleanup of toxic or hazardous contaminants at closed or abandoned waste dumps. Responsible parties (e.g., owners, operators, previous landowners, generators, handlers, disposers, etc.) are expected to clean up old waste sites. Where the responsible parties do not clean up a site, the EPA may proceed with the cleanup using "Superfund" money, and later seek reimbursement. The fact that disposal practices were legal at the time of disposal does not diminish the requirement to clean up a site. In addition to requiring the investigation and cleanup of sites, CERCLA mandates the reporting of releases (spills, dumpings, etc.) or the threatened releases of hazardous substances from both current and past operations. The EPA has published regulations for responding to oil and hazardous spills in a document called the National Oil and Hazardous Substances Pollution Contingency Plan (often referred to as the National Contingency Plan).

CFR - Code of Federal Regulations

(See table of selected parts at the end of this listing.)

Discussion: The Code of Federal Regulations consists of 50 Titles representing broad areas that are subject to Federal regulation. For example, all regulations promulgated by the Environmental Protection Agency are contained in Title 40 of the CFR. All general and permanent regulations published in the daily Federal Register by executive agencies and departments of the Federal Government appear in the CFR, which

is updated annually. These Regulations may apply in certain circumstances, such as to 'implement' the basic Statutes covering environmental matters. As such they form a part of the total concern about training requirements, and must be considered in an overall study of training and qualification activities.

CWA - Clean Water Act - See FWPCA below

CZMA - Coastal Zone Management Act

Reference: 16 U.S.C. 1451 et seq.

Discussion: This legislation was enacted to encourage the participation and cooperation of State, local, regional, and Federal agencies and governments having programs affecting the coastal zone. The Act allows States to develop a Coastal Zone Management Plan (CZMP) in which they define permissible land and water use within the State coastal zone. The coastal zone extends 3 miles seaward, and inland as far as necessary to protect the coast. The definition of 'coastal zone' excludes Federal property, but Federal agencies must ensure that their actions are consistent with Federally approved State programs "to the maximum extent practicable". A coastal consistency determination and State concurrence are required for Federal actions which might affect the coastal zone of a State.

EPCRKA - Emergency Planning and Community Right to Know Act of 1986

Reference: 42 U.S.C 11001 et seq.

Discussion: This Act is also known as SARA, Title III. It focuses on the hazards associated with toxic chemical releases. Specific sections of the Act require immediate notification of State and local emergency response planners upon release of extremely hazardous substances or RCRA-defined hazardous substances. The Act requires State and local coordination in planning response actions for chemical emergencies. It requires certain industries to submit information on chemical inventories and fugitive emissions. The Act ensures that the hazards of chemicals are evaluated, and that employees have a "right to know" this information. It serves as a standard for emergency communications, and requires that employers have a written hazard communication program.

ESA - Endangered Species Act of 1973

Reference: 16 U.S.C. 1531 et seq.

Discussion: This Act establishes a Federal policy to conserve endangered and threatened species of fish, wildlife, and plants. The Secretary of the Interior or the Secretary of Commerce determine what species are endangered or threatened, and list them in the Federal Register periodically. The "taking" of a listed species by anyone in prohibited. "Tak ing" m eans to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect (or attempt to do so). Section 7 of the Act requires Federal agencies to consult with the Department of the Interior or the Department of Commerce prior to undertaking an action which might adversely affect an endangered species. A study called a 'Biological Assessment' is required when an endangered or threatened species may be present in an area affected by Federal action. This study forms the basis for a 'Biological Opinion' issued by the Fish and Wildlife Service. Projects requiring a biological assessment may proceed once a 'no jeopardy' opinion is received. Nearly 600 species in

the United States are protected by this Act. The Fish and Wildlife Service estimates that another 1000 species may merit protection.

FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act

Reference: 7 U.S.C. 136 et seq., as amended by U.S.C. 136-136y; 15 U.S.C. 1261 et seq., 21 U.S.C. 321 et seq.

Discussion: This legislation provides the principal means for preventing environmental pollution from pesticides through product registration and applicator certification. The registration of all pesticide products by the EPA results in label instructions on each container for use, storage, and disposal. Label instructions are legally applicable to all users. Under this Act, the EPA is required to accept certain pesticides under recall for safe disposal. It is unlawful to purchase, distribute, or use any pesticide that does not have an EPA registration number, or for which registration has been canceled or suspended. It is also unlawful to apply, store, or dispose of any pesticide or its container in any manner inconsistent with applicable regulations. This Act was amended in 1972 by the Federal Environmental Pesticide Control Act.

FWPCA - Federal Water Pollution Control Act, as amended

Reference: 33 U.S.C. 1251 et seq.

Discussion: This is the major law dealing with pollution of surface waters (rivers, streams, lakes, etc.). It is often referred to as the Clean Water Act. It covers on-going discharges, spills, and dredge/fill operations. The heart of the Act is a system for regulating discharges of pollutants into surface waters. This system is called the National Pollutant Discharge Elimination System (NPDES). Permits (called NPDES permits) are required for discharges which empty directly into surface waters. NPDES permits serve to limit the type and amount of pollutants that can be discharged. Permit limits are based on the pollution control technology that is available, and on the designated use of the receiving water. The EPA has delegated permitting authority to most States. The optimistic original goal was to eliminate all discharges of pollutants by 1985. Congress also intended effluent limits to become increasingly stringent with time. Indirect discharges (those which go to a treatment plant prior to discharge) are subject to pretreatment requirements developed by the EPA. Both types of discharges require monitoring and self-reporting. A third group of regulated discharges, addressed in the Clean Water Act Amendments of 1987, require States to develop programs for the control of non-point (primarily run-off) sources of pollution. Another major requirement of the Act is the prevention reporting, and cleanup of oil and hazardous substance spills in surface waters. Spills must be reported to the National Response Center, and to State and local regulatory agencies. The Act contains specific provisions for regulation of ship's wastewater and disposal of dredge spoil within navigable waters.

HSWA - Hazardous and Solid Waste Amendments

Reference: 42 U.S.C. 6901 et seq.

Discussion: These amendments were added to the Solid Waste Disposal Act which, in the 1976 revision, is called The Resource Conservation and Recovery Act (RCRA). RCRA provides for control of solid waste disposal, including emphasis on recycling and safe handling and disposaI of hazardous waste. The amendment added in

1984 imposes strict performance standards on land disposal facilities, and authorizes the regulation of underground storage tanks containing petroleum or hazardous substances. The amendments added in 1988 establish a pilot program for tracking medical wastes. The greatest impact of these amendments is in the hazardous waste area, where a system is established for tracking hazardous wastes from generation to disposal. There is provision for passing operation of the program to the States.

MBTA - Migratory Bird Treaty Act, as amended

Reference: 16 U.S.C. 703 et seq.

Discussion: This Act prohibits "taking" or harming a migratory bird, its eggs, nests, or young without a permit. As defined in this law, "take" means to ".. pursue, hunt, capture, kill, (or attempt to take, capture, kill), possess, offer for sale...". Most birds are covered by this Act. However, three common birds NOT protected are pigeons, starlings, and house sparrows. The U. S. Fish and Wildlife Service may issue permits to "take" migratory birds. These permits are relatively easy to obtain for pest species, but are difficult to obtain when large colonies of birds are affected.

MMPA - Marine Mammal Protection Act, as amended

Reference: 16 U.S.C. 11361 et seq.

Discussion: This law protects certain species of marine mammals from diminishing to the point where they cease to be a significant functioning element of the ecosystem. The Act prohibits the "taking" of marine mammals either within the waters or lands of the U. S., or on the high seas by a person subject to U.S. jurisdiction. In this law, "taking" means to harass, hunt, capture, kill (or attempt to do these things). Marine mammals protected include those whose bodies are adapted to the marine environment (sea otters, porpoises, dolphins, seals, sea lions, whales, walruses, manatees) and those who primarily inhabit the marine environment (polar bears). The National Oceanic and Atmospheric Administration (NOAA) and the Department of the Interior are assigned oversight authority, and may allow taking by permit.

MPRSA - Marine Protection, Research, and Sanctuaries Act of 1972, as amended

Reference: 33 U.S.C. 1401-1444

Discussion: This is the major legislation concerning protection of the ocean waters from dumping. It was updated by the U. S. Public Vessel Medical Waste Anti-Dumping Act of 1988. It provides for the establishment of procedures for regulating transportation of materials for ocean dumping. It prohibits the dumping of sewage sludge after 31 Dec 1991.

NCA - Noise Control Act of 1972

Reference: 42 U.S.C. 4901 et seq.

Discussion: This Act authorizes the establishment of Federal noise emission standards for products distributed in commerce, and coordinates Federal research efforts in noise control.

NCP - National Contingency Plan

Reference: National Oil and Hazardous Substances Pollution Contingency Plan

Discussion: The regulations published by the Environmental Protection Agency under the reference title are often called the National Contingency Plan. These are regulations for responding to oil and hazardous spills. See CERCLA above.

NEPA - National Environmental Policy Act of 1969, as amended

Reference: 42 U.S.C. 4321 et seq.

Discussion: This Act was signed into law on 1 Jan 1970. It provided the first major statement on environmental policy. It established a National policy for the environment, and provided for the establishment of a Council on Environmental Quality.

NHPA - National Historic Preservation Act of 1966

Reference: 16 U.S.C. 1531 et seq.

Discussion: This Act provides for the nomination, identification, and protection of historical and cultural properties of significance. It establishes specific procedures for compliance, including initial review authority by the cognizant State Historical Protection Office. The Act is intended to preserve and protect prehistoric and historic resources for future generations. The Department of the Interior (National Park Service) maintains a listing of these resources (The National Register of Historic Places), and establishes criteria for adding resources to the list. Among the historic resources which may be listed are districts, sites, structures, buildings, and objects of significance in American history, architecture, archaeology, or culture. In general, properties usually must be over 50 years old to be listed. Nationwide, over 52,000 properties are listed, and another 100,000 are eligible.

OSHA - Occupational Safety and Health Administration

Reference: 29 CFR 1910

Discussion: Occupational Safety and Health Standards appear in the reference, along with OSHA Regulations on Hazardous Waste and Emergency Response (1910. 120) and OSHA Hazard Communication Standard (1910.1200).

RCRA - Resource Conservation and Recovery Act

Reference: 42 U.S.C. 6901 et seq., 40 CFR 260-270.

Discussion: RCRA was enacted as an amendment to the Solid Waste Disposal Act. It became the first comprehensive Federal effort to deal with the safe disposal of all types of solid and hazardous wastes. One of its original goals was to tap the hidden resources available in material that had been thrown away. RCRA provisions for solid non-hazardous waste require the State to develop solid waste management plans, prohibit open dumping, and require disposal of waste in sanitary landfills that comply with EPA regulations. RCRA provisions for dealing with hazardous wastes require regulation from 'cradle to grave'. The EPA has developed detailed implementing regulations. Requirements apply to those who generate, handle, transport, treat, store, or dispose of hazardous waste. Manifest forms, establishing a chain of custody, must accompany all shipments of hazardous wastes leaving an installation. Permits are required for treatment, storage, or disposal on-site. Cleanup of contamination from past as well as current operations, referred to as corrective actions, may be required as a condition of a RCRA treatment, storage, or disposal permit. States may, and usually do, obtain authorization

from EPA to en.force hazardous waste programs. Requirements for underground storage tanks are also contained in RCRA. Owners and operators are required to register tanks, provide secondary containment, monitor, and clean up contamination from their tanks.

SARA - Superfund Amendments and Reauthorization Act

Reference: 42 U.S.C. 9601 et seq.

Discussion: This Act sets up a "superfund" to enable the cleanup of releases of hazardous materials when the present owners are unable or unwilling to clean up. See CERCLA above.

SDWA - Safe Drinking Water Act, an amendment to the Public Health Service Act

Reference: 42 U.S.C. 300F et seq.

Discussion: The Safe Drinking Water Act, prompted by outbreaks of waterborne diseases, was enacted to ensure that the public water systems provide safe drinking water to consumers, and to protect existing sources of groundwater. The general regulatory approach is for the EPA to set standards, and for the States to enforce those standards. The law requires the EPA to set primary drinking water standards for 83 contaminants. Primary drinking water standards are to protect human health. Secondary standards are to protect the non-health-related properties of water, such as odor and turbidity. Providers of public drinking water must monitor and meet primary drinking water standards. Whenever the standards are exceeded, they must also inform their users, usually by publishing a notice in the newspaper. This Act also protects underground sources of water by regulating the underground injection of wastes, and by requiring States to establish plans to protect well fields from contaminants.

SWDA - Solid Waste Disposal Act, as amended

Reference: 42 U.S.C. 6901 et seq.

Discussion: This is the basic Act that was amended by RCRA and by HSWA, see discussion of these amendments above.

TSCA - Toxic Substances Control Act

Reference: 15 U.S.C. 2601 et seq.

Discussion: This Act empowers the EPA to collect information and regulate toxic chemicals at any stage from manufacture through disposal. It authorizes the EPA to screen new chemicals proposed for manufacture, and to review the safety of existing chemicals already on the market. Under this law, the EPA may prohibit manufacture, limit production, ban or control use, control disposal methods, require public notification of hazards, etc. to protect the public health from toxic chemicals. Although the major brunt of this law falls on manufacturers, shipyards may be impacted as users of chemical products. TSCA authority may NOT be delegated to the States.

WRPA - Water Resources Planning Act of 1965, as amended

Reference: 42 U.S.C. 1962D et seq.

Discussion: This is an Act to provide for the optimum development of the Nation’s natural resources through the coordinated planning of water and related resources.

CFR - CODE OF FEDERAL REGULATIONS

This listing includes those parts of the Code of Federal Regulations which may be of concern to the shipyard community from a training standpoint. Each of these parts may not be applicable to all shipyards, but should be considered during a comprehensive analysis of environmental training matters.

15 CFR 930	Federal Consistency with Approved Coastal Management Programs
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Occupational Safety and Health Administration Regulations on Hazardous Waste and Emergency Response
29 CFR 1910.1200	Occupational Safety and Health Administration Hazard Communication Standard
32 CFR 229	Natural Resources Management Program
32 CFR 265	Natural Resources Management Program
33 CFR 154	Oil Pollution Prevention Regulations for Marine Oil Transfer Facilities
36 CFR 800+	National Historic Preservation Act Regulations for the Protection of Historic Properties
40 CFR 6	EPA Regulations on Implementation of National Environmental Policy Act Procedures
40 CFR 50	EPA Regulations on National Primary and Secondary Ambient Air Quality Standards
40 CFR 56	EPA Regulation on Regional Consistency Under the Clean Air Act
40 CFR 58	EPA Ambient Air Quality Surveillance Regulations
40 CFR 60	EPA Regulations on New Source Performance Standards
40 CFR 62	EPA Regulations on State Plans for Designated Facilities and Pollutants
40 CFR 65	EPA Regulations on Delayed Compliance Orders Under the Clean Air Act
40 CFR 66	EPA Regulations for Assessment and Collection of Noncompliance Penalties
40 CFR 69	EPA Special Exemptions from Requirements of the Clean Air Act
40 CFR 81	EPA Regulations Designating Areas for Air Quality Planning
40 CFR 82	EPA Stratospheric Ozone Protection Regulations
40 CFR 104	EPA Regulations on Public Hearings on Effluent Standards for Toxic Pollutants
40 CFR 109	EPA Regulations on Criteria for State, Local, and Regional Oil Removal Contingency Plans
40 CFR 110	EPA Regulations on Discharge of Oil
40 CFR 112	EPA Regulations on Oil Pollution Prevention
40 CFR 113	EPA Regulations on Liability for Small Onshore Oil Storage Facilities

40 CFR 116-117	EPA Regulations on Hazardous Substances
40 CFR 112-124	EPA Regulations Implementing the Resource Conservation and Recovery Act (RCRA)
40 CFR 125	EPA Regulations on Criteria and Standards for the National Pollutant Discharge Elimination System
40 CFR 129	EPA Toxic Pollutant Effluent Standards
40 CFR 130	EPA Requirements for Water Quality Planning and Management
40 CFR 141-143	EPA National Drinking Water Regulations
40 CFR 148	EPA Regulations on Hazardous Waste Disposal Restrictions for Class I Wells
40 CFR 150-186	EPA Regulations for Pesticide Programs
40 CFR 230	EPA Interim Regulations on Discharge of Dredged or Fill Material into Navigable Waters
40 CFR 231	EPA Regulations on Disposal Site Determination Under the Clean Water Act
40 CFR 240-241	EPA Guidelines for the Thermal Processing of Solid Wastes and for the Land Disposal of Solid Wastes
40 CFR 243	EPA Guidelines for Solid Waste Storage and Collection
40 CFR 245	EPA (Guidelines for Resource Recovery Facilities
40 CFR 247	EPA Guidelines for Procurement of Products that Contain Recycled Material
40 CFR 255	EPA Guidelines for Identification of Regions and Agencies for Solid Waste Management
40 CFR 257	EPA Regulations on Criteria for Classification of Solid Waste bisposal Facilities and Practices
40 CFR 259	EPA Medical Waste Regulations
40 CFR 260-270	EPA Regulations Implementing the Resource Conservation and Recovery Act (RCRA)
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
40 CFR 300	EPA National Oil and Hazardous Substances Pollution Contingency Plan Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
40 CFR 302	EPA Designation, Reportable Quantities and Notification Requirements for Hazardous Substances under (CERCLA)
40 CFR 350	Trade Secrecy Claims for Emergency Planning and Community Right-To-Know Information and Trade Secret Disclosures to Health Professionals
40 CFR 355	EPA Regulations for Emergency Planning and Notification under CERCLA
40 CFR 370	EPA Hazardous Chemical Reporting and Community Right-To-Know Requirements
40 CFR 372	EPA Toxic Chemical Release Reporting Regulations

40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 413	EPA Effluent Guidelines and Standards for Electroplating
40 CFR 414	EPA Effluent Guidelines and Standards for Organic Chemicals
40 CFR 415	EPA Guidelines and Standards for Inorganic Chemicals
40 CFR 417	EPA Effluent Guidelines and Standards for Soaps and Detergents
40 CFR 433	EPA Effluent Guidelines and Standards for Metal Finishing
40 CFR 504	State Sludge Management Program Regulations
40 CFR 760-761	EPA Regulations for Controlling PCBS
40 CFR 1500-1508	Council on Environmental Quality Regulations on Implementing National Environmental Policy Act (NEPA) Procedure
49 CFR 100-199	Department of Transportation Hazardous Materials Regulations
50 CFR 10	Regulation Concerning Marine Mammals
50 CFR 17.11	Fish and Wildlife Service List of Endangered and Threatened Wildlife
50 CFR 18.216,228	Regulations Concerning Marine Mammals
50 CFR 402	Interagency Cooperation - Endangered Species Act of 1973

NOTE: In order to complete the listing of environmental requirements that may affect the environmental training needs of the shipyard industry, the environmental requirements imposed by regional, State, and local activities must be *added.*

APPENDIX C

+ + +

MASTER PLAN FOR ENVIRONMENTAL EDUCATION

+ + +

PARTNERSHIP FOR ENVIRONMENTAL TECHNOLOGY EDUCATION

PROGRAM SUMMARY

October 1,1992

NSRP Task No. SP1-91-1

PARTNERSHIP FOR
ENVIRONMENTAL TECHNOLOGY EDUCATION

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PROGRAM SUMMARY

October 1, 1992

ABSTRACT

PARTNERSHIP FOR ENVIRONMENTAL TECHNOLOGY EDUCATION (PETE)

The need for broad cooperative effort directed toward the enhancement of science and mathematics education, including environmental science and technology has been recognized as a national priority by government, industry, and the academic community alike. In an effort to address this need, the Partnership for Environmental Technology Education (PETE) has been established in the five western states of Arizona, California, Hawaii, Nevada and Utah. PETE's overall objectives are to link the technical resources of the DOE, EPA, and NASA Laboratories and private industry with participating community colleges to assist in the development and presentation of curricula for training Environmental-Hazardous Materials Technicians and to encourage more transfer students to pursue studies in environmental science at four-year institutions. The PETE methodology is presently being extended nationally.

INTRODUCTION

The need for broad cooperative effort directed toward the enhancement of science and mathematics education in the United States has been recognized as a national priority by government, industry and the academic community alike. Within the context of this broad need, the U. S. Department of Energy and the U. S. Environmental Protection Agency have defined "needs driven" or specific interests which require increasing the numbers of qualified graduates in areas of environmental science and engineering, including technicians, and fostering improved public literacy in environmental science and waste management. Carefully targeted education intervention programs are required if these important goals are to be realized.

There are approximately 1200 community, technical and junior colleges in the U. S. with a 1989 student population of 5.7M. This does not include another 5.0M non-credit enrolled students attending these two-year institutions. On the basis of sheer numbers alone, these institutions represent a significant, nationwide resource that should play a key role in the conduct of a successful Environmental Protection/Restoration and Waste Management education program.

Community colleges have been in the process of a major transition during the 1980s. They have moved toward a much stronger role in vocational education and in supporting U. S. industry. Despite this major shift toward vocational education, however, the nation's community colleges still represent a key transition point for millions of students (particularly minority students) between high school and the four-year institutions. Operating on a philosophy of higher education opportunity for all, with minimal entrance requirements and low cost, the community colleges afford the average high school student the opportunity to start college when they may not have qualified to enter a four-year institution, or may still be trying to decide the appropriate direction of their college careers. The community colleges also increasingly represent the easy access, low cost alternative for people already in the work force to return for continuing vocational training or retraining for new career directions.

For these reasons, most of the minority or other disadvantaged students presently pursuing post-secondary education in the U. S. today are attending a community college. An environmental education intervention program which recognizes current problems in the nation's education system and is geared to the realities of changing demographics must focus adequate programmatic attention on this pivotal segment of the education pipeline.

APPROACH

The Partnership for Environmental Technology Education (PETE), a regional program which could be extended nationally, has been developed and implemented to link the technical resources of federal laboratories and the private sector with regional community colleges to provide direct technical assistance for:

- development and presentation of Environmental-Hazardous Materials Technician curricula at the two-year degree/certificate level;

- development/enhancement of environmental science and pre-engineering curricula targeting the attraction and preparation of transfer students to four-year institutions.

This is a five-year program which will evolve through a partnership of government, industry and academia, and include the participation of the DOE National Laboratories, the Nevada Test Site and regional EPA, and NASA Laboratories. PETE is being supported by its sponsors during the first eighteen months on a pilot basis in five western states.

GOALS

1) Provide a mechanism for bringing the technical expertise of the DOE, EPA, and NASA Laboratories into direct and continuing support of the community colleges.

2) Accelerate the development and implementation, and enhance the technical foundation of Environmental-Hazardous Materials Technician curricula to meet the near-term and long-term human resource needs of both government and industry.

3) Provide a mechanism for coordinating greater private industry, government, academic, professional society and Laboratory collaboration at the community college level.

4) Provide a mechanism for assisting with outreach initiatives to feeder high schools and articulation to four-year curricula in environmental science and engineering.

5) Develop a continuing collaborative and mutually supportive relationship between DOE, EPA, and NASA Laboratories in support of national education objectives.

PILOT PROGRAM

The first year effort has been devoted to developing and implementing the program on a pilot basis in the states of Arizona, California, Hawaii, Nevada, Utah. This has included two primary initiatives:

- Environmental-Hazardous Materials Technician curriculum development and implementation: A program is in place to assist community colleges in implementing this curriculum in the five-state region, including accelerated instructor training and creative approaches to assuring the availability of state-of-the-art equipment and teaching aids. To date, PETE has assisted nine regional community colleges in starting new programs.

Ž Resource Instructor Institute in the Environmental Sciences: Each community college within the five-state region will be invited to nominate a science, math or hazardous materials technician instructor to participate in a "regional instructor network." The Institute will serve as a formal mechanism for the community colleges, DOE, EPA, and NASA Laboratories, the private sector and professional societies to coordinate on:

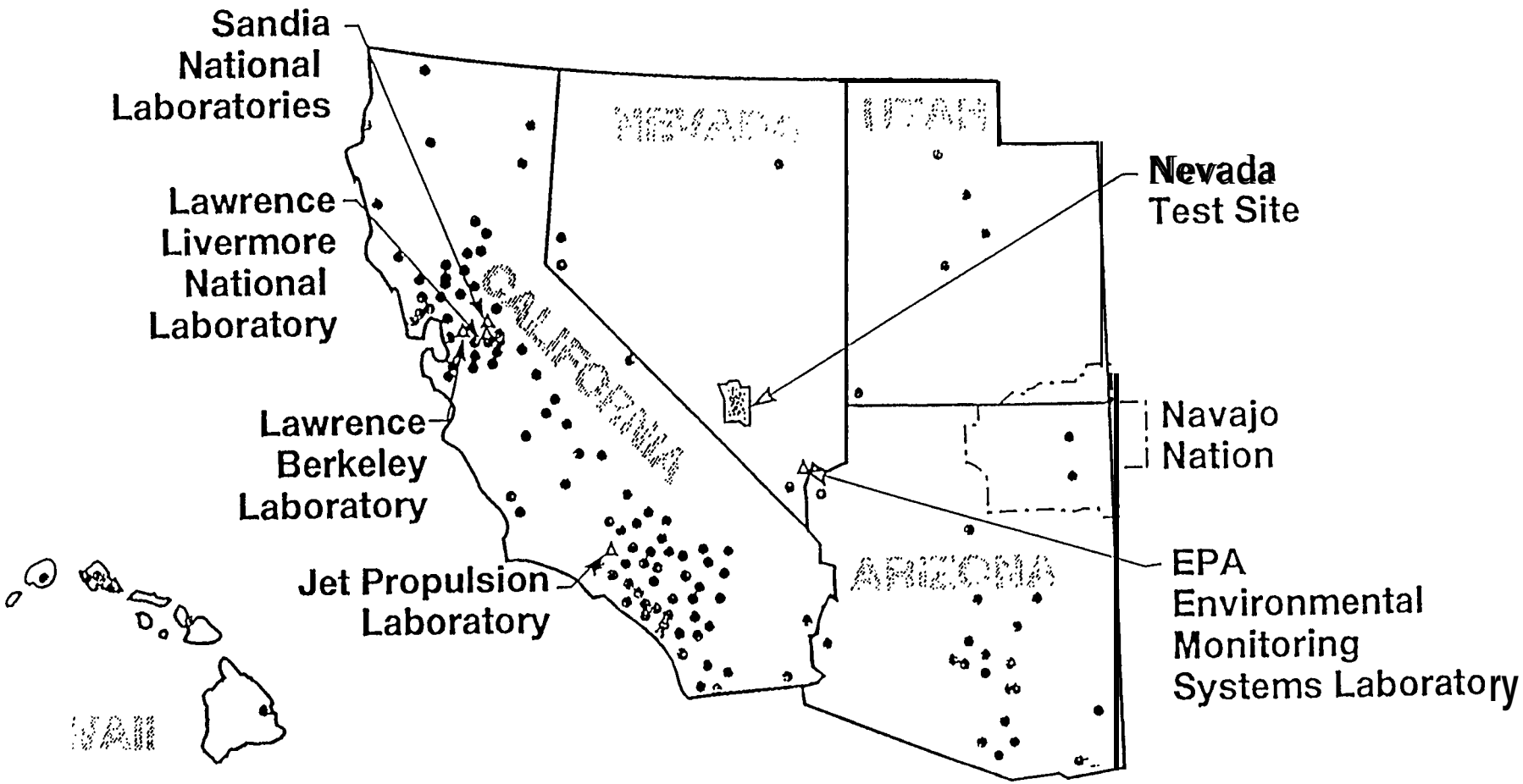
regular information exchange (semi-annual, 2-day conferences),
direct Laboratory and industry support to curriculum presentation,
curriculum articulation with four-year institutions,
development and implementation of high school or community outreach programs (e.g. 2+2+2/Tech Prep),
laboratory and industry summer work/research, and continuing education opportunities for instructors and students,
- DOE/EPA/NASA technology transfer,
recruiting opportunities for DOE, EPA, NASA, their contractors, and private industry.

The program has been developed and implementation begun through the collaboration of several key regional players:

Ž Arizona, California, Hawaii, Nevada, Utah Community Colleges
Environmental Monitoring Systems Laboratory (EPA)
- Industry Education Council of California
- et Propulsion Laboratory (NASA)
- Lawrence Berkeley Laboratory (DOE)
- awrence Livermore National Laboratory (DOE)
- National Center for Research in Vocational Education

Ž National Environmental Training Association
- Navajo Community College

PETE Region



- 152 Community, Junior and Technical Colleges

- Nevada Test Site (DOE)
- Sandia National Laboratories, Livermore (DOE)

Also participating in the program is the American Association of Community Colleges, the Department of Energy San Francisco and Nevada Field Offices, and the EPA Region IX Office. Representatives of the Environmental Protection Office in each of the five states will also be invited to advise the program on a regular basis.

ROLE OF PRIVATE INDUSTRY AND PROFESSIONAL SOCIETIES

Private industry and professional societies will play a vital role in the development and conduct of the program. This will include participation in the Resource Instructor Institute and advising on curriculum development and presentation. Along with government, private industry will be a primary beneficiary of the significantly increased number of technician graduates which will result from this initiative. We will seek substantial private sector funding and/or in-kind support for the program. This will primarily involve assistance with equipment needs, cosponsorship of semi-annual Resource Instructor Conferences, and summer internship opportunities for instructors and students. The Industry Education Council of California, a statewide consortium of government, industry and academia, is a full partner in PETE, bringing direct access to many of the State's major corporations. Similar organizations will be sought in Arizona, Hawaii, Nevada and Utah to coordinate private sector participation in the program.

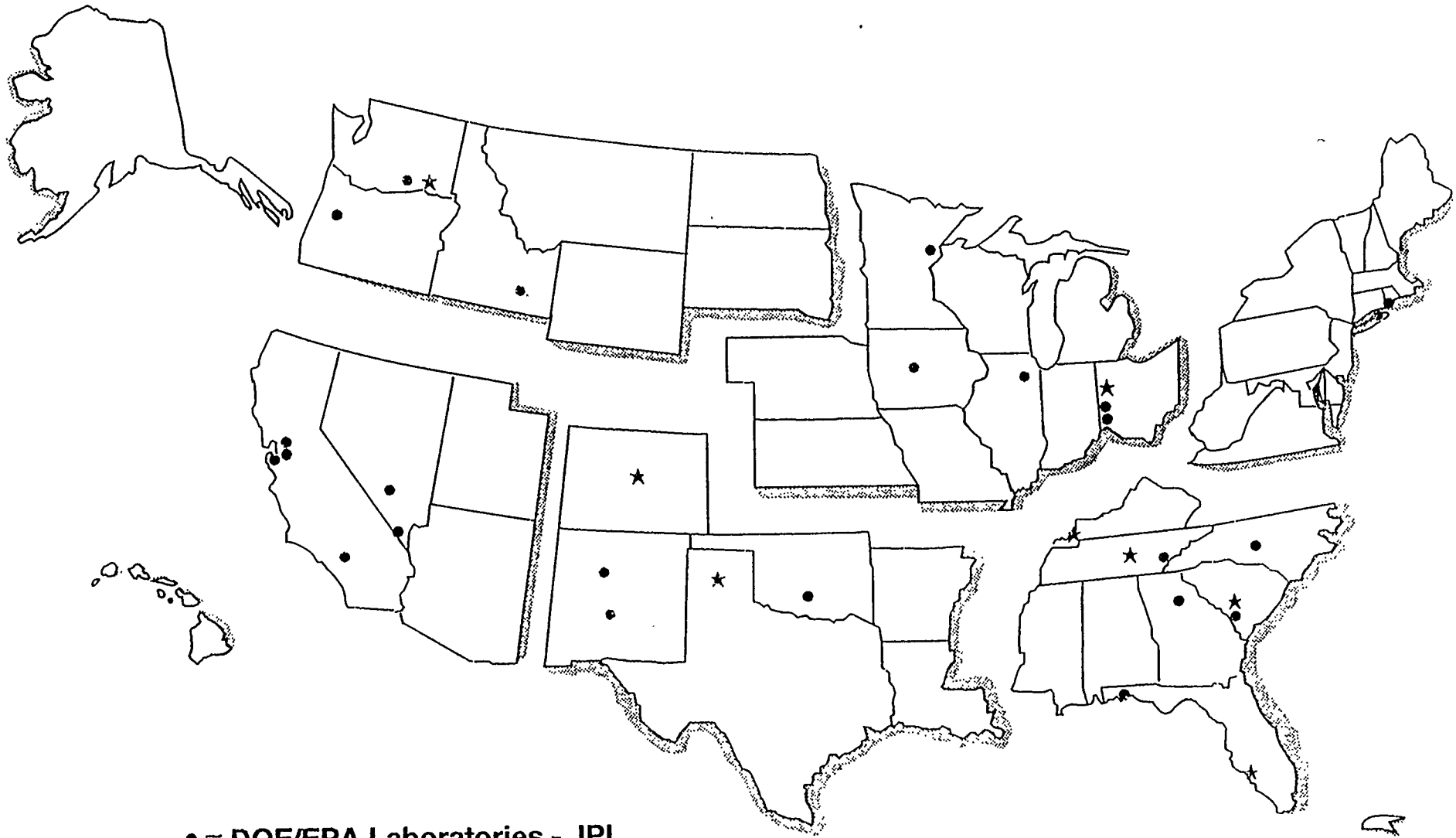
STRATEGY FOR A NATIONAL PROGRAM

The overall goal of this program is to significantly enhance the number of graduates emerging from the education pipeline in disciplines related to environmental science and engineering, with an emphasis on technicians. The PETE methodology, as demonstrated through this regional pilot program, could be extended nationally in order to assure maximum beneficial impact. Three other regional partnerships are in fact already forming in the Southeast (8 states), Midwest (10 states), Northwest (8 states), and Northeast (13 states). The Laboratories, Community College representatives, and other partners in PETE will be available during years 3-5 to directly assist other regions in starting up their programs, while recognizing the unique needs and resources of each region.

NCRVE NATIONAL LABOR MARKET STUDY

The National Center for Research in Vocational Education, a part of the U. C. Berkeley Graduate School of Education, is a study center funded by the U. S. Department of Education. The Center is conducting a two-year assessment of the projected national labor market demand and skills requirements for Environmental-Hazardous Materials Technicians on a matching funds basis as a part of its Department of Education-supported program. The results of this study,

Six Proposed Regional Programs



● = DOE/EPA Laboratories - JPL

★ = DOE Production Complex

which will be available by December 1992, will serve as an important indicator of just how extensively the PETE methodology should be replicated nationally.

CURRICULUM AND TEACHING AIDS DEVELOPMENT

One of the primary issues raised since the formation of PETE has been the general lack of appropriate texts and teaching aids to support Environmental-Hazardous Materials Technician curricula at the community college level. In response to this need, a National Curriculum Development Working Group has been established, which includes representatives from eight leading colleges outside the PETE region, to develop teaching materials for core curriculum modules in this field. Eight core module outlines have been developed. PETE will enter into a Teaming Agreement with INTELECOM, a non-profit community college telecommunications consortium, to foster agreements with major publishers and develop accompanying video sets. This is expected to be a three-five year initiative.

ORGANIZATION AND MANAGEMENT

The Partnership is directed by a Steering Committee representing the Community College systems in the five pilot region states, the Laboratories and NTS, private industry, and other participating organizations. The Committee is chaired by an elected community college representative. The National Environmental Training Association is presently serving as Fiscal Agent.

BUDGET

This five-year program is being cosponsored by DOE and EPA as a collaborative national initiative. Total funding for the Western pilot region was $250K in FY91 and $500K in FY92, provided primarily by DOE. A budget request for FY93 is presently being developed and we are now proposing that the Department of Defense and EPA join the Department of Energy in cosponsorship of PETE. Additional funding support will be required for implementation in other regions. Significant support will also be sought from local industry in the five states. The State of California continues to commit funding for the development and implementation of the Environmental-Hazardous Materials Technician curriculum at additional colleges (6 in 1992), and the NCRVE has committed a total of $100K to the national labor demand study through FY92.

Funding to initiate this program in the five-state region in FY91 and FY92 was provided by the DOE Offices of Environmental Restoration and Waste Management, Contractor Human Resource Management, and Office of University and Science Education Programs.

ACCOMPLISHMENTS TO DATE

Several specific accomplishments can be cited since PETE was initially funded by DOE in April 1991:

- The formation of PETE has created a regional infrastructure within which the academic community, industry, federal agencies, the states and professional societies are working together toward common goals in environmental protection, restoration and waste management education and training. The program provides a mechanism for focused action, leveraging of resources and information sharing which is already benefiting the five participating states.

- The semi-annual Resource Instructor Conferences provide a regular forum for information exchange and mutual support among participating community colleges and the other regional partners. Three conferences have been conducted to date. The first, in San Francisco in August 1991, included representatives from sixty regional colleges and provided the Steering Committee with important input on problems and recommended priorities for PETE. The second conference was held in Las Vegas, Nevada, in February 1992. This event focused on the issue of private sector demand for Environmental-Hazardous Materials Technicians and the pros and cons of developing national certification standards. The third conference was held in San Diego, California, in July 1992 with a primary theme of 2+2+2/Tech Prep.

- During the summer of 1991, PETE assisted in the initiation of Environmental-Hazardous Materials Programs in the State of Nevada at the Community College of Southern Nevada in Las Vegas and Truckee Meadows Community College in Reno. Direct assistance was provided to seven other new start colleges in 1992. PETE also initiated the Summer Internship Program in FY92, placing eight community college instructors at the Laboratories and NTS for 8-10 week assignments.

- The Industry Education Council of California has established a statewide coordinating committee to implement industry participation in PETE in California. This committee, chaired by Unisys Corporation, includes representatives from several major corporations in the state, as well as the US Navy.

For more information about PETE, contact the 1992-93 Steering Committee Officers:

Chairperson.	Mr. David Hoggard Community College of Southern Nevada (702) 643-6060 (Ext. 325)
Vice-Chairperson:	Ms. Chulee Grove Honolulu Community College (808) 845-9478
Secretary:	Mr. Paul R. Dickinson Lawrence Livermore National Laboratory (510) 422-6525
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