# *OFFICE OF WATER*
# *PERFORMANCE EVALUATION STUDY PROJECT*

*Final Report*

*Prepared for:*

*The Acting Assistant Administrator for Water*

*Prepared by:*

*Communications and Information Management Staff*
*Policy and Resource Management Office*
*Office of Water*

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I would like to thank the following for their assistance in conducting the study:

## The Design Team

Wendy Blake-Coleman, Quality Assurance Manager for the Office of Water

Martin Brossman, Quality Assurance Officer for the Office of Wetlands, Oceans, and Watersheds

Robert Runyon, Quality Assurance Officer for Region II

Charles Jones, Quality Assurance Officer for Region III

Wade Knight, Quality Assurance Officer for Region IV

## The Advisory Panel

James M. Conlon, Director
Drinking Water Standards Division

Geoffrey Grubbs, Director
Assessment and Watershed Protection Division

Michelle Hiller, Chief
Communication and Information Management Staff

Richard Kozlowski, Director
Enforcement Division

William Telliard, Chief
Analytical Methods Staff

Ramona E. Trovato, Director
Ground Water Protection Division

Nancy Wentworth, Director
Quality Assurance Management Staff

The Regional Quality Assurance Officers and Staff of the Environmental Services Divisions

This group was instrumental in collecting and compiling use and benefit data as well as reviewing the final report.

| | |
|---|---|
| Carol Wood, Region I | Art Clark, Region I |
| Robert Runyon, Region II | Mark Winter, Region II |
| Charles Jones, Region III | Jeff Dodd, Region III |
| Wade Knight, Region IV | George Shupp, Region V |
| Charles Ritchie, Region VI | Al Smith, Region VI |
| Jeff Wandke, Region VII | Rick Edmonds, Region VIII |
| Barbara Daboll, Region VIII | Kent Kitchingman, Region IX |
| Raleigh Farlow, Region X | Barry Towns, Region X |

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Martha G. Prothro
Deputy Assistant Administrator
Office of Water

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## *EXECUTIVE SUMMARY*

### *Introduction*

The quality and reliability of data used to implement water programs at the Federal, Regional, and State levels is critical to the success of EPA's water programs. Using data of inadequate quality or reliability creates the possibility of decision-making errors that lead to unnecessary compliance expenditures of many millions of dollars or in regulations that do not sufficiently protect public health or the environment. In recognition of the critical importance of data quality, the Office of Water (OW) and the Office of Research and Development (ORD) have cooperated in conducting a comprehensive laboratory performance evaluation (PE) study program since the 1970s.

Laboratory PE studies are one of a suite of tools used to ensure the quality of analytical data. PE studies are a relatively efficient and low cost way to determine whether laboratories have the technical capability to accurately analyze samples. PE studies involve laboratory analysis of samples which contain known concentrations of chemicals. The test samples are sent to laboratories in ampules which must be diluted to the appropriate volume, or as prepared samples for analysis using specified analytical methods. Laboratories report the qualitative and/or quantitative results of their analyses within a specified time period.

This report presents detailed qualitative and quantitative information concerning the uses of and needs for water laboratory PE studies at the Federal, Regional, and State levels. It reflects contributions from more than 75 staff and managers in Headquarters OW programs, Regional water programs the Regional Environmental Services Divisions, and QA representatives from state programs. The report is the first comprehensive compilation of descriptive information concerning water laboratory PE studies. As such, it will serve as a resource document for continuing efforts to identify and implement long and short term solutions to the problem of adequate funding for the water laboratory PE studies, improved administrative processes, and effective technical approaches.

*Background*

The joint OW/ORD water performance evaluation study program is summarized in Exhibit ES-1. The program consists of three principal studies:

1. The Water Supply (WS) study, involving 4000 to 5000 laboratories annually, which has chemistry, microbiology, and radiochemistry components and supports implementation of the Safe Drinking Water Act;

2. The Water Pollution (WP) study, involving approximately 5000 laboratories annually, which includes inorganic and organic analytes and tests laboratories' abilities to analyze for common surface water quality parameters and pollutants; and

3. The Discharge Monitoring Report Quality Assurance (DMRQA) study, distributed to more than 7500 permit holders annually, which has chemistry and whole effluent toxicity components and is used as one tool for ensuring the quality of monitoring data submitted by National Pollutant Discharge Elimination System (NPDES).

OW's Office of Science and Technology also conducts a laboratory PE study program in support of effluent guideline development. PE testing is conducted for a limited number of laboratories (nine laboratories were tested in FY 1992) that provide analytical services for special projects supporting effluent guideline development, evaluation, and revision.

In April of 1992, OW undertook a review of the laboratory performance evaluation (PE) studies conducted for water programs by the Environmental Monitoring Systems Laboratories in Cincinnati (EMSL-Ci) and Las Vegas (EMSL-LV) and by the OW Office of Science and Technology (Engineering and Analysis Division). This effort was designed to achieve five principal goals:

## *EXHIBIT ES-1*

## *WATER PERFORMANCE EVALUATION STUDIES*

| *STUDY* | *KEY PURPOSE* | *LEAD ORGANIZATION* |
|---|---|---|
| **Water Supply (WS)** | | |
| Chemistry | Drinking Water Certification | EMSL-Cincinnati |
| Microbiology | Drinking Water Certification | EMSL-Cincinnati |
| Radiochemistry | Drinking Water Certification | EMSL-Las Vegas |
| **Water Pollution (WP)** | Monitor performance of laboratories that generate ambient water quality monitoring data. | EMSL-Cincinnati |
| **Discharge Monitoring Report Quality Assurance (DMRQA)** | | |
| Chemistry | Monitor quality of chemistry data submitted by NPDES permittees in Discharge Monitoring Reports. | EMSL-Cincinnati |
| Toxicity Testing | Monitor quality of toxicity data submitted by NPDES permittees in Discharge Monitoring Reports. | EMSL-Cincinnati* |
| **Effluent Guidelines Quality Assurance** | Monitor performance of contract laboratories that analyze wastewater samples to support effluent guidelines development. | Analytical Methods Staff |

* The Office of Wastewater Enforcement and Compliance collaborates with EMSL-Cincinnati on study design and implementation.

1. Determine the importance of laboratory PE studies for water programs;

2. Identify current and future water program needs for laboratory PE studies;

3. Evaluate the administrative efficiency and technical adequacy of current water laboratory PE studies;

4. Determine current and future costs for water program laboratory PE studies; and

5. Identify options for funding water program laboratory PE studies in the future.

The study was conducted in response to concerns raised by the Environmental Monitoring Management Council (EMMC) as well as by OW and ORD. In 1991, EMMC conducted an initial examination of funding issues pertaining to laboratory PE studies conducted Agency-wide. EMMC and OW agreed that OW would serve as a pilot for a comprehensive Agency-wide review of current and future needs for laboratory PE studies and an evaluation of funding alternatives. As a pilot, the OW project examines only PE study needs for OW programs and alternatives for funding OW laboratory PE study needs in the future.

***The OW Project***

Data and information were gathered from six principal staff sources:

- EPA Headquarters OW,
- EPA Regional Water Management Divisions,

- EPA Regional Environmental Services Divisions (monitoring and quality assurance),
- Office of Research and Development (both at EPA Headquarters and the EMSL laboratories),
- Other EPA Program Offices at Headquarters, and
- Other Federal agencies.

The information collected focuses on uses and needs for PE studies in water programs, including those implemented under the Safe Drinking Water Act, the Clean Water Act, the Marine Protection, Research, and Sanctuaries Act, and other programs implemented by OW. Limited information was also collected on the extent to which the water PE studies are used by other environmental programs at the Federal, Regional, and State levels.

The results of this study reveal that the water laboratory PE studies are a critical component of quality assurance programs for data collection activities conducted in support of water programs at the National, Regional, and State levels. Because of the consistent quality, comprehensiveness, reliability, and availability of the water PE studies over the years, they are the most widely used environmental laboratory performance monitoring tool in the United States. The majority of study participants expressed a belief that OW laboratory PE studies constitute an important and cost-effective quality assurance tool for program planning, regulation development, water quality assessment, compliance assessment, and enforcement activities. They also support quality assurance for Regional and State ambient water quality monitoring and discharge permitting programs.

The Water Supply (WS) laboratory PE studies are an integral and mandatory component of EPA's Drinking Water Laboratory Certification Program required under the Safe Drinking Water Act. All but two states use the WS studies to certify laboratories for drinking water analysis. Many states use the WS results to certify environmental testing laboratories for other purposes as well. The Water Pollution laboratory PE studies are critical to NPDES, ambient water quality monitoring, and hazardous waste laboratory accreditation programs conducted by

the States. In some cases, State statutes and regulations include requirements for participation in the Water Pollution studies as a condition for laboratory accreditation. The results from the water laboratory PE studies conducted by EMSL-Ci and EMSL-LV are used not only to support water program quality assurance programs, but also to support many other types of Federal and State environmental programs (i.e., Resource Conservation and Recovery Act, State hazardous waste programs, other State programs and programs in the Departments of Defense and Energy).

***Current and Future Needs for Laboratory PE Studies***

The study shows that there are current unmet or potential needs for laboratory PE study data in nearly all OW programs.

Water Supply Studies

The Drinking Water Laboratory Certification Program will experience substantial new requirements for PE studies over the next two to five years as a result of proposed and anticipated regulatory changes. New monitoring requirements for dioxin and asbestos in drinking water will result in additions to the chemistry component of the WS studies in FY 1994. The WS radiochemistry component will require new studies to test performance in radon measurement in FY 1994 also. Additional regulations requiring increased monitoring of drinking water supplies for viruses (such as *Giardia*) and other waterborne pathogens (such as *Cryptosporidium*) will result in expansion of the microbiology studies in the next two years. As the drinking water program continues to develop over the next five years and additional standards are developed, proposed and promulgated, the scope and size of all three components of the WS studies are expected to continue to grow.

Water Pollution and DMRQA Studies

As emphasis shifts in wastewater and surface water monitoring towards biological indicators of ecosystem health and new programs for clean-up and control of contaminated sediment and sludge are implemented, laboratory PE materials and studies will have to shift to test laboratories' ability to measure a wide range of analytes in complex matrices. These matrices include fish and animal tissue, sediment, and sludge.

Laboratory PE materials are needed now or in the future for many additional environmental matrices including marine and estuarine water, wastewater, soil, sediment, sludge, and plant and animal tissue. Numerous chemical and biological analytes and tests, not presently included in water laboratory PE studies, will be needed in the next five years as a result of new requirements for monitoring of surface water discharges. For example, new emphasis on studying the sources of microbial drinking water contaminants found in surface water sources of drinking water may link surface water discharges to violations of drinking water standards. The linkages may result in imposition of microbiological monitoring requirements for NPDES permittees with a concurrent need for inclusion of microbial agents in the DMRQA PE studies. Needs such as these will cause the scope of both the DMRQA and the WP studies to grow and change.

*Findings: Efficiency of the Current Laboratory PE Studies*

The review identified numerous opportunities for achieving technical, administrative, and cost efficiencies in the water performance evaluation study program. They include the following:

- Reducing the scope of the current studies by making changes to the technical design (e.g., by reducing the numbers of analytes in each study);
- Combining the WP and DMRQA studies into one study designed to achieve the combined objectives of both;
- Combining the like components of all three studies into one set of chemistry, microbiology, radiological, and toxicity testing studies designed to meet all water program needs;
- Developing a system for distributing the DMRQA study test kits directly to the laboratories involved rather than to the more than 7000 permittees;
- Examining opportunities for improving the efficiency of the current studies by automating recordkeeping functions; and

- Investigating options for improving study timeliness by electronic transfer of study results.

As a result of this study, OW is examining each of these opportunities in FY 1994 to determine whether they represent potentially significant time and cost savings. In particular, in FY 1994, OW is forming a technical work group to examine opportunities for improving the studies and to develop an implementation plan. This effort will include examining options for combining current studies. Any decision to implement changes in the program must consider the potential impact on State programs and recommend an approach which allows adequate lead time.

*Findings: Current and Potential Program Costs*

As detailed in Exhibit ES-2, the water laboratory PE studies cost in excess of $2 million in FY 1993. The total resource requirement for the water PE studies in FY 1993 was $2.34 million in extramural expenditures and 16.12 FTE. Of this amount, the DMRQA studies account for the largest share of the extramural expenses ($1.17 million) and the WS studies account for the largest share of intramural resources (11.91 FTE). The total requirement represents an increase of 11 percent over FY 1992 levels, with the largest increase experienced in the WS chemistry study (25 percent). Because OW needs for laboratory PE study needs continue to grow, costs will continue to increase over the next decade. Exhibit ES-3 identifies major unmet current and projected future needs for new PE studies, changes in study size and scope, and changes in PE materials and matrices.

Data show that, although laboratory PE studies are considered mission critical by most OW, Environmental Services Division, and Office of Research and Development managers and staff interviewed, the allocated budget is not sufficient. ORD reprograms end-of-year dollars annually to cover budget shortfalls. Reliance on end-of-year funds jeopardizes the studies both from the standpoint of funding and technical adequacy. As a result, OW and ORD have maintained a minimal water PE study program that addresses only the most fundamental needs. In addition, needed expansions in the program have been postponed and needs currently exist that are not addressed by the present study designs. In fact, as costs have increased over time

## *EXHIBIT ES-2*

## *COST OF THE WATER PE STUDIES*

## *FY 1993*

| STUDY | FY 1993 $ | FY 1993 FTE |
|---|---|---|
| **WS Chemistry** | $493,400 | 4.22 |
| **WS Microbiology** | 260,900 | .91 |
| **WS Radiochemistry** | 0 | 6.78 |
| **WP** | 488,200 | 2.47 |
| **DMRQA Chemistry** | 681,300 | .89 |
| **DMRQA Toxicity Testing** | 339,600 | .85 |
| **Effluent Guidelines** | 80,000 | 0 |
| **TOTALS** | $2,343,400 | 16.12 |

# *EXHIBIT ES-3*

## *ADDITIONAL NEEDS FOR PE STUDIES*

## *OFFICE OF WATER PROGRAMS*

| STUDY NEEDS | |
|---|---|
| **CURRENT** | **FUTURE** |
| **New Analytes** | **New Analytes** |
| Dioxin (50 labs) Public Water Supply (PWS) Program *(OGWDW)* | Giardia (150-5000 labs) PWS Program *(OGWDW)* |
| Asbestos (130 labs) PWS Program *(OGWDW)* | Cryptosporidium (150-5000 labs) PWS Program *(OGWDW)* |
| Radon (250-300 labs) PWS Program *(OGWDW)* | Disinfectant By-products (25 additional analytes every 3 years for 2000 labs) PWS Program *(OGWDW)* |
| Priority Pollutants(DMRQA) *(OWEC & Criteria and Standards/OST)* | **New Matrices** |
| Selected Analytes based on the frequency of reporting in PCS (DMR monitoring, permits enforcement) *(OWEC)* | Biodiversity (106/305(b)) *(OWOW & OST)* |
| **Study Size** | Sludge (Section 503) *(OWEC)* |
| Microbiological (3000-5000 labs) PWS Program *(OGWDW)* | Sediment (DMRQA) *(OWEC (NEP, 403(c) and 319); OWOW & (re Water Resource Development Bill) OST)*<br>- Chemical<br>- Toxicity<br>304(h) |
| **New Matrices** | Tissue *(Criteria & Standards/OST and (NEP & Watershed Protection Approach) OWOW)*<br>• Fish (filet and liver)<br>• Macroinvertebrates<br>• Mammal<br>• Vegetation |
| Marine (NEP, 301(h) and 403(c)) *(OWOW)* | **Study Size** |
| Sediment (NEP, 403(c) and 319) *(OWOW)* | Expand to include Minors (DMRQA; GAO/IG Reports) *(OWEC)* |
| "Dirty Water" Matrices (Effluent Guideline Programs) *(OST)* and Ambient Monitoring Programs *(OWOW)* | **Study Design** |
| **Study Design** | Add alternate test methods for stormwater and sludge rules (DMRQA) *(OWEC)* |
| Increase the number concentrations available beyond 2 (DMRQA) *(OWEC)* | |
| Additional methods for Whole Effluent Toxicity (DMRQA) *(OWEC)*; (403(c), NEP and 319) *(OWOW)* | |
| Tissue (NEP, 106/305(b), and 304(h)) *(OWOW)*<br>- Fish<br>- Macroinvertebrate | |

and availability of year-end funding has decreased, changes in study design have been necessary. The program has actually eroded over time. Continued funding shortfalls may necessitate additional changes in study frequency or design. Such changes will have detrimental effects on State certification programs as well as EPA quality assurance and programmatic oversight activities.

The report emphasizes that finding short and long term funding approaches must be a top priority for OW and ORD during FY 1994 and beyond. Another key recommendation is that, in FY 1994, OW examine three long term funding options and make a commitment to implementing a long term funding strategy for laboratory PE studies, in conjunction with ORD and other EPA programs.

***Options for Funding Laboratory PE Studies***

The Agency's laboratory PE study needs in general and OW needs in particular, are growing rapidly. A reliable approach to funding is required to ensure that all program needs are met as efficiently and cost-effectively as possible and that costs are distributed equitably among EPA programs that are study users. The study recommends that funding issues and approaches be addressed at two levels: within OW and Agency-wide.

Funding Approaches for OW

The report recommends that the Office of Water work with the Office of Research and Development and the Environmental Monitoring Management Council (EMMC) to examine all possible alternatives for funding water performance evaluation studies and develop both a short term and long term approach to funding the water studies.

In the near term, OW should assume greater responsibility for funding the water laboratory PE studies until a permanent solution is implemented. There are two potential sources for additional funds: (1) OW can redirect program funds to the PE study program at the expense of other priorities and (2) the Assistant Administrator for Water can request that ORD

place a higher priority on funding the water PE studies at the expense of other water research priorities. ORD has suggested transferring the R&D base funding currently used to support the PE program to the OW AC&C base budget to support a permanent line item in the OW budget. OW should work with ORD to implement the transfer of resources. As part of this approach, OW will have to decide whether to continue to use ORD staff to design and administer the studies and analyze the results, have OW staff assume these responsibilities, or contract out the activities to a third party. This approach has numerous resource implications, including the possibility of transferring FTE from ORD to OW for purposes of administering the studies.

In addition to implementing strategies for securing additional funding for the water PE studies, OW will pursue alternatives for improving the efficiency of the current program, as recommended by the report. These include options for consolidating the studies and automating information management aspects of the studies.

For OW, one long-range funding option is to generate user fees to support the water laboratory PE study program. Currently there is no statutory authority for fees collected under such a program to return to EPA. OW is investigating the merit of fees and addressing issues pertaining to returning fees to the Agency during the reauthorization of the Clean Water Act and the Safe Drinking Water Act. Implementation of this option would be a 3 to 5 year process. In addition to obtaining statutory authority for collecting and retaining fees, OW would have to set up a fee structure and collection process. EPA would also have to allow the States several years to change their statutory and programmatic processes to accommodate the fee program.

Various alternatives also exist for funding laboratory PE studies through external sources. These options should be fully explored and considered. For example, the EMMC is in the third year of an effort that, if successful, will lead to establishment of a national program for environmental laboratory accreditation. This national accreditation program could be designed as EPA's sole source of laboratory PE materials and studies. The EMMC anticipates, however, that, once established, a national accreditation program would take at least 5 years to implement.

Agency-wide Approaches to Funding PE Studies

As a result of this pilot project, the Assistant Administrator for Water will recommend to ORD and the Administrator that an Agency-wide initiative on quality assurance and laboratory performance evaluation studies be undertaken. The initiative should identify budgetary and statutory alternatives for establishing a comprehensive quality assurance program within EPA, including a strong laboratory oversight component based on performance evaluation studies. Other EPA program offices should conduct studies similar to OW's to document needs for PE studies. The Agency-wide initiative on quality assurance should include a component to support laboratory PE studies, as part of the FY 1996 budget development process. The initiative should promote establishment of a permanent change in the Agency's budget development and formulation processes to ensure funding to support quality assurance, including laboratory PE studies. The QA budget appropriation could take the form of a centralized or decentralized Agency-wide tap on the budget, a request for an increase in the Agency's base budget, or a redirection of programmatic funds to provide sufficient funds for all of EPA's laboratory PE study requirements. Part of this effort would include determining whether AC&C or R&D dollars should be used to fund laboratory PE studies and other quality assurance activities and whether ORD or the program offices should have principal responsibility for providing the necessary staff support.

*Next Steps*

During FY 1994, the Office of Water and Office of Research and Development will work to develop a short term and long term funding approach for water laboratory PE studies. In addition, as a result of this study, OW is now working with EMMC and ORD to establish an Agency-wide work group to address common technical, programmatic, and funding issues associated with laboratory PE studies. The work group will examine opportunities for improving the efficiency of the existing water PE study program, such as combining the various studies into one or two studies designed to meet multiple program needs, and will develop an action plan for implementing program improvements.

*OFFICE OF WATER*

*PERFORMANCE EVALUATION STUDY PROJECT*

*Final Report*

## *I. BACKGROUND*

In April of 1992, the Office of Water undertook a review of the laboratory performance evaluation (PE) studies conducted for water programs by the Environmental Monitoring Systems Laboratories (EMSL) in Cincinnati and Las Vegas and by the Office of Science and Technology, Engineering and Analysis Division. The review was prompted by continuing funding shortages, reported by EMSL, and a recognition that available resources for quality assurance in general, and PE studies in particular, have been eroding over time. The goals of the study were to: (1) determine the current needs for PE studies within the Office of Water and uses by Regional and State programs; (2) anticipate changes in PE study needs in the next five years; and (3) develop options and recommendations to establish a permanent solution to the problem of funding PE studies in the future. The study was conducted in response to requests made by several OW Division Directors who recognized the importance of PE studies as a tool for ensuring the quality of monitoring data used to make program decisions.

### *The Importance of Quality Assurance*

Environmental monitoring data provide the basis for many of the policy, regulatory, and planning decisions made within the Office of Water and in water programs at the Regional and State levels. To ensure that monitoring data are of sufficient quality to support effective decision making, the Office of Water, with support from the Office of Research and Development, implements a quality assurance program, which includes a PE component. This program has

evolved to protect against deficiencies in data that could lead managers to make technical, regulatory, or policy decisions that fail to protect human health or the environment; use program funds inefficiently or incorrectly; take actions that create a negative public image for EPA; lead to lawsuits; or prompt Congressional inquiries.

The quality of monitoring data used in EPA programs has recently been an issue of concern to various Congressional and other oversight organizations. Audits and investigations by the General Accounting Office and the Inspector General have called into question various aspects of EPA's quality assurance programs. As a result, in FY 1993, the Agency has recommended that EPA's quality assurance program documentation be declared a weakness at the Presidential level under the Federal Managers' Financial Integrity Act (FMFIA). This action underscores the importance of quality assurance and data integrity to water programs.

### *Laboratory Performance Evaluation Studies*

Laboratory performance evaluation (PE) studies are one of a suite of tools used for ensuring the quality of analytical data. PE studies are a relatively efficient and low cost tool for testing whether laboratories have the equipment and technical ability to accurately analyze samples. PE studies may be designed as "single blind" or "double blind" studies. In single blind studies, laboratories analyze samples identified as PE samples containing concentrations of analytes known to the study designer but not known to the laboratory. Double blind studies involve submitting PE samples disguised as real samples to the laboratory so that the identity of the sample and its composition are unknown to the laboratory.

PE studies involve analysis of solutions of known concentrations of analytes. The solutions are sent to laboratories, in the form of ampules which must be diluted to the appropriate volume or as prepared samples, for analysis using specified analytical methods. Laboratories report back the qualitative and/or quantitative results of their analyses within a specified time period. The water PE studies are designed to be "single blind" or quantitative challenge studies. Laboratories know that the solutions they receive are performance evaluation

samples and they know the identity of the analyte groups in the solutions. They must determine only the quantitative concentrations of the analytes using specified analytical methods. The results are scored against performance criteria that are statistically or empirically based.

PE studies do not provide a continuous indication of laboratory performance over time, measure the quality of particular data sets generated by a laboratory, or prevent laboratory fraud. However, PE study results are valuable as an indicator of basic laboratory capability and competency. An accurate assessment of the value of PE studies cannot be conducted in an independent, stand alone context. The value of PE studies is most effectively demonstrated as a basic component in the framework of an overall program for assuring the quality of environmental measurements.

The Office of Water PE studies support planning, regulation development, assessment, compliance, and enforcement activities of the Drinking Water Program, Office of Wastewater Enforcement and Compliance, and the Office of Science and Technology. The PE studies also support EPA Regional and State ambient water quality programs under: Clean Water Act sections 106, 205 (g and j), 305(b), 314, 319; and Federal programs such as the National Estuary Program, the Ocean Dumping Program, and the Effluent Guidelines Program. Regional staff indicate that Water PE studies are used to support RCRA, CERCLA and other State programs. Exhibits B-4 through B-13 of Appendix B provide a detailed profile of the types of programs, at the State level, that utilize the results of the water PE studies. Appendix B also indicates the types of program decisions supported by PE study results at the State level.

Office of Water PE studies support methods development for the Office of Research and Development. They support water quality monitoring programs and provide laboratory performance evaluation information for programs at the Regional and State levels. Exhibit 1 identifies the different PE studies conducted each year, their principal purposes, and the organization within EPA that has lead responsibility for executing each study.

## *EXHIBIT 1*

## *WATER PERFORMANCE EVALUATION STUDIES*

| *STUDY* | *KEY PURPOSE* | *LEAD ORGANIZATION* |
|---|---|---|
| **Water Supply (WS)** | | |
| Chemistry | Drinking Water Certification | EMSL-Cincinnati |
| Microbiology | Drinking Water Certification | EMSL-Cincinnati |
| Radiochemistry | Drinking Water Certification | EMSL-Las Vegas |
| **Water Pollution (WP)** | Monitor performance of laboratories that generate ambient water quality monitoring data. | EMSL-Cincinnati |
| **Discharge Monitoring Report Quality Assurance (DMRQA)** | | |
| Chemistry | Monitor quality of chemistry data submitted by NPDES permittees in Discharge Monitoring Reports. | EMSL-Cincinnati |
| Toxicity Testing | Monitor quality of toxicity data submitted by NPDES permittees in Discharge Monitoring Reports. | EMSL-Cincinnati* |
| **Effluent Guidelines Quality Assurance** | Monitor performance of contract laboratories that analyze wastewater samples to support effluent guidelines development. | Analytical Methods Staff |

* The Office of Wastewater Enforcement and Compliance collaborates with EMSL-Cincinnati on study design and implementation.

### *Study Goals and Approach*

The Office of Water Performance Evaluation Study project was designed to achieve three principal goals:

1. Determine the importance of performance evaluation studies for water programs as indicated by participation in the studies and use of the study results.

2. Evaluate the efficiency of current performance evaluation studies.

3. Determine current and potential costs and identify funding mechanisms for performance evaluation studies.

To achieve these goals, data and information were gathered from seven principal sources: EPA Headquarters Office of Water, EPA Regional Water Management Divisions, EPA Regional Environmental Services Divisions (monitoring and quality assurance staffs), State water and quality assurance programs, the Office of Research and Development (both at EPA Headquarters and the EMSL laboratories), other EPA Program Offices at Headquarters, and other Federal agencies. The study involved three principal data collection steps: (1) a survey of performance evaluation study users, conducted with the assistance of the Regional Quality Assurance Managers, (2) interviews with staff at EPA Headquarters and at other Federal agencies that use or conduct laboratory performance evaluation studies, and (3) interviews with staff at the Environmental Monitoring Systems Laboratories (EMSL) in Cincinnati and Las Vegas.

## *II. PE STUDY USES AND NEEDS*

The results of PE studies (i.e., whether a laboratory is successful in identifying and quantifying the analytes of concern) are used in a number of ways by Headquarters, Regional, and State water programs, other EPA Regional and State environmental programs such as RCRA and State Hazardous Material Programs, and by the Office of Research and Development. They

are also useful to the laboratories themselves, as a method for identifying and correcting potential performance problems and as a tool for demonstrating their capability to prospective clients. Exhibit 2 identifies users of PE study data and summarizes their principal uses. Appendix B provides a summary of data collected through a survey of water PE study users at the Regional level. Each of the ten Regional Quality Assurance Managers collected quantitative and qualitative information concerning uses of PE study results within their Region. Information sources consulted included Regional Water Management Division staff (including the Discharge Monitoring Report Quality Assurance (DMRQA) Coordinators, Water Quality Monitoring Coordinators, Regional Environmental Services Division (ESD) laboratory directors, and State environmental and laboratory certification program representatives.

The survey requested information concerning:

- Numbers of laboratories in each Region participating in the water PE studies and their purpose for participating;
- The types of Regional and State programs that use the results of the water PE studies;
- Regional and State practices concerning the number of times per year that laboratories are requested or required to participated in the water PE studies;
- The types of program decisions supported at the Regional and State levels by the results from water PE studies;
- The adequacy of the current water PE studies for meeting Regional and State program needs;
- Additional analytes and matrices for which PE materials and studies will be needed in the future;
- States that have statutes or regulations requiring the use of the water PE studies; and

*EXHIBIT 2*

*WATER PE STUDY CLIENTS AND THEIR USES FOR PE STUDY DATA*

| STUDY | CLIENTS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HEADQUARTERS | | | | REGIONS | | | ORD | | STATES |
| | OGWDW | OWOW | OWEC | OST | ESD | LAB | WDD | CIN | LV | |
| WS Chem | 1.Standard setting/ modification<br>2.Rule making/ modification<br>3.Oversee programs | | | | 1.Certify Prog. - DW<br>2.Targeting Lab Audits<br>3.Oversee State programs | 1.Certification<br>2.QA Tool | | 1.Validate Methods<br>2.Oversee & Support Regional Programs | | 1.Certification Prog. - DW<br>-Wastewater (minor)<br>-State Ambient Monit. (minor)<br>-RCRA (minor)<br>2.Method Performance<br>3.Lab Audit<br>4.Lab Training |
| WS Micro | 1.Standard setting/ modification<br>2.Rule making/ modification<br>3.Oversee programs | | | | 1.Certify Prog. - DW<br>2.Oversee State programs | 1.Certification<br>2.QA Tool | | 1.Validate Methods<br>2.Oversee & Support Regional Programs | | 1.Certification Prog. - DW<br>-Wastewater<br>-State Ambient Monitoring<br>2.Method Performance<br>3.Lab Improvement<br>4.Lab Audit<br>5.Lab Training |
| WS RAD | 1.Standard setting<br>2.Rule making | | | | 1.Certify Orig. - DW<br>2.Targeting Lab Audits<br>3.Oversee State programs | 1.Certification<br>2.QA Tool | | | 1.Validate Methods<br>2.Oversee & Support Regional Programs<br>3.Certif. Program-DW | 1.Certification Prog. - DW<br>-Wastewater<br>-Ambient Monitoring<br>2.Method Performance<br>3.Lab Improvement<br>4.Lab Audit<br>5.Lab Training |
| WP | | | | | 1.Certify State ambient monitoring labs<br>2.Verify lab capability to participate in RCRA/Superfund Programs | 1.Performance Eval.<br>2.QA & QC | | 1.Validate Methods<br>2.Oversee & Support Regional Programs | | 1.Certification Programs<br>-Wastewater permitting/ enforcement (incl. minors)<br>-State Ambient Monitoring<br>-RCRA<br>-State HAZMAT/Superfund<br>2.Across the board use for enforcement, lab audits, method development, improve lab performance |
| DMRQA Chemical & Whole Effluent Toxicity | | | 1.Enforcement Support<br>2.Evaluation of Data Integrity (QA) | | 1.Enforcement Support<br>2.Targeting Lab Audits<br>3.Evaluation of Data Integrity<br>4.Improving Lab Performance | 1.QA Tool | 1.Enforcement<br>2.Lab Audits | 1.Validate Methods | | 1.Lab Audits<br>2.Method Performance<br>3.Enforcement Support<br>4.Lab Certification (1/3 of respondents)<br>5.Improve Lab Performance |
| Effluent Guidelines | | | 1.Rule making/ modification | Evaluate Contract Labs | | | | | | |

WS = Water Supply
WP = Water Pollution
RAD = Radiological
DMR = Discharge Monitoring Report

- Regional processes for managing participation in the water PE studies by State and other laboratories.

The information collected through the survey is displayed in a series of summary tables and graphics in Appendix B. These tables form the basis for conclusions regarding current uses of PE study data and support the analysis of current and future PE study needs.

### *Current Uses of PE Study Data*

#### Overview

The principal use for the Water Supply (WS) and Water Pollution (WP) PE studies is laboratory evaluation, accreditation or certification. States use the EPA water PE studies for this purpose, because they are widely available, reliable, cover a wide range of regulated analytes, and aid reciprocity among States. PE studies for laboratories are critical to EPA because they are the only standard and unbiased tool we have available nationally to measure laboratory capability for EPA-regulated analytes.

#### State Use

In order for a State to receive primacy for the State drinking water program they must meet a national certification requirement. Successful completion of one PE study per year for each analyte certified (the Water Supply PE study) is required for laboratories to be granted certification under the program. In addition, certified laboratories must pass an on-site audit conducted by State auditors at least once every three years. Nearly all States hold primacy for the Safe Drinking Water Act program and consequently, operate the required Drinking Water Certification Program. All but two primacy States (New York and Illinois) use the EPA Water Supply PE Study for laboratory certification, identifying laboratories with performance problems, and targeting auditing priorities. New York and Illinois have their own PE study programs. The analytes and ranges covered by these State programs are virtually identical to those available

through EMSL-Cincinnati.

State certification programs also constitute the single most important user community for the WP studies. Exhibits B-9, B-10, and B-11 in Appendix B show that almost half of the States use the Water Pollution (WP) Studies to certify laboratories analyzing samples for the National Pollutant Discharge Elimination System Program and the State Ambient Water Quality Monitoring Program. The Regional Quality Assurance Managers reported that discontinuing or decreasing the frequency of the WP studies would have a significant detrimental effect on state programs. Another 10 States use the Discharge Monitoring Report Quality Assurance (DMRQA) PE study to certify laboratories analyzing samples for the National Pollutant Discharge Elimination System (NPDES) Program. Many States not using the Water Pollution or DMRQA studies for certification use the studies to identify laboratories with performance problems and to set priorities for laboratory audits.

Exhibits B-8, B-11, and B-26 through B-30 of Appendix B show that approximately 40 States currently operate environmental laboratory certification programs for analyses conducted pursuant to environmental regulations and programs other than those generated for the Public Water Supply Program, NPDES permitting, and ambient water quality monitoring (i.e., programs administered under authority of the Clean Air Act, Resource Conservation and Recovery Act, and Superfund). Many of the analytes included in water PE studies are also of concern to other programs. Moreover, the water PE studies are widely used in the commercial and government laboratory communities. Other EPA programs have not developed, or are just now developing, appropriate PE samples and studies to support their performance evaluation needs. Consequently, the results from the WS, WP and the DMRQA are also used as the best available tool for purposes of making certification decisions, for other environmental programs.

EPA Regions

At the EPA Regional level, water PE studies are used for several purposes. The Regional ESD laboratories participate in the Water Supply PE Study to monitor their own performance

and maintain drinking water certification. Drinking Water Certification Officers monitor the performance of State principal laboratories and use PE study data to grant or revoke their certifications. In cases where the States do not have primacy, EPA Regional Drinking Water Certification Officers certify commercial and municipal drinking water laboratories located in the State. Results from Water Supply PE Studies are also used to set priorities for on-site audits.

ESD laboratories participate in Water Pollution PE Studies to monitor their own performance and so that they can evaluate the performance of State principal laboratories for ambient and wastewater monitoring under the Clean Water Act. Study results are used to assess ambient and wastewater methods for program grant requirements.

Regional DMRQA coordinators use the results from the DMRQA PE Studies to identify laboratories with potential performance problems. The results are also used to set priorities for conducting Performance Audit Inspections for NPDES permittees and enforcement actions.

ORD Laboratories

The EMSL laboratories use PE study results in evaluating national laboratory performance data, defining training needs, developing interlaboratory methods performance, and method validation information/acceptance criteria. Other ORD laboratories request PE studies on an as needed basis for quality assurance associated with special in-house projects and to evaluate the performance of contract and grantee laboratories. The EMSL-Las Vegas laboratory operates the drinking water certification program for radiochemistry and conducts the WS Radiochemistry studies. EMSL-Las Vegas uses the WS Radiochemistry results to grant or revoke drinking water certification for radiochemistry analytes.

EPA Headquarters

Office of Water Headquarters programs also use PE study data. Results from the WS

studies are used in setting Maximum Contaminant Levels (MCLs) for drinking water, particularly for carcinogens where the MCL must be set as close to zero as is practically possible. Performance evaluation studies conducted by the Office of Science and Technology as part of the Effluent Guidelines Quality Assurance Program are designed specifically to monitor the performance of contract laboratories that supply data for development of effluent guidelines. Although the results of the WP studies are not used by Headquarters program presently, OWOW recognizes the important role of the studies as a tool for overseeing the quality of data entered into STORET. OWOW is investigating approaches to making more direct use of the WP studies in the ambient water quality monitoring program at the national level.

The DMRQA chemistry and toxicity testing PE studies are designed specifically for Office of Wastewater Enforcement and Compliance. The data generated are entered into the Permit Compliance System (PCS) data base and support program planning and compliance activities.

***Current and Future PE Study Needs***

There are potential applications for PE study data in nearly all Office of Water programs. Interviews with program staff identified numerous areas where new monitoring programs or requirements are in development. As emphasis in monitoring shifts toward biological indicators of ecosystem health and new programs for clean-up and control of contaminated sediment and sludge are implemented, there will be needs for PE materials and studies that test laboratories' ability to measure a wide range of analytes in more complex matrices, such as fish and animal tissue, sediment, and sludge and other new biological PE needs. Exhibits 3, 4 and 5 summarize needs for additional PE studies.

In general, needs for new PE study materials or analytes derive from statutory requirements for new monitoring programs or requirements. Following passage of the 1987 amendments to the Clean Water Act, for example, OW began to design national programs in

# *EXHIBIT 3*

## *ADDITIONAL NEEDS FOR PE STUDIES*

## *OFFICE OF WATER PROGRAMS*

| STUDY NEEDS | |
|---|---|
| **CURRENT** | **FUTURE** |
| **<u>New Analytes</u>**<br><br>Dioxin (50 labs) Public Water Supply (PWS) Program *(OGWDW)*<br><br>Asbestos (130 labs) PWS Program *(OGWDW)*<br><br>Radon (250-300 labs) PWS Program *(OGWDW)*<br><br>Priority Pollutants(DMRQA) *(OWEC & Criteria and Standards/OST)*<br><br>Selected Analytes based on the frequency of reporting in PCS (DMR monitoring, permits enforcement) *(OWEC)*<br><br>**<u>Study Size</u>**<br><br>Microbiological (3000-5000 labs) PWS Program *(OGWDW)*<br><br>**<u>New Matrices</u>**<br><br>Marine (NEP, 301(h) and 403(c)) *(OWOW)*<br><br>Sediment (NEP, 403(c) and 319) *(OWOW)*<br><br>"Dirty Water" Matrices (Effluent Guideline Programs) *(OST)* and Ambient Monitoring Programs *(OWOW)*<br><br>**<u>Study Design</u>**<br><br>Increase the number concentrations available beyond 2 (DMRQA) *(OWEC)*<br><br>Additional methods for Whole Effluent Toxicity (DMRQA) *(OWEC)*; (403(c), NEP and 319) *(OWOW)*<br><br>Tissue (NEP, 106/305(b), and 304(h)) *(OWOW)*<br>- Fish<br>- Macroinvertebrate | **<u>New Analytes</u>**<br><br>Giardia (150-5000 labs) PWS Program *(OGWDW)*<br><br>Cryptosporidium (150-5000 labs) PWS Program *(OGWDW)*<br><br>Disinfectant By-products (25 additional analytes every 3 years for 2000 labs) PWS Program *(OGWDW)*<br><br>**<u>New Matrices</u>**<br><br>Biodiversity (106/305(b)) *(OWOW & OST)*<br><br>Sludge (Section 503) *(OWEC)*<br><br>Sediment (DMRQA) *(OWEC (NEP, 403(c) and 319); OWOW & (re Water Resource Development Bill) OST)*<br>- Chemical<br>- Toxicity<br>304(h)<br><br>Tissue *(Criteria & Standards/OST and (NEP & Watershed Protection Approach) OWOW)*<br>• Fish (filet and liver)<br>• Macroinvertebrates<br>• Mammal<br>• Vegetation<br><br>**<u>Study Size</u>**<br><br>Expand to include Minors (DMRQA; GAO/IG Reports) *(OWEC)*<br><br>**<u>Study Design</u>**<br><br>Add alternate test methods for stormwater and sludge rules (DMRQA) *(OWEC)* |

## *EXHIBIT 4*

## *ADDITIONAL NEEDS FOR PE STUDIES IDENTIFIED BY EPA Regions and States*

| MATRICES | ANALYTES |
|---|---|
| Marine | Not specified |
| Estuarine water | Not specified |
| Wastewater | Not specified |
| Soil, Sediment and Sludge | PCBs<br>Total metals<br>BTex and other hydrocarbons |
| Waste oil | Metals<br>Total hydrocarbons |
| Flammable waste | Flash point |
| Microbiologicals | *Giardia*<br>*Cryptosporidium*<br>*Legionella*<br>*Viruses* |
| Tissue:<br><br>- Fish (filets and livers)<br>- Invertebrates<br>- Mammals<br>- Plankton | Trace metals<br>Organics<br>Pesticides<br>Herbicides |
| Biological materials (vertebrate) | Not specified |

## *EXHIBIT 5*

## *ADDITIONAL NEEDS FOR PE STUDIES IDENTIFIED BY EPA Regions and States*

### *Analytes in Reagent Water Matrix*

| WATER POLLUTION (WP) | WATER SUPPLY (WS) | DISCHARGE MONITORING REPORT QA (DMRQA) |
|---|---|---|
| Furans<br>Herbicides<br>Barium<br>Polynuclear Aromatic Hydrocarbons (PAH)<br>Phthalate Esters<br>Radiochemistry<br>Chlorophyll<br>Noble Metals | PCBs<br>Asbestos<br>Dioxin<br>Radon<br>Iron<br>Zinc<br>Aluminum<br>Manganese<br>Chloride<br>Phosphate<br>BNAs<br>Color<br>Odor<br>Foaming Agents | Organics |

areas such as contaminated sediments and sludge. In general, following promulgation of rules or guidance establishing the national program, States incorporate the changes and, as permits expire and are reissued, the new monitoring requirements are incorporated and the need for laboratory oversight in the form of PE studies is realized. Because a period of years elapses before new monitoring requirements begin to be incorporated into permits, many of the future needs for PE materials cited by Office of Water staff could not be quantified. In order to fully understand the extent to which new monitoring requirements will generate demand for PE studies and contribute to expanding PE study costs, a quantitative predictive model or other tool may be needed.

*Water Supply*

The most immediate needs for new PE materials and analytes derive from recent and planned additions to drinking water regulations. PE studies for asbestos, dioxin, disinfection by-products, and radon will be needed during FY 1993 and FY 1994. In addition, the Safe Drinking Water Act Amendments require that MCLs be promulgated for 25 new contaminants every three years. As standards are developed and promulgated, the WS studies will need to be expanded.

Presently, the WS Chemistry study includes both regulated and unregulated analytes. Unregulated analytes are those for which MCLs are proposed or expected to be proposed in the future. Such analytes are included in the study in order to generate data to support development and validation of analytical methods. Analyses for unregulated analytes are not mandatory for certification. In order to maintain the WS as a source of method validation data, expansion of the study to account for planned MCLs will need to occur one to two years in advance of final rulemakings.

OGWDW staff and representatives from EMSL-Cincinnati, the Regions and the States also reported a need for expanding the number of laboratories included in the WS Microbiology studies for total and fecal coliform bacteria. The study is now distributed to the EPA Regional

and State principal laboratories (approximately 250 laboratories). Local laboratories, which number between 3,000 and 5,000 and include municipal, utility-owned, and commercial laboratories, are not now included in the study. Several States reported that they require local laboratories seeking certification for microbiological analytes to purchase and analyze microbiological PE materials from commercial sources. New York and Iowa reported that they manufacture and distribute their own PE materials for this purpose. The Regional Quality Assurance Managers noted that the importance of microbiological parameters from a public health standpoint makes this aspect of the program important. They recommended that the Office of Water and EMSL-Cincinnati take steps to expand the WS Microbiology study to include local laboratories in the future.

### *Discharge Monitoring Report Quality Assurance (DMRQA)*

The most recent DMRQA PE study contained 15 metals, 5 nutrients, and 10 other water chemistry analytes. OWEC and EMSL-Cincinnati representatives both noted that emphasis on toxic organic pollutants, particularly the primary pollutants, in permit monitoring requirements is increasing. Consequently, they recommended that the DMRQA chemistry study be expanded in the future to cover toxic organic analytes. The shift from technology-based effluent limits to water quality-based effluent limits creates a need to provide PE samples with lower concentrations of analytes currently included as well as to expand coverage to new analytes.

The DMRQA toxicity testing PE study is a relatively new study which is still in development. In FY 1992, the study tested only a portion of the toxicity testing methods presently in use by the regulated community. Both OWEC and EMSL-Cincinnati staff noted that considerable additional work will be needed to expand the studies to address additional methods presently allowed in NPDES permits.

## *III. SCOPE AND COST OF THE CURRENT PE STUDY PROGRAM*

In FY 1992, the water PE studies cost an estimated $2.63 million. Exhibit 6 provides

## *EXHIBIT 6*

## *SIZE, SCOPE AND COST OF WATER PE STUDIES*

## *FY 1992*

| *STUDY PER YEAR* | *NO. LABS PER YEAR ANNUAL COST* | *NO. ANALYTES* | *NO. AMPULES* |
|---|---|---|---|
| WS Chemistry | 4000 | 196 | 116,000 |
| | $395K | | |
| WS Microbiology | 520 | 4 | 7,800 |
| | $244K | | |
| WS Radiochemistry | 355 | 33 | 4,500* |
| | $516K** | | |
| WP | 5000 | 152 | 190,000 |
| | $456K | | |
| DMRQA Chemistry | 7500*** | 30 | 75,000 |
| | $637K | | |
| DMRQA Toxicity Testing | 800 | 16‡ | 400 |
| | $295K | | |
| Effluent Guidelines | 9 | NA | NA |
| | $ 83K | | |
| TOTAL | $2.63M | | |

* WS Radiochemistry study uses cubitainers rather than ampules.

** Based on an average cost of $76,106 per FTE (for 6.78 FTE). This average dollar value includes labor and other program costs that are not tracked independently, such as shipping, stockroom supplies, word processing, graphics support, copying and mailing.

*** For DMRQA Chemistry, test kits are distributed to permittees rather than to laboratories.

‡ For DMRQA Toxicity Testing Study, laboratories measure the toxicity of only one analyte using only one of 16 possible test methods.

a summary of total costs for each of the studies. More detailed FY 1992 cost data, for the studies conducted by EMSL-Cincinnati and by EMSL-Las Vegas, are provided in Appendix C. Exhibit 7 summarizes FY 1992 costs (in dollars and FTE) and provides an estimate of FY 1993 costs for each study, broken out by study phase. The largest projected increase in cost (25 percent) is expected to be for WS Chemistry. This increase is attributable to the increased number of analytes in the study, in response to expanded regulations, as discussed previously. The DMRQA Toxicity Testing study is expected to experience a 15 percent increase in costs in FY 1993. This increase is also attributable to inflation and changes in the study. Other studies will experience smaller cost increases attributable to inflation.

Exhibit 8 shows the funds available in FY 1992 and FY 1993 to EMSL-Cincinnati for conducting the WS Chemistry and Microbiology, the WP, and the DMRQA studies and compares the percent change in funding to the projected increase in funding requirements. In all cases, funds available in FY 1993 are expected to be less than funds available in FY 1992. As stated previously, the largest increase in needs will be for the WS Chemistry and the DMRQA Toxicity Testing studies.

Exhibits 9 and 10 provide estimates of costs associated with the principal new needs for PE studies identified by Headquarters staff during interviews. Exhibit 9 shows those that can be quantified based on available information, all of which will become critical in FY 1994. Exhibit 10 provides cost estimates for needs that will be realized in approximately FY 1998 or later. Information concerning the scope and extent of the needs shown in Exhibit 10 was not available. Consequently, projected costs could not be accurately quantified.

### *Opportunities for Achieving Cost Efficiencies*

Throughout the information collection phase of the project, representatives from OW programs, EMSL-Cincinnati, EMSL-Las Vegas, and the Regions made numerous suggestions for changing the PE studies in order to make them more efficient and/or cost-effective. Interviewees also suggested that options for covering the cost of PE studies through external

## *EXHIBIT 7*

## *SUMMARY OF FY 1992 AND ESTIMATED FY 1993 COSTS BY STUDY (DOLLARS AND FTE)*

| Study Phase | WS Chem | | WS Micro | | WS Rad | | WP | | DMRQA Chem | | DMRQA Tox | | Effluent Guidelines | | Total Cost | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FY92 | FY93 | FY92 | FY93 | FY92 | FY93 | FY92 | FY93 | FY92 | FY93 | FY92 | FY93 | FY92 | FY93 | FY92 | FY93 |
| Planning | 22,400 (.83) | 28,000 (.83) | 66,000 (.15) | 70,500 (.15) | 0.0 (1.38) | 0.0 (1.38) | 31,100 (.37) | 33,300 (.37) | 66,000 (.14) | 70,800 (.14) | 181,400 (.56) | 209,000 (.56) | 16,000 * | 17,000 * | 382,900 (3.43) | 428,400 (3.43) |
| Production & Distribution | 327,600 (2.4) | 409,400 (2.4) | 139,100 (.6) | 148,800 (.6) | 33,200 (2.88) | 22,000 (2.88) | 366,800 (1.15) | 392,400 (1.15) | 275,000 (.6) | 294,200 (.6) | 81,900 (.15) | 94,100 (.15) | 47,000 * | 45,000 * | 1,237,400 (7.78) | 1,383,900 (7.78) |
| Analysis & Results | 44,800 (.99) | 56,000 (.99) | 39,200 (.16) | 41,600 (.16) | 20,000 (2.52) | 20,000 (2.52) | 58,400 (.95) | 62,500 (.95) | 295,900 (.15) | 316,500 (.15) | 31,700 (.14) | 36,500 (.14) | 20,000 * | 18,000 * | 490,000 (4.91) | 531,000 (4.91) |
| Totals | 394,800 (4.22) | 493,400 (4.22) | 244,300 (.91) | 260,900 (.91) | 53,200 (6.78) | 42,000 (6.78) | 456,300 (2.47) | 488,200 (2.47) | 636,900 (.85) | 681,300 (.89) | 295,000 (.85) | 339,600 (.85) | 83,000 * | 80,000 * | 2.11M (16.12) | 2.34M (16.12) |
| % Change (92 to 93) | 25% | | 7% | | -21% | | 7% | | 7% | | 16% | | -4% | | 11% | |

OST supports this activity with extramural funds only.

## *EXHIBIT 8*

## *COMPARISON OF FY 1992 AND FY 1993 FUNDS AVAILABLE AND FUNDS NEEDED (DOLLARS)*

| *STUDY* | *FY 1992 FUNDS AVAILABLE EMSL* | *FY 1993 FUNDS AVAILABLE EMSL* | *PERCENT CHANGE IN AVAILABLE FUNDING* | *PERCENT CHANGE IN FUNDING NEEDS (FROM EXHIBIT 7)* |
|---|---|---|---|---|
| WS Chemistry | $173.3K | $143.3K | -17% | +25% |
| WS Microbiology | 0 | 0 | 0 | + 7 |
| WS Radiochemistry* | $516K | unknown | unknown | unknown |
| WP | 206.7 | 104.6 | -49 | + 7 |
| DMRQA Chemistry<br>ORD<br>OW | <br>100.5<br>330.0 | <br>93.4<br>240.0 | <br>- 9<br>-27 | <br><br>+15 |
| DMRQA Toxicity Testing<br>ORD<br>OW | 0 | 0<br>125.0 | 0<br>-17 | <br><br>0 |

* Data for WS Radiochemistry based on 6.78 FTE and an average cost of $76,106 per FTE, derived from FY 1992 data. The cost for FY 1993 FTE is not yet known. EMSL-LV will dedicate the same level of resources to the WS Radiochemistry studies in FY 1993 as was used in FY 1992.

***EXHIBIT 9***

***ESTIMATED COSTS FOR MEETING***
***NEAR-TERM WATER PROGRAM PE NEEDS***
***FY 1994***

| ***EST. TIME FRAME*** | ***PROGRAM/NEED*** | ***EST. ANNUAL COST*** |
|---|---|---|
| FY 1994 | Drinking Water/Asbestos | $ 50,000 - $150,000 |
| FY 1994 | Drinking Water/Dioxin | $ 60,000 - $100,000 |
| FY 1994 | Drinking Water/Micro Expansion | $240,000 - $350,000 |
| FY 1994 | Drinking Water/Radon | $250,000 - $400,000 |
| | | $519,000 - $1,050,000 |

***EXHIBIT 10***

***ESTIMATED COSTS FOR MEETING***

***LONG-TERM WATER PROGRAM PE STUDY NEEDS***

| ***EST. TIME FRAME*** | ***PROGRAM/NEED*** | ***EST. ANNUAL COST*** |
|---|---|---|
| FY 1998 | Metals in Sludge | $450,000 - $650,000 |
| FY 1998 | Sediment Chemistry | >$500,000 |
| FY 1998 | Sediment Toxicity | Unquantified |
| FY 1998 | Biodiversity | Unquantified |
| Undetermined | Pathogens in Sludge and Drinking Water | Unquantified |

sources (e.g., through user fee systems similar to those used by State laboratory certification programs) should also be investigated. Many also noted a link between the PE studies and the Environmental Monitoring Management Council (EMMC) initiative on national laboratory accreditation. Incorporating OW's PE study requirements into a national environmental laboratory accreditation program would also be an option for covering the PE study costs through external sources. A summary listing of the design, administration and funding issues identified during the project appears in Appendix D.

Regarding the WS Chemistry study, EMSL-Cincinnati representatives made two principal suggestions for reducing study costs: (1) reducing the number of analytes tested in each study and (2) reducing the frequency of the study from twice each year to once annually. Reducing the number of analytes in the study could be used to make the study both a qualitative challenge and a quantitative challenge to laboratories, if the identity of the analytes included in the study were unknown to laboratories. Laboratories would then be required to determine which of the regulated analytes appear in the ampules and make a quantitative determination of the concentration for each analyte.

The qualitative challenge aspect of the study design would have the further advantage of improving the extent to which the study tests laboratory capability. Presently, for the most part, laboratories know which regulated analytes are present in each of the ampules for a study. They need only determine the quantitative concentrations. If the study were changed to be a qualitative challenge also, laboratories would still need to run the full set of analytical methods to determine which analytes are and are not present. Adding the qualitative challenge aspect would require a re-examination of the requirements for drinking water certification, however, since certification is now dependent on passing the quantitative challenge samples for each analyte.

It is not clear that making the WS Chemistry study a qualitative and quantitative challenge would result in significant cost savings. Such a change would reduce the number of analytes tested and could potentially reduce the number of ampules manufactured and distributed

for each study. The data returned to EMSL-Cincinnati by the laboratories would also change and modifications to data reporting sheets and the scoring process would be needed.

EMSL-Cincinnati has given consideration to reducing the frequency of the WS study in recent years. Presently, most States and Regions require that laboratories participate in the first study of each year to maintain certification. Laboratories participate in the second study if they did not participate in the first study or if they fail to meet any of the performance criteria in the first study. Only those analytes missed in the first study are required to be analyzed in the second. Subsequent failure for the same analytes in the second study can result in a laboratory losing its drinking water certification. Decreasing the frequency of the WS study would have the effect of requiring laboratories to wait for a full year before having the opportunity to demonstrate proficiency on analytes missed in a particular study. States and Regions would need to develop revised certification policies and requirements if the frequency were changed. However, reducing the WS to one study per year would result in a significant cost savings.

Two principal opportunities for increasing the cost-effectiveness of the DMRQA Chemistry study were cited by Office of Water and EMSL representatives: (1) combining the WP and the DMRQA Chemistry study into one study designed to meet both wastewater and ambient water monitoring needs; and (2) developing a system for requiring NPDES permittees to designate laboratories for receipt of their PE study test kits as an alternative to the present system which distributes test kits to all designated permittees. The potential for combining the WP and DMRQA Chemistry studies has been examined previously by a technical work group of OW, ORD, and Regional representatives. The most often-cited barrier to combining the two studies is that the concentration ranges of interest to the two programs (ambient water quality monitoring and NPDES) are significantly different. A comparison of the analytes and concentrations tested in the two studies shows considerable overlap in the analytes tested by all three chemistry studies (see Appendix E). Moreover, the concentrations tested in the WP and DMRQA studies are essentially the same (as demonstrated by the comparison analysis and confirmed by EMSL-Cincinnati). Combining the studies therefore has significant potential as a cost-savings alternative.

In the DMRQA Toxicity Testing study, participating NPDES permittees are contacted and asked to designate a laboratory for receipt of their test kit. Kits are then distributed to the laboratories directly and the laboratories report the results back to their client(s). The permittees report the results to EPA. OWEC estimates that this system allows EPA to send out 60 percent fewer test kits than would be needed if the kits were sent to all participating permittees. A similar system could be developed for the DMRQA Chemistry study to reduce the number of kits distributed (approximately 7300 in the FY 1992 study). Such a system would require collection of additional information from the permittees (i.e., each would have to designate a laboratory or laboratories for receipt of the kits) and the information would have to be verified and updated annually. OWEC is presently working with EMSL-Cincinnati to determine whether such a system would result in meaningful cost savings or program efficiencies.

During the EMSL-Cincinnati site visit, numerous opportunities for automating the PE study records and information management system were identified that would benefit all of the studies. Potential opportunities exist for using machine-readable data reporting forms and for electronic transfer of test results and summary reports to Regions and States, for example. A review of the present information management system used to store PE study results could be useful for identifying opportunities for cost and time savings.

## *IV. FUNDING ISSUES AND OPTIONS*

The water PE studies will cost in excess of $2 million in FY 1993. Because the Office of Water PE study needs continue to grow, it is anticipated that the cost of the studies will continue to increase over the next decade.

Although PE studies are considered mission critical by most Office of Water, Environmental Services Division, and Office of Research and Development managers and staff interviewed, the Agency budget is not sufficient to cover the entire cost of the studies. Consequently, ORD reprograms end-of-year dollars annually to cover budget shortfalls for the studies. This reliance on end-of-year funds to supplement PE study budgets jeopardizes the

studies because funding cannot be guaranteed from year to year. A funding shortfall would necessitate either changes in study frequency or design and would have detrimental effects on State certification programs as well as EPA quality assurance and programmatic oversight activities.

In FY 1991, EPA's Environmental Monitoring Management Council (EMMC), the Office of Water and the Office of Research and Development concluded that, because of the importance of PE studies, there should be an Agency-wide initiative to establish a stable approach to funding this important component of environmental quality assurance programs. The findings of this study support the EMMC conclusion. It is therefore recommended that finding stable short and long term funding sources be a top priority for the Office of Water and the Office of Research and Development during FY 1993 and FY 1994. It is further recommended that funding issues and approaches be addressed at two levels: within OW and Agency-wide.

***Funding Approaches for OW***

The Office of Water should continue working with the Office of Research and Development and the Environmental Monitoring Management Council (EMMC) to examine all possible alternatives for funding water performance evaluation studies and develop both a short term and long term approach to funding the water studies.

In the near term, OW should assume greater responsibility for funding the water laboratory PE studies until a permanent solution is implemented. There are two potential sources for additional funds: (1) OW can redirect program funds to the PE study program at the expense of other priorities and (2) the Assistant Administrator for Water can request that ORD place a higher priority on funding the water PE studies at the expense of other water research priorities. ORD has suggested transferring the R&D base funding currently used to support the PE program to the OW AC&C base budget to support a permanent line item in the OW budget. OW should work with ORD to implement the transfer of resources. As part of this approach, OW will have to decide whether to continue to use ORD staff to design and administer the

studies and analyze the results, have OW staff assume these responsibilities, or contract out the activities to a third party. This approach has numerous resource implications, including the possibility of transferring FTE from ORD to OW for purposes of administering the studies.

In addition to implementing strategies for securing additional funding for the water PE studies, OW will pursue alternatives for improving the efficiency of the current program, as recommended by the report. These include options for consolidating the studies and automating information management aspects of the studies.

For OW, one long-range funding option is to generate user fees to support the water laboratory PE study program. Currently there is no statutory authority for fees collected under such a program to return to EPA. OW is investigating the merit of fees and addressing issues pertaining to returning fees to the Agency during the reauthorization of the Clean Water Act and the Safe Drinking Water Act. Implementation of this option would be a 3 to 5 year process. In addition to obtaining statutory authority for collecting and retaining fees, OW would have to set up a fee structure and collection process. EPA would also have to allow the States several years to change their statutory and programmatic processes to accommodate the fee program.

Various alternatives also exist for funding laboratory PE studies through external sources. These options should be fully explored and considered. For example, the National Institute of Standards and Technology (NIST) has the capability to implement a self-supporting program for PE studies. OPPTS has established a Memorandum of Understanding with NIST to operate an accreditation program for laboratories that conduct asbestos analysis. OPPTS provides limited funding to NIST for research needed to develop and test analytical methods and new PE materials. All other program funds are generated through fees paid by applicant laboratories. NIST also operates a PE testing program for the National Oceanic and Atmospheric Administration (NOAA) to support its Status and Trends and Mussel Watch marine monitoring programs.

The Agency's PE study program could also be operated independently in the context of

a national laboratory accreditation program. In October of 1992, the EMMC recommended to the Deputy Administrator that steps be taken to design a national program for accrediting environmental testing laboratories. Since then, an EPA/State Operating Group has been convened to plan and establish a national conference on environmental laboratory accreditation. The program model currently under consideration would incorporate all existing State environmental laboratory accreditation programs and includes provisions for ensuring uniform national performance evaluation testing. The model assumes that all accreditation costs would be borne by the participating laboratories.

The Agency has not yet decided whether the development and distribution of PE samples to support national laboratory accreditation would be operated by EPA's Office of Research and Development or by a private sector organization. Implementation of a national program will involve development of consensus uniform national standards for laboratory accreditation, coordination of over 30 existing State environmental laboratory accreditation programs, and establishment of new programs in states that do not presently have them. Consequently, EMMC estimates that a national program could not be operational for at least 5 years. It is critical that OW staff continue to play a major role in the development of the national laboratory accreditation program to ensure that the program is adequate to meet OW programmatic laboratory oversight needs.

***Agency-wide Approaches to Funding PE Studies***

As a result of this pilot project, the Assistant Administrator for Water will recommend to ORD and the Administrator that an Agency-wide initiative on quality assurance and laboratory performance evaluation studies be undertaken. The initiative should identify budgetary and statutory alternatives for establishing a comprehensive quality assurance program within EPA, including a strong laboratory oversight component based on performance evaluation studies. Other EPA program offices should conduct studies similar to OW's to document needs for PE studies. The Agency-wide initiative on quality assurance should include a component to support laboratory PE studies, as part of the FY 1996 budget development process. The initiative should

promote establishment of a permanent change in the Agency's budget development and formulation processes to ensure funding to support quality assurance, including laboratory PE studies. The QA budget appropriation could take the form of a centralized or decentralized Agency-wide tap on the budget, a request for an increase in the Agency's base budget, or a redirection of programmatic funds to provide sufficient funds for all of EPA's laboratory PE study requirements. Part of this effort would include determining whether AC&C or R&D dollars should be used to fund laboratory PE studies and other quality assurance activities and whether ORD or the program offices should have principal responsibility for providing the necessary staff support.

*APPENDIX A*

*THE WATER PROGRAM*

*LABORATORY PERFORMANCE EVALUATION STUDY*

*REGIONAL USE SURVEY*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN - 8 1992

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Analysis of Performance Evaluation Studies Used by the Water Program

FROM: Martha G. Prothro
Deputy Assistant Administrator

TO: Environmental Services Division Directors
Water Management Division Directors
Office of Water Office Directors

The purpose of this memorandum is to request your assistance, over the next two months, in an Office of Water (OW) effort to assess laboratory performance evaluation (PE) studies. PE studies are used to determine and ensure the technical competency of laboratories analyzing monitoring samples. OW will be documenting how PE studies are used in the water programs, the benefits being derived, and current and future PE study needs. The information we collect will be the basis for determining the best way to design and administer water-related PE studies in the future so that OW program needs are met in a cost-effective manner.

**BACKGROUND**

In FY 1992, the cost of PE studies supporting water programs will be between $2-3 million. The Office of Research and Development (ORD) currently funds between 70-80% of the water program PE study costs through the Research Committee process. In the summer of 1991, ORD requested that the Office of Water assume full responsibility for funding PE studies. Other Agency program offices are also being asked to fund their PE studies. Resources saved will be shifted to research.

In the winter of 1991, several OW Division Directors requested that the Immediate Office take the lead in responding to ORD's request on funding. They emphasized that lack of funding for PE studies would have serious impacts throughout the water programs. PE studies are critical for certifying EPA Regional, State, and commercial drinking water laboratories; certifying State wastewater and water quality laboratory programs; developing and validating new analytical

methods; providing data for the drinking water regulatory development process; assuring that data received in the Discharge Monitoring Reports is of sufficient quality to use in oversight and enforcement actions; and ensuring the quality of water monitoring data used in national information systems and national reports.

The Division Directors suggested that the appropriate approach would be to evaluate all existing and future needs for PE studies within the water programs. The information gathered would be the basis for design, administrative, and funding decisions. ORD senior management, as well as the Environmental Monitoring Management Council (EMMC) support this approach. It is anticipated that the OW effort will be a pilot for other Agency program offices.

**SCOPE OF THE PROJECT**

Over the last 2-3 months, OW staff has worked with both Headquarters and Regional staff to design three tools to obtain the information necessary for this study:

- A questionnaire on the design, administration, and funding of PE studies for the Environmental Monitoring Systems Laboratories (EMSL) in Cincinnati and Las Vegas;

- A PE Study Use Questionnaire for Headquarters and Regional staff to determine how States, Environmental Services Divisions (ESD), Headquarters and Regional Water Program Offices, and EPA Regional and ORD Laboratories use water-related PE studies in their programs; and

- A "guide" to use during interviews with selected staff in Office of Water, the Water Management Divisions, the ESDs, Regional Laboratories, and the ORD Laboratories to determine if there are program needs not met by current PE studies and/or new monitoring requirements that will require additional PE studies in the future.

All ten Regional Quality Assurance Officers (RQAOs) have participated in designing and reviewing draft versions of the PE Study Use Questionnaire and have approved the final version (Attachment 1). Discharge Monitoring Report (DMR) Quality Assurance Coordinators and Regional ESD laboratory staff also assisted. Selected Regional and Headquarters staff were involved in developing the other two tools. The project will build upon previous studies and will be coordinated with related activities

such as the lab certification and the methods integration efforts sponsored by the Environmental Monitoring Management Council. Attachment 2 provides more detailed information on the scope of the overall project.

**NEXT STEPS**

The RQAOs have been asked to coordinate with the Regional Water Management Divisions and Laboratory staff to collect and compile responses to the PE Study Use Questionnaire. All indicated a willingness to participate and believe the effort will take between 4-6 weeks.

Our discussions with the RQAOs indicate that the ESDs maintain most of the information needed. Some telephone calls to State program representatives may also be required. The RQAOs will consult with representatives of the various Regional Water Management Divisions and the Laboratory Branch Chiefs in responding to the questionnaires. We would like to have the completed questionnaires returned to Wendy Blake-Coleman, of my staff, by July 15, 1992.

During the same time frame, OW will contact Headquarters and Regional staff to arrange interviews. We will also be working with EMSL Cincinnati and Las Vegas to document PE study design, administration and funding information. We will analyze the results in late July, report the findings, and make preliminary recommendations to senior Water Managers and the EMMC in August.

This study is a first step in resolving long-term and Agency-wide issues associated with the most efficient and effective way to conduct PE studies. Please contact Wendy Blake-Coleman at 202-260-5680 for further information.

Attachments

cc: LaJuana Wilcher
Alan Fox
Robert Pavlik
Cynthia Puskar
Kathi Payne
Gary McKee
Tom Clark
J. Gareth Pearson
Regional Quality Assurance Officers

ATTACHMENT 2

REVIEW OF WATER PROGRAM PERFORMANCE EVALUATION STUDIES

BACKGROUND

EPA's principal tool for evaluating laboratory performance is the performance evaluation (PE) study program presently operated by the Environmental Monitoring Systems Laboratories (EMSLs) in Cincinnati and Las Vegas. PE studies involve sending manufactured samples to laboratories identified by the regions and states once, twice, or four times annually. Participating laboratories are asked to analyze the samples in accordance with certain specified analytical methods and to identify and quantify the pollutants present in the samples. The laboratories' analytical results are submitted to EPA and are evaluated statistically. Laboratories that do not perform at or above the statistical average may be required to participate in additional PE studies and/or to report on corrective actions taken.

The Office of Water is undertaking a study to evaluate the current water PE studies to determine the extent to which they are meeting the current needs of OW quality assurance programs, to characterize changing needs for PE studies in water programs, and to develop options for administering the water PE studies in the future. The study involves collecting information on current program administration from the EMSLs, information on current uses from the Regional Environmental Services and Water Management Divisions, and information on anticipated future needs from staff at Headquarters and in the Regions.

STUDY PLAN

OW will work with the EMSLs to develop an administrative profile of the current studies. This component will characterize the extent of the national program and provide information for developing future program options. It will also provide managers at Headquarters and in the regions with an understanding of how the current program is operated and managed.

In conjunction with the Regional Quality Assurance Officers (RQAOs), the Regional Laboratory Branch Chiefs, and the Regional DMRQA Coordinators, OW has developed a questionnaire for use in developing and inventory of current uses of water PE studies. The inventory will be used to:

- Evaluate the present uses of PE study data by Headquarters, regional, and state/local programs;

- Identify present needs for PE information that are not being serviced by current studies;

- Identify additional uses of PE study data that could benefit current programs; and

- Identify new areas where additional or different types of PE studies will be needed.

The analysis of future requirements for PE studies will involve interviews with Headquarters, regional program and regional ESD staff. The focus of these interviews will be anticipated program directions and changes in monitoring requirements. New program requirements in areas such as biological monitoring and contaminated sediments management

will result in needs for additional PE studies or changes to existing studies. This information will be used to develop strategic options for administering PE studies in the future such that they adequately support the quality assurance aspects of new monitoring requirements, from logistical and budgetary standpoints. OW will begin conducting interviews for the requirements analysis at Headquarters in May of 1992 and will contact each Region to ask their participation in this aspect of the study.

The inventory of present uses will be used in conjunction with the analysis of future requirements and an evaluation of potential funding options to develop recommendations for future program configurations. OW will also determine whether there are alternative sources, external to EPA, for meeting the PE study needs of water programs.

WATER PROGRAM PERFORMANCE EVALUATION STUDIES:
CURRENT USES

1. NUMBERS OF LABORATORIES PARTICIPATING IN PE STUDIES BY TYPE

Record the number of laboratories of the following types that participate in each of the Water Program Performance Evaluation (PE) studies indicated. In cases where one laboratory falls into more than one category, include it in all applicable categories (this will appear to result in "double counting"). For example, a private/permittee laboratory that also analyzes samples for commercial clients should be included in both the Private/Permittee and Private/Commercial categories for all applicable studies.

For the DMRQA study, be sure to verify and report the number of laboratories (rather than the number of permittees) participating, based on information from the DMRQA report forms. Note that the number of laboratories for DMRQA may be smaller than the number of permittees. Information for other studies may be obtained from regional records, reports from EMSL-Cincinnati, or both.

Provide data for the following studies, as indicated on the table: WP 026 and WP 027, WS 028 and WS 029, DMRQA 11, and any other studies used. Complete one table for the Regional Office and one for each state in the Region. The Office of Water will obtain records concerning radiological performance evaluation studies from EMSL-Las Vegas. Regions should provide only additional or unique regional or state information pertaining to those studies. In the space below, indicate the information sources used and identify the data provided by each.

| DATA SOURCE | INFORMATION PROVIDED |
|---|---|

NUMBERS OF LABORATORIES PARTICIPATING IN PE STUDIES BY TYPE

REGIONAL OFFICE NO.: _____

| STUDY\LAB TYPE | PRIVATE/ COMMERCIAL | PRIVATE/ PERMITTEE | STATE | MUNICIPAL | FEDERAL: EPA | FEDERAL: NON-EPA | UNIVERSITY | OTHER* |
|---|---|---|---|---|---|---|---|---|
| WP 026 | | | | | | | | |
| WP 027 | | | | | | | | |
| WS 028 (Chem) | | | | | | | | |
| WS 029 (Chem) | | | | | | | | |
| WS 028 (M) | | | | | | | | |
| WS 029 (M) | | | | | | | | |
| RAD** | | | | | | | | |
| DMRQA 11 | | | | | | | | |
| OTHER* | | | | | | | | |

* Identify and provide data on a separate sheet, if necessary.

** Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

NUMBERS OF LABORATORIES PARTICIPATING IN PE STUDIES BY TYPE

STATE: _____

| STUDY\LAB TYPE | PRIVATE/ COMMERCIAL | PRIVATE/ PERMITTEE | STATE | MUNICIPAL | FEDERAL: EPA | FEDERAL: NON-EPA | UNIVERSITY | OTHER* |
|---|---|---|---|---|---|---|---|---|
| WP 026 | | | | | | | | |
| WP 027 | | | | | | | | |
| WS 028 (Chem) | | | | | | | | |
| WS 029 (Chem) | | | | | | | | |
| WS 028 (M) | | | | | | | | |
| WS 029 (M) | | | | | | | | |
| RAD** | | | | | | | | |
| DMRQA 11 | | | | | | | | |
| OTHER* | | | | | | | | |

* Identify and provide data on a separate sheet, if necessary.

** Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

2. SUMMARY OF USES BY PROGRAM

On the table provided, for each PE study, indicate the programs that use the study, the number of laboratories participating for each program that uses the study results, and the type of use or uses each program makes of the data. Use the program and use codes provided. If other programs or uses are needed, please identify and define on a separate sheet. Include Headquarters, regional, and state/local programs. State/local programs and uses should be verified with state program representatives.

For example, in a case where WS Chemistry has 50 laboratories participating for drinking water certification, 10 laboratories participating for state laboratory certification for the parameters and methods tested, 20 laboratories participating to demonstrate their performance on the method for purposes of RCRA program work, and 5 laboratories participating to demonstrate proficiency for ambient ground water monitoring for a state program, report the following:

| | | | |
|---|---|---|---|
| WS Chemistry | dw | 50 labs | lc |
| | cp | 10 labs | lc |
| | rp | 20 labs | mp |
| | sa | 5 labs | lc |

Complete one table for the Regional Office and one for each state in the Region.

Program Abbreviations

dw = federal or delegated state drinking water program
np = federal or delegated state wastewater permitting program
en = federal or state enforcement program (identify statute and explain use)
cp = state laboratory certification/accreditation program (explain scope and purpose on a separate sheet)
sa = state ambient monitoring program
rp = federal or delegated state RCRA permitting program
rc = federal or delegated state RCRA compliance program
fp = regional Superfund program
sp = state program for clean-up of hazardous materials sites
op = other programs (identify on a separate sheet)
no = not program-specific

Use Abbreviations

lc = laboratory certification/accreditation/acceptability determination
mp = method performance
md = method development
es = enforcement support
mv = validation for alternative procedure
ip = improve laboratory performance (lab's own internal use)
ep = improve laboratory performance at EPA/state's request
rf = reference materials/standards
la = laboratory audit/audit targeting
lt = laboratory training
o = other (identify on separate sheet)
cu = contact unaware of use

SUMMARY OF USES BY PROGRAM

REGIONAL OFFICE NO.: _____

| STUDY | PROGRAM | NO. LABS | USE(S) |
|---|---|---|---|
| WP 026 | | | |
| WP 027 | | | |
| WS 028 (Chem) | | | |
| WS 029 (Chem) | | | |
| WS 028 (M) | | | |
| WS 029 (M) | | | |
| RAD* | | | |
| DMRQA 11 | | | |
| Other (identify) | | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

SUMMARY OF USES BY PROGRAM

STATE: _____

| STUDY | PROGRAM | NO. LABS | USE(S) |
|---|---|---|---|
| WP 026 | | | |
| WP 027 | | | |
| WS 028 (Chem) | | | |
| WS 029 (Chem) | | | |
| WS 028 (M) | | | |
| WS 029 (M) | | | |
| RAD* | | | |
| DMRQA 11 | | | |
| Other (identify) | | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

3. FREQUENCY OF USE BY PROGRAM

For each program that uses PE studies, indicate the number of times per year participants are required to analyze samples for each study. Also provide the reason for requiring analysis more than once per year (where appropriate). For example, if laboratories are required to analyze samples for the odd-number study only when unacceptable results were achieved for the previous even-numbered study, the reason for analyzing more than once per year would be to ensure that corrective action has been taken following unacceptable performance. Odd-numbered studies may also be required, for example, when a new laboratory participates for the first time. In cases where laboratories analyze samples for odd-numbered studies although not required by state or Federal programs, indicate "voluntary" or "for lab's own use".

Include information for Headquarters, regional, and state/local programs. Information concerning state/local programs should be verified with state program representatives, as appropriate. Complete one table for the Regional Office and one for each state.

FREQUENCY OF USE BY PROGRAM

REGIONAL OFFICE NO.: _____

| STUDY | PROGRAM | NO. TIMES/YR. | PURPOSE OF MORE THAN 1/YR. |
|---|---|---|---|
| WP 026 | | | |
| WP 027 | | | |
| WS 028 (Chem) | | | |
| WS 029 (Chem) | | | |
| WS 028 (M) | | | |
| WS 029 (M) | | | |
| RAD* | | | |
| DMRQA 11 | | | |
| Other (identify) | | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

FREQUENCY OF USE BY PROGRAM

STATE: _____

| STUDY | PROGRAM | NO. TIMES/YR. | PURPOSE OF MORE THAN 1/YR. |
|---|---|---|---|
| WP 026 | | | |
| WP 027 | | | |
| WS 028 (Chem) | | | |
| WS 029 (Chem) | | | |
| WS 028 (M) | | | |
| WS 029 (M) | | | |
| RAD* | | | |
| DMRQA 11 | | | |
| Other (identify) | | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

4. PROGRAM DECISIONS SUPPORTED BY PE STUDIES

For each program that uses each study, identify the types of decisions are supported by the study results. Use the Program Abbreviations and the Application Abbreviations provided below. If necessary, identify and define any other Application Abbreviations needed. Include information on Headquarters, regional, and state/local programs. Address all uses by all regional and state programs, including those not related to water. For example, include state programs for certifying coal mining laboratories and methods validation applications by state RCRA programs. Information concerning state/local programs should be verified with state program representatives, as appropriate. Complete one table for the Regional Office and one for each state in the Region.

Program Abbreviations

dw = federal or delegated state drinking water program
np = federal or delegated state wastewater permitting program
en = federal or state enforcement program (identify statute and explain use)
cp = state laboratory certification/accreditation program (explain scope and purpose on a separate sheet)
sa = state ambient monitoring program
rp = federal or delegated state RCRA permitting program
rc = federal or delegated state RCRA compliance program
fp = regional Superfund program
sp = state program for clean-up of hazardous materials sites
op = other programs (identify on a separate sheet)
no = not program-specific

Application Abbreviations

a = requiring corrective action
t = targeting audits
p = measuring compliance with laboratory performance requirements
d = determining validity/acceptability of data
c = making certification/accreditation determinations

PROGRAM DECISIONS SUPPORTED BY PE STUDIES

REGIONAL OFFICE NO.: _____

| STUDY | PROGRAM | APPLICATIONS |
|---|---|---|
| WP 026 | | |
| WP 027 | | |
| WS 028 (Chem) | | |
| WS 029 (Chem) | | |
| WS 028 (M) | | |
| WS 029 (M) | | |
| RAD* | | |
| DMRQA 11 | | |
| Other (identify) | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

PROGRAM DECISIONS SUPPORTED BY PE STUDIES

STATE: _____

| STUDY | PROGRAM | APPLICATIONS |
|---|---|---|
| WP 026 | | |
| WP 027 | | |
| WS 028 (Chem) | | |
| WS 029 (Chem) | | |
| WS 028 (M) | | |
| WS 029 (M) | | |
| RAD* | | |
| DMRQA 11 | | |
| Other (identify) | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

5. TECHNICAL ADEQUACY OF PE STUDIES

On the tables provided, for each program that uses each study, characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices). Use the Program Abbreviations and the Technical Adequacy Codes provided below, or define others, as needed. Any inadequacy noted should include an accompanying narrative explanation to further define the inadequacy noted. For example, if inadequate analyte coverage is noted for the RCRA program participants in the WP study due to the absence of furans in the PE samples, the entry should be:

WP rp ic (PE samples do not contain furans)

The information provided should reflect all relevant perspectives, including state program and laboratory representatives and Regional program and laboratory representatives. Complete one table for the Regional Office and one for each state in the Region.

Program Abbreviations

dw = federal or delegated state drinking water program
np = federal or delegated state wastewater permitting program
en = federal or state enforcement program (identify statute and explain use)
cp = state laboratory certification/accreditation program (explain scope and purpose on a separate sheet)
sa = state ambient monitoring program
rp = federal or delegated state RCRA permitting program
rc = federal or delegated state RCRA compliance program
fp = regional Superfund program
sp = state program for clean-up of hazardous materials sites
op = other programs (identify on a separate sheet)
no = not program-specific

Technical Adequacy Codes

ad = adequate study design
id = inadequate study design
aq = adequate number of performance evaluation samples
iq = inadequate number of performance evaluation samples
ac = adequate analyte coverage
ic = inadequate analyte coverage
ak = adequate analyte concentrations
ik = inadequate analyte concentrations
am = adequate matrices tested
im = inadequate matrices tested (please identify recommended additional matrices and analytes on a separate sheet)

In the space below or on a separate sheet, discuss any administrative inadequacies or opportunities for improving the administration or efficiency of the studies:

TECHNICAL ADEQUACY OF PE STUDIES

REGIONAL OFFICE NO.: _____

| STUDY | PROGRAM | ADEQUACY OF STUDY TO MEET NEED |
|---|---|---|
| WP 026 | | |
| WP 027 | | |
| WS 028 (Chem) | | |
| WS 029 (Chem) | | |
| WS 028 (M) | | |
| WS 029 (M) | | |
| RAD* | | |
| DMRQA 11 | | |
| Other (identify) | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

TECHNICAL ADEQUACY OF PE STUDIES

STATE: _____

| STUDY | PROGRAM | ADEQUACY OF STUDY TO MEET NEED |
|---|---|---|
| WP 026 | | |
| WP 027 | | |
| WS 028 (Chem) | | |
| WS 029 (Chem) | | |
| WS 028 (M) | | |
| WS 029 (M) | | |
| RAD* | | |
| DMRQA 11 | | |
| Other (identify) | | |

* Information to be provided by EMSL-Las Vegas for PE A and PE B. Provide any additional or unique regional or state data, if available.

6. STATE STATUTORY AND REGULATORY REQUIREMENTS FOR PE STUDIES

For each state program, are the studies used required by state regulation or statute (Y or N) and what is the legal citation? Please use the Program Abbreviations.

Program Abbreviations

dw = delegated state drinking water program
np = delegated state wastewater permitting program
en = state enforcement program (identify statute and explain use)
cp = state laboratory certification/accreditation program (explain scope and purpose on a separate sheet)
sa = state ambient monitoring program
rp = delegated state RCRA permitting program
rc = delegated state RCRA compliance program
fp = regional Superfund program
sp = state program for clean-up of hazardous materials sites
op = other programs (identify on a separate sheet)
no = not program-specific

| STUDY | STATE | PROGRAM | REQUIRED BY: STATUTE? | REG.? | CITATION |
|---|---|---|---|---|---|
| WP | | | | | |
| WS Chem. | | | | | |
| WS M. | | | | | |
| RAD | | | | | |
| DMRQA | | | | | |
| Other (identify) | | | | | |

7. Describe the process by which the Region manages, oversees, administers, or organizes participation in the PE studies. Indicate points of contact with the laboratories, the states, within the Region, and with EMSL-Cincinnati. Do the states in the region make requests directly from EMSL-Cincinnati, or are all requests conveyed through a single regional point of contact with Cincinnati? Also, indicate whether laboratories can be included at their own request and whether such requests are honored by the Region or must be forwarded to the Region by the state contact. Provide a brief description of records maintained by the Region, including tracking systems or other documentation showing which laboratories receive samples and which return results of what type.

8. How and by whom are decisions made concerning which laboratories participate and how often? Describe Regional and state policies for including laboratories in the studies. If no policies exist (i.e., all requestors are allowed to participate, regardless of need/application), please note this. Do you receive "extra" or surplus PE samples and, if so, how are they used?

## 9. ALTERNATIVE APPROACHES TO EVALUATING LABORATORY PERFORMANCE/DATA QUALITY

Based on current Regional quality assurance needs, are PE studies the best way to acquire the information needed or are there other approaches that could be used? If PE studies are not the best alternative, explain why and state what you would recommend be done differently.

10. QUALITY/RELIABILITY OF INFORMATION

On the table provided below, estimate the relative reliability of the information provided for questions 1 - 8 above, based on the sources consulted and your judgement. Use the following scale:

3 = Very reliable information, based on complete, comprehensive records

2 = Somewhat reliable information, based on complete but not comprehensive records

1 = Somewhat unreliable information, based on incomplete records

0 = Information based on judgements of regional/state representative

**QUALITY/RELIABILITY OF INFORMATION**
**REGIONAL OFFICE NO.: _____**

| QUESTION\STUDY | WP | WS CHEM | WS M | RAD | DMRQA | OTHER | |
|---|---|---|---|---|---|---|---|
| Q1 | | | | | | | |
| Q2 | | | | | | | |
| Q3 | | | | | | | |
| Q4 | | | | | | | |
| Q5 | | | | | | | |
| Q7 | | | | | | | |
| Q8 | | | | | | | |

QUALITY/RELIABILITY OF INFORMATION
STATE: _____

| QUESTION\STUDY | WP | WS CHEM | WS M | RAD | DMRQA | OTHER | |
|---|---|---|---|---|---|---|---|
| Q1 | | | | | | | |
| Q2 | | | | | | | |
| Q3 | | | | | | | |
| Q4 | | | | | | | |
| Q5 | | | | | | | |
| Q6 | | | | | | | |
| Q8 | | | | | | | |

QUALITY/RELIABILITY OF INFORMATION
STATE: _____

| QUESTION\STUDY | WP | WS CHEM | WS M | RAD | DMRQA | OTHER | |
|---|---|---|---|---|---|---|---|
| Q1 | | | | | | | |
| Q2 | | | | | | | |
| Q3 | | | | | | | |
| Q4 | | | | | | | |
| Q5 | | | | | | | |
| Q6 | | | | | | | |
| Q8 | | | | | | | |

QUALITY/RELIABILITY OF INFORMATION
STATE: _____

| QUESTION\STUDY | WP | WS CHEM | WS M | RAD | DMRQA | OTHER | |
|---|---|---|---|---|---|---|---|
| Q1 | | | | | | | |
| Q2 | | | | | | | |
| Q3 | | | | | | | |
| Q4 | | | | | | | |
| Q5 | | | | | | | |
| Q6 | | | | | | | |
| Q8 | | | | | | | |

QUALITY/RELIABILITY OF INFORMATION
STATE: _____

| QUESTION\STUDY | WP | WS CHEM | WS M | RAD | DMRQA | OTHER | |
|---|---|---|---|---|---|---|---|
| Q1 | | | | | | | |
| Q2 | | | | | | | |
| Q3 | | | | | | | |
| Q4 | | | | | | | |
| Q5 | | | | | | | |
| Q6 | | | | | | | |
| Q8 | | | | | | | |

*APPENDIX B*

*PRELIMINARY RESULTS FROM THE WATER PROGRAM*
*LABORATORY PERFORMANCE EVALUATION STUDY*
*REGIONAL USE SURVEY*

## *APPENDIX B*

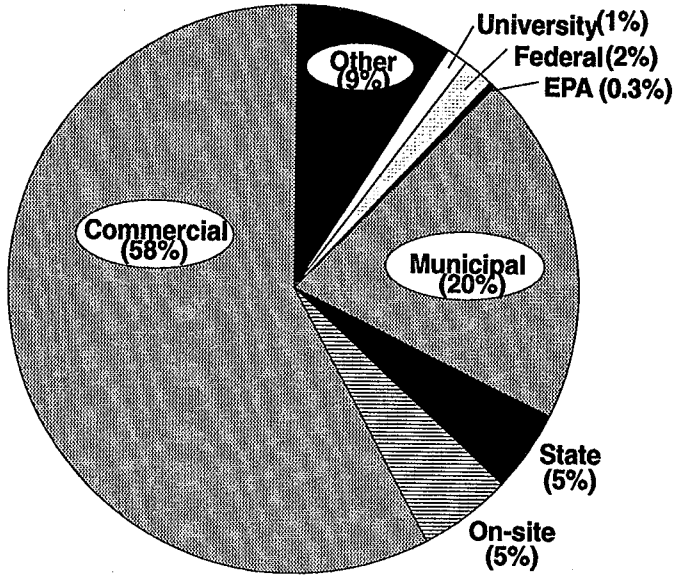
## *PRELIMINARY RESULTS FROM THE WATER PROGRAM LABORATORY PERFORMANCE EVALUATION STUDY REGIONAL USE SURVEY*

This Appendix provides graphical and tabular summaries of the results from the Water Program Laboratory Performance Evaluation Study Regional Use Survey. The survey form (see Appendix A) was completed by each of the ten Regional Quality Assurance Managers (RQAMs) in EPA's Regional Offices using information available in the Regional Offices and based on their understanding of State programs in their Regions.

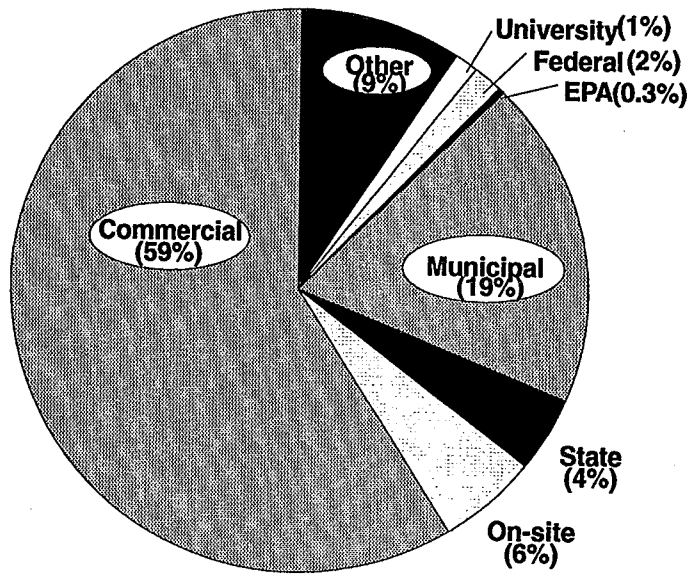
Responses to the questions posed by the survey were varied. Due to differences in recordkeeping and information management practices in the Regions, some were unable to provide definitive quantitative responses to certain of the questions. In addition, one Region was not able to respond to most of the questions posed. The summary graphics and tables displayed in this Appendix include all of the information that was provided. Each indicates the level of response received. Cases where significantly low response rates were experienced are noted. As a result of this variability, the data provided in this Appendix should be interpreted to be an indication in trends related to the use of the water PE studies nationwide. Specific information regarding individual State or Regional programs should be verified with the State or Region before being used in any other context.

# NUMBER OF LABS PARTICIPATING IN WS STUDIES

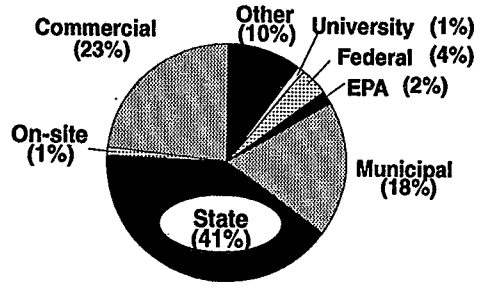
Provide the number of private/commercial, private/permitee, state, municipal, Federal/EPA, Federal/Non-EPA, university, and other laboratories that participated in the FY 1992 Water PE Studies.



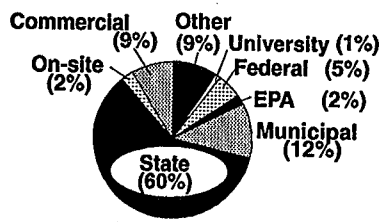

**WS CHEM 28**
(Total 2582 Labs)




**WS CHEM 29**
(Total 2575 Labs)



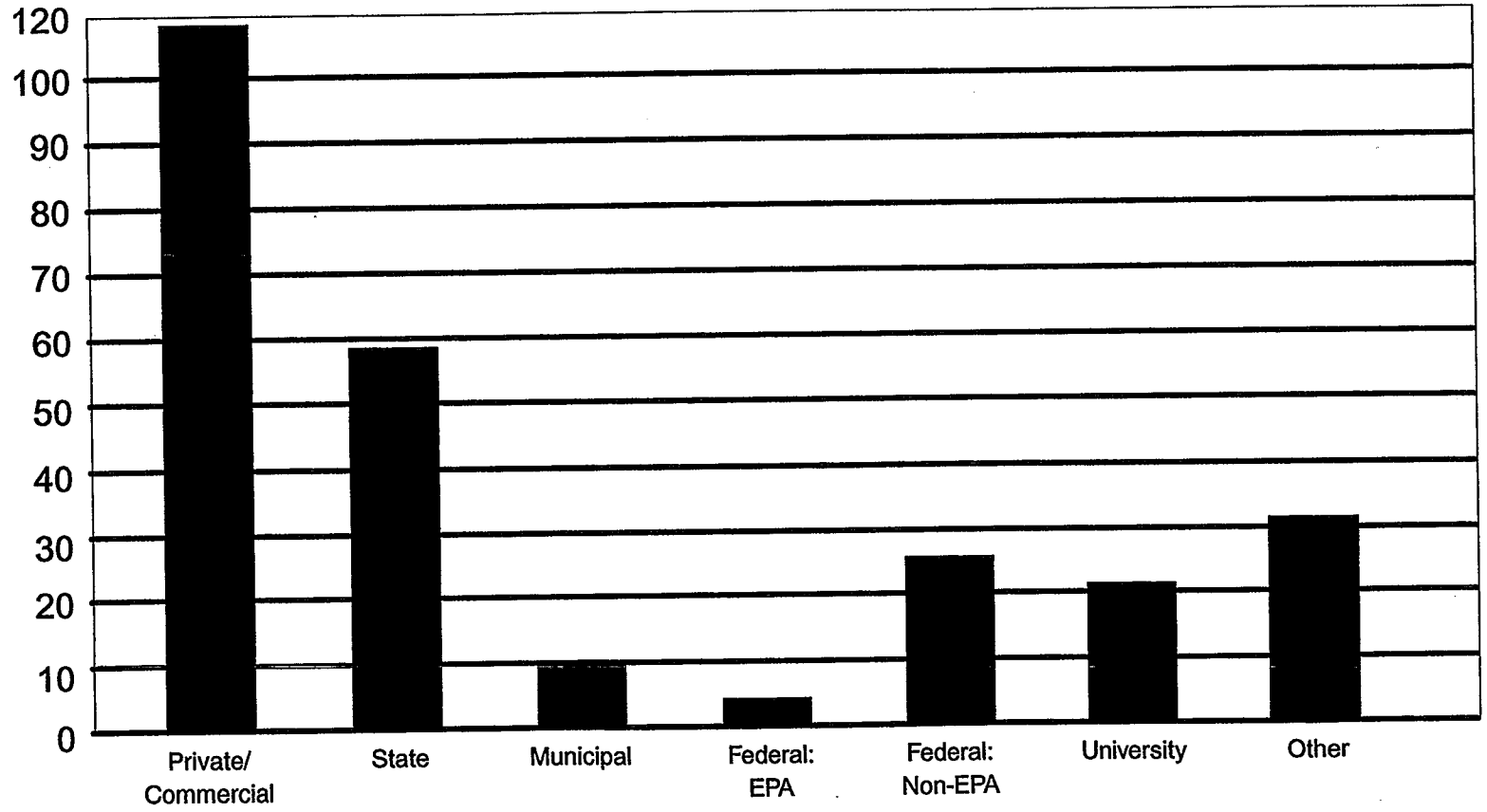

**WS MICRO 28**
(Total 337 Labs)




**WS MICRO 29**
(Total 198 Labs)

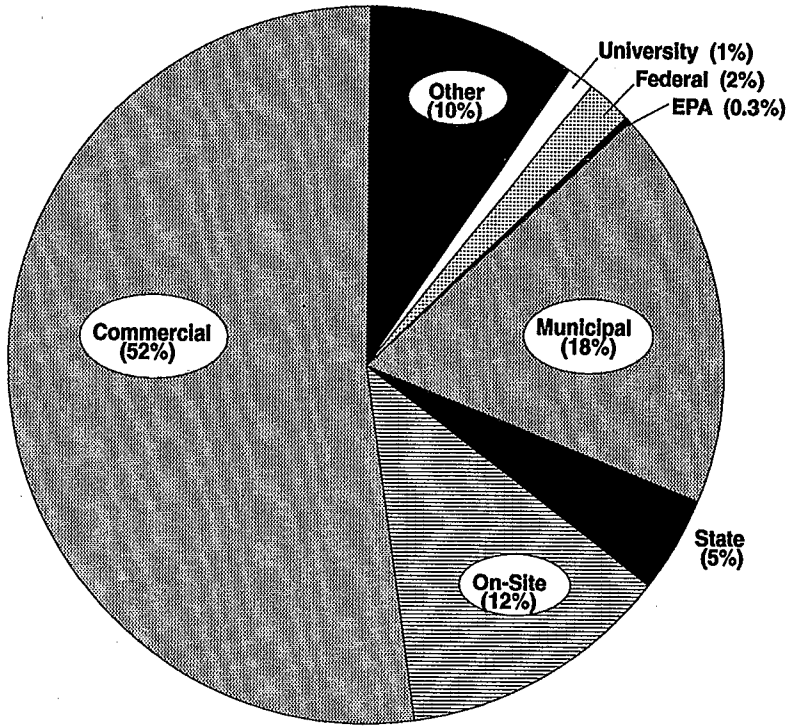
# NUMBER OF LABS PARTICIPATING IN WS RAD STUDIES

Provide the number of private/commercial, private/permitee, state, municipal, Federal/EPA, Federal/Non-EPA, university, and other laboratories that participated in the FY 1992 Water PE Studies.

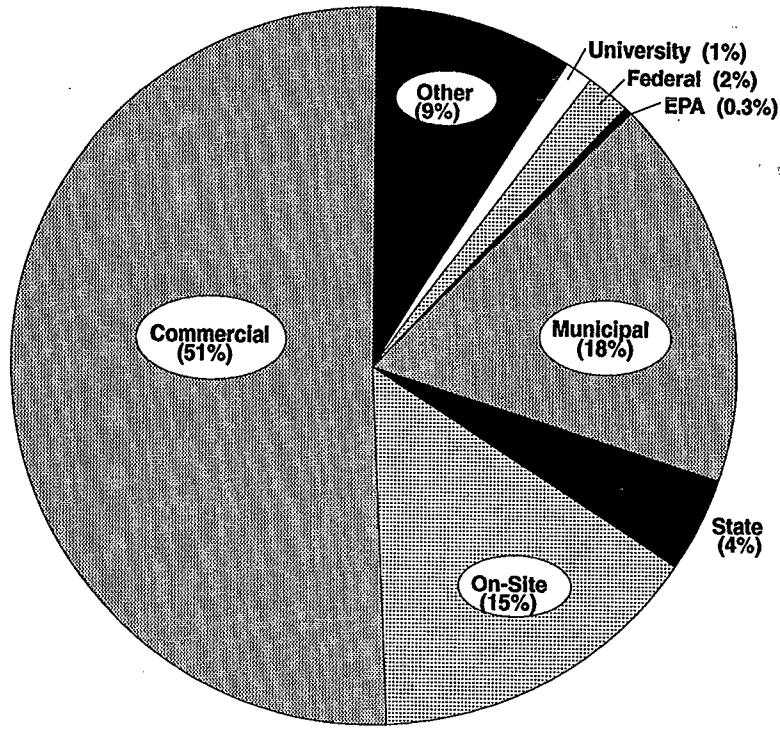


# NUMBER OF LABS PARTICIPATING IN WP STUDIES

Provide the number of private/commercial, private/permitee, state, municipal, Federal/EPA, Federal/Non-EPA, university, and other laboratories that participated in the FY 1992 Water PE Studies.



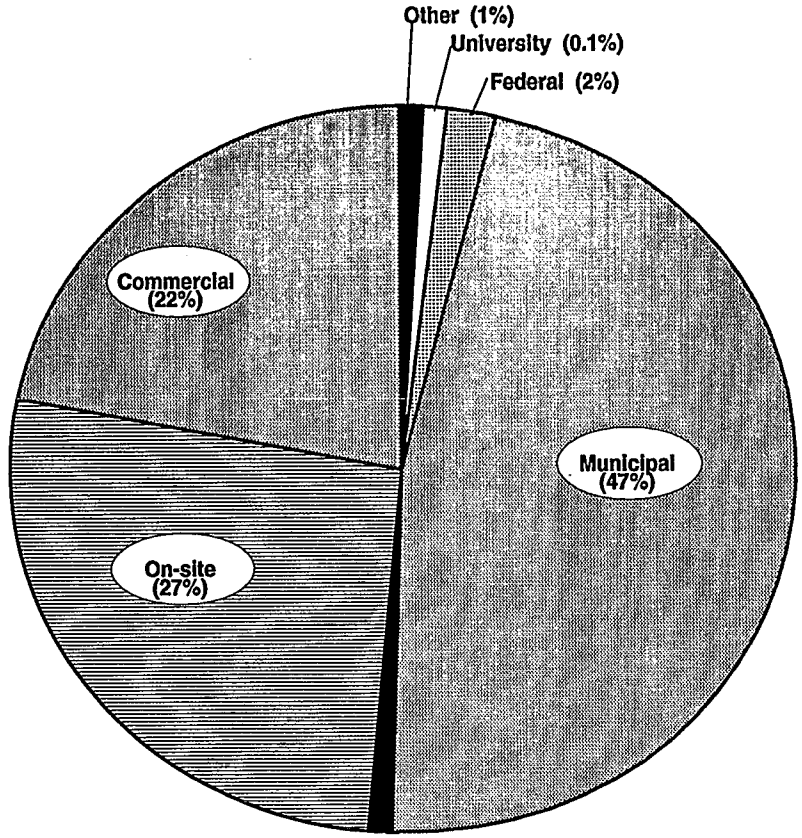

**WP 26**
(Total 3543 Labs)




**WP 27**
(Total 3823 Labs)

# NUMBER OF LABORATORIES PARTICIPATING IN DMRQA STUDIES

Provide the number of private/commercial, private/permitee, state, municipal, Federal/EPA, Federal/Non-EPA, university, and other laboratories that participated in the FY 1992 Water PE Studies.




(Total 4043 Laboratories)

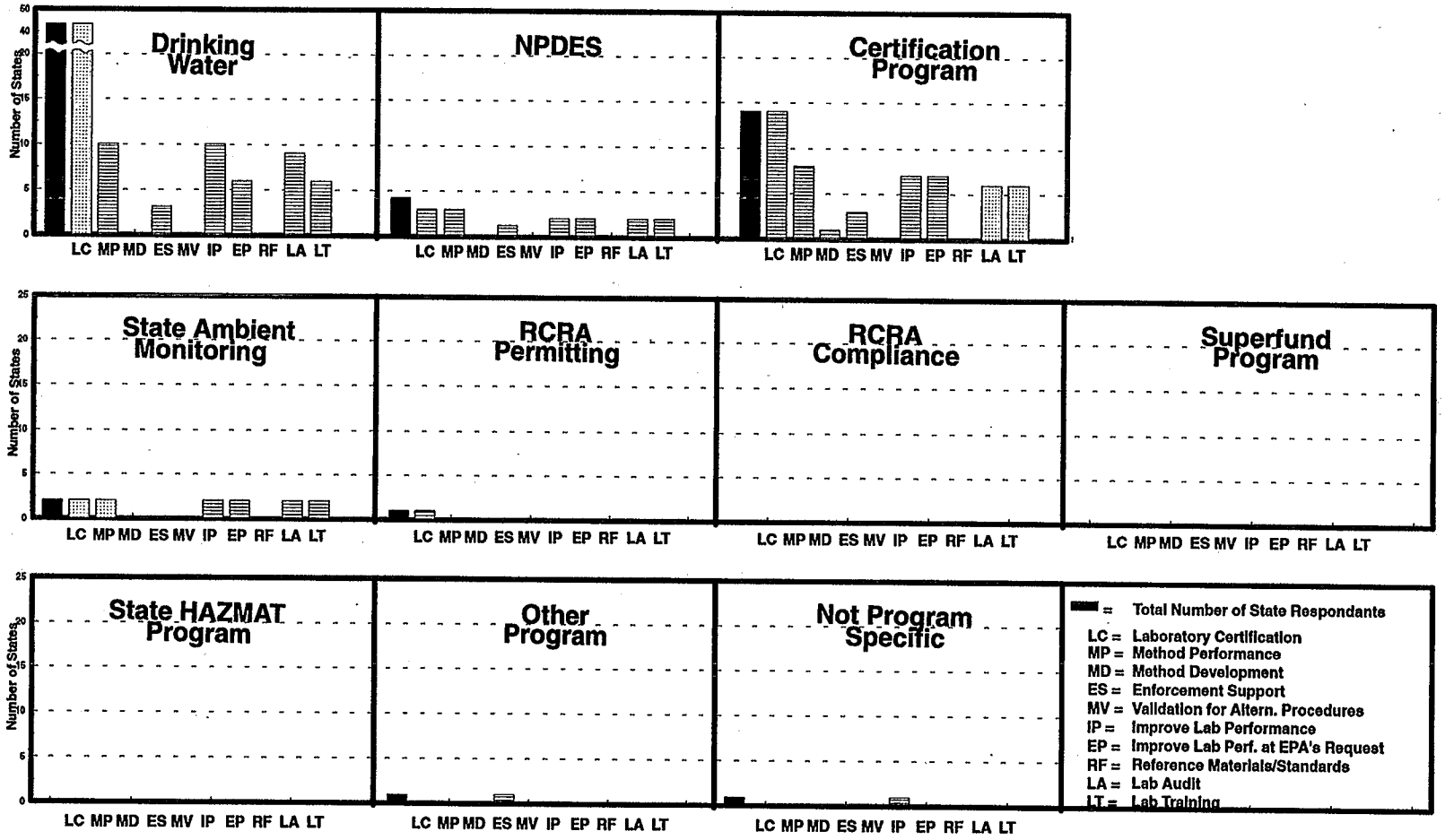
Includes labs from Regions 1, 2, 4, 7, 8, 9 and 10.

Regions 3 and 6 reported permittees instead of labs and were excluded for consistency.

There was no response from Region 5.

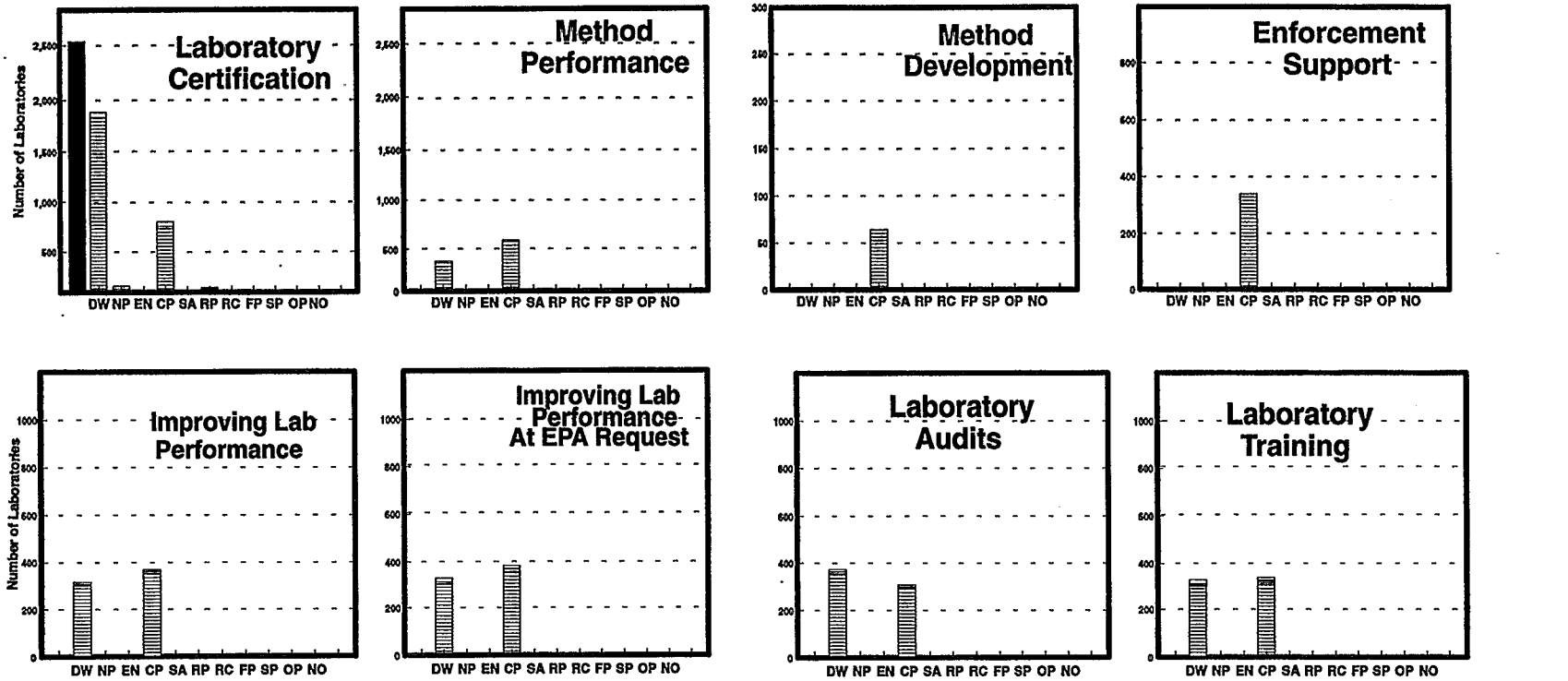
## NUMBER OF STATE PROGRAMS USING WS CHEM PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



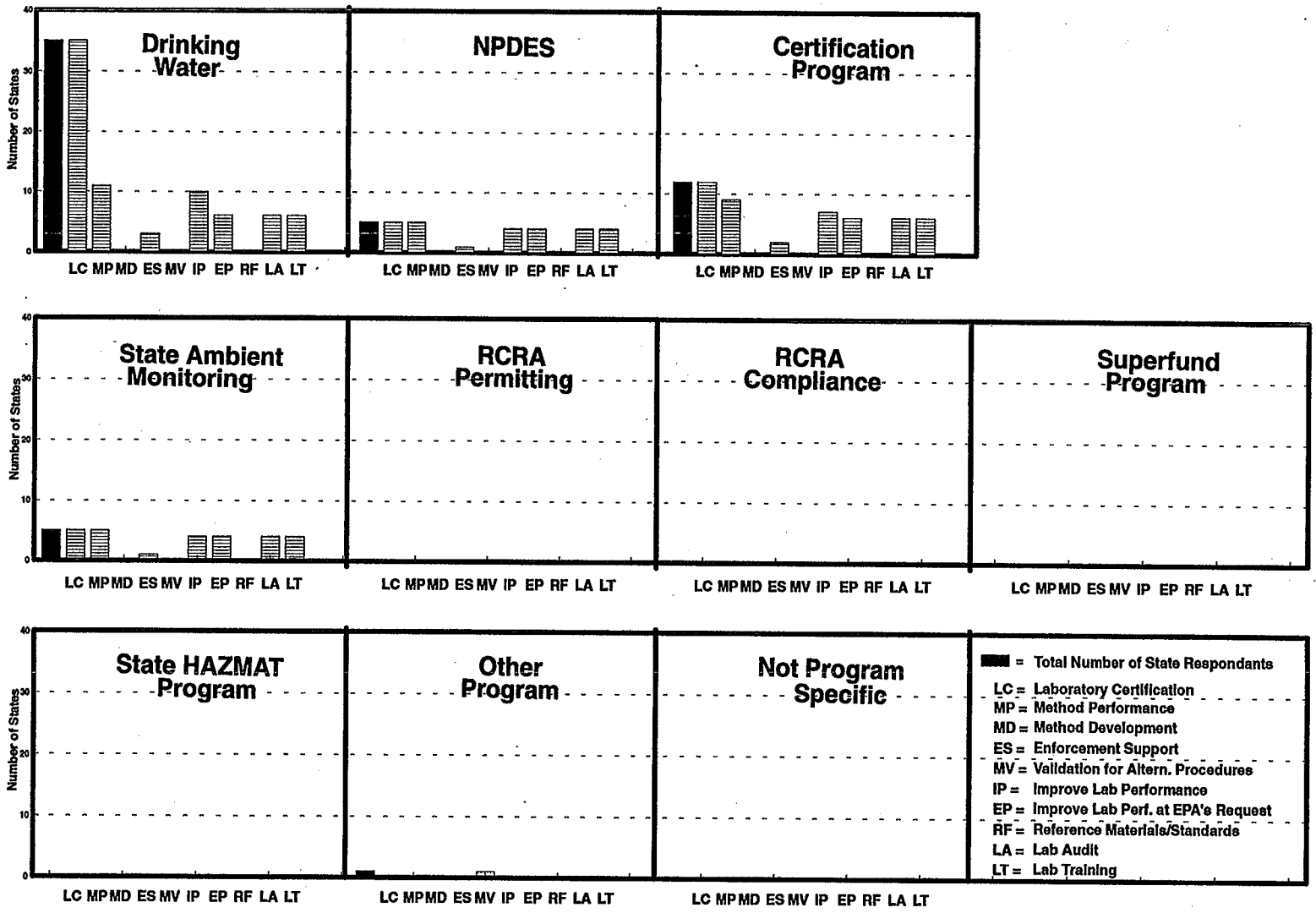
# REPORTED APPLICATIONS FOR WS 28 PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



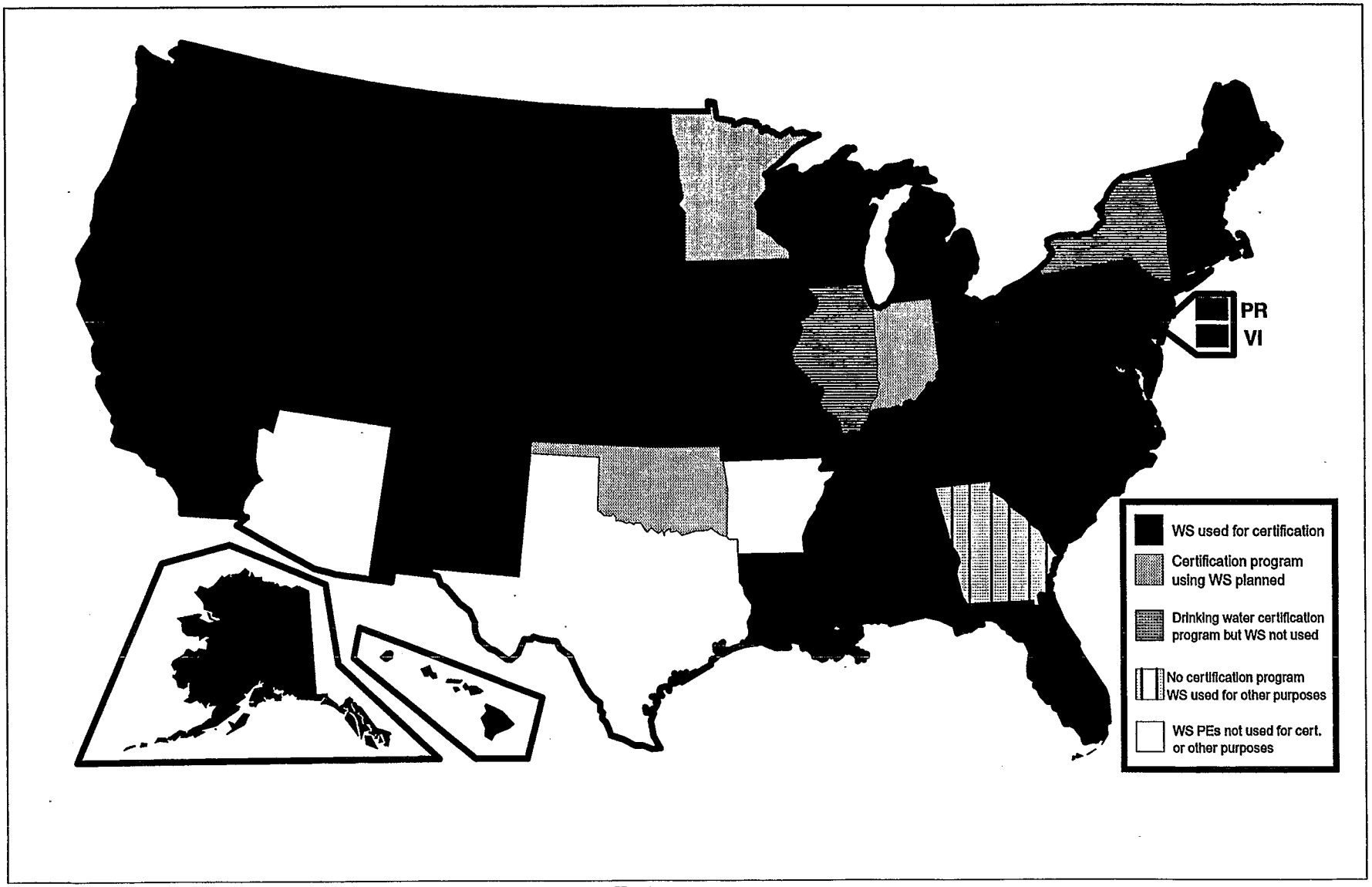
## NUMBER OF STATE PROGRAMS USING WS MICRO 28 PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



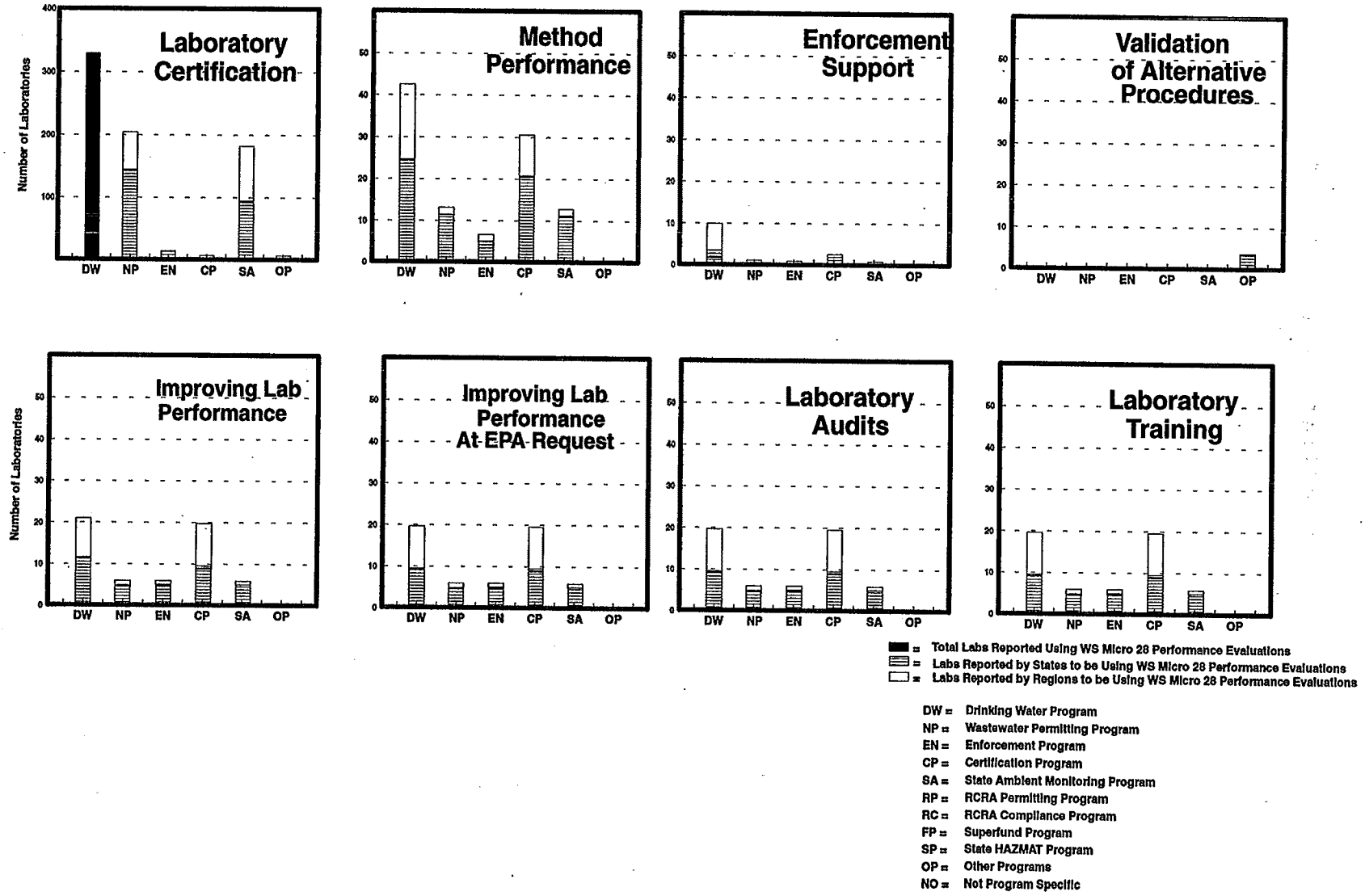
## SURVEY OF STATE CERTIFICATION PROGRAMS USING WS STUDIES IN 1992

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



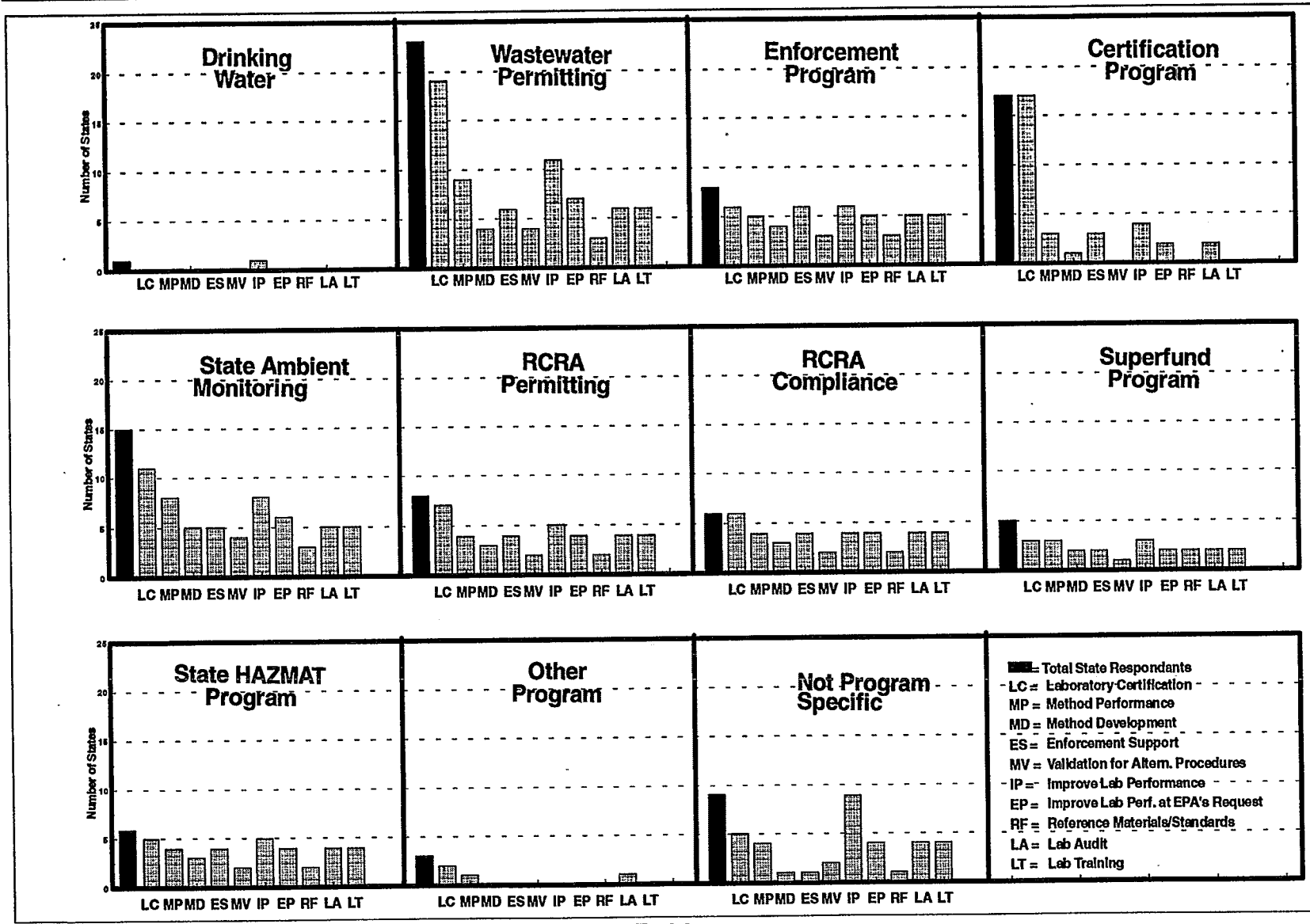
# REPORTED APPLICATIONS FOR WS MICRO 28 PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



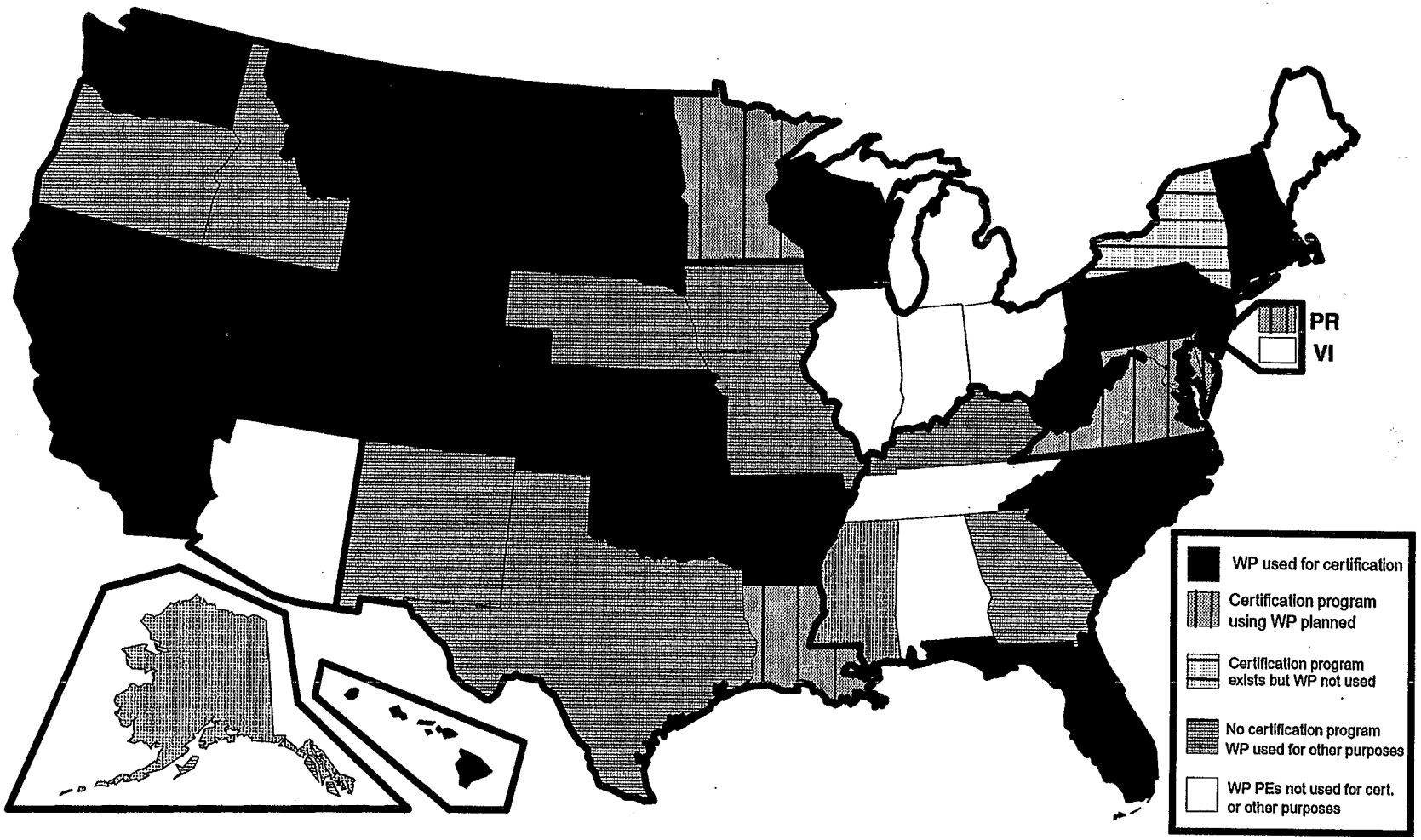
# NUMBER OF STATE PROGRAMS USING WP PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



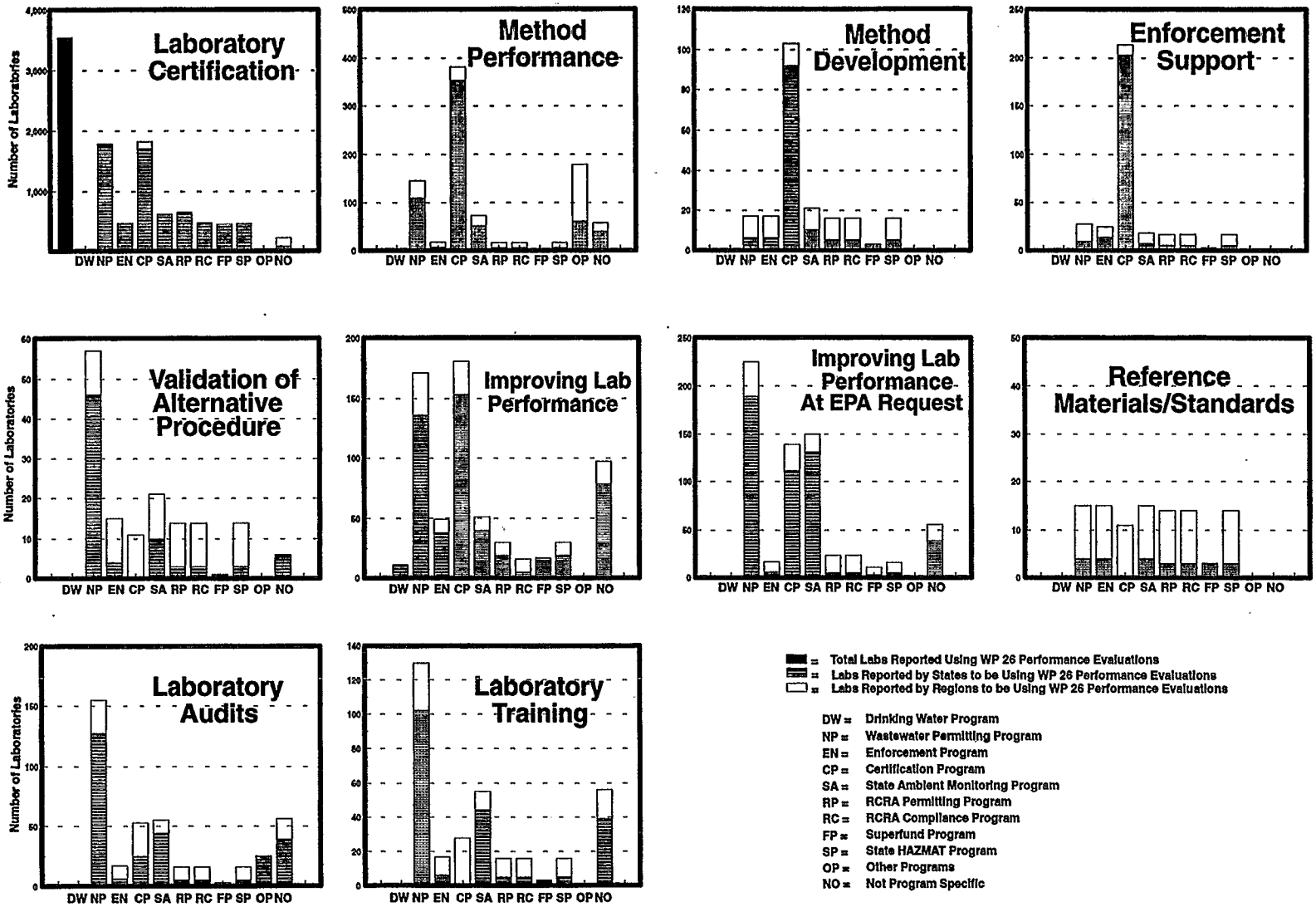
## SURVEY OF STATE CERTIFICATION PROGRAMS USING WP STUDIES IN 1992

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



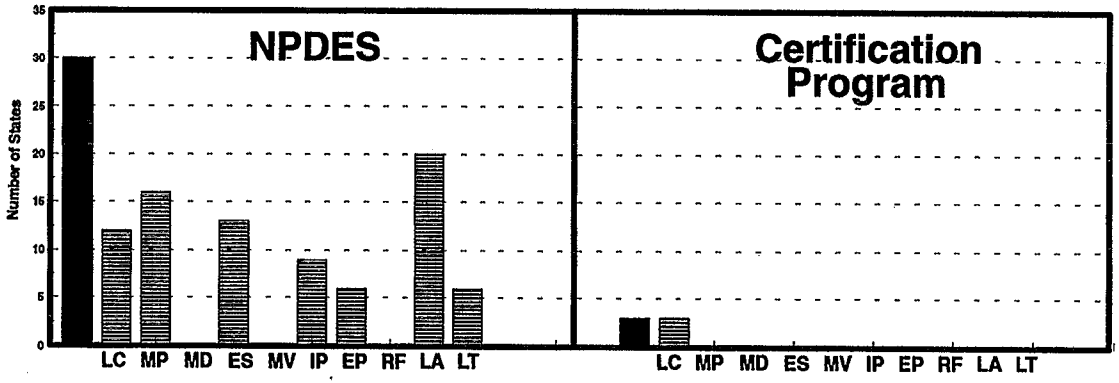
# REPORTED APPLICATIONS FOR WP 26 PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



## NUMBER OF STATE PROGRAMS USING DMRQA PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



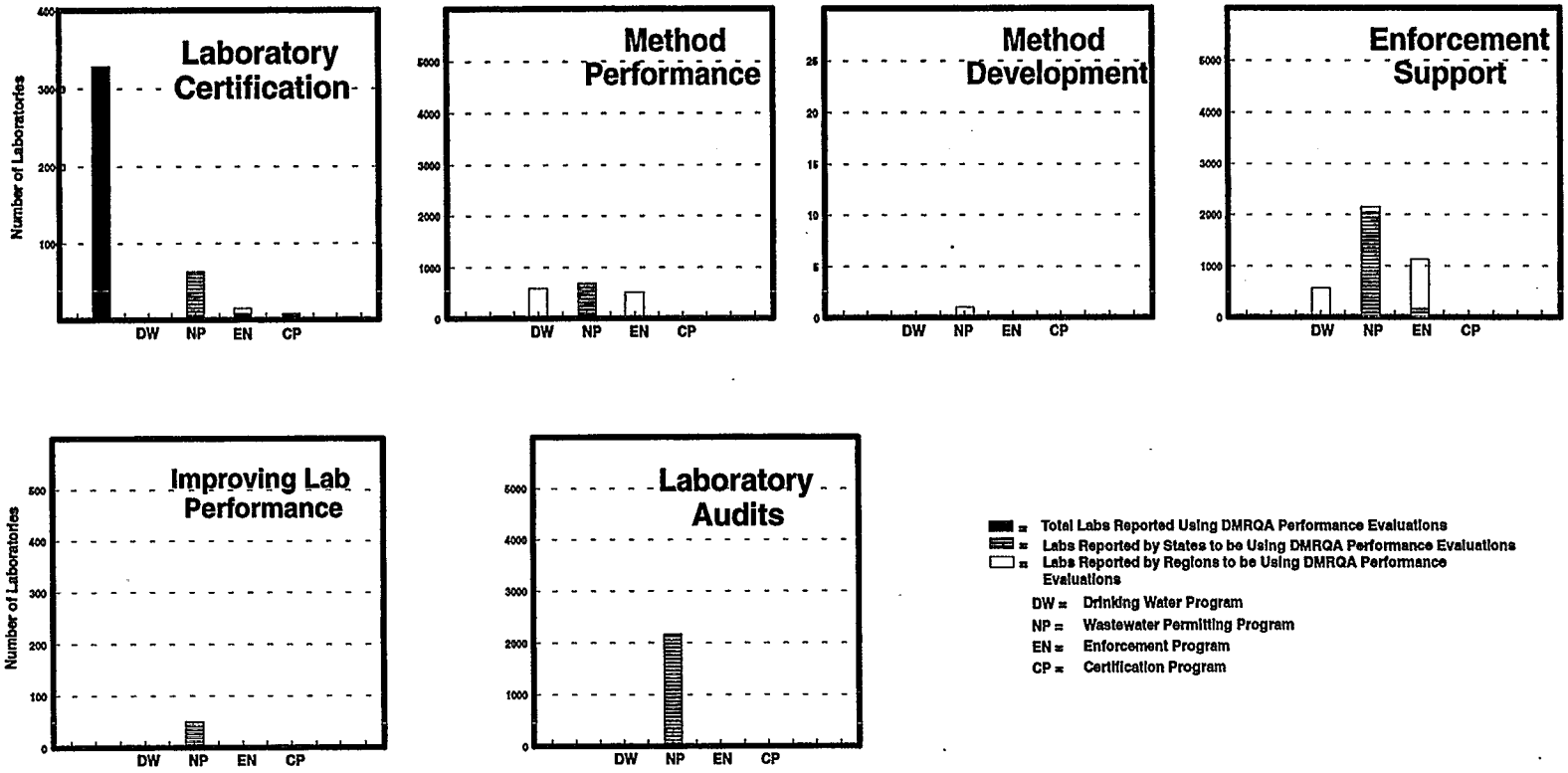

**NOTE: No other State programs reported using DMRQA performance evaluations**

= Total State Respondants

LC = Laboratory Certification
MP = Method Performance
MD = Method Development
ES = Enforcement Support
MV = Validation for Altern. Procedures
IP = Improve Lab Performance
EP = Improve Lab Perf. at EPA's Request
RF = Reference Materials/Standards
LA = Lab Audit
LT = Lab Training

# REPORTED APPLICATIONS FOR DMRQA PERFORMANCE EVALUATION STUDIES

For each Water PE study, indicate the programs that use the study, the number of laboratories participating for each program, and the types of uses each program makes of the data.



## REASONS WHY WATER LABORATORIES USE PERFORMANCE EVALUATION STUDIES MORE THAN ONCE PER YEAR

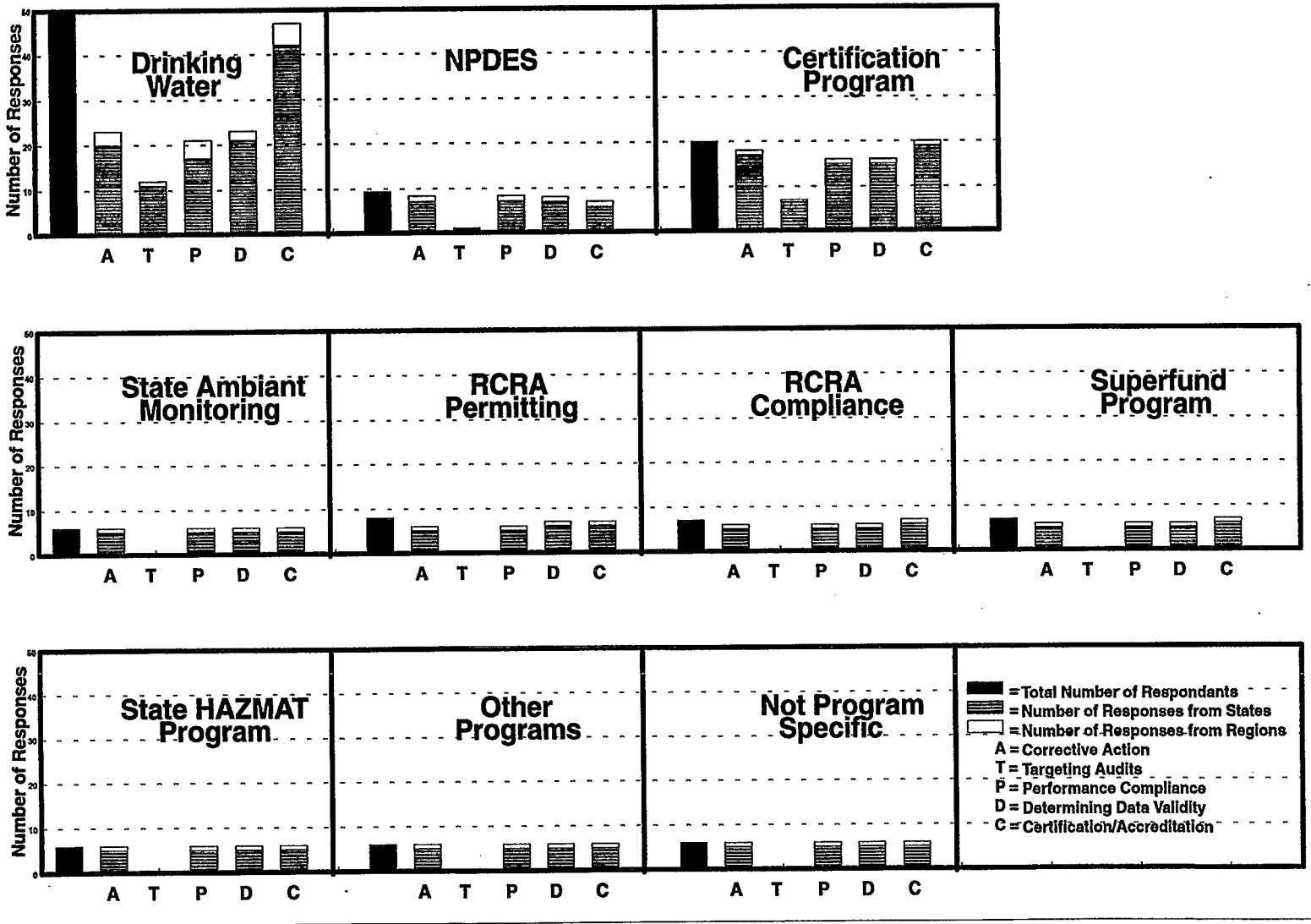
For each program that uses PE studies, indicate the number of times per year participants are required to analyze samples for each study. Also provide the reason for requiring analysis more than once per year, if appropriate.

- **All but DMRQA study are offered twice per year**
- **Most States have labs participate twice a year**
  - **First test is mandatory**
  - **Second test is used for corrective action and follow up**
- **Most labs voluntarily participate for performance improvement in the second test even if corrective action is not required**
- **Some States indicate that labs failing the DMRQA test are required to participate in the next WP study**

# PROGRAM DECISIONS SUPPORTED BY PE STUDIES

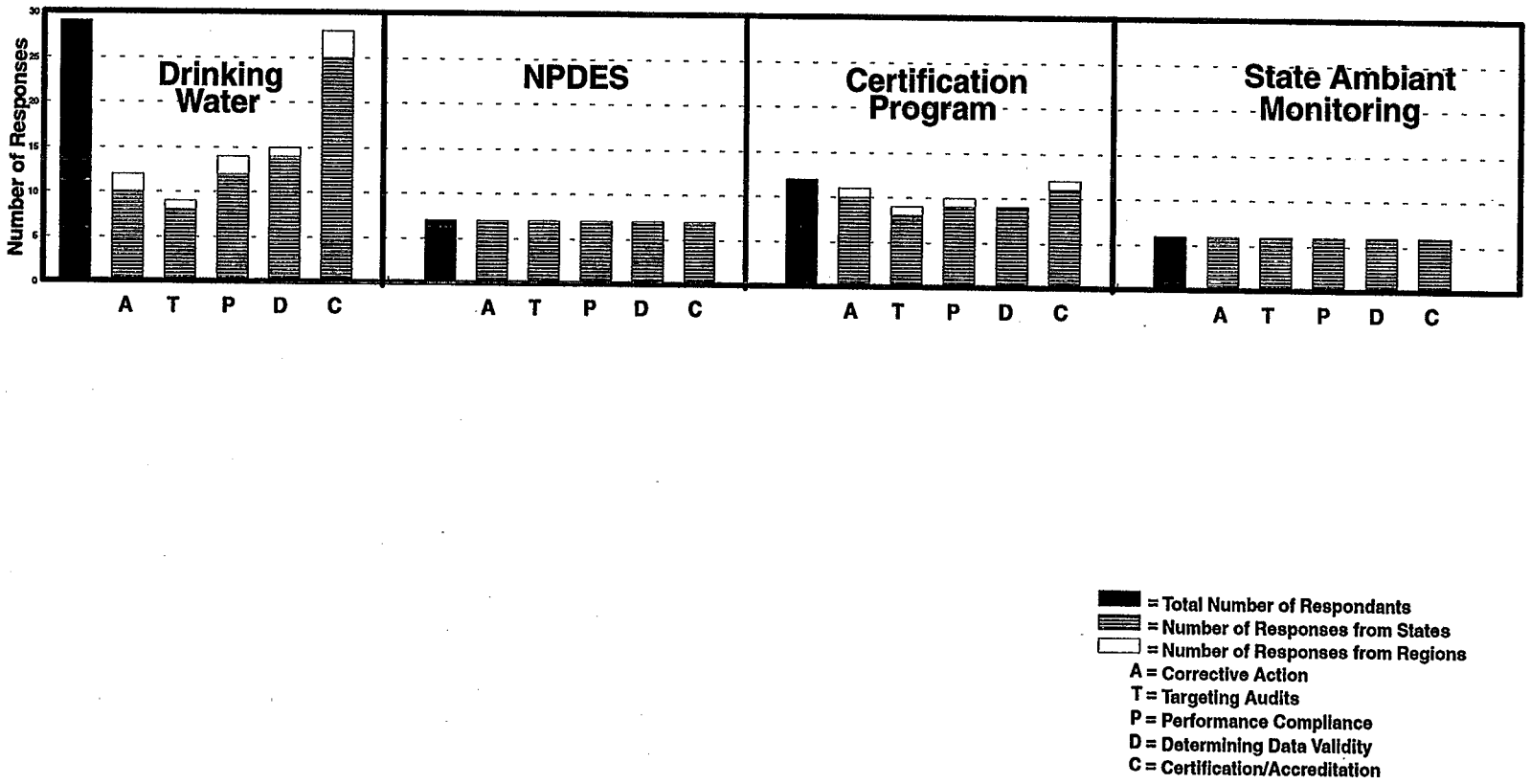
## WS CHEM STUDIES

For each program that uses each study, identify the types of decisions that are supported by the results.



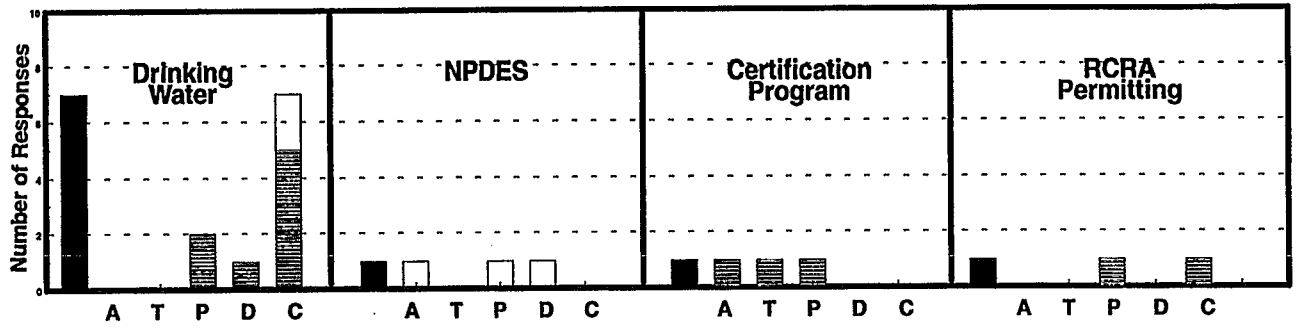
# PROGRAM DECISIONS SUPPORTED BY PE STUDIES
## WS MICRO STUDIES

For each program that uses each study, identify the types of decisions that are supported by the results.



# PROGRAM DECISIONS SUPPORTED BY PE STUDIES
## WS RAD STUDIES

For each program that uses each study, identify the types of decisions that are supported by the results.

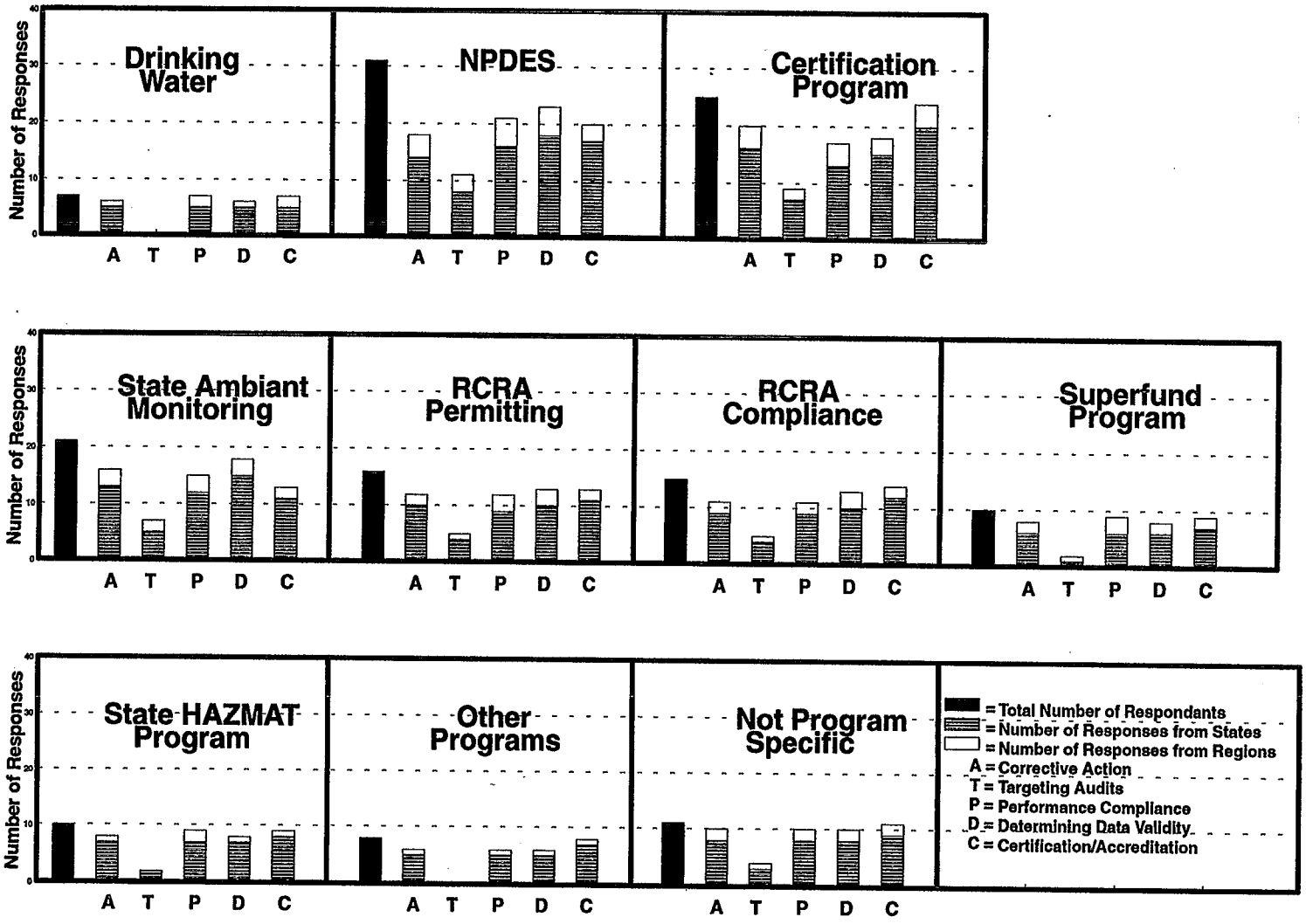



= Total Number of Respondants
= Number of Responses from States
= Number of Responses from Regions
A = Corrective Action
T = Targeting Audits
P = Performance Compliance
D = Determining Data Validity
C = Certification/Accreditation

# PROGRAM DECISIONS SUPPORTED BY PE STUDIES

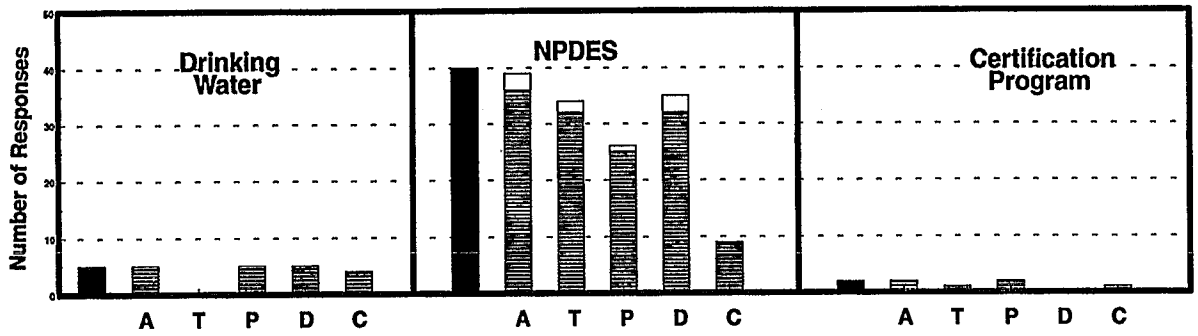
## WP 26/27 STUDIES

For each program that uses each study, identify the types of decisions that are supported by the results.



# PROGRAM DECISIONS SUPPORTED BY PE STUDIES
# DMRQA STUDIES

For each program that uses each study, identify the types of decisions that are supported by the results.



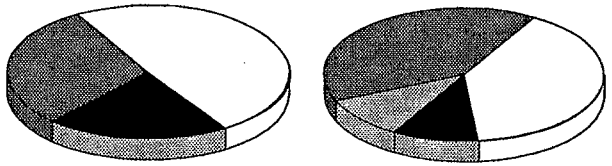

=Total Number of Respondants
=Number of Responses from States
=Number of Responses from Regions
A =Corrective Action
T =Targeting Audits
P =Performance Compliance
D =Determining Data Validity
C =Certification/Accreditation

# TECHNICAL ADEQUACY OF PE STUDIES

## WS CHEM STUDIES

For each program that uses each study, characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices).

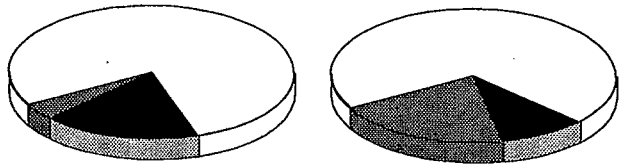
### ADEQUACY OF STUDY DESIGN



**STATES**
30% positive
21% negative
49% no response

**REGIONS**
40% positive
10% positive and negative
10% negative
40% no response

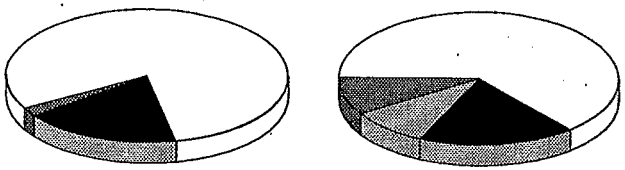
### ADEQUACY OF QUANTITY OF PE SAMPLES



**STATES**
4% positive
18% negative
78% no response

**REGIONS**
20% positive
10% negative
70% no response

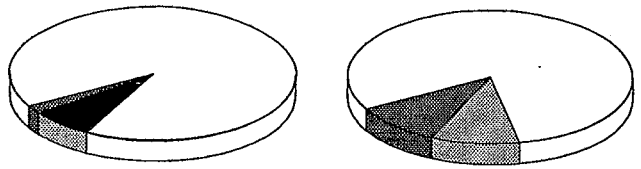
### ADEQUACY OF ANALYTE COVERAGE



**STATES**
2% positive
18% negative
80% no response

**REGIONS**
10% positive
10% positive and negative
20% negative
60% no response

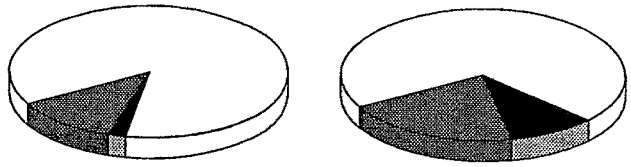
### ADEQUACY OF ANALYTE CONCENTRATION



**STATES**
2% positive
7% negative
91% no response

**REGIONS**
10% positive
10% positive and negative
80% no response

### ADEQUACY OF MATRICES TESTED



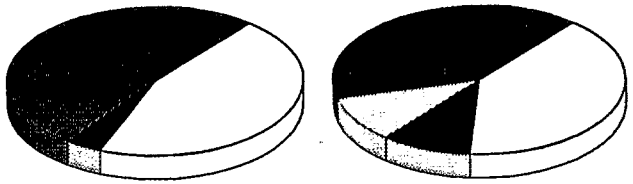
**STATES**
12% positive
2% negative
86% no response

**REGIONS**
20% positive
10% negative
70% no response

# TECHNICAL ADEQUACY OF PE STUDIES
## WS MICRO STUDIES

For each program that uses each study,.characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices).

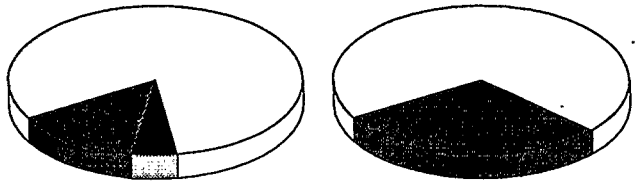
### ADEQUACY OF STUDY DESIGN



**STATES**
51% positive
4% negative
45% no response

**REGIONS**
40% positive
10% positive and negative
10% negative
40% no response

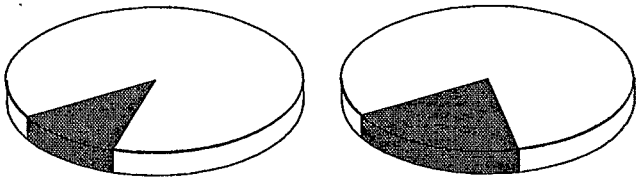
### ADEQUACY OF QUANTITY OF PE SAMPLES



**STATES**
14% positive
5% negative
81% no response

**REGIONS**
30% positive
70% no response

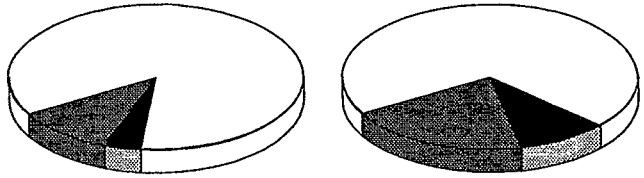
### ADEQUACY OF ANALYTE COVERAGE



**STATES**
12% positive
88% no response

**REGIONS**
20% positive
80% no response

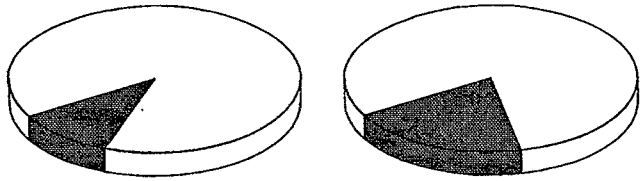
### ADEQUACY OF ANALYTE CONCENTRATION



**STATES**
11% positive
4% negative
85% no response

**REGIONS**
20% positive
10% negative
70% no response

### ADEQUACY OF MATRICES TESTED



**STATES**
11% positive
89% no response

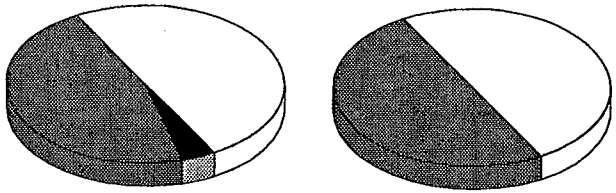
**REGIONS**
20% positive
80% no response

# TECHNICAL ADEQUACY OF PE STUDIES

## WP STUDIES

For each program that uses each study, characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices).

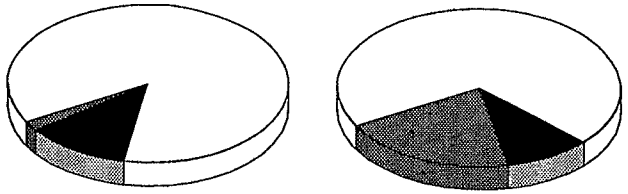
### ADEQUACY OF STUDY DESIGN



**STATES**
46% positive
4% negative
50% no response

**REGIONS**
50% positive
50% no response

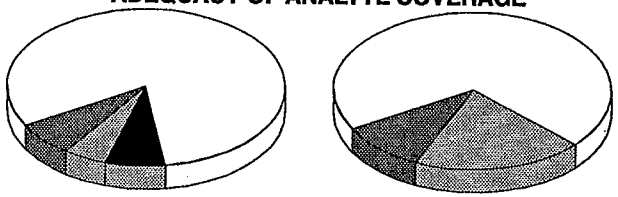
### ADEQUACY OF QUANTITY OF PE SAMPLES



**STATES**
2% positive
12% negative
86% no response

**REGIONS**
20% positive
10% negative
70% no response

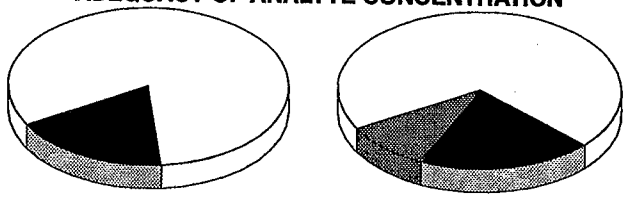
### ADEQUACY OF ANALYTE COVERAGE



**STATES**
7% positive
5% positive and negative
7% negative
81% no response

**REGIONS**
10% positive
20% positive and negative
70% no response

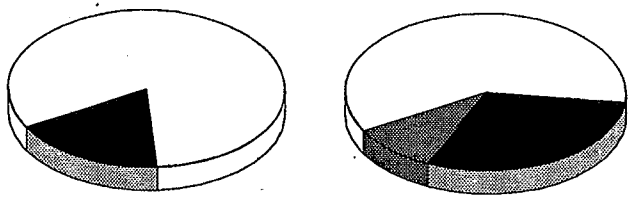
### ADEQUACY OF ANALYTE CONCENTRATION



**STATES**
18% negative
82% no response

**REGIONS**
10% positive
20% negative
70% no response

### ADEQUACY OF MATRICES TESTED



**STATES**
18% negative
82% no response

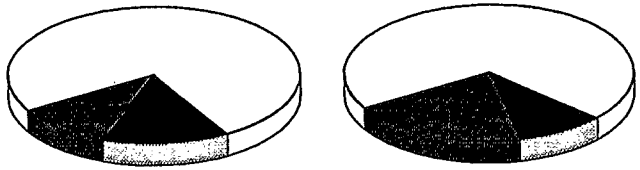
**REGIONS**
10% positive
30% negative
60% no response

# TECHNICAL ADEQUACY OF PE STUDIES

## DMRQA STUDIES

For each program that uses each study, characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices).

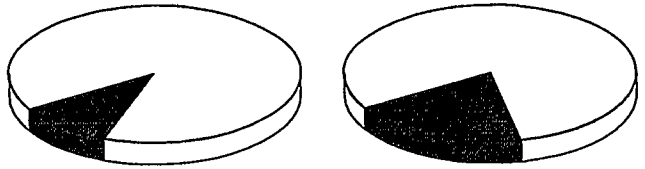
### ADEQUACY OF STUDY DESIGN



**STATES**
11% positive
14% negative
75% no response

**REGIONS**
20% positive
10% negative
70% no response

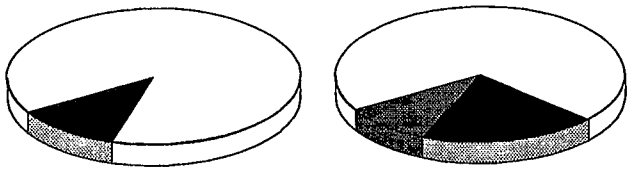
### ADEQUACY OF QUANTITY OF PE SAMPLES



**STATES**
11% positive
89% no response

**REGIONS**
20% positive
80% no response

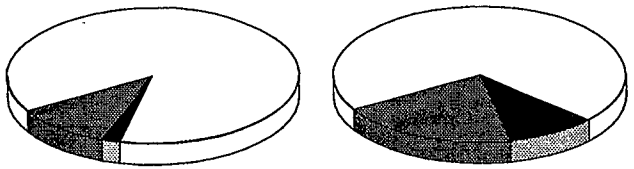
### ADEQUACY OF ANALYTE COVERAGE



**STATES**
12% negative
88% no response

**REGIONS**
10% positive
20% negative
70% no response

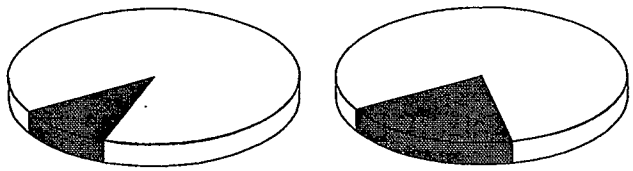
### ADEQUACY OF ANALYTE CONCENTRATION



**STATES**
11% positive
2% negative
87% no response

**REGIONS**
46% positive
4% negative
50% no response

### ADEQUACY OF MATRICES TESTED



**STATES**
11% positive
89% no response

**REGIONS**
20% positive
80% no response

## PRELIMINARY INSIGHTS: WP NEEDS FOR PE STUDIES ARE INCREASING

For each program that uses each study, characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices).

| MATRICES | ANALYTES |
|---|---|
| Marine | Not Specified |
| Estuarine water | Not Specified |
| Wastewater | Not Specified |
| Soil, Sediment and Sludge | PCBs<br>Total metals<br>BTex and other HCs |
| Waste Oil | Metals<br>Total HCs |
| Flammable waste | Flash point |
| Microbiologicals | Giardia<br>Cryptosporidium<br>Legionella<br>Viruses |
| Fish tissue (filets and livers) | Trace metals<br>Organics<br>Pesticides<br>Herbicides |
| Invertebrates | Same as fish tissue |
| Plankton | Same as fish tissue |
| Biological materials (e.g., mammals) | Same as fish tissue |

## ADDITIONAL ANALYTES IN DISTILLED WATER MATRIX

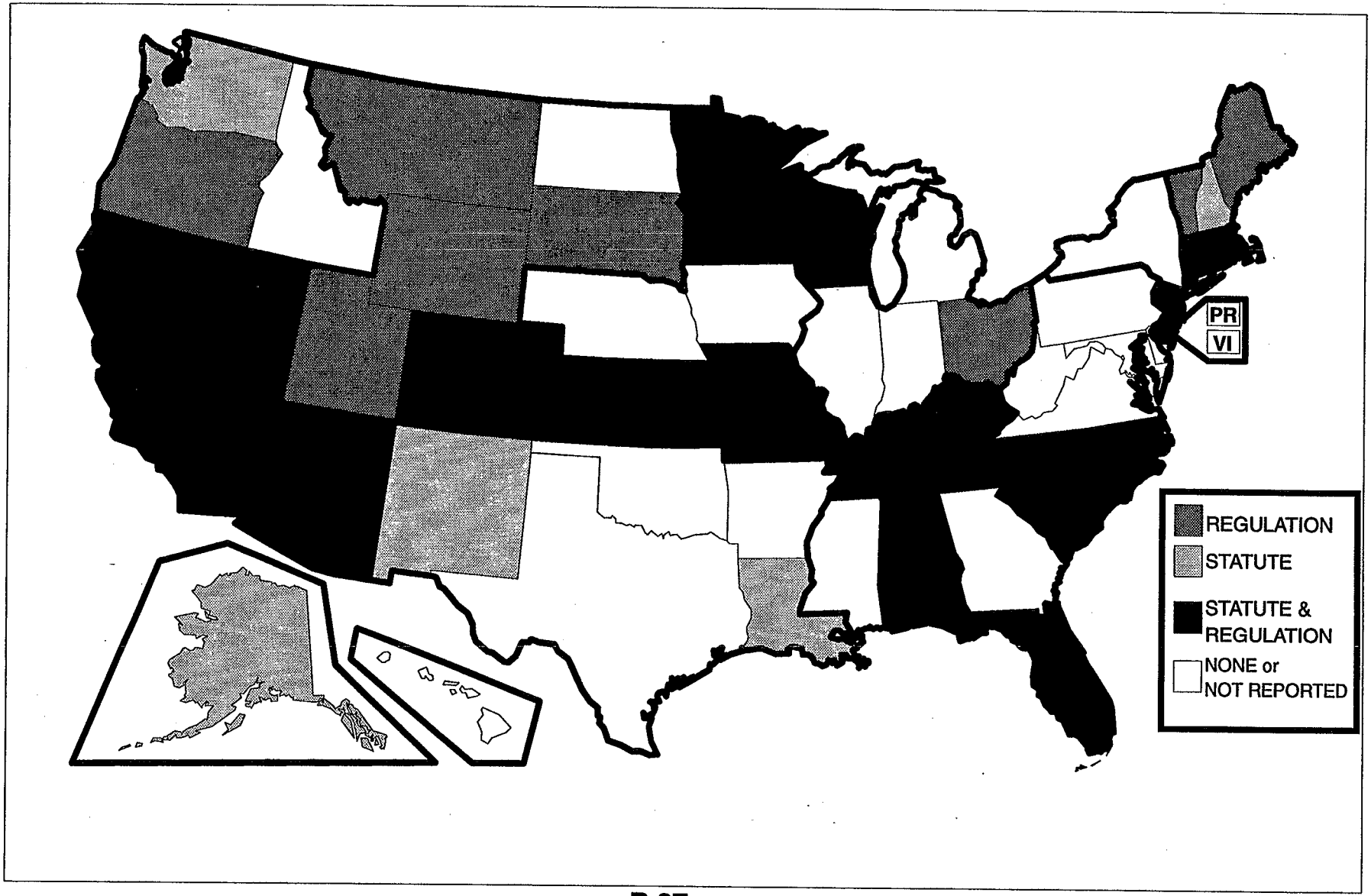
For each program that uses each study, characterize whether the current study is adequate to meet program quality assurance goals (i.e., sufficient quantity, frequency, analyte coverage, concentrations, matrices).

| Water Polllution Studies (WP) | Water Supply Studies (WS) | Discharge Monitoring Report QA Studies (DMRQA) |
|---|---|---|
| Furans | PCBs (e.g., Aroclors) | Organics |
| Herbicides | Asbestos | |
| Barium | Dioxin | |
| PAH | Iron | |
| Phthalate Esters | Zinc | |
| Radio Chemistry | Alumunum | |
| BNAs | Manganese | |
| Chlorophyll | Chloride | |
| Noble Metals | Phosphate | |
| | BNAs | |
| | Color | |
| | Odor | |
| | Foaming Agents | |
| | Secondary Analyte | |

# STATES WITH STATUTES AND REGULATIONS REQUIRING PE STUDIES

## WS CHEM STUDIES

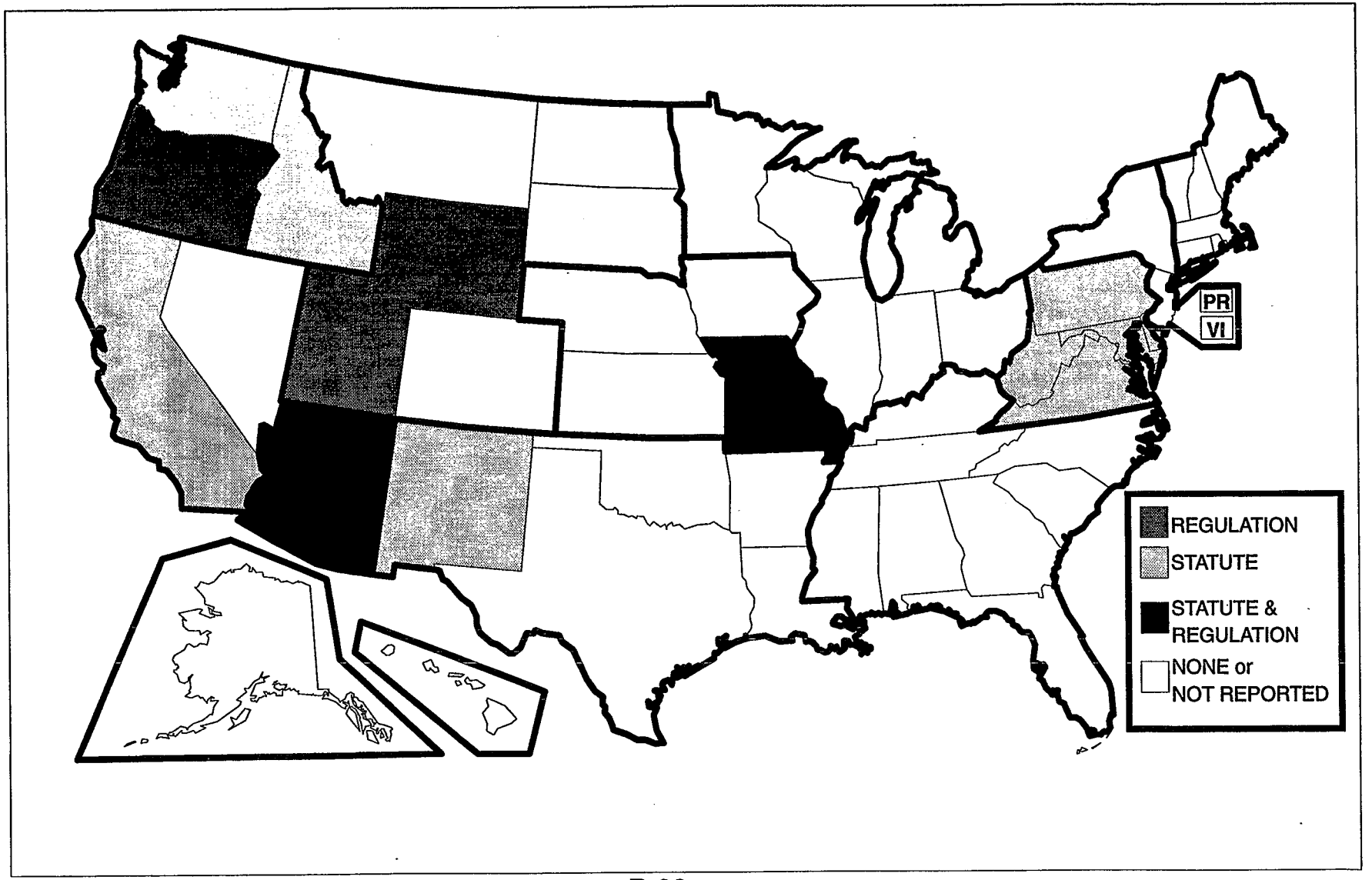
For each state program, are the studies used required by state regulation or statute?



# STATES WITH STATUTES AND REGULATIONS REQUIRING PE STUDIES

## WS MICRO STUDIES

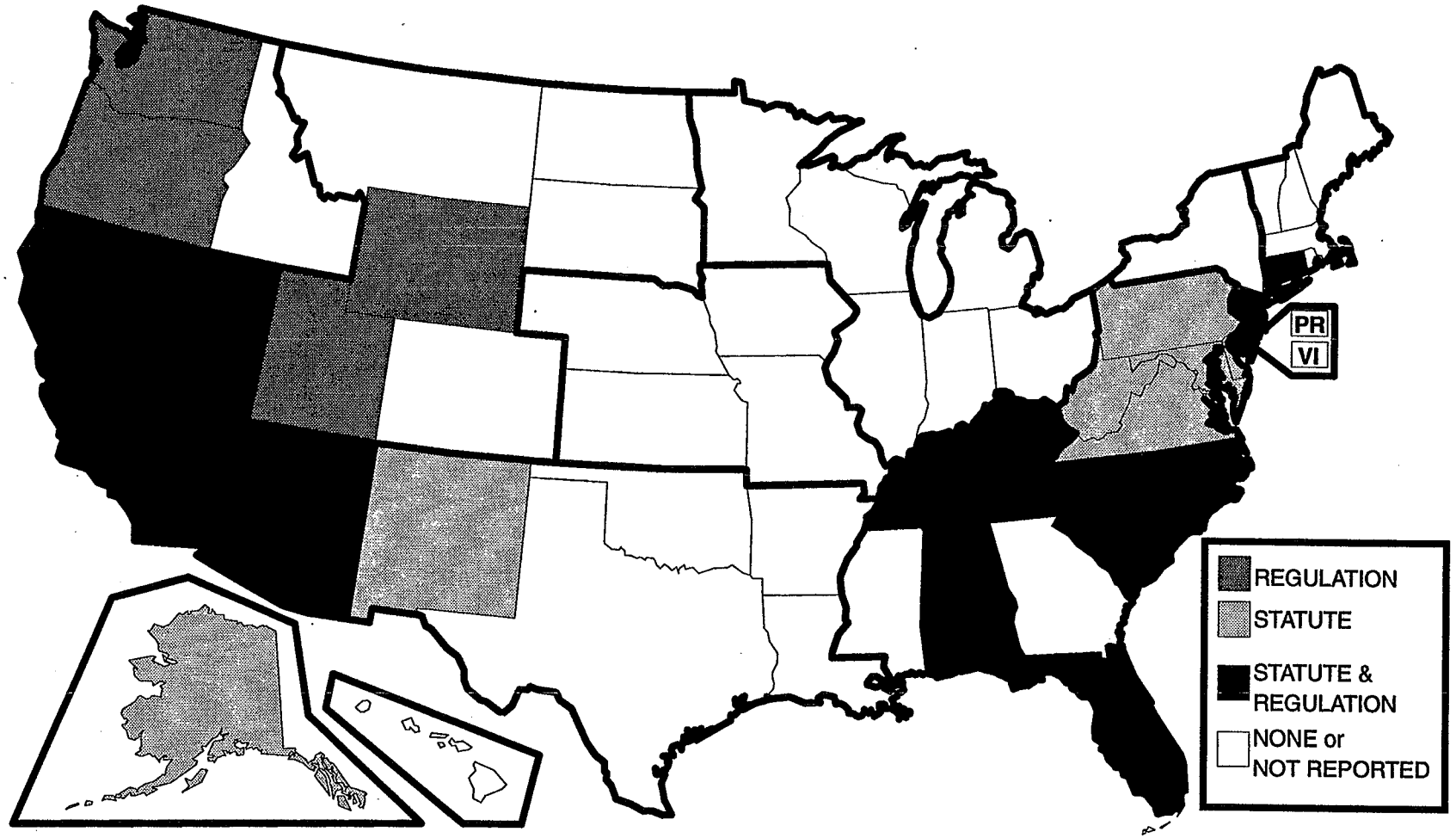
For each state program, are the studies used required by state regulation or statute?



# STATES WITH STATUTES AND REGULATIONS REQUIRING PE STUDIES

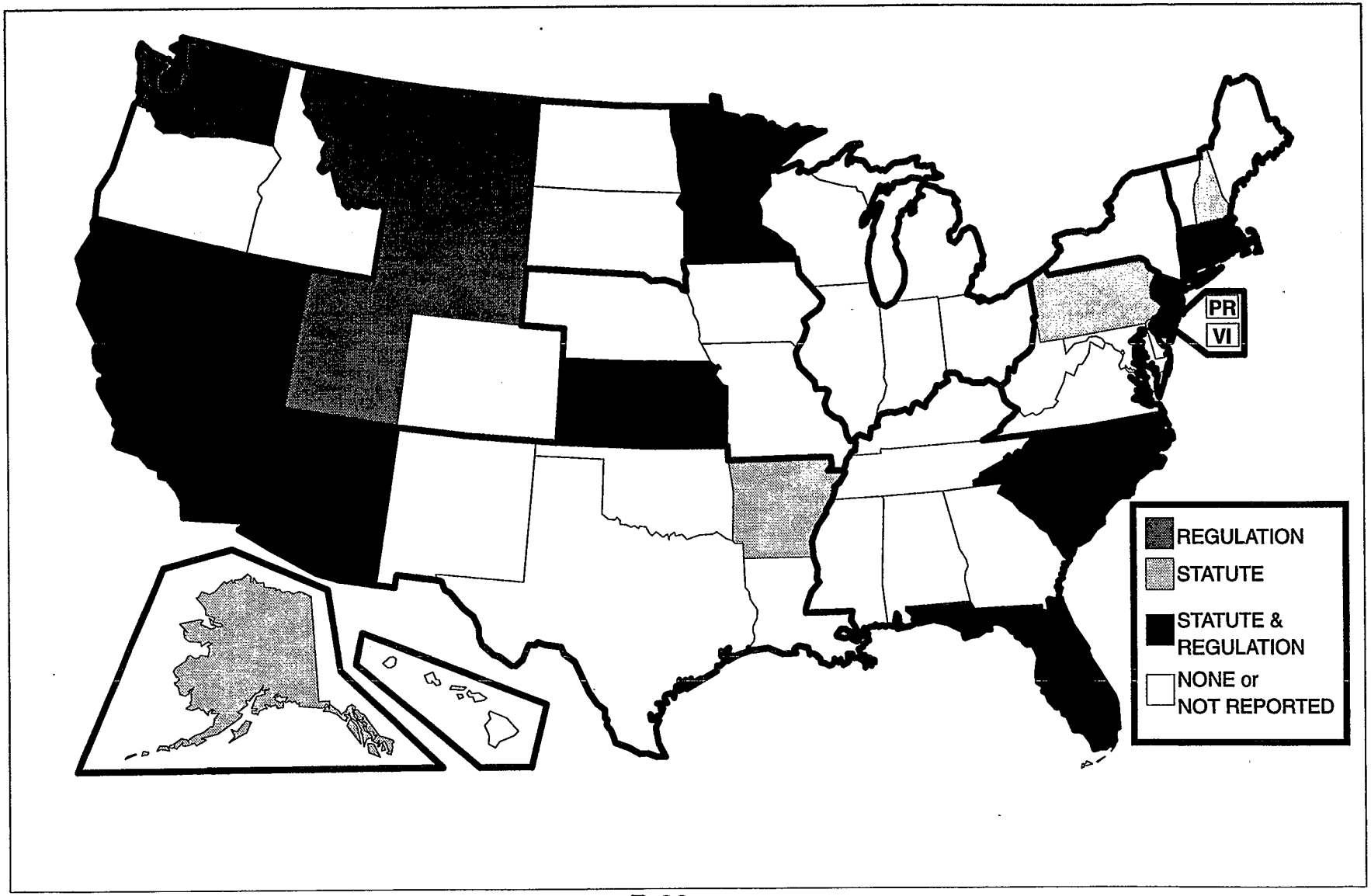
## WS RAD STUDIES

For each state program, are the studies used required by state regulation or statute?



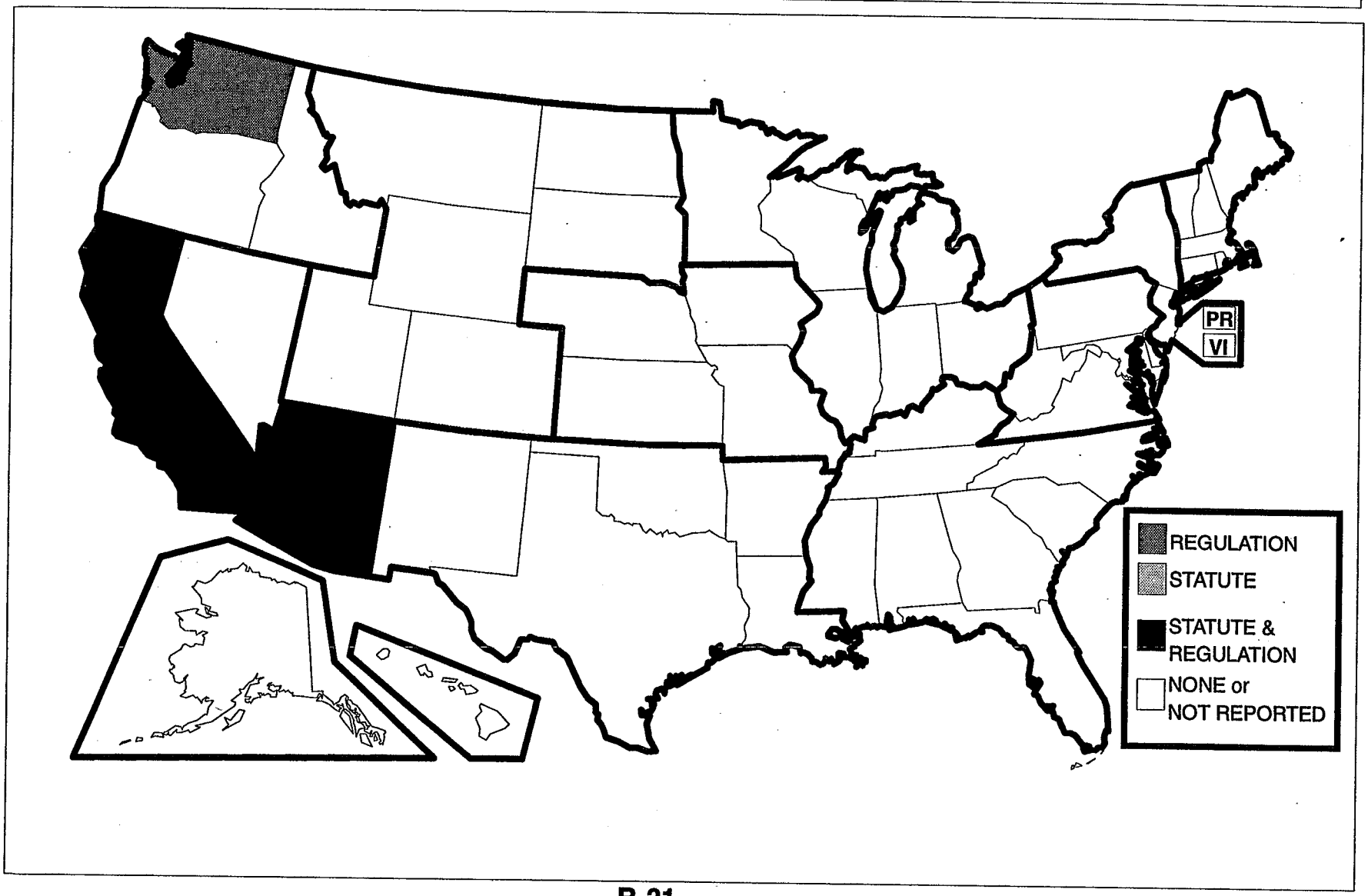
# STATES WITH STATUTES AND REGULATIONS REQUIRING PE STUDIES
## WP STUDIES

For each state program, are the studies used required by state regulation or statute?



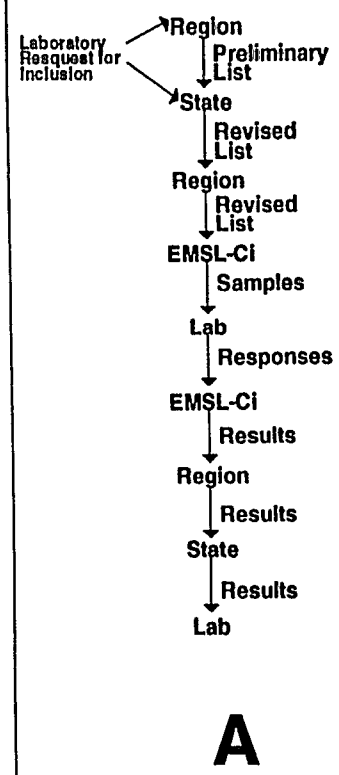
# STATES WITH STATUTES AND REGULATIONS REQUIRING PE STUDIES
## DMRQA STUDIES

For each state program, are the studies used required by state regulation or statute?

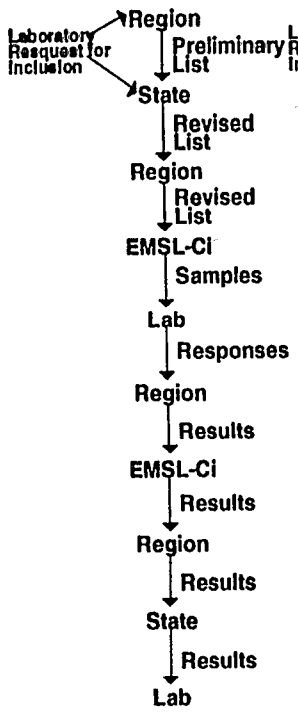


# General WP & WS (Chem) Processes

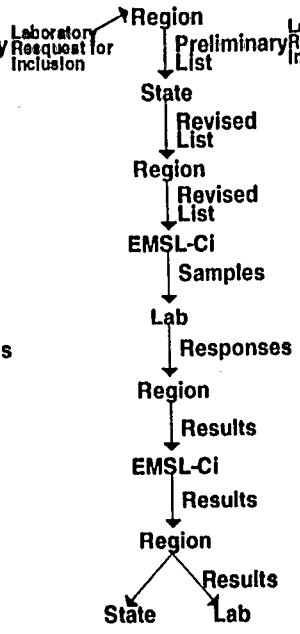
Describe the process by which the Region manages, oversees, administers, or organizes participation in the PE studies. How and by whom are decisions made concerning which laboratories participate and how often? Describe Regional and state policies for including laboratories in the studies.



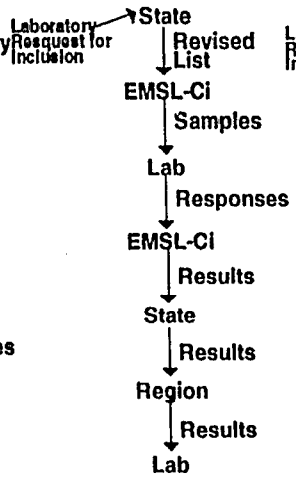

A



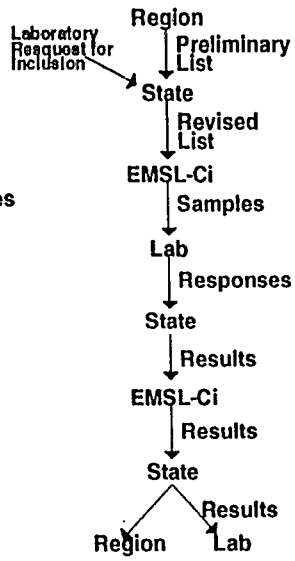

B



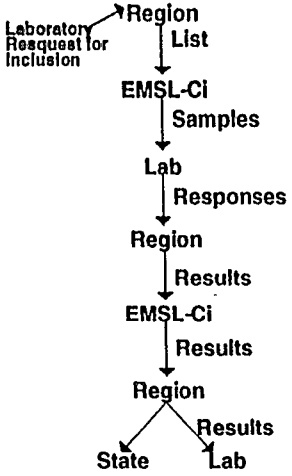

C




D




E

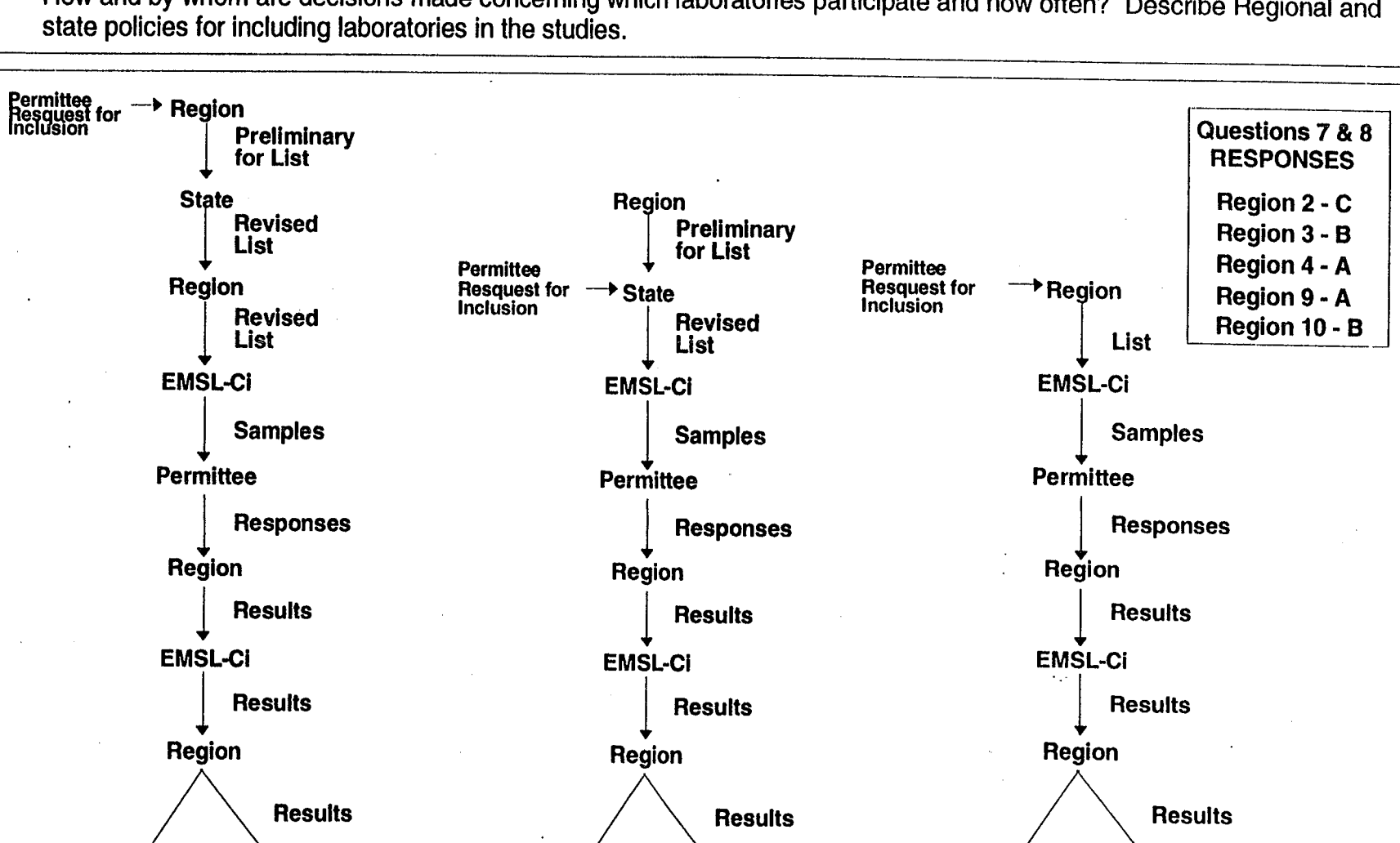



F

| Question 7 & 8 RESPONSES |
|---|
| Region 1 - B |
| Region 3 - A |
| Region 4 - A |
| Region 6 - C |
| Region 9 - C |
| Region 10 (WP) - F |
| Region 10 (WS) - B |
| NJ, CA, HI, NV - D |
| VA, MD, PA - E |
| NY - None |

# General DMR-QA Processes

Describe the process by which the Region manages, oversees, administers, or organizes participation in the PE studies. How and by whom are decisions made concerning which laboratories participate and how often? Describe Regional and state policies for including laboratories in the studies.



*APPENDIX C*

*FY 1992 RESOURCE REQUIREMENTS FOR*
*WATER PROGRAM PERFORMANCE EVALUATION STUDIES*
*BY STUDY PHASE*

# OFFICE OF WATER PE STUDIES
# DESCRIPTION OF THE PE STUDY PROCESS

## PHASE I: Study Planning

FY92 RESOURCE REQUIREMENTS

| STEP | PARTICIPANTS | WS CHEM[1] 2 Studies/Year FTE | WS CHEM[1] 2 Studies/Year EXTRA MURAL* | WS MICRO[2] 2 Studies/Year FTE | WS MICRO[2] 2 Studies/Year EXTRA MURAL* | WP[3] 2 Studies/Year FTE | WP[3] 2 Studies/Year EXTRA MURAL* | DMRQA CHEM[4] 1 Study/Year FTE | DMRQA CHEM[4] 1 Study/Year EXTRA MURAL* | DMRQA TOX[5] 1 Study/Year FTE | DMRQA TOX[5] 1 Study/Year EXTRA MURAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Research on new sample designs, statistical procedures, new reference toxicants, etc. | QARD<br>EMRD<br>TAI<br>Narragansett | 0.25 | NA | 0.04 | NA | 0.04 | NA | 0.01 | NA | 0.25 | 84.8K |
| 2. Produce a draft study design which specifies:<br>-Samples to be produced,<br>-Analytes in each sample,<br>-Whether participant responses for each sample will be qualitative, quantitative or both,<br>-Target true values for each analyte in each sample,<br>-Sample production design,<br>-Sample packing plan. | QARD<br>EMRD<br>TAI<br>Office of Water<br>Bionetics<br>Narragansett | 0.25 | NA | 0.01 | 46.2K | 0.05 | NA | 0.05 + OW? | 1.1K | 0.15 + OW? | 22.1K |
| 3. Draft schedule of activities; distribute for review; generate final schedule. | QARD<br>Bionetics | 0.02 | NA | 0.01 | 4.6K | 0.03 | NA | 0.03 | NA | 0.01 | NA |
| 4. Generate participant instructions and reporting forms. | QARD<br>EMRD<br>Narragansett<br>Office of Water<br>TAI<br>Bionetics | 0.15 | NA | 0.05 | 2.0K | 0.05 | NA | 0.05 + OW? | NA | 0.15 + OW? | 25.8K |
| 5. Prepare study announcement and shipping memoranda. | QARD<br>Office of Water<br>Bionetics | 0.04 | NA | 0.01 | 2.6K | 0.05 | NA | (OW?) | 4.4K | (OW?) | 3.7K |

*Based on cost of average contractor workyear.

OFFICE OF WATER PE STUDIES
DESCRIPTION OF THE PE STUDY PROCESS

PHASE I: Study Planning - Continued

| STEP | PARTICIPANTS | FY92 RESOURCE REQUIREMENTS* WS CHEM[1] 2 Studies/Year FTE | WS CHEM[1] 2 Studies/Year EXTRA MURAL* | WS MICRO[2] 2 Studies/Year FTE | WS MICRO[2] 2 Studies/Year EXTRA MURAL* | WP[3] 2 Studies/Year FTE | WP[3] 2 Studies/Year EXTRA MURAL* | DMRQA CHEM[4] 1 Study/Year FTE | DMRQA CHEM[4] 1 Study/Year EXTRA MURAL* | DMRQA TOX5[5] 1 Study/Year FTE | DMRQA TOX5[5] 1 Study/Year EXTRA MURAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6. Prepare initial participant shipping list for each nominating office based on participant lists from previous study in the series. | QARD<br>Bionetics | 0.04 | 2.7K | 0.01 | 3.3K | 0.05 | 3.9K | NA | 19.8K | NA | 3.7K |
| 7. Distribute announcement memo, shipping lists, and updated instructions to nominating offices and others. | QARD<br>CSC<br>Bionetics | 0.04 | NA | 0.01 | NA | 0.05 | NA | NA | 7.7K | NA | NA |
| 8. Review, update and return participant list. | Regions<br>States<br>ORD<br>Bionetics | X** | NA | X | NA | X | NA | X | NA | X | NA |
| 9. Produce final participants shipping lists. | QARD<br>CSC<br>Bionetics | 0.04 | 2.7K | 0.01 | 4.0K | 0.05 | 3.9K | NA | 12.1K | NA | 33.9K |
| 10. Modify all data handling to reflect study design. | CSC<br>Bionetics | NA | 17.0K | NA | 3.3K | NA | 23.3K | NA | 20.9K | NA | 7.4K |

*Based on cost of average contractor workyear.
**Resources for regions, states, etc. not included.

OFFICE OF WATER PE STUDIES
DESCRIPTION OF THE PE STUDY PROCESS

PHASE II: Production and Distribution

FY92 RESOURCE REQUIREMENTS

| STEP | PARTICIPANTS | WS CHEM[1] 2 Studies/Year FTE | WS CHEM[1] 2 Studies/Year EXTRA MURAL* | WS MICRO[2] 2 Studies/Year FTE | WS MICRO[2] 2 Studies/Year EXTRA MURAL* | WP[3] 2 Studies/Year FTE | WP[3] 2 Studies/Year EXTRA MURAL* | DMRQA CHEM[4] 1 Study/Year FTE | DMRQA CHEM[4] 1 Study/Year EXTRA MURAL* | DMRQA TOX[5] 1 Study/Year FTE | DMRQA TOX[5] 1 Study/Year EXTRA MURAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Produce sample batches; package and label ampuls. | Bionetics | NA | 137.6K | NA | 58.7K | NA | 168.3K | NA | 66.0K | NA | 15.5K |
| 2. For each sample batch, verify the following:<br>- chemical analyses and approve samples for use,<br>-The actual value for each analyte is consistent with the planned true value,<br>-The sample batch is homogeneous among ampules,<br>-The sample batch is stable over time. | QARD<br>TAI<br>Ref labs | 2.15 | 147.8K | 0.20 | 33.0K | 1.0 | 120.2K | 0.55 | 81.4K | 0.08 | 22.1K |
| 3. Store samples until needed. | Bionetics | NA | 2.0K | NA | 4.6K | NA | 2.3K | NA | 8.8K | NA | 9.6K |
| 4. Produce sample kits and distribute to participants (includes required kits and sample shipment documents). | QARD<br>Bionetics | NA | 40.2K | 0.10 | 23.7K | NA | 76.0K | NA | 84.7K | NA | 8.1K |
| 5. Monitor production and distribution process; verify the schedule is met. | QARD | 0.10 | NA | 0.30 | NA | 0.05 | NA | 0.05 | NA | 0.02 | NA |
| 6. Provide technical and administrative assistance to participants. Respond to telephone inquiries. | QARD<br>Bionetics<br>Office of Water | 0.15 | NA | NA | 19.1K | 0.10 | NA | NA | 34.1K | 0.05 + OW? | 26.6K |

*Based on cost of average contractor workyear

# OFFICE OF WATER PE STUDIES
# DESCRIPTION OF THE PE STUDY PROCESS

PHASE III: Results

FY92 RESOURCE REQUIREMENTS

| STEP | PARTICIPANTS | WS CHEM[1] 2 Studies/Year FTE | WS CHEM[1] 2 Studies/Year EXTRA MURAL | WS MICRO[2] 2 Studies/Year FTE | WS MICRO[2] 2 Studies/Year EXTRA MURAL* | WP[3] 2 Studies/Year FTE | WP[3] 2 Studies/Year EXTRA MURAL* | DMRQA CHEM[4] 1 Study/Year FTE | DMRQA CHEM[4] 1 Study/Year EXTRA MURAL* | DMRQA TOX[5] 1 Study/Year FTE | DMRQA TOX[5] 1 Study/Year EXTRA MURAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Receive and log participant responses. Arrange for data entry. Oversee data entry. | QARD CSC Bionetics | 0.09 | 6.1K | 0.01 | 0.7K | 0.10 | 7.8K | NA | 157.3K | NA | 3.7K |
| 2. Review and edit tape error report; investigate errors; make corrections; verify participant accounts. | QARD CSC Bionetics | 0.20 | 2.7K | 0.05 | 0.7K | 0.15 | 3.9K | 0.10 | 27.5K | NA | 0.7K |
| 3. Run evaluation statistics, verify true values and performance evaluation limits. | QARD CSC | 0.09 | 2.7K | 0.01 | 0.7K | 0.10 | 3.9K | NA | 4.4K | NA | 11.8K |
| 4. Generate complete files containing all report forms, data sets and reports. Store. | QARD CSC | 0.04 | 15.7K | 0.01 | 1.3K | 0.05 | 19.4K | NA | 8.8K | NA | 1.5K |
| 5. Update historical statistical files for the study series. | CSC | NA | 6.1K | NA | 0.7K | NA | 7.8K | NA | 4.4K | NA | 0.7K |
| 6. Prepare Performance of EPA Laboratories Report, and cover memorandum for distribution of study results. | QARD Office of Water Bionetics | 0.20 | NA | NA | 4.6K | 0.15 | NA | (OW?) | 3.3K | 0.05 + OW? | 7.4K |
| 7. Generate and distribute results to all nominating offices and EPA offices. | QARD CSC Bionetics | 0.04 | 2.7K | 0.01 | 0.7K | 0.05 | 3.9K | NA | 46.2K | NA | 1.5K |
| 8. Follow up on study results | Regions and States | X | NA | X | NA | X | NA | X | NA | X | NA |
| 9. Provide technical assistance for follow-up. | QARD EMRD Bionetics Narragansett | 0.25 | NA | 0.05 | 28.4K | 0.25 | NA | 0.05 | 34.1K | 0.09 | 3.7K |

*Based on cost of average contractor workyear.

OFFICE OF WATER PE STUDIES
DESCRIPTION OF THE PE STUDY PROCESS

HASE III: Results - Continued

FY92 RESOURCE REQUIREMENTS

| TEP | PARTICIPANTS | WS CHEM[1] 2 Studies/Year FTE | WS CHEM[1] 2 Studies/Year EXTRA MURAL* | WS MICRO[2] 2 Studies/Year FTE | WS MICRO[2] 2 Studies/Year EXTRA MURAL* | WP[3] 2 Studies/Year FTE | WP[3] 2 Studies/Year EXTRA MURAL* | DMRQA CHEM[4] 1 Study/Year FTE | DMRQA CHEM[4] 1 Study/Year EXTRA MURAL* | DMRQA TOX[5] 1 Study/Year FTE | DMRQA TOX[5] 1 Study/Year EXTRA MURAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0. Copy appropriate data les to public access account; :move outdated files from ublic access account. | CSC | NA | 2.7K | NA | 0.7K | NA | 3.9K | NA | NA | NA | NA |
| 1. Update historical parti-ipants list. | QARD | 0.04 | NA | 0.01 | NA | 0.05 | NA | NA | NA | NA | NA |
| 2. Compile summary of rrors made in data entry rovide feedback to data ntry service. | QARD | 0.04 | NA | 0.01 | NA | 0.05 | NA | NA | NA | NA | NA |
| 3. Update and maintains ll computer programs and elated documentation. | CSC | NA | 6.1K | NA | 0.7K | NA | 7.8K | NA | 9.9K | NA | 0.7K |
| TOTALS: | | 4.22 | 395.0K | 0.91 | 244.0K | 2.47 | 456.0K | 0.89 | 637.0K | 0.85 | 295.1K |

FTE TOTAL = 9.34
EXTRAMURAL TOTAL = 25.27

. Per WS Chem Study: Approximately 2000 laboratories; 98 regulated and unregulated analytes; 29 separate solutions; 58,000 ampuls produced, verified and distributed.

. Per WS Micro Study: Approximately 260 laboratories, detects presence or absence of coliform and fecal microorganisms or E. Coli; 15 ampuls per laboratory; false positives can be determined; coliform tests must be onfirmed as fecal coliform.

. Per WP Study: Approximately 2500 laboratories; 76 analytes; 38 separate solutions; 95,000 ampuls produced, verified and distributed.

. Per DMR-QA Chem Study: Approximately 7500 laboratories; 30 analytes; 10 separate solutions; 75,000 ampuls produced, verified and distributed.

. Per DMR-QA Tox Study: Approximately 400 laboratories representing 2500 major dischargers; solid and liquid reference toxicants tested on four different organisms for both acute and chronic effects.

Based on cost of average contractor workyear.

*APPENDIX D*

*OFFICE OF WATER PERFORMANCE EVALUATION STUDY PROJECT*
*ISSUES IDENTIFIED DURING STAFF INTERVIEWS*

OFFICE OF WATER PE STUDY PROJECT
SUMMARY OF ISSUES BY TYPE, PROGRAM AND STUDY
July 9, 1992

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| DESIGN ISSUES | | |
| 1. PEs do not measure routine lab performance | OGWDW | WS |
| | OST | WS<br>WP<br>DMRQA<br>OST |
| | Regions | WS<br>WP<br>DMRQA |
| A. Directions unclear | OGWDW | WS |
| | Regions | WS<br>WP<br>DMRQA |
| B. No enforcement mechanism for directions | OGWDW | WS |
| | Regions | WS<br>WP<br>DMRQA |
| C. Concentration ranges known in advance | OGWDW | WS |
| | Regions | WS<br>WP<br>DMRQA |
| D. Samples not "double blind" | OGWDW | WS |
| | Regions | WS<br>WP<br>DMRQA |
| E. Linkage to performance standards/ certification status leads to "over performance" | OGWDW | WS |
| | Regions | WS<br>WP |

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| DESIGN ISSUES (CONT) | | |
| 2. Considerable duplication across studies | OST | WS<br>WP<br>DMRQA |
| | OWEC | WP<br>DMRQA |
| | Regions | WS<br>WP<br>DMRQA |
| ADMINISTRATION ISSUES | | |
| 1. Criteria for including laboratories are inconsistent/unclear | Regions | WS<br>WP |
| 2. Number of studies overloads Regional and state laboratories | OGWDW | WS<br>WP |
| | Regions | WS<br>WP |
| 3. Inefficiencies in sample distribution exist | | |
| A. Laboratories receive all samples regardless of need | OWEC | DMRQA |
| | Regions | WP<br>DMRQA |
| B. Laboratories receive multiple sets of samples | OWEC | DMRQA |
| | Regions | DMRQA |
| C. Studies too infrequent for effective data quality control | Regions | WS<br>DMRQA |
| USE ISSUES | | |
| 1. Study data inappropriately used for numeric standard-setting | OGWDW | WS |
| 2. Used for state certification programs | OWEC | DMRQA |
| | Regions | WS<br>WP<br>DMRQA |

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| USE ISSUES (CONT) | | |
| 3. Used for non-water program applications (e.g., RCRA method validation, coal mining laboratory certification) | Regions | WP |
| FUNDING ISSUES | | |
| 1. Users do not contribute to funding accordingly | OWOW | WP |
| 2. Privatization may be appropriate | OWEC | DMRQA |
| 3. Effect of privatization on state programs | Regions | WS<br>WP<br>DMRQA |

OFFICE OF WATER PE STUDY PROJECT
SUMMARY OF ISSUES FROM EMSL-CINCINNATI INTERVIEWS
DRINKING WATER PROGRAM/WATER SUPPLY STUDY
August 5, 1992

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| **DESIGN ISSUES** | | |
| 1. Study design is cumbersome and expensive. | EMSL | WS |
| A. Rapidly increasing number of analytes adds cost and increases design complexity. | EMSL | WS |
| 2. PEs do not measure routine laboratory performance. | EMSL<br>TSD | WS |
| A. Laboratories anticipate concentration ranges based on their experience and knowledge of MCLs and acceptance levels. | EMSL | ALL |
| B. Samples are not "double blind." | EMSL | ALL |
| C. Linkage to certification status leads to "over performance." | EMSL | ALL |
| 3. Micro PEs not required by national program for local Micro laboratories. | EMSL<br>TSD | WS |
| A. Inconsistent QA policy (vs. Chem and Rad). | EMSL<br>TSD | WS |
| B. Some states have implemented programs on their own. | EMSL<br>Regions | WS |
| C. Expanding micro PEs would be expensive; current production at capacity. | EMSL<br>Bionetics | WS |
| 4. Allowable analytical methods are not evolving with technological advances. | EMSL<br>TSD | WS |
| A. PE analyte concentrations based on least sensitive allowable method. | EMSL<br>TSD | WS |
| B. Laboratories may "re-tool" for PE studies, or, in some cases, must maintain old, special equipment for PEs (e.g., packed column method for THMs). | TSD | WS |

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| DESIGN ISSUES (CONT) | | |
| 5. Fixed acceptance limits create technical performance problems at concentrations near method detection limits. | EMSL | WS |
| A. Initial high failure rate due to narrow acceptance range. | EMSL | WS |
| B. Assumes linearity in non-linear range; scientifically invalid. | EMSL | WS |
| 6. Acceptance range limits set at 95% level; acceptable range narrower than WP and DMRQA (barrier to consolidation). | EMSL | WS |
| 7. Conversion of analytes from unregulated to regulated status should be timed to allow for certification prior to effective date of rules. | EMSL | WS |
| 8. Utility of requiring analysis of a high and low concentration ampul for each analyte. | EMSL | WS |
| USE ISSUES | | |
| 1. Using PE study data for standard-setting and regulation development. | TSD<br>EMSL | WS |
| A. PE studies are an efficient way to generate method performance database. | EMSL | |
| B. Separate program to test method performance and generate data needed standard-setting should be established. | TSD | WS |
| C. PE study data do not represent typical or average laboratory conditions and are therefore not appropriate for standard-setting. | EMSL<br>TSD | WS |
| D. Unregulated chemicals add to expense and complexity of study design. | EMSL | WS |
| 2. Micro PEs used for ambient and wastewater monitoring laboratories (especially states). | EMSL | WS |

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| **ADMINISTRATION ISSUES** | | |
| 1. Report distribution process is cumbersome and time consuming. | EMSL | ALL |
| A. Minimum of 4 copies per laboratory must be distributed. | EMSL | ALL |
| B. EMSL distributes to many sources (Regions, states, others). | EMSL | ALL |
| 2. Study results often not timely. Considerable delays reported. | TSD Regions | WS |
| 3. Modernization | EMSL | ALL |
| A. Automated information handling and data access. | EMSL | ALL |
| B. Linkage to other water databases. | EMSL | ALL |
| C. Automating the production process. | EMSL | ALL |
| **FUNDING ISSUES** | | |
| 1. Study growing in scope and complexity; costs increasing; funding steady/eroding. | EMSL | WS |
| 2. Asbestos PE material requires funding for further development (stability study). | EMSL | WS |
| 3. Funding required to expand coverage of Micro PE study. | EMSL | WS |

OFFICE OF WATER PE STUDY PROJECT
SUMMARY OF ISSUES RESULTING FROM EMSL-CI VISIT/WP

August 10, 1992

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| **DESIGN ISSUES** | | |
| 1. Analytes "frozen" in early 1970s. | EMSL | WP |
| A. No guidance on analytes or concentrations from Headquarters. | EMSL | WP |
| B. Design does not necessarily reflect current uses of study results. | EMSL | WP |
| 2. Analytes overlap with DMRQA Chem. and WS. | EMSL | WP |
| 3. Microbiological PE needed for surface water monitoring. | EMSL | WP |

OFFICE OF WATER PE STUDY PROJECT
SUMMARY OF ISSUES RESULTING FROM EMSL-CI VISIT/DMRQA

August 10, 1992

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| **DESIGN ISSUES** | | |
| 1. WET study methods | EMSL | DMRQA/WET |
| A. Number of methods and variations makes study complicated. | EMSL | DMRQA/WET |
| B. Methods not necessarily representative of monitoring requirements. | EMSL | DMRQA/WET |
| **ADMINISTRATION ISSUES** | | |
| 1. Test kits for Chemistry sent to permitees rather than to laboratories | EMSL | DMRQA/Chem |
| A. Identity and numbers of laboratories not known; sending kits to laboratories designated by permittees could save resources. | EMSL | DMRQA/Chem |
| B. Sending kits directly to designated laboratories requires additional resources for information management/tracking. | Bionetics | DMRQA |
| 2. List of recipients based on PCS; often out of date. | Bionetics | DMRQA |
| 3. Requirement for technical assistance to laboratories is significant (Bionetics receives ca. 1000 calls per month during the study; EMSL, regions and states also receive calls). | Bionetics EMSL Regions | ALL |
| A. Agency contact should be identified in study instructions. | EMSL | ALL |

| ISSUE | PROGRAM | STUDY |
|---|---|---|
| ADMINISTRATION ISSUES (CONT) | | |
| B. Policy needed for replacement of "lost" and/or "broken" ampuls. | EMSL<br>EMSL | ALL<br>DMRQA |
| 4. Automation requirements | EMSL | ALL |
| A. Handling of Announcement Letters should be automated. | | |
| B. Numbers of reports distributed for each laboratory (6) is unnecessary. Sending hard copies is costly and cumbersome. | EMSL | ALL |
| USE ISSUES | | |
| 1. WET data used for method validation only; not applicable for enforcement because of method complications. | EMSL | DMRQA/Chem |
| FUNDING ISSUES | | |
| 1. Resources required for technical assistance to laboratories. | EMSL | ALL |
| 2. Sending Chemistry test kits to laboratories designated by permitees may significantly decrease study costs. | EMSL | DMRQA/Chem |
| 3. WET should be expanded to include significant minor permittees. | EMSL | DMRQA/WET |

*APPENDIX E*

*OFFICE OF WATER PERFORMANCE EVALUATION STUDY PROJECT*
*SUMMARY OF ANALYTES BY STUDY*

***OFFICE OF WATER PE STUDY PROJECT***
***COMPARISON OF ANALYTES AND HISTORICAL CONCENTRATION RANGES***

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| **Trace Metals** | | | |
| Aluminum | .046 - 1.5 mg/L | .04 - 3.5 mg/L | .95 - 4 mg/L |
| Antimony | .006 - .015 | .015 - .2 | NT |
| Arsenic | .025 - .15 | .007 - .45 | .004 - .5 |
| Barium | .5 - 1.0 | NT | NT |
| Beryllium | .0004 - .01 | .006 - .9 | .002 - .1 |
| Boron | * | NT | NT |
| Cadmium | .0025 - .05 | .002 - .45 | .003 - .225 |
| Chromium | .05 - .2 | .006 - .9 | .05 - 1.0 |
| Colbalt | NT | .008 - .9 | .1 - .5 |
| Copper | .1 - 1.0 | .008 - .9 | .026 - 1.0 |
| Iron | NT | .01 - 1.9 | .3 - 4.0 |
| Lead | .0025 - .1 | .016 - 1.4 | .025 - .6 |
| Manganese | NT | .015 - 1.0 | .1 - 4.0 |
| Mercury | .0005 - .008 | .0003 - .05 | .0002 - .005 |
| Molybdenum | .003 - .07 | .003 - .08 | NT |
| Nickel | .15 - 1.9 | .012 - 2.2 | .071 - 2.92 |
| Selenium | .005 - .1 | .01 - .2 | .01 - .1 |
| Silver | .025 - .12 | .0005 - .017 | NT |
| Strontium | NT | .0015 - .085 | NT |
| Thallium | .002 - .01 | .003 - .1 | NT |
| Titanium | NT | .035 - .3 | NT |
| Vanadium | .022 - 1.9 | .022 - 10.0 | 6.0 - 20.0 |
| Zinc | .013 - 1.3 | .012 - 1.9 | .095 - 2.0 |
| **Nutrients** | | | |
| N-Nitrate | .1 - 10 mg/L | .25 - 15 mg/L | 2 - 40 mg/L |
| N-Nitrite | .05 - 2 | NT | NT |
| N-Ammonia | NT | .25 - 20 | 2 - 14.5 |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| N-TKN | NT | .35 - 35 mg/L | 3 - 36 mg/L |
| P-Orthophosphate | NT | .05 - 5.5 | .3 - 1.5 |
| P-Total Phosphate | NT | .15 - 10 | 0.8 - 3 |
| **Demand** | | | |
| BOD | NT | 10 - 225 | 15 - 45 |
| CBOD | NT | 10 - 200 | 14.8 - 40 |
| TOC | NT | 5 - 100 | 5 - 70 |
| COD | NT | 12 - 250 | 50 - 200 |
| **Cyanide** | .02 - 5.0** | .02 - 1 | 0.01 - 1 |
| **Residue** | | | |
| TSS/Non-filterable | NT | 20 - 100 | 23 - 50 |
| Turbidity | .5 - 8.0 NTU | NT | NT |
| Total Dissolved Solids | 200 - 400** | 30 - 650 | NT |
| **Other Chemistry** | | | |
| CaCO3/Ca++ | 90 - 250** | NT | NT |
| CaCO3/Alkalinity | 25 - 50** | 4.5 - 120 | NT |
| Calicum | NT | 1.3 - 110 | NT |
| Chloride | NT | 8.0 - 250 | NT |
| Chlorine (Total Residual) | .25 - 1.8** | .1 - 5.0 | 0.018 - 1 |
| Conductivity | NT | 50.0 - 1050 | NT |
| Corrositiviy (Agressive Index) | * | NT | NT |
| Corrositivity (Langlier Index) | * | NT | NT |
| Fluoride | .1 - 8 | .1 - 4 | NT |
| Hardness | NT | 12 - 350 | NT |
| Magnesium | NT | .6 -40 | NT |
| Oil and Grease | NT | 5 - 50 | 10 - 20 |
| pH | 6.0 - 9.3 (pH Units)** | 4.0 - 9.5 pH units | 6 - 9 pH Units |
| Potassium | NT | .8 - 40 | NT |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Sodium | 12 - 24 mg/L** | 5 - 125 mg/L | NT |
| Sulfate | 5.0 - 40** | 5 - 125 | NT |
| Total Phenolics (4-AAP) | NT | .02 - 5 | 0.003 - 0.6 |
| **Herbicides** | | | |
| 2,4 - D | .001 - .15 | NT | NT |
| 2,4,5 - TP (Silvex) | .004 - .025 | NT | NT |
| Bentazon | 1 - 20** | NT | NT |
| Dalapon | .0075 - .1** | NT | NT |
| DCPA Acid Metabolites | .1 - 2** | NT | NT |
| Dicamba | .32 - 2** | NT | NT |
| Dinoseb | .001 - .1** | NT | NT |
| Picloram | .0075 - .1** | NT | NT |
| Pentachlorophenol | .0004 - .1 | NT | NT |
| **Pesticides** | | | |
| Alachlor | .001 - .02 | NT | NT |
| Aldrin | NT | .0001 - .001 | NT |
| Atrazine | .003 - .03 | NT | NT |
| Bromocil | .0125 - .050** | NT | NT |
| Chlordane | .0007 - .005 | .001 - .015 | NT |
| DDT | NT | .0001 - .0015 | NT |
| DDE | NT | .0001 - .001 | NT |
| DDD | NT | .0001 - .0015 | NT |
| Dieldrin | NT | .0001 - .001 | NT |
| Diquat | .0025 - .05** | NT | NT |
| Endothall | .05 - .5** | NT | NT |
| Endrin | .0001 - .0015 | NT | NT |
| Glyphosate | .03 - .5** | NT | NT |
| Heptachlor | .00005 - .0025 | .00008 - .001 | NT |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Heptachlor Epoxide | .000075 - .0015 mg/L | .00008 - .001 mg/L | NT |
| Hexachlorocyclopentadiene | .00065 - .005 | NT | NT |
| Hexachlorobenzene | .00005 - .0025 | NT | NT |
| Lindane | .000075 - .0015 | NT | NT |
| Methoxychlor | .005 - .1 | NT | NT |
| Metolachlor | .00375 - .030** | NT | NT |
| Metribuzin | .00075 - .020** | NT | NT |
| Prometon | .0015 - .030** | NT | NT |
| Simazine | .02 - .2 | NT | NT |
| Toxaphene | .0025 - .015 | NT | NT |
| Trifluralin | .15 - 10 | NT | NT |
| **PCBs** | | | |
| Aroclor 1016/1242 | NT | .001 - .015 | NT |
| Aroclor 1248 | NT | .001 - .015 | NT |
| Aroclor 1260 | NT | .001 - .015 | NT |
| Aroclor 1232 | NT | .001 - .015 | NT |
| Aroclor 1254 | NT | .001 - .015 | NT |
| Decachlorobiphenyl | .0005 - .005** | NT | NT |
| **PCBs in Oil** | | | |
| Aroclor 1254 | NT | 10 - 50 | NT |
| Aroclor 1260 | NT | 7 - 50 | NT |
| Aroclor 1016/1242 | NT | 10 - 50 | NT |
| **Volatile Organics** | | | |
| Arbon Tetrachloride | .0025 - .02 | NT | NT |
| Benzene | .0025 - .02 | .004 - .1 | NT |
| Bromobenzene | .005 - .02** | NT | NT |
| Bromochloromethane | .002 - .02** | NT | NT |
| Bromodichloromethane | .01 - .03 | .005 - .065 | NT |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Bromoform | .01 - .04 mg/L | .003 - .07 mg/L | NT |
| Bromomethane | .005 - .02** | NT | NT |
| n-Butylbenzene | .002 - .02** | NT | NT |
| sec-Butylbenzene | .002 - .02** | NT | NT |
| tert-Butylbenzene | .002 - .02** | NT | NT |
| Carbontetrachloride | NT | .002 - .08 | NT |
| Chlorobenzene | .002 - .2 | .005 - .07 | NT |
| Chlorodibromoethane | .002 - .02** | NT | NT |
| Chloroethane | .002 - .02** | NT | NT |
| Chloroform | .01 - .06 | .005 - .075 | NT |
| Chloromethane | .005 - .02** | NT | NT |
| o-Chlorotoluene | .002 - .02** | NT | NT |
| p-Chlorotoluene | .002 - .02** | NT | NT |
| Dibromochloromethane | .01 - .03 | .003 - .065 | NT |
| 1,2-Dibromo-3-chloropropane | .0001 - .02 | NT | NT |
| Dibromomethane | .002 - .02** | NT | NT |
| m-Dichlorobenzene | .005 - .03** | .005 - .1 | NT |
| o-Dichlorobenzene | .005 - .02 | .0025 - .1 | NT |
| p-Dichlorobenzene | .0025 - .02 | .005 - .1 | NT |
| Dichlorodifluoromethane | .002 - .02** | NT | NT |
| 1,1-Dichloroethane | .002 - .02** | NT | NT |
| 1,2-Dichloroethane | .002 - .02 | .002 - .07 | NT |
| 1,1-Dichloroethene | .002 - .02 | NT | NT |
| cis-1,2-Dichloroethylene | .002 - .2 | NT | NT |
| trans-1,2-Dichloroethylene | .002 - .2 | NT | NT |
| Dichloromethane | .005 - .02** | NT | NT |
| 1,2-Dichloropropane | .0025 - .02 | NT | NT |
| 1,3-Dichloropropane | .0025 - .02** | NT | NT |
| 2,2-Dichloropropane | .005 - .02** | NT | NT |
| 1,1-Dichloropropene | .002 - .02** | NT | NT |

| ANALYTE | WS | WP | DMROA |
|---|---|---|---|
| cis-1,3-Dichloropropene | .002 - .02 mg/L** | NT | NT |
| trans-1,3-Dichloropropene | .002 - .02** | NT | NT |
| Ethylbenzene | .002 - .02 | .004 - .1 | NT |
| Ethylene Dibromide | .000025 - .02 | NT | NT |
| Fluorotrichloromethane | .002 - .02** | NT | NT |
| Hexachlorobutadiene | .002 - .02** | NT | NT |
| Isopropylbenzene | .002 - .02** | NT | NT |
| p-Isopropyltoluene | .002 - .02** | NT | NT |
| Methylene Chloride | NT | .004 - .075 | NT |
| n-Propylbenzene | .002 - .02** | NT | NT |
| Styrene | .002 - .2 | NT | NT |
| 1,1,1,2-Tetrachloroethane | .002 - .02** | NT | NT |
| 1,1,2,2-Tetrachloroethane | .002 - .02** | NT | Nt |
| Tetrachloroethylene | .002 - .02 | .0022 - .075 | NT |
| Toluene | .002 - .02 | .003 - .1 | NT |
| Total Trihalomethanes | .0275 - .25 | NT | NT |
| Total Xylenes | .002 - .05 | NT | NT |
| 1,2,3-Trichlorobenzene | .002 - .02** | NT | NT |
| 1,2,4-Trichlorobenzene | .002 - .02** | NT | NT |
| 1,1,1-Trichloroethane | .002 - .02 | .002 - .07 | NT |
| 1,1,2-Trichloroethane | .002 - .02** | NT | NT |
| Trichloroethene | .002 - .02 | .004 - .065 | NT |
| 1,2,3-Trichloropropane | .002 - .02** | NT | NT |
| 1,2,4-Trimethylbenzene | .002 - .02** | NT | NT |
| 1,3,5-Trimethylbenzene | .002 - .02** | NT | NT |
| Vinyl Chloride | .001 - .005 | NT | NT |
| m-Xylene | .002 - .02 | NT | NT |
| o-Xylene | .002 - .02 | NT | NT |
| p-Xylene | .002 - .02 | NT | NT |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| **Carbamates** | | | |
| Aldicarb | .005 - .05 mg/L** | NT | NT |
| Aldicarb Sulfoxide | .005 - .05** | NT | NT |
| Aldicarb Sulfone | .01 - .1** | NT | NT |
| Carbofuran | .0075 - .15** | NT | NT |
| Methomyl | .0025 - .025** | NT | NT |
| Vydate | .01 - .1** | NT | NT |
| **Adipate/Phthalate** | | | |
| Bis-(2-ethylhexyl) Phthalate | .004 - .08** | NT | NT |
| Butyl Benzyl Phthalate | .0025 - .05** | NT | NT |
| Di-(2-ethylhexyl) Adipate | .003 - .06** | NT | NT |
| Diethyl Phthalate | .004 - .08** | NT | NT |
| Dimethyl Phthalate | .0015 - .03** | NT | NT |
| Di-n-butyl Phthalate | .02 - .2** | NT | NT |
| **PAHs** | | | |
| Acenaphthylene | .0005 - .01** | NT | NT |
| Anthracene | .0005 - .01** | NT | NT |
| Benzo (a) Anthracene | .001 - .02** | NT | NT |
| Benzo (k) Fluoranthene | .0015 -.03** | NT | NT |
| Benzo (b) Fluoranthrene | .0015 - .03** | NT | NT |
| Benzo (g,h,i) Perylene | .005 - .01** | NT | NT |
| Benzo (a) Pyrene | .005 - .1** | NT | NT |
| Chrysene | .0015 - .03** | NT | NT |
| Dibenzo (a,h) Anthracene | .0005 - .01** | NT | NT |
| Fluoranthene | .0015 - .03** | NT | NT |
| Fluorene | .001 - .02** | NT | NT |
| Indeno (1,2,3-c,d) Pyrene | .0005 - .01** | NT | NT |
| Naphthalene | .015 - .05** | NT | NT |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Phenanthrene | .001 - .02 mg/L** | NT | NT |
| Pyrene | .0005 - .01** | NT | NT |
| **Organic Disinfection By-Products** | | | |
| Bromochloroacetonitrile | .0005 - .01 | NT | NT |
| Chloral Hydrate | .005 - .03 | NT | NT |
| Dibromoacetic Acid | .005 - .015 | NT | NT |
| Dibromoacetonitrile | .0005 - .01 | NT | NT |
| Dichloroacetic Acid | .005 - .5 | NT | NT |
| Dichloroacetonitrile | .0005 - .01 | NT | NT |
| 1,1-Dichloropropanone | .0005 - .01 | NT | NT |
| Monobromoacetic Acid | .005 - .015 | NT | NT |
| Monochloroacetic Acid | .005 - .015 | NT | NT |
| Trichloroacetic Acid | .005 - .05 | NT | NT |
| Trichloroacetonitrile | .0005 - .01 | NT | NT |
| 1,1,1-Trichloropropanone | .0005 - .01 | NT | NT |
| **Inorganic Disinfection By-Produts** | | | |
| Bromate | .02 - .1 | NT | NT |
| Chlorate | .03 - .2 | NT | NT |
| Chlorite | .03 - .6 | NT | NT |

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NT Not Tested

* Indicates analyte listed by EMSL-Ci, but no concentration range quoted.

** Unregulated analyte.

*OFFICE OF WATER PE STUDY PROJECT*
*COMPARISON OF ANALYTES LISTED IN TABLES II - V WITH PE STUDY ANALYTES*
*(40 CFR, PART 122, APPENDIX D)*

**TABLE II (40 CFR PART 122, APPENDIX D)**

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| **Volatiles** | | | |
| Benzene | X | X | |
| Bromoform | X | X | |
| Carbon Tetrachloride | | X | |
| Chlorobenzene | X | X | |
| Chlorodibromomethane | X | | |
| Chloroethane | X | | |
| Chloroform | X | X | |
| 1,1-Dichloroethane | X | | |
| 1,2-Dichloroethane | X | X | |
| 1,1-Dichloroethylene | X | | |
| 1,2-Dichloropropane | X | | |
| 1,3-Dichloropropylene | X | | |
| Ethylbenzene | X | X | |
| Methylene Chloride | | X | |
| 1,1,2,2-Tetrachloroethane | X | | |
| Tetrachloroethylene | X | X | |
| Toluene | X | X | |
| 1,2-trans-Dichloroethylene | X | | |
| 1,1,1-Trichloroethane | X | X | |
| 1,1,2-Trichloroethane | X | | |
| Trichloroethylene | X | X | |
| Vinyl Chloride | X | | |
| **Base/Neutrals** | | | |
| Acenaphthylene | X | | |
| Anthracene | X | | |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Benzo (a) Anthracene | X | | |
| Benzo (k) Fluoranthene | X | | |
| Benzo (g,h,i) Perylene | X | | |
| Benzo (a) Pyrene | X | | |
| Bis (2-ethylhexyl) Phthalate | X | | |
| Butyl Benzyl Phthalate | X | | |
| Chrysene | X | | |
| Dibenzo (a,h) Anthracene | X | | |
| 1,2-Dichlorobenzene | X | X | |
| 1,3-Dichlorobenzene | X | X | |
| 1,4-Dichlorobenzene | X | X | |
| Diethyl Phthalate | X | | |
| Dimethyl Phthalate | X | | |
| Di-n-butyl Phthalate | X | | |
| Fluoranthene | X | | |
| Fluorene | X | | |
| Hexachlorobenzene | X | | |
| Hexachlorobutadiene | X | | |
| Hexachlorocyclopentadiene | X | | |
| Indeno (1,2,3-c,d) Pyrene | X | | |
| Napthalene | X | | |
| Phenanthrene | X | | |
| Pyrene | X | | |
| 1,2,4-Trichlorobenzene | X | | |
| **Pesticides** | | | |
| Aldrin | | X | |
| Chlordane | X | X | |
| DDT | | X | |
| DDE | | X | |
| DDD | | X | |

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Dieldrin | | X | |
| Endrin | X | | |
| Heptaclor | X | X | |
| Heptachlor Epoxide | X | X | |
| PCB-1242 | | X | |
| PCB-1254 | | X | |
| PCB-1232 | | X | |
| PCB-1248 | | X | |
| PCB-1260 | | X | |
| PCB-1016 | | X | |
| Toxaphene | X | | |

**TABLE III (40 CFR, PART 122, APPENDIX D)**

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Antimony | X | X | |
| Arsenic | X | X | X |
| Beryllium | X | X | X |
| Cadmium | X | X | X |
| Chromium | X | X | X |
| Copper | X | X | X |
| Lead | X | X | X |
| Mercury | X | X | X |
| Nickel | X | X | X |
| Selenium | X | X | X |
| Silver | X | X | |
| Thallium | X | X | |
| Zinc | X | X | X |
| Cyanide | X | X | X |
| Total Phenols | | X | X |

TABLE IV (40 CFR, PART 122, APPENDIX D)

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| Chlorine, Total Residual | X | X | X |
| Fluoride | X | X | |
| Nitrate-Nitrite | X | X | X |
| Oil and Grease | | X | X |
| Sulfate | X | X | |
| Aluminum | X | X | X |
| Barium | X | | |
| Boron | X | | |
| Cobalt | | X | X |
| Iron | | X | X |
| Magnesium | | X | |
| Molydenum | X | X | |
| Manganese | | X | |
| Titanium | | X | |

TABLE V (40 CFR, PART 122, APPENDIX D)

| ANALYTE | WS | WP | DMRQA |
|---|---|---|---|
| 2-D | X | | |
| Dicamba | X | | |
| Diquat | X | | |
| Ethylene Dibromide | X | | |
| Methoxychlor | X | | |
| Strontium | | X | |
| Styrene | X | | |
| 2,4,5-TP (Silvex) | X | | |
| Vanadium | X | X | X |
| Xylene | X | | |

*ANALYTES LISTED IN TABLES II - V WITH NO PE STUDY*
*(40 CFR, PART 122, APPENDIX D)*

**TABLE II (40 CFR, PART 122, APPENDIX D)**

**ANALYTES**

**Volatiles**

Acrolein

Acrylonitrile

2-Chloroethylvinyl Ether

Dichlorobromomethane

Methyl Bromide

Methyl Chloride

**Acid Compounds**

2-Chlorophenol

2,4-Dichlorophenol

2,4-Dimethylphenol

4,6-Dinitro-o-cresol

2,4-Dinitrophenol

2-Nitrophenol

4-Nitrophenol

p-Chloro-m-Cresol

Pentachlorophenol

Phenol

2,4,6-Trichlorophenol

**Base/Neutrals**

Acenaphthene

Benzidene

3,4-Benzofluoranthene

Bis-(2-chloroethoxy)methane

Bis-(2-chloroethyl)ether

ANALYTES

Bis-(2-chloroisopropyl)ether

4-Bromophenyl Phenyl Ether

2-Chloronaphthalene

4-Chlorophenyl Phenyl Ether

3,3'-Dichlorobenzidine

2,4-Dinitrotoluene

2,6-Dinitrotoluene

Di-n-Octyl Phthalate

1,2-Diphenylhydrazine (as azobenzene)

Hexachloroethane

Isophorone

Nitrobenzene

N-nitrosodimethylamine

N-nitrosodi-n-propylamine

N-nitrosodiphenylamine

Pesticides

alpha-BHC

beta-BHC

gamma-BHC

delta-BHC

alpha-Endosulfan

beta-Endosulfan

Endosulfan Sulfate

Endrin Aldehyde

PCB-1221

TABLE IV (40 CFR, PART 122, APPENDIX D)

ANALTYE

Bromide

Color

Fecal Coliform

Nitrogen, Total Organic

Phosphorous

Radioactivity

Sulfide

Sulfite

Surfactants

Tin

TABLE V (CFR 40, PART 122, APPENDIX D)

Toxic Pollutants

Abestos

Hazardous Waste

Acetaldehyde
Allyl Alcohol
Allyl Chloride
Amyl Acetate
Aniline
Benzonitrile
Benzyl Chloride
Butyl Acetate
Butylamine
Captan
Carbaryl
Carbofuran
Carbon Disulfide
Chlorpyrifos
Coumaphos
Cresol
Crotonaldehyde
Cyclohexane
Dimethylamine
Diazinon
Disulfoton
Dichlobenil
Dichlone
2,2-Dichloropropionic Acid
Dichlorvos
Diethyl amine
Dintrobenzene
Diuron
Epichlorohydrin
Ethion
Ethylene diamine
Formaldehyde
Furfural
Guthion
Isoprene
Isopropanolamine
Kelthane
Kepone
Malathion
Mercaptodimethur
Dimethyl Amine
Methyl Mercaptan
Methyl Methacrylate
Methyl Parathion
Mevinphos
Mexacarbate
Monoethyl Amine
Monomethyl Amine
Naled
Napthenic Acid
Nitrotoluene
Parathion
Phenolsulfanate
Phosgene
Propargite
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Strychrine
Disulfoton
2,4,5-T
TDE
Trichlorofan
Triethanolamine Dodecylbenzenesulfonate
Triethylamine
Trimethylamine
Uranium
Vinyl Acetate
Xylenol
Zirconium