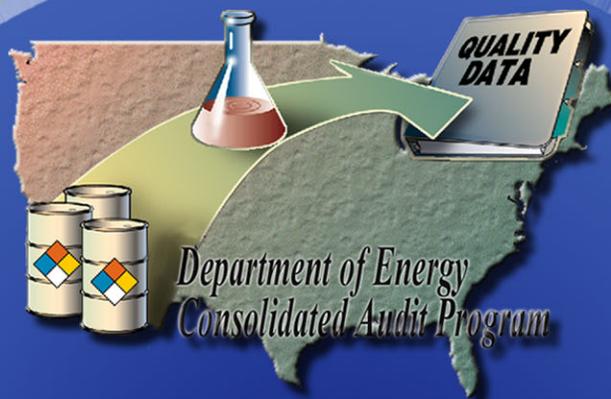


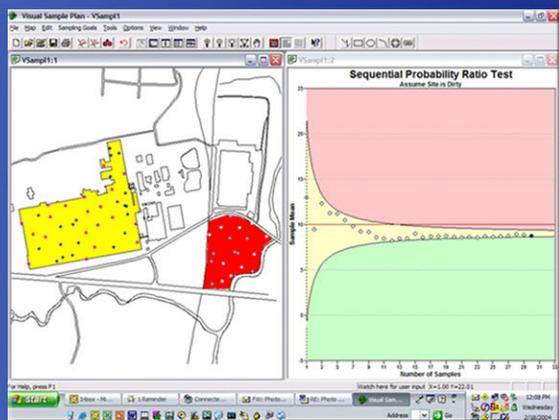


U.S. Department of Energy Analytical Services Program Fiscal Year 2005 Report

*Department of Energy
Consolidated Audit Program*



*Department of Energy
Consolidated Audit Program*



*Environmental Field Sampling Systematic
Planning and Data Assessment Tools*

*Mixed Analyte Performance
Evaluation Program*

December 2005

Helping the field succeed with safe and reliable operations.





DOE Analytical Services Program – Fiscal Year 2005 Report

The Analytical Services Program is managed by the U.S. Department of Energy, Office of Corporate Performance Assessment, Office of Quality Assurance Programs in Germantown, Maryland. For further details about the Program, contact Robert M. Loesch, Acting Director, Office of Quality Assurance Programs, at 301-903-4443; or George E. Detsis, Manager, Analytical Services Program, at 301-903-1488. Information may also be obtained by accessing the Analytical Services Program web page at <http://www.ch.doe.gov/asp>.





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Acronyms

A2LA American Association for Laboratory Accreditation
 AIT Auditor-in-Training
 AMESH Assistant Manager for Environment, Safety and Health
 ASP Analytical Services Program
 CAA Clean Air Act
 CAP Corrective Action Plan
 CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
 CWA Clean Water Act
 DoD Department of Defense
 DOE Department of Energy
 DOECAP DOE Consolidated Audit Program
 DOELAP DOE Laboratory Accreditation Program
 DQA Data Quality Assessment
 DQOs Data Quality Objectives
 EDS Electronic Data System
 EE Office of Energy Efficiency and Renewable Energy
 EFCOG Energy Facility Contractors Group
 EH Office of Environment, Safety and Health
 EH-31 Office of Quality Assurance Programs
 EM Office of Environmental Management





Acronyms (continued)

EPA	Environmental Protection Agency
FY	Fiscal Year
GOCO	Government-Owned, Contractor-Operated
HQ	Headquarters
IDQTF	Interdepartmental Data Quality Task Force
INELA	Institute for National Environmental Laboratory Accreditation
ISO	International Organization for Standardization
LM	Office of Legacy Management
MAPEP	Mixed Analyte Performance Evaluation Program
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NIST	National Institute of Standards and Technology
NNSA	National Nuclear Security Administration
NQA-1	American Society of Mechanical Engineers (ASME) <i>Quality Assurance Requirements for Nuclear Facility Applications</i>
ORO	Oak Ridge Office
OSWER	Office of Solid Waste and Emergency Response
PE	Performance Evaluation
POC	Point of Contact
PSO	Program Secretarial Office
QEC	Qualification Evaluation Committee
QSAS	Quality Systems for Analytical Services
RCRA	Resource Conservation and Recovery Act
RESL	Radiological and Environmental Sciences Laboratory
RMCCP	Radiation Measurements Cross-Calibration Project
RPM	Remedial Project Manager
RTP	Radiological Traceability Program
SC	Office of Science
SOP	Standard Operating Procedure
TSDf	Treatment, Storage, and Disposal Facility
VDQA	Visual Data Quality Assessment
VSP	Visual Sample Plan





Executive Summary

This report provides an overview of the Department of Energy (DOE) Analytical Services Program (ASP) activities for Fiscal Year 2005 (FY05). The ASP is managed and funded through the Headquarters Office of Corporate Performance Assessment, Office of Quality Assurance Programs, EH-31. Component elements of the ASP comprise:

- The DOE Consolidated Audit Program (DOECAP),
- The Mixed Analyte Performance Evaluation Program (MAPEP), and
- Development of environmental field sampling Systematic Planning and data assessment tools, and associated training.

Additional information may be obtained by accessing the ASP web page at <http://www.eh.doe.gov/asp>.

DOECAP

The DOECAP conducts annual audits of analytical laboratories and commercial waste treatment, storage, and disposal facilities (TSDFs) that have contracts or agreements to provide services to the DOE. DOECAP audits are performed on behalf of, and with the participation of, sites throughout the DOE complex and across all Departmental program line organizations. First formulated in the mid-1990s, the intent of this corporate Departmental program is to conduct consolidated audits to eliminate redundant audits previously conducted independently by DOE field element sites; and achieve standardization in audit methodology, processes, and procedures. Additional information may be obtained by accessing the DOECAP Electronic Data System (EDS) at <https://www.oro.doe.gov/DOECAP>.

The DOECAP represents a small investment used in an efficient and effective manner to leverage funding resources to ensure confidence in analytical data results and accountability in waste treatment and disposal. Specific benefits derived through effective implementation of the DOECAP include:

- **Risk Management** – Reduced potential liability for the Department associated with the quality of analytical data used in environmental decision making, and the proper disposition of low-level and mixed radioactive waste and chemical waste, through rigorous DOECAP qualification audits of laboratories and TSDFs,
- **Cost Reduction** – Consistent savings to the Department and taxpayer of at least \$1.3M annually through audit consolidation eliminating the need to conduct approximately twice the number of audits throughout the DOE complex,
- **Efficiency** – Increased efficiency through the use of centralized DOECAP functions, managed processes for communication amongst stakeholders, and technical and analytical quality standards that can be affixed to any contract,
- **Audit Quality** – Improved audit quality and consistency as a result of forming audit teams from a pool of technical experts from throughout the DOE complex, and through the use of standardized DOECAP processes and documents,
- **Data Quality** – Improved analytical laboratory performance and data quality resulting from resolution of audit findings through implementation of the DOECAP corrective action process, and
- **Safety** – Enhanced safety handling DOE samples and waste through verification of compliance with applicable standards and regulations.





In FY05, a total of 46 DOECAP audits were conducted: 35 at commercial analytical laboratories; 4 at government-owned-contractor-operated (GOCO) laboratories located at DOE field element sites; and 7 at commercial TSDFs. Those audits included qualification audits, surveillance for verification of corrective actions, and a laboratory closure audit to verify proper disposition of DOE materials and assess the status of contractual obligation fulfillment.

Common deficiencies cited in DOECAP laboratory findings were related to inadequate procedure content and control, failure to properly perform and document instrument calibration, and poor waste management practices. Common deficiencies cited in DOECAP TSDF findings were related to either not following required processes or not meeting process requirements, and a lack of complete and acceptable procedures.

MAPEP

The MAPEP provides important quality assurance oversight for environmental analytical services under contract with DOE by performing semiannual performance testing and evaluation of both DOE onsite and commercial analytical laboratories. MAPEP proficiency tests help ensure the accuracy of analytical results reported to DOE field element sites and provide an efficient means for laboratories to demonstrate analytical proficiency. Performance testing and evaluation are implemented through the distribution of mixed analyte water and soil matrices (i.e., containing radiological, stable inorganic, and organic constituents), as well as radiological air filter and vegetation matrices; gross alpha/beta air filter and water matrices are also provided. MAPEP test samples are prepared with natural matrix material spiked with standards traceable to the National Institute of Standards and Technology (NIST) whenever feasible, providing a NIST traceability link for many of the targeted analytes. The Idaho

National Laboratory – Radiological and Environmental Sciences Laboratory (RESL), which administers the MAPEP, is also directly traceable to NIST in both the analysis and preparation of radiological environmental samples. Performance data for all matrices from a MAPEP test session (i.e., Series) are reported to DOE-EH, DOE Field Offices, Sample Management Offices or contractors, participating laboratories, and audit personnel to support quality assurance oversight and quality improvement. Over 100 laboratories participated in the FY05 MAPEP Series 14. Performance reports and program information are available on the MAPEP public web page at <http://www.inel.gov/resl/mapep>. A password-protected MAPEP web page for participants and stakeholders is found at <http://mapep.inel.gov>.

The MAPEP expanded in FY05 to include radiological vegetation. The number of participants also increased to over 100, including 11 international laboratories. The international laboratories are participating in DOE sponsored activities or areas of interest. Other FY05 MAPEP highlights included:

- An increase in the preparation of MAPEP samples from 477 to 1,031 per year,
- Analytical laboratory data quality issues continued to be identified through routine MAPEP performance testing and specialized testing for false positive, false negative, and sensitivity evaluations, including issues regarding antimony and refractory plutonium analyses,
- A MAPEP program review was performed by DOE-EH with an independent committee of Federal and contractor technical experts, and
- A MAPEP survey of DOECAP points-of-contact gathered information to verify whether MAPEP organic analytes adequately target current and long-term analytical needs of users throughout the DOE complex.





Development of Environmental Field Sampling Systematic Planning and Data Assessment Tools, and Associated Training

To ensure environmental field sampling data are of sufficient quality to support confident decisions, DOE must not only ensure analytical laboratories are producing high quality results but also that the appropriate type, quantity, and quality of data are gathered and that inherent uncertainties within the data are appropriately taken into account when making decisions. Through the development of tools for environmental field sampling Systematic Planning and data assessment, along with providing associated training, the DOE helps site personnel optimally plan data gathering efforts and assess whether the data gathered meets established Data Quality Objectives (DQOs).

During FY05, enhancements were made to the Visual Sample Plan (VSP) software to support data quality assessments and statistical evaluations, and Version 4.0 was released in July 2005. With over 5,000 users, including virtually all DOE sites and most regulatory entities, VSP is widely recognized as the tool of choice for Systematic Planning and DQO implementation. Additional information regarding VSP may be obtained at <http://dgo.pnl.gov/vsp>.

VSP training was performed in FY05 at Hanford, Mound, and Pantex, and training in Systematic Planning was also conducted at Hanford. Software advances included development of training software aids and further development of the Visual Data Quality Assessment (VDQA) prototype tool. DQA and other course development efforts also continued. Additional information regarding software development and training may be obtained at <http://www.hanford.gov/dgo/dqa/dqahome.html>.





DOE Analytical Services Program – Fiscal Year 2005 Report

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1.0 Department of Energy Consolidated Audit Program (DOECAP)

The DOECAP conducts annual audits of analytical laboratories and commercial waste treatment, storage, and disposal facilities (TSDFs) that have contracts or agreements to provide services to the DOE. DOECAP audits are performed on behalf of, and with the participation of, sites throughout the DOE complex and across all Departmental program line organizations. Additional Program information is available on the DOECAP Electronic Data System (EDS) at <https://www.oro.doe.gov/DOECAP>.

DOECAP ownership rests within the Office of Environment, Safety and Health (EH); a Federal Analytical Services Program (ASP) Manager located in Germantown, Maryland, provides overall policy direction, guidance, funding, and DOECAP complex-wide leadership. A manager from the DOE Oak Ridge Office (DOE-ORO), Office of the Assistant Manager for Environment, Safety and Health (AMESH), as DOECAP Manager provides Federal oversight of the contractor DOECAP Operations Team also located in Oak Ridge, Tennessee. The DOECAP Operations Team is responsible for program administration and implementation from audit scheduling and coordination through tracking and coordinating closure of corrective actions. DOECAP Operations Team members are also qualified as DOECAP auditors. The DOECAP core organization comprises the ASP Manager, DOECAP Manager, and DOECAP Operations Team.

Beyond the DOECAP core organization, DOECAP lead auditors and auditors, as well as other personnel associated with the Program (i.e., Federal points-of-contact [POCs], contractor POCs, Qualification Evaluation Committee members), all participate on an as-needed basis. DOE Program Offices and sites

participate voluntarily in the DOECAP – motivated by historically demonstrated benefits of participation, and provide lead auditors, auditors, and others to support the Program; those personnel have been and continue to be vital to the success and viability of the Program. The cost incurred by Program Offices and sites to voluntarily provide personnel to participate in the DOECAP is a prudent investment, with a considerable dividend returned in the form of significantly reduced costs otherwise incurred by sites performing independent laboratory and TSDF qualification audits. That dividend is further compounded for the Department and the taxpayer by eliminating redundant audits of the same laboratories and TSDFs performed by multiple, independent sites; hence the benefit of pooled resources under a program of consolidated DOE audits. The ability to draw upon voluntary resources from throughout the DOE complex to successfully implement the Program and realize significant cost savings for the Department and taxpayer, as well as increase the overall efficiency and quality of the auditing process, is part of the unique history of the DOECAP. As a result of DOECAP activities, the necessity for approximately twice the number of audits (i.e., over 40 additional annual audits) throughout the DOE complex is eliminated, resulting in an estimated annual cost savings in excess of \$1.3M.

It is possible to rely upon the results of DOECAP audits to qualify contracted laboratories and TSDFs without actively participating in the Program; thereby deriving benefits of the Program by eliminating the need to conduct independent audits, without providing reciprocal support. This practice places an unfair burden upon active DOECAP participants to continue to provide cost elimination benefits, and also withholds valuable resources necessary to continue to effectively implement the consolidated Program.





DOECAP Laboratory Auditor Inspecting Equipment

1.1 Background and Scope

In the mid-1990s, the DOE Office of the Inspector General and the General Accounting Office issued reports citing inefficiency, redundancy, and ineffectiveness regarding audits of analytical laboratories conducted by the Department. The reports were critical of using funds for individual DOE field elements to perform redundant audits of the same laboratories, employing disparate audit protocol and criteria.

In response, the Office of Environmental Management (EM) mandated implementation of a consolidated, uniform audit program for conducting annual audits of analytical laboratories in support of EM field environmental decision making with the following goals and objectives:

- Eliminate audit redundancy,
- Provide a pool of trained auditors sufficient to support consolidated audits, and
- Standardize terms and conditions of existing and proposed contracts to allow acceptance of consolidated audit results.

Since that time, audits of TSDFs have been added to the scope of the DOECAP, and the Program was transferred to EH in December 2003 to provide a broader and more cross-cutting Departmental focus. However, the DOECAP continues to meet the intent of the original EM mandate through:

- Consolidated audit planning, scheduling, and coordination achieving cost savings for the Department and taxpayers, as well as minimizing impact to contractor laboratories and TSDFs,
- Development and maintenance of standard audit procedures, including standardized audit reports,
- Development of standard qualification requirements, and establishment of a pool of DOECAP-qualified auditors and lead auditors from across the complex to support audits of both laboratories and TSDFs,
- Coordination and centralized tracking of corrective actions and closure of audit findings and observations,
- Establishment of a cadre of DOE and contractor POCs from across the complex, with bi-weekly teleconferences to update POCs and auditors of program-related activities,
- Establishment and maintenance of the EDS to share information, and
- Active participation with state and Federal regulatory agencies, as well as other industry standard-setting groups (e.g., National Environmental Laboratory Accreditation Conference, Interagency Data Quality Task Force).





Specific benefits derived through effective implementation of the DOECAP include:

- **Risk Management** – Reduced potential liability for the Department associated with the quality of analytical data used in environmental decision making, and the proper disposition of low-level and mixed radioactive waste and chemical waste, through rigorous DOECAP qualification audits of laboratories and TSDFs,
- **Cost Reduction** – Consistent savings to the Department and taxpayer of at least \$1.3M annually derived through audit consolidation by eliminating the need to conduct approximately twice the number of audits throughout the DOE complex,
- **Efficiency** – Increased efficiency through the use of centralized DOECAP functions, managed processes for communication amongst stakeholders, and technical and analytical quality standards that can be affixed to any contract,
- **Audit Quality** – Improved audit quality and consistency as a result of forming audit teams from a pool of technical experts in various areas from throughout the DOE complex and through the use of standardized DOECAP processes and documents (e.g., checklists, templates),
- **Data Quality** – Improved analytical laboratory performance and data quality resulting from resolution of audit findings through implementation of the DOECAP corrective action process, and
- **Safety** – Enhanced safety regarding the handling of DOE samples and waste through verification of compliance with applicable standards and regulations, including conduct of DOECAP regulatory agency reviews as part of TSDF audits.

1.2 FY05 Activities and Accomplishments

1.2.1 Program Processes and Metrics

The following summarizes key processes, as well as any associated metrics, relative to implementation of the DOECAP.

Pre-Audit Process

The DOECAP pre-audit process begins with establishing the FY audit schedule and extends to commencement of the on-site audit. The pre-audit process may be sequentially segmented into six major steps implemented or facilitated by the DOECAP Operations Team, identified in Table 1.1.

1. FY audit schedule developed based upon field response to 'facility usage query' (i.e., laboratories and TSDFs projected to be used by sites throughout the DOE complex)
2. Audit date set with audited facility (i.e., laboratory or TSDF), and audit notification letter sent
3. Lead auditor selected and audit team formed based upon sites using the audited facility, personnel availability, and shared DOECAP resources from throughout the DOE complex
4. Pre-audit information requested from audited facility (e.g., procedures, licenses, permits) for inclusion in audit packages
5. Audit packages (i.e., CDs) developed, including pre-audit information provided by audited facility as well as other audit tools and information (e.g., audit checklists, reference material), and sent to audit team members
6. Pre-audit conference call conducted with audit team

Table 1.1 – DOECAP Pre-Audit Process





The facility usage query is typically completed and the tentative audit schedule for the next FY developed by the beginning of the fourth quarter of the current FY. Audit dates are established and teams staffed as far in advance of the audit as practicable. A goal of providing audit packages to audit team members at least 14 days prior to commencement of the audit is targeted, and generally met unless delays are encountered receiving pre-audit information requested from the audited facilities. Pre-audit conference calls are typically conducted the week before the audit.

A total of 190 laboratory audit packages and 41 TSDF audit packages were distributed to audit team members in FY05.

Audit Performance

Audits are performed following a standardized format by teams comprising a DOECAP qualified lead auditor, and an appropriate number of DOECAP qualified auditors determined by varying factors (e.g., audit scope and complexity, personnel availability, individual site interests). In addition, DOECAP auditors-in-training (AITs) as well as observers may be authorized by the DOECAP Manager to join the audit team. While DOECAP laboratory lead auditors may be either Federal or contractor personnel, DOECAP TSDF lead auditors are limited to only Federal employees due to the need for DOE accountability for low-level radioactive waste emanating from DOE sites. DOECAP checklists are used to guide auditors through each area of the audit; checklists are available online from the DOECAP EDS at <https://www.oro.doe.gov/DOECAP>. The six DOECAP laboratory audit areas and associated checklists are identified in Table 1.2, and the seven DOECAP TSDF audit areas and associated checklists are identified in Table 1.3.

1. Quality Assurance Management Systems and General Laboratory Practices
2. Data Quality for Organic Analyses
3. Data Quality for Inorganic and Wet Chemistry Analyses
4. Data Quality for Radiochemistry Analyses
5. Laboratory Information Management Systems and Electronic Data Management
6. Hazardous and Radioactive Materials Management

Table 1.2 - DOECAP Laboratory Audit Areas and Associated Checklists

In addition to the on-site audit, a review is conducted at the offices of the cognizant regulatory agency(ies) as part of a DOECAP TSDF audit. As a result of discussions conducted at the annual DOECAP meeting in September 2005, FY06 regulatory agency reviews may be conducted remotely via telephone conversations with regulatory agency personnel, followed by visits to regulatory agency offices as determined necessary by the lead auditor.

1. Quality Assurance Management Systems
2. Sampling and Analytical Data Quality
3. Waste Operations
4. Environmental Compliance/Permitting
5. Radiological Control
6. Industrial and Chemical Safety
7. Transportation Management

Table 1.3 - DOECAP TSDF Audit Areas and Associated Checklists





In FY05, a total of 46 DOECAP audits were conducted: 35 at commercial analytical laboratories; 4 at government-owned-contractor-operated (GOCO) laboratories located at DOE field element sites; and 7 at commercial TSDFs accepting DOE low-level and mixed radioactive waste and chemical waste. While these audits were primarily initial and continuing qualification audits, two were conducted as surveillances for verification and acceptance of corrective actions.

In addition, one of the 46 FY05 DOECAP audits was a laboratory closure audit conducted to verify proper disposition of DOE materials and assess the status of contractual obligation fulfillment. That DOECAP audit was considered “invaluable” by representatives of those DOE sites and Programs from which samples sent to the closing laboratory originated, and was cited by many as ample justification for the DOECAP in and of itself. The DOECAP audit team worked closely with the laboratory and stakeholders to confirm the inventory of DOE sample material on site respective to origin and contractual obligation for disposition (i.e., disposal or return), as well as to verify the proper disposition/documentation of disposed samples. A plan was established to achieve proper disposition of all DOE sample material on site by December 31, 2005, and the laboratory will notify stakeholders and the DOECAP upon completion.

The 39 FY05 DOECAP laboratory audits were conducted by teams comprising a total of 182 DOECAP auditors, provided by 10 different DOE sites, for a total of 507 auditor-days on site at the audited laboratories. The 7 FY05 DOECAP TSDF audits were conducted by teams comprising a total of 50 DOECAP auditors, provided by 9 different DOE sites, for a total of 150 auditor-days on site at the audited TSDFs. A listing of laboratories and TSDFs audited by the DOECAP in FY05 is provided in Appendix A of this report.



DOECAP TSDF Auditor Inspecting Waste Containers

Post-Audit Process

The DOECAP post-audit process extends from completion of on-site audit activities and issuance of the audit report through notifying the audited facility of acceptance of the proposed Corrective Action Plan (CAP). The post-audit process may be sequentially segmented into the seven major steps identified in Table 1.4.

A process for monitoring the timeliness of completing post-audit processes was implemented in FY05 as an opportunity for Program assessment and improvement. A goal of completing the post-audit process within 110 days after completion of the on-site audit is currently targeted, with an actual average of 124 days achieved in FY05. Figure 1.1 illustrates the post-audit process and provides a comparison of target to average actual time for completing each step in FY05. Many factors can impact the timeliness of completing the post-audit process, including the amount of time required to communicate and resolve audit report issues. In light of these factors, FY05 timeliness of completing the post-audit process compared to currently targeted goals is considered acceptable. However, performance will continue to





1. Audited facility reviews draft audit report for factual accuracy and resolves any issues with audit team, after which lead auditor submits draft audit report to DOECAP Operations Team for review
2. DOECAP Operations Team reviews draft audit report, resolves any issues (e.g., ambiguity, incorrect references) with audit team, and submits proposed final audit report to DOECAP Manager for review and approval as well as resolution of any issues not previously settled
3. DOECAP Manager reviews and approves proposed final audit report, including resolution of any issues not previously settled, followed by issuance of approved final audit report to audited facility
4. Audited facility develops CAP in response to audit findings, and submits CAP for review by audit team
5. Audit team reviews proposed CAP, including resolution of any issues (e.g., corrective action does not adequately address finding) with the audited facility, and notifies DOECAP Operations Team of acceptance (this step is facilitated by the DOECAP Operations Team)
6. DOECAP Operations Team processes approved CAP and submits to DOECAP Manager for acceptance
7. DOECAP Manager reviews and accepts CAP, followed by notification of CAP acceptance sent to audited facility (includes DOECAP Operations Team entering CAP into EDS for tracking corrective actions to closure)

Table 1.4 – DOECAP Post-Audit Process

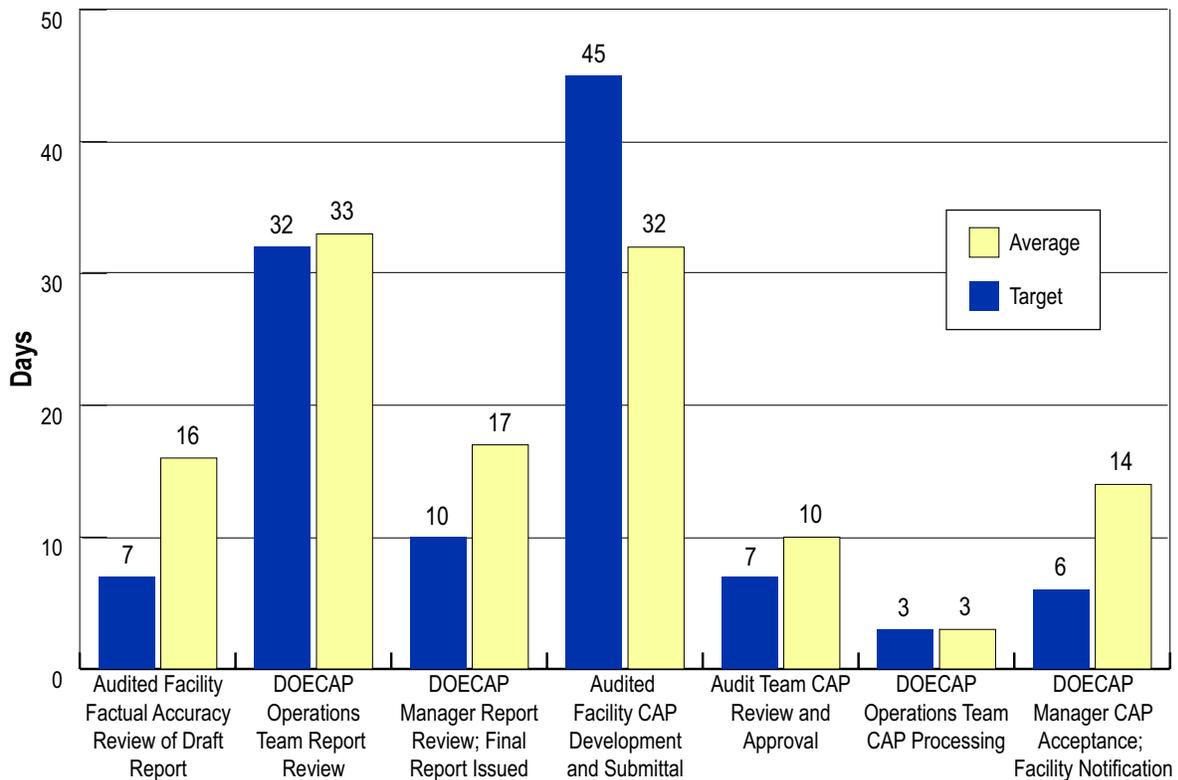


Figure 1.1 – DOECAP Post-Audit Process Timeline





be monitored and further consideration will be given to improving Program performance in this area, as well as potentially adjusting targets based on FY06 performance.

A concerted effort was made in FY05 to increase the overall quality of DOECAP audit reports. Specific focus was placed upon report text clarity and succinctness, differentiation between findings and observations, and accuracy of citations (i.e., regulatory or programmatic bases) for findings. This topic was also addressed with DOECAP participants via a presentation during the DOECAP annual meeting in September 2005. A significant improvement in audit report quality was achieved as a result of this effort, and will remain an area of focus for FY06.

Program Participation and Support

A fundamental DOECAP premise is that most DOE sites have auditors qualified to meet certain site-specific needs, which the DOECAP leverages with existing resources to build complex-wide teams resulting in lower cost to any given site, as well as to the Department and taxpayer. Past program success has been enhanced by sites designating appropriate POCs and submitting technically qualified personnel for qualification as DOECAP auditors. Figure 1.2 identifies participants across the DOE complex that supported FY05 DOECAP audits of laboratories and TSDFs, along with the number and allocation of qualified auditors.

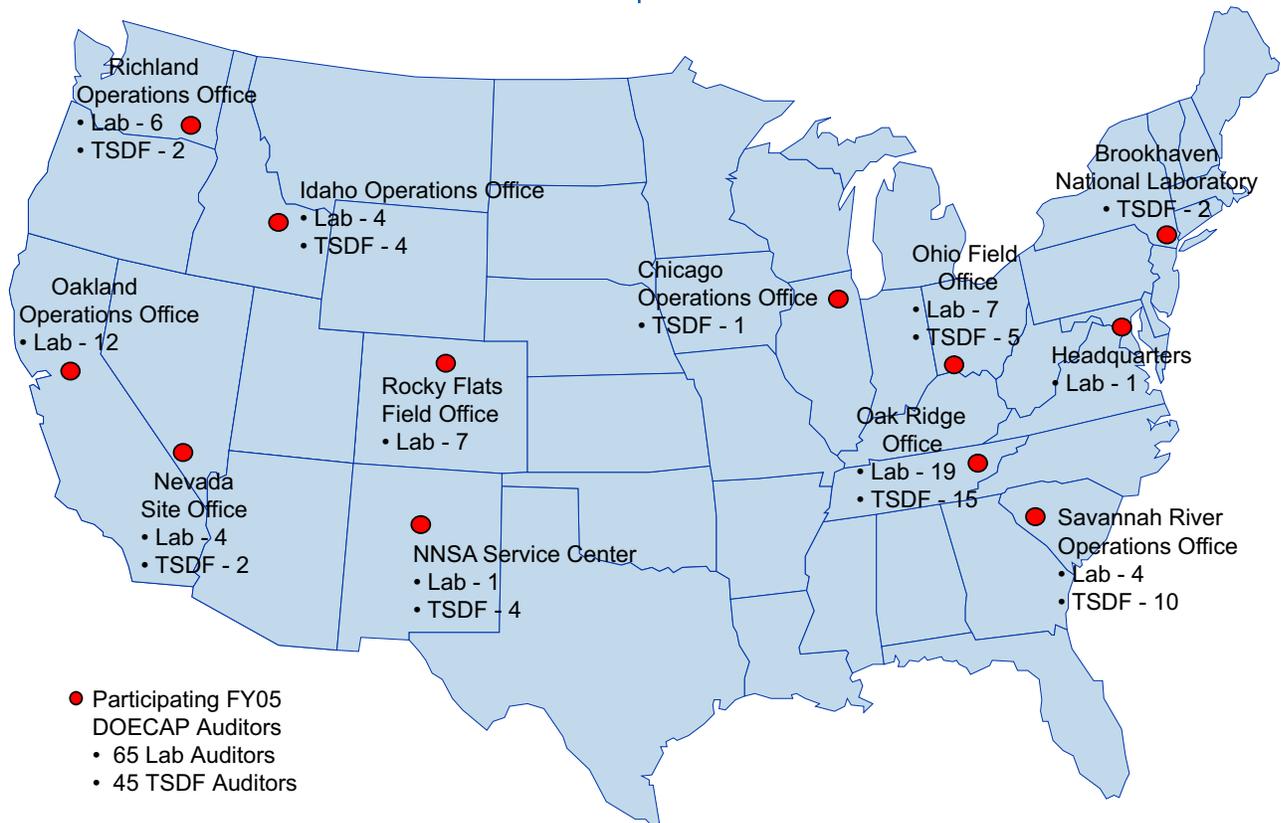


Figure 1.2 – FY05 Participating DOECAP Laboratory and TSDF Auditors





Efforts continued in FY05 to encourage DOE sites participating in the DOECAP to qualify additional auditors, as well as encourage non-participating DOE sites and Program Offices to engage in the DOECAP. Active participation will continue to represent a challenge to continued Program viability as DOE sites continue the closure process.

Figures 1.3 and 1.4 illustrate DOE participation in DOECAP audits of laboratories and TSDFs, respectively, for the past 3 years.

Auditor Qualification and Training

Prospective DOECAP auditors (and lead auditors) are submitted for qualification by sponsoring DOE

sites in a particular audit area or areas (see Tables 1.2 and 1.3 for audit areas); many auditors maintain qualification in multiple audit areas. Requirements are established regarding submittal of auditor qualification documentation and evaluation by the DOECAP Laboratory Qualification Evaluation Committee (QEC) or DOECAP TSDF QEC, as appropriate. Upon QEC approval, successful candidates are notified and must complete online DOECAP auditor training prior to receiving DOECAP auditor certification. Each auditor must complete at least one DOECAP audit every two years, and complete periodic online training as required, in order to maintain certification.

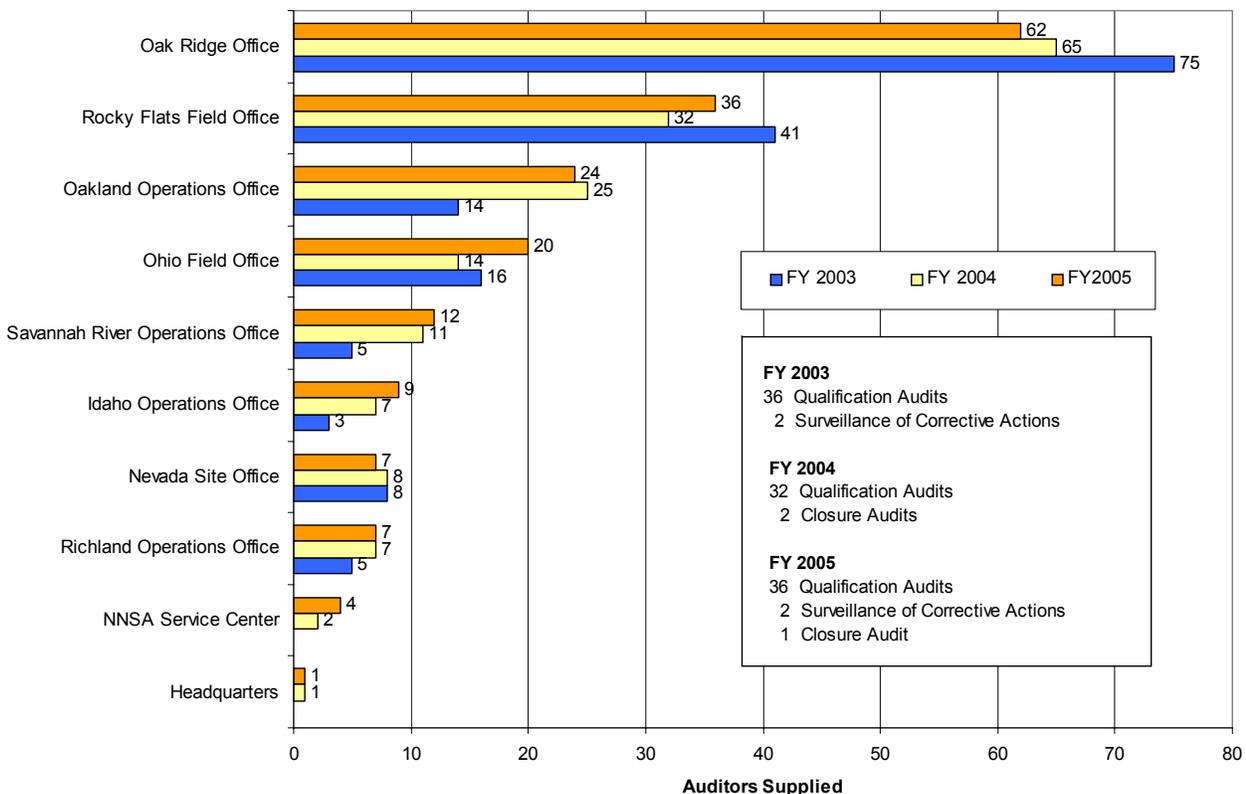


Figure 1.3 – DOECAP Laboratory Audit Participation for the Past 3 Years



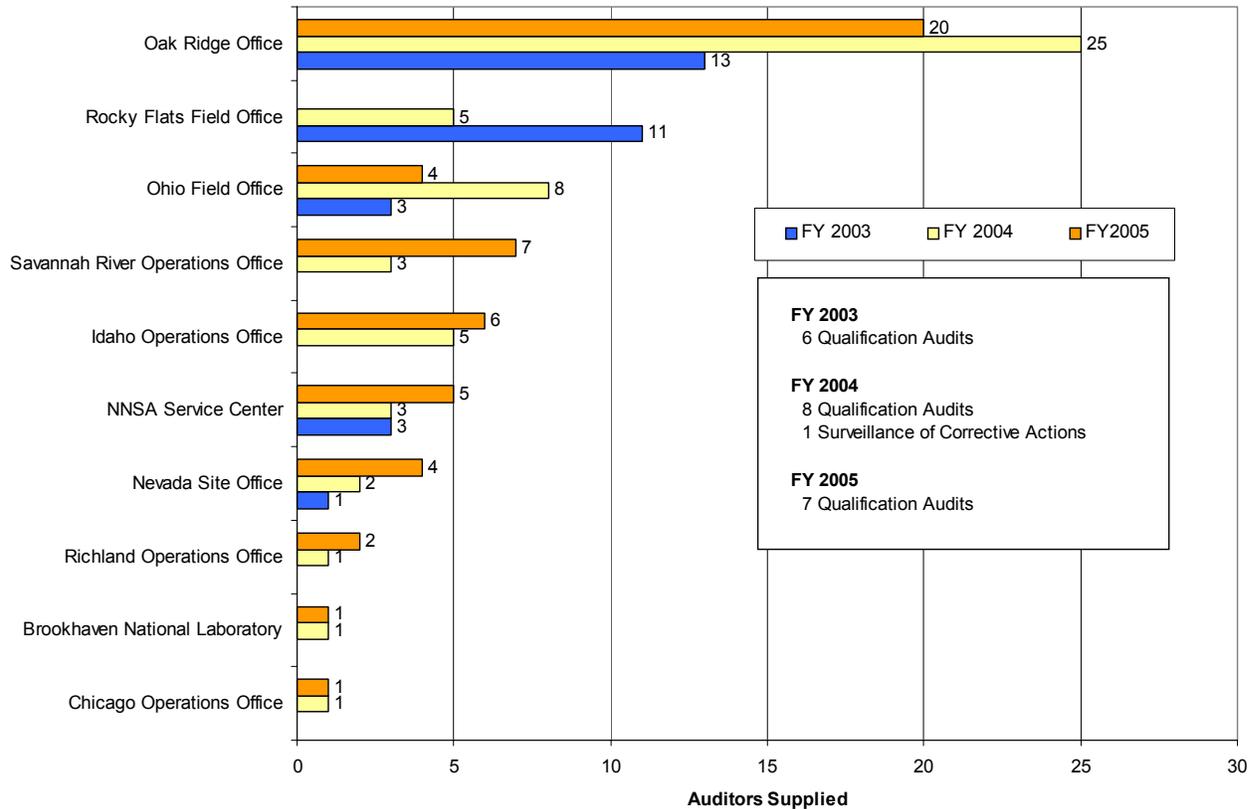


Figure 1.4 - DOECAP TSDF Audit Participation for the Past 3 Years

Most participating sites submitted prospective auditors for DOECAP qualification during FY05, with nearly every site initially adding to auditor qualification status. However, as illustrated in Table 1.5, while the total number of qualified TSDF auditors experienced a net gain over FY05, the total

number of laboratory lead auditors and laboratory auditors experienced a net decrease due to site closure and other factors (e.g., reductions in force at participating sites). For example, seven qualified DOECAP laboratory auditors were lost in September 2005 alone (i.e., end of FY05) as a result of a site closure.

	Laboratory	TSDF
Lead auditors beginning FY05	11	3
Lead auditors ending FY05	10	3
Auditors beginning FY05	56	32
Auditors ending FY05	47	37

Table 1.5 - FY05 DOECAP Lead Auditor and Auditor Qualification Status

DOECAP TSDF audits are led by Federal employees due to the need for DOE accountability for low-level and mixed radioactive waste emanating from DOE sites. The three DOECAP TSDF lead auditors qualified throughout FY05 were all provided by DOE-ORO.





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DOECAP Laboratory Audit Area	Auditors Qualified as of 9/30/05
Quality Assurance Management Systems and General Laboratory Practices	37
Data Quality for Organic Analyses	17
Data Quality for Inorganic and Wet Chemistry Analyses	20
Data Quality for Radiochemistry Analyses	17
Laboratory Information Management Systems and Electronic Data Management	6*
Hazardous and Radioactive Materials Management	10
DOECAP TSDF Audit Area	Auditors Qualified as of 9/30/05
Quality Assurance Management Systems	15
Sampling and Analytical Data Quality	8
Waste Operations	10
Environmental Compliance/Permitting	10
Radiological Control	7*
Industrial and Chemical Safety	6*
Transportation Management	7*

* Audit area requiring additional auditors.

Table 1.6 – FY05 DOECAP Auditor Distribution per Audit Area

A DOECAP auditor may be qualified in multiple audit areas. Table 1.6 illustrates the distribution of qualified DOECAP auditors at the end of FY05 per audit area. While sites are encouraged to submit prospective auditors for qualification in all audit areas, specific laboratory audit areas requiring additional qualified auditors are Laboratory Information Management Systems and Electronic Data Management, and Hazardous and Radioactive Materials Management; and specific TSDF audit areas requiring additional qualified auditors are Radiological Control, Industrial and Chemical Safety, and Transportation Management.

EDS Usage

One of the major tools for sharing Program information is the DOECAP Electronic Data System (EDS). Due to the confidential and potentially business sensitive nature of stored information regarding audited laboratories and TSDFs, access to the inner (i.e., password-protected) portion of the EDS is limited to active DOECAP participants who are required to sign a confidentiality agreement stipulating authorized uses of the information, thereby safeguarding audited facility-specific information from unauthorized access including competitors. Access for DOECAP non-participants, including representatives of audited laboratories and TSDFs, is limited to the outer (i.e., unprotected) portion of the EDS which contains key Program correspondence and documents, contractual information, and Program contact information. The unprotected portion of the EDS may be accessed at <https://www.oro.doe.gov/DOECAP>.

In FY05, the protected laboratory section of the EDS was accessed 3,876 times, and the protected TSDF section was accessed 1,533 times. The ability to track access to the unprotected portion of the EDS was not available in FY05, but may be added to the EDS in FY06.





Proposed FY06 Audit Schedule

The DOECAP pre-audit process begins with the DOECAP Operations Team conducting a facility usage query; i.e., a field data call to identify which DOE sites have contracted for services with analytical laboratories and TSDFs, as well as estimated volume (dollars) of work. Responses to the facility usage query are compiled, evaluated, and presented to the DOECAP Manager for use in developing a tentative DOECAP audit schedule for the next FY.

In order for a laboratory or TSDF to be audited by the DOECAP, the following basic criteria must generally be met:

1. Usage by more than one DOE site, and
2. Ability to staff an audit team with personnel from sites using the laboratory or TSDF, augmented by auditors from other DOECAP participating sites.

Exceptions may be made by the DOECAP Manager based on extenuating circumstances such as providing a unique analytical or waste processing capability, or the likelihood that additional DOE sites will need services from that laboratory or TSDF in the future.

The FY06 facility usage query, completed in the beginning of the fourth quarter of FY05, resulted in the development of a tentative FY06 DOECAP audit schedule covering 24 laboratories – 15 fewer than in FY05, and the same 7 TSDFs audited in FY05. The decrease in the number of DOECAP FY06 laboratory audits is attributable to DOE site closure and elimination of DOE field element sites having contractual agreements for analytical services, such as closure of the Rocky Flats Environmental Technology Site and reduced need for analytical services from both the Fernald and Mound Closure Projects.

1.2.2 Audit Findings

A DOECAP finding is defined as a deviation from accepted procedures, requirements or practices. Findings are issued in two categories: Priority I and Priority II.

A Priority I finding represents a serious procedural infraction or breakdown in key management control that could render the facility unacceptable for use or unfit to perform services for DOE. The DOECAP issued a total of four Priority I findings in FY05; two were issued to the same TSDF, and another one each to two different laboratories. A total of eight Priority I findings have been issued by the DOECAP to laboratories and TSDFs over the past 5 years. The two FY05 Priority I findings issued to the TSDF addressed an incident involving a worker failing to use appropriate fall protection while performing elevated work, and failure on the part of the TSDF to close self-assessment findings in a timely manner related to license or permit actions. The Priority I finding regarding fall protection was downgraded to a Priority II finding during the audit in response to immediate action taken by the TSDF. The two FY05 Priority I findings issued to the two analytical laboratories both addressed radiation protection program breakdowns. As of the end of FY05, only one laboratory Priority I finding remained open, pending verification of corrective actions to be performed early in FY06.

A Priority II finding represents a deviation from requirements that does not render the facility unfit for service to DOE. A total of 357 Priority II findings were issued as a result of the FY05 DOECAP laboratory audits, with another 39 findings issued from the FY05 DOECAP TSDF audits. Also in FY05, 84 percent of previously issued (i.e., issued prior to FY05) DOECAP laboratory findings were closed, as were 78 percent of previously issued TSDF findings. Figure 1.5 illustrates the



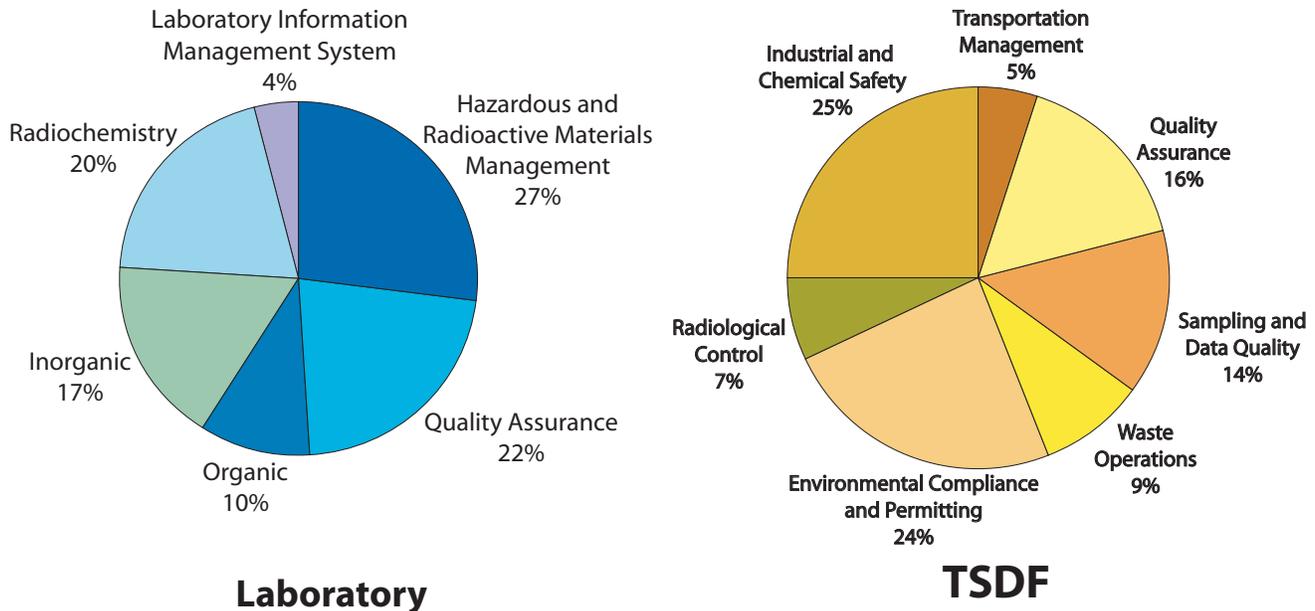


Figure 1.5 – Percent Distribution of FY05 DOECAP Laboratory and TSDF Priority II Findings per Audit Area

percent distribution of FY05 Priority II findings by audit area for laboratories and TSDFs.

Evaluation of Priority II findings issued to TSDFs in FY05 and previous years did not reveal any notable trend relative to common deficiencies in audit areas. However, in all audit areas, either not following the required process or not meeting the requirements of the process was a recurring theme. A lack of complete and acceptable standard operating procedures (SOPs) was also a common deficiency.

Evaluation of Priority II findings issued to laboratories in FY05 and previous years reveals notable trends. The following provides an overview of laboratory Priority II findings for each audit area.

- **Quality Assurance Management Systems and General Laboratory Practices**

Most findings were related to SOPs, generally addressing documentation and review. Either SOPs

were not reviewed within the required time frame, or processes defined in SOPs were not documented or not documented correctly. While these trends have been consistent since FY00, it is interesting to note that quality related findings decreased in FY05 by approximately 25 percent compared to previous years. This decrease could indicate that DOECAP audits have resulted in an increased focus on quality by audited laboratories.

- **Data Quality for Organic Analyses**

Findings tended to address a wide range of issues, with no specific trend noticeable. However, a common cause for findings could be attributed to insufficient SOPs.

- **Data Quality for Inorganic and Wet Chemistry Analyses**

The most significant findings in this audit area were related to calibration. Generally, calibration issues





resulted from the laboratory failing to perform the calibration or failing to perform the calibration correctly. These issues were often related to the number of findings addressing SOP deficiencies, the second most common source of findings in this audit area: laboratories failed to follow calibration requirements established in SOPs.

- **Data Quality for Radiochemistry Analyses**

The most common deficiency cited was inadequate SOPs. Information was often missing or incorrect regarding formulas and calculations. Also, SOPs often did not contain information necessary to properly perform the analysis. The second most common deficiency cited was equipment and instrument calibration not correctly performed or not properly documented.

- **Laboratory Information Management Systems and Electronic Data Management**

The most common deficiency cited was the absence of SOPs; information management systems were often put into use with few if any SOPs. The second most common deficiency noted was inadequate or incomplete SOPs. One interesting trend noted was that previous year findings were most common regarding system security, and system backup and disaster recovery. However, no findings were issued in FY05 regarding system security, and only one finding was issued regarding backup and disaster recovery; possibly indicating a trend toward better security and recovery.

- **Hazardous and Radioactive Materials Management**

The most common findings were related to waste containers, waste storage, waste disposal and waste management. These findings resulted from incorrect labeling, improper storage, lack of secondary containment, and generally poor waste management

practices. The second most common findings were related to SOPs being incomplete, inadequate or nonexistent. SOP findings spanned a broad area of programmatic elements including safety, inventory tracking, sample receipt and chain of custody, and waste handling.

1.2.3 Program Recognition

The Energy Facility Contractors Group (EFCOG) received a nomination in FY05 from Lawrence Berkeley National Laboratory to cite the DOECAP as an EFCOG “Best Practice” based on the quality and results of DOECAP audits, and cost effectiveness in consolidating resources. The EFCOG defines a Best Practice as:

A practice with redeeming qualities and attributes that has been proven through implementation and would be beneficial for others to use. Best Practices typically are a proven and practiced system, process or program that has been recognized by managers as having positive attributes, would be applicable complex-wide, and is supportive of continuous improvement in a Topical Area.

Under the EFCOG nomination heading entitled “What are the benefits of the best practice,” LBNL stated the following:

Participation in DOECAP audits has resulted in the following benefits for the Berkeley Laboratory:

- Improved analytical laboratory performance and data quality by resolving DOECAP audit findings through the corrective action process and by implementing DOECAP audit team recommendations.





- Increased expertise of the analytical audit teams due to the participation of auditors who have extensive analytical laboratory working experience. Many auditors maintain NQA-1 certification.
- Decreased resources and travel costs required to conduct analytical laboratory audits and TSDf audits.
- Increased quality of the analytical laboratory audits through the use of detailed checklists, which reference the applicable EPA method requirements and/or DOE requirements for each question. The checklists were developed to satisfy NQA-1 requirements.
- Fewer analytical laboratory audits conducted annually by the Berkeley Lab. DOECAP conducts audits of East Coast analytical laboratories and the Berkeley Lab uses solely the audit reports.
- Decreased resources needed to schedule audits, prepare checklists, consolidate analytical laboratory SOPs, QAPs, and other pre-audit documentation. (All are prepared by the DOECAP Office in Oak Ridge.)
- Decreased resources needed to manage corrective actions, qualify new auditors, provide auditor training, and provide database management and information sharing. (All are provided by the DOECAP Office in Oak Ridge.)

The entire Best Practice (i.e., EFCOG Best Practice #31) may be read online at <http://www.efcog.org/bp/p/31.htm>.

1.2.4 Program Document Revision/Development

The following DOECAP documents and audit tools were revised during FY05:

DOE Quality Systems for Analytical Services Document (QSAS)

The QSAS establishes a single, integrated Quality Assurance program for analytical laboratories supporting the DOE, and allows laboratories to implement a unified standard thus improving efficiency and quality in a cost-effective manner. The QSAS establishes criteria for independent assessments, implemented through the DOECAP, to measure quality and promote improvement. Furthermore, the QSAS represents a significant advance toward normalizing analytical data quality requirements across various Federal agencies and closely follows the approach taken by the Department of Defense (DoD) and the Environmental Protection Agency (EPA). In fact, the QSAS is based in total on the EPA's National Environmental Laboratory Accreditation Conference (NELAC) Chapter 5 – *Quality System*, based on ISO 17025 – *General Requirements for the Competence of Testing and Calibration Laboratories*, and also incorporates the EPA's "Performance Approach." However, since NELAC Chapter 5 requirements do not fully address DOE-specific analytical laboratory requirements, information associated with implementation of those DOE requirements has been added to the QSAS.

A working meeting was held March 8 – 11, 2005, in Oak Ridge, Tennessee, with DOECAP subject matter experts from throughout the DOE complex, to update the QSAS to remain current with guidance recently implemented by the NELAC. Following a period of review and comment by DOECAP-laboratory participants, Revision 2 of the QSAS was





finalized and issued in July, and presented at the NELAC conference in August 2005. In keeping with the intent for the QSAS to be a “living document,” open technical issues from Revision 2 were discussed during a working session at the annual DOECAP meeting in September 2005. After finalizing all remaining open items, Revision 2.1 of the QSAS will be issued in early FY06, to be used commencing with the FY06 DOECAP laboratory audit cycle. Revision 2.1 will also be forwarded to the NELAC and the Institute for National Environmental Laboratory Accreditation (INELA) for consideration and incorporation into a National Standard, particularly those performance requirements associated with radiochemistry, performance evaluation and testing, and quality assurance.

DOECAP Audit Checklists

DOECAP audit checklists are used to implement the audit process to ensure consistency and enhance efficiency. See the sub-section entitled *Audit Performance* in section 1.2.1 for more information regarding DOECAP checklists, including Table 1.2 for a listing of laboratory audit checklists and Table 1.3 for a listing of TSDF audit checklists.

DOECAP laboratory audit checklists were revised in FY05 to clarify and update references to applicable regulations and consensus standards regarding analytical protocol and procedures, as well as account for revisions made to the QSAS. Laboratory checklists were submitted for revision to review panels established for each checklist, followed by distribution of draft checklists for review by DOECAP auditors qualified in areas specific to each checklist. Auditor review comments were consolidated, and draft checklists were returned to the review panels for comment resolution, and subsequent approval. Revised laboratory checklists were then posted on the DOECAP EDS.

The process of revising DOECAP TSDF audit checklists commenced mid-FY05 to update references to revised regulations, as well as clarify content and improve overall quality. DOECAP qualified TSDF auditors were queried for feedback on TSDF checklists. The checklists were then submitted for revision to review panels established for each checklist. The revision of TSDF audit checklists was discussed in a working session at the annual DOECAP meeting in September 2005. TSDF audit checklist revision will be completed early in FY06, to be used commencing with the FY06 DOECAP TSDF audit cycle.

DOECAP Auditor Training

After approval by the DOECAP Qualification Evaluation Committee, an individual is required to complete specified training in order to be certified as a DOECAP auditor. Training modules are provided online on the DOECAP EDS.

In FY05 a first revision of auditor training was completed, and revised training modules were loaded onto the DOECAP EDS. Additional revision is planned for FY06, as well as potentially enhancing the online training user interface.

1.2.5 EDS Enhancement

The EDS, a screenshot of which is provided in Figure 1.6, is a web-based system providing the main information sharing tool and repository for the DOECAP, currently maintained within the scope of the DOE-ORO information technology contractor. EDS password-protected information (i.e., audit schedules and team information, audit reports, accepted corrective action plans, key program documentation, on-line training, qualification status) is accessible to designated DOECAP POCs and auditors. EDS non password-protected information (i.e., general program information and documents,





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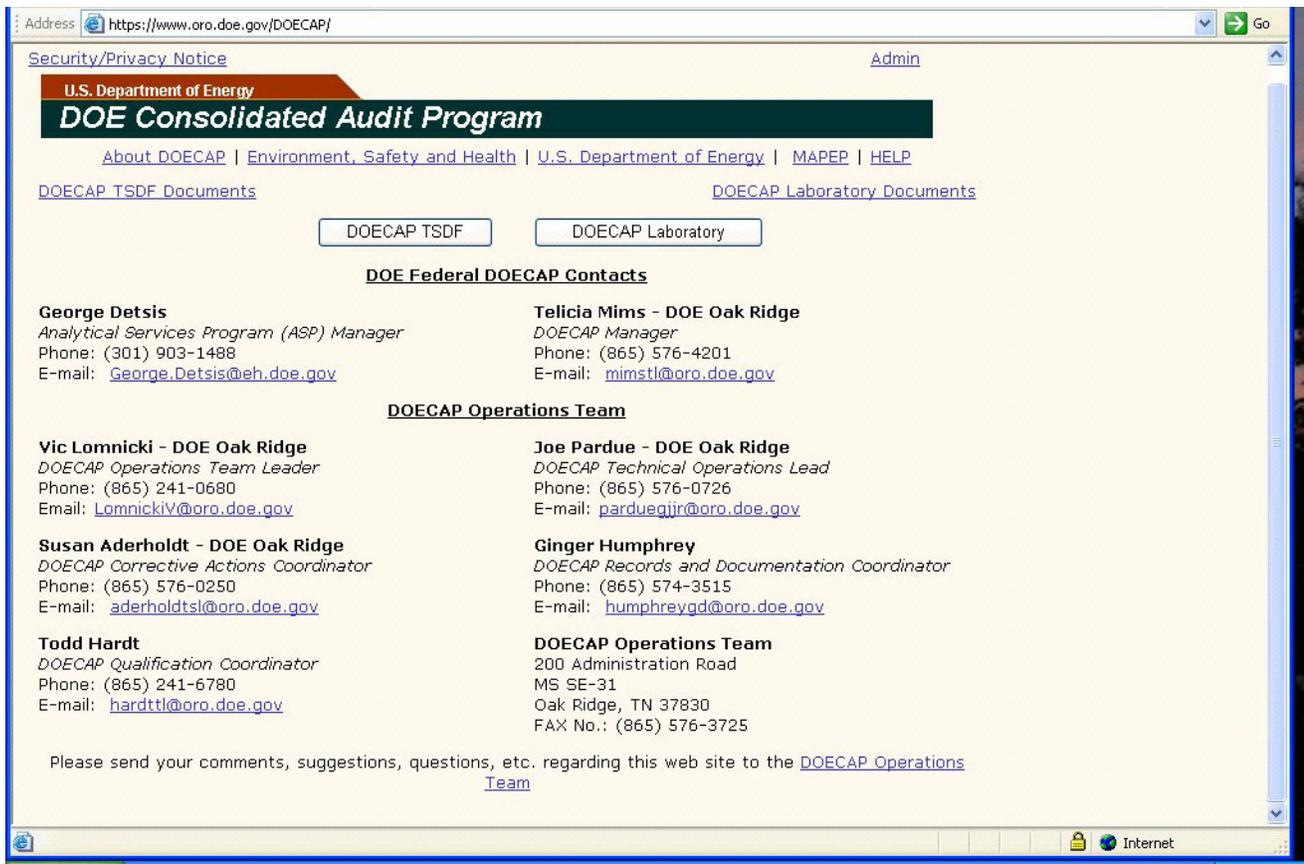


Figure 1.6 – DOECAP EDS Home Page Screenshot

contact information, links to related sites) may be accessed at <https://www.oro.doe.gov/DOECAP>.

The initiative launched in FY04 to relocate and restructure the EDS to one central location at DOE-ORO was completed in FY05. This accomplishment resulted in operational enhancements and efficiencies; improved system performance, reliability and security; and annual cost savings of \$50K. In addition, a number of enhancements completed in FY05 to improve the EDS/user interface as well as increase system utility included installation of an animated user help function (i.e., tutorial) which guides users through various functions, and launch of a bulletin board for posting items of interest to DOECAP participants

(e.g., conference call notes, technical discussions, requests for assistance, and notices regarding findings).

1.2.6 Information Protection

Compliance with DOECAP pre-audit information requests is a potential issue, especially for TSDFs, due to concern regarding disclosure of business-sensitive information. In response, in addition to the standard DOECAP nondisclosure agreement implemented in FY04, an expanded nondisclosure agreement was developed, and approved by DOE general counsel in FY05, for use at audited facilities that request greater assurance of confidentiality than that provided by the standard DOECAP nondisclosure agreement.





1.2.7 NELAC/IDQTF Participation

One of the goals of the DOECAP is to actively participate with state and Federal regulatory agencies, as well as other industry standard-setting groups such as the NELAC, to promote interagency normalization of analytical data quality requirements.

In FY05, the ASP Manager supported NELAC standards development activities of significance to the DOECAP by participating in the NELAC interim and full meetings. In addition, the EPA NELAC/NELAP Director attended the DOECAP annual meeting in September 2005 and gave a presentation regarding current NELAC status, ongoing initiatives, and interfaces with the DOE ASP. A presentation was also given by the EPA Federal Facilities Restoration and Reuse Office Coordinator on the Interagency Data Quality Task force regarding EPA/DOE/DoD interagency activities related to quality assurance project plans.

1.2.8 Program Review

A Headquarters-sponsored DOECAP program review was conducted in March 2005 between DOE Headquarters (EH-3 and EH-31), DOE-ORO, and the Parallax contractor (i.e., DOECAP Operations Team) personnel, for the purpose of management assessment of opportunities for improvement and potential barriers to continued DOECAP success. Two key meetings were also held as part of the review: one with senior DOE HQ EH management to discuss DOECAP performance and direction; and a second with Program Secretarial Office (PSO) points-of-contact for the DOECAP from EM, the Office of Science (SC), and the National Nuclear Security Administration (NNSA) to discuss and encourage DOECAP participation.

1.2.9 Annual Meeting

The DOECAP annual meeting (i.e., DOECAP 2005) was held September 19 – 23, 2005, in Albuquerque, New Mexico. The meeting was conducted primarily at the NNSA Energy Training Complex located on Kirtland Air Force Base. Meeting activities including a luncheon were also conducted on September 21st at the Wyndham Albuquerque Hotel, to facilitate transition from the laboratory to TSDF portion of the meeting. The meeting was attended by over 125 individuals, and brought together DOECAP auditors, HQ and field DOECAP POCs, analytical laboratory and TSDF representatives, senior DOE management, representatives from other ASP Programs, and representatives from other Federal agencies.

Topics discussed during working sessions included QSAS revision, laboratory and TSDF checklist revision, and feedback on the DOECAP from both Program participants and audited laboratories and TSDFs. Presentations were made by DOECAP representatives and participants on a variety of subjects including Program status, challenges and opportunities; status of various DOE sites relative to closure and projected DOECAP participation; and Program updates such as FY05 enhancements to the EDS. Presentations were also made regarding other ASP Programs: i.e., the Mixed Analyte Performance Evaluation Program (MAPEP); and the development of environmental field sampling Systematic Planning and data assessment tools, and associated training. In addition, presentations were made on topics of general interest to DOECAP participants and audited facilities by representatives from the EPA NELAC, the EPA Federal Facilities Restoration and Reuse Office, the EPA Office of the Inspector General – Laboratory Fraud Directorate, and the U.S. Navy Laboratory Quality & Accreditation Office. Copies of meeting presentations are available on the DOECAP EDS, under either “DOECAP





TSDF Documents” or “DOECAP Laboratory Documents,” online at <https://www.oro.doe.gov/DOECAP>.



Presentation at DOECAP 2005 Annual Meeting

1.2.10 Review of FY05 Goals

The following provides a brief summary regarding status of attaining DOECAP goals established for FY05, as documented in the FY04 ASP Annual Report.

- **Program Participation** – Gain broader DOECAP participation across the complex via HQ reaffirmation of previous EM guidance regarding DOECAP participation.

Progress was made in this area during the DOECAP program review conducted in March 2005, during which a key meeting was held with PSO POCs for the DOECAP from EM, SC, and NNSA to discuss and encourage DOECAP participation.

- **HQ Program Office Interface** – Enhance coordination between line programs and DOECAP initiatives.

As noted above, the opportunity to further develop POCs was taken during the annual DOECAP review in March 2005 by meeting with HQ POCs. Following the review meeting, facility usage tools were developed and provided to the ASP Manager for distribution to the HQ POCs to enable them to query input from within their PSOs regarding potential use of the DOECAP. Responses to the query were processed and used to further promote the Program as well as establish a tentative DOECAP FY06 audit schedule.

In addition, efforts continued throughout FY05 to identify and contact POCs within PSOs throughout the complex to promote DOECAP participation. As a result of those efforts, lines of communication were established with both HQ and field POCs, including initial contacts made within Legacy Management (LM), and the Office of Energy Efficiency and Renewable Energy (EE). Efforts in this area will continue in FY06.

- **Auditor Qualification** – Encourage and support sites to qualify DOECAP auditors.

Progress was made in this area with nearly all sites submitting prospective auditors for qualification; however, additional auditors are required. As discussed in detail in section 1.2.1, *Auditor Qualification and Training*, the number of qualified DOECAP laboratory lead auditors and auditors decreased over FY05 due to attrition (resultant from site closure and other causes) exceeding the number of new auditors added. Efforts to encourage qualification of new auditors will continue in FY06.





- **Auditor Training** – Revise and upgrade auditor training modules.

In FY05 the first revision of auditor training was completed, and revised training modules were loaded onto EDS. Additional revision is planned for FY06, as well as potentially enhancing the online training user interface.

- **Audit Team Leadership** – Recruit additional Federal staff to qualify as DOECAP lead auditors to increase Federal participation throughout the complex.

No progress was made in this area, although efforts were made to identify and contact Federal employees considered to be potential lead auditors. This goal is of particular significance with respect to the performance of DOECAP TSDF audits which must be led by Federal staff due to the need for DOE accountability for low-level and mixed radioactive waste emanating from DOE sites. The three currently qualified DOECAP TSDF lead auditors are provided by DOE-ORO. Efforts to recruit Federal staff will continue in FY06, particularly directed toward DOE field sites that ship large volumes of waste to TSDFs.

- **Program Document Revision and Development** – Host working meeting during FY05 to update the QSAS to remain current with NELAC guidance.

As discussed in section 1.2.4 of this report, this FY05 goal was met with issuance of Revision 2 of the QSAS. Remaining open technical items will be resolved, and QSAS Revision 2.1 will be issued early in FY06 for use in the FY06 DOECAP audit cycle.

- **EDS Enhancement** – Complete EDS restructuring.

As discussed in section 1.2.5 of this report, this FY05 goal was met.

1.3 FY06 Goals and Challenges

The following provides management assessment of opportunities for improvement and potential barriers to continued DOECAP success.

1.3.1 Program Participation

Decline in DOECAP participation represents a primary barrier to continued Program success and viability. If the DOECAP is to continue to achieve goals and objectives previously established, it is essential to increase and sustain participation throughout the complex.

Proposed FY06 actions/goals to promote DOECAP participation throughout the DOE complex include:

- Increase participation within PSOs beyond EM, with special emphasis on NNSA, SC, and LM,
- Increase participation of currently identified POCs (Federal and contractor),
- Increase active participation by sites in teleconferences and the DOECAP annual meeting, and
- Identify and pursue opportunities to increase site participation, particularly sites that use DOECAP audit results without actively participating in the Program.

1.3.2 Auditor and Lead Auditor Qualification

A FY06 goal is established to qualify additional DOECAP auditors from all participating sites





sufficient to adequately staff proposed laboratory and TSDF audits. While sites are encouraged to submit prospective auditors for qualification in all audit areas, specific laboratory audit areas requiring additional qualified auditors are Laboratory Information Management Systems and Electronic Data Management, and Hazardous and Radioactive Materials Management. Specific TSDF audit areas requiring additional qualified auditors are Radiological Control, Industrial and Chemical Safety, and Transportation Management.

A FY06 goal is also established to recruit Federal staff to serve as DOECAP lead auditors.

1.3.3 Code of Conduct

Personnel participating in DOECAP audits represent the interests of the DOE, and must do so in an objective, unbiased manner, ensuring no actions are taken which could constitute the appearance of a conflict of interest on the part of the auditor (e.g., discussing employment opportunities with audited facility management during the course of the audit). A presentation on this topic was made by the ASP Manager at the DOECAP annual meeting in September 2005, and was further emphasized during a presentation by the EH Deputy Assistant Secretary, Office of Corporate Performance Assessment. A FY06 goal is established to develop a code of conduct for DOECAP auditors to provide guidance regarding the avoidance of potential conflicts of interest.

1.3.4 Auditor Training

A FY06 goal is established to complete revision of online DOECAP auditor training modules to enhance content, as well as potentially improve the trainee interface; e.g., provide comprehension checks (i.e., quizzes) more often within each module including instant feedback regarding correct/incorrect responses.

1.3.5 QSAS Revision 2.1

A FY06 goal is established to resolve remaining open technical items, and issue QSAS Revision 2.1 for use commencing with the first FY06 DOECAP laboratory audit.

1.3.6 Laboratory Closure Checklist

A FY06 goal is established to develop and issue a formal checklist to be used to guide laboratory closure audits performed to verify proper disposition of DOE materials and assess the status of contractual obligation fulfillment. The thoroughness of previously conducted laboratory closure audits relied largely upon the technical expertise of the audit team without access to a relevant DOECAP checklist.

1.3.7 TSDF Checklists

A FY06 goal is established to complete revision of TSDF checklists for use commencing with the first FY06 DOECAP TSDF audit. In addition, a FY06 goal is established to develop and issue a checklist to be used to guide regulatory agency reviews conducted as part of TSDF audits.

1.3.8 Procedure Revision

A FY06 goal is established to revise DOECAP procedures, and develop new procedures, as necessary to more clearly document Program processes and policies.

1.3.9 Records Management

A FY06 goal is established to review DOECAP records management practices for compliance with applicable DOE requirements and guidance, including retention of electronic files. Procedures will be revised or developed as necessary to more clearly document DOECAP records management requirements.





2.0 Mixed Analyte Performance Evaluation Program (MAPEP)

The MAPEP is a performance evaluation (PE) program designed to help assure the quality and reliability of analytical data necessary to facilitate regulatory compliance and support DOE decisions. The DOE Idaho National Laboratory, Radiological and Environmental Sciences Laboratory (RESL) administers the MAPEP. Additional information is available on the MAPEP homepage at <http://www.inel.gov/resl.mapep>.

2.1 Background and Scope

MAPEP is the only PE program that targets radiological and non-radiological constituents (i.e., mixed analytes) in the same sample for quantification and analytical performance evaluation in water and soil matrices. Air filter and vegetation matrices are also prepared for radiological constituents, and gross alpha/beta samples are provided for air filter and water matrices. MAPEP participants can efficiently demonstrate proficiency in radiological, stable inorganic, and organic analyses from single-blind MAPEP performance evaluation samples traceable to the National Institute of Standards & Technology (NIST). The MAPEP is performance based and does not dictate the methodology to be used for the various sample analyses.

MAPEP PE samples are distributed twice per year in a test session (i.e., MAPEP Series), typically in July and January. A MAPEP Series refers to the complete set of water, soil, vegetation, and air filters per distribution. Within a MAPEP Series, the specific Study refers to the particular matrix and compound classification (i.e., Radiological Vegetation, Gross Alpha/Beta Filter, Radiological Filter, Gross Alpha/Beta Water, Organic Water, Mixed-Analyte Water, and Mixed-Analyte Soil). Performance on PE samples is reported by RESL as acceptable (A), acceptable



MAPEP Performance Testing Standards

with warning (W), or not acceptable (N), according to criteria described in the MAPEP Handbook which can be found online at <http://www.inel.gov/resl/mapep>. Performance results are reported to individual participants as well as appropriate DOE Field Offices and Sample Management Offices. MAPEP also provides a forum in which analytical deficiencies and areas of improvement can be identified, technical assistance can be requested, and various methodologies can be compared. Auditors from the DOECAP use MAPEP performance evaluations as well as results from other accredited PE programs when conducting laboratory audits.

2.2 FY05 Activities and Accomplishments

2.2.1 Sample Distribution and Program Expansion

MAPEP sample distribution was expanded in July 2004 (MAPEP Series 12) to include additional





sample matrices: radiological air filters, gross alpha/beta in water, and gross alpha/beta in air filters. The frequency of sample distribution was increased to twice per year for all matrices. In January 2005 (MAPEP Series 13) the program added radiological vegetation samples. The total PE samples shipped increased from 183 in FY03 to 1,031 in FY05.

Table 2.1 summarizes the increase in total PE sample distribution by MAPEP and analyses performed by participating laboratories from FY03 through FY05, and Figure 2.1 illustrates the increase in participating laboratories by sample matrix from July 2004 (MAPEP Series 12) through July 2005 (MAPEP Series 14). RESL staff accomplished the increased workload through process improvements and enhanced efficiencies.

Samples for MAPEP Series 14 were distributed to over 100 laboratories in July 2005 (See Table 2.2);

Fiscal Year	Number of MAPEP Samples	Number of Analyses by Laboratories
2003	183	3,823
2004	477	6,134
2005	1,031	10,400*

* Includes an estimate for MAPEP Series 14

Table 2.1 - Increase in Samples Distributed and Analyses by Laboratories

Appendix B lists the domestic and foreign laboratories participating in Series 14. Most of the 11 foreign laboratories are participating in the MAPEP as the PE program for the DOE sponsored Radiation Measurements Cross-Calibration Project (RMCCP) in the Middle East, facilitated by Sandia National Laboratory. Other foreign laboratories participate in MAPEP when a DOE connection can

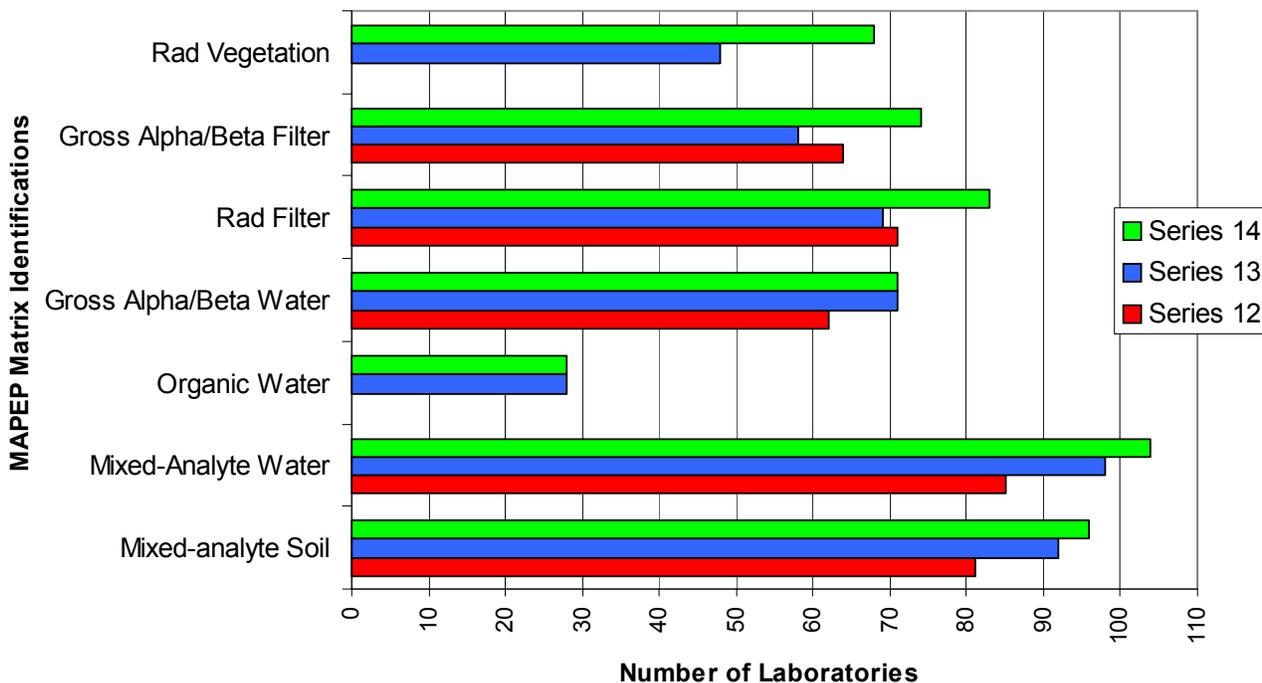


Figure 2.1 - MAPEP Laboratory Participation from 2004 to 2005





MAPEP Matrix Series 14	Matrix ID	Total Labs	Foreign Labs
Mixed-Analyte Soil	MaS	96	10
Mixed-Analyte Water	MaW	104	11
Radiological Vegetation	RdV	68	10
Radiological Air Filters	RdF	83	9
Gross Alpha/Beta Water	GrW	71	8
Gross Alpha/Beta Filter	GrF	74	6

Table 2.2 – Laboratories Participating in MAPEP Series 14 (July 2005)

be provided to MAPEP. Foreign laboratories are using MAPEP to establish quality assurance and cross calibration of radiological measurements crucial to:

- Responding in the event of a terrorist attack (e.g., dirty bomb),
- Promoting and monitoring nuclear nonproliferation treaties,
- Providing accurate environmental surveillance, and



MAPEP PE Sample for Gamma Verification

- Promoting overall security in the region (Middle East).

2.2.2 Quality Issues Identified by MAPEP Performance Tests

Laboratories participating in MAPEP Series 13 were reviewed and evaluated for historical performance, performance within Series 13, and for non-reporting of analytes during a false positive test or sensitivity evaluation. For example, if a laboratory reported results for Pu-239, but not for Pu-238, the laboratory received a “Not Acceptable” flag for Pu-238; since Pu-239 was reported, the laboratory obviously had the capability to also analyze for Pu-238. Laboratories may fail to report an analyte if they suspect it is a false positive test or sensitivity evaluation. Laboratories have been cautioned repeatedly that they must report a result for radionuclides they routinely analyze or readily have the capability to analyze for DOE. Forty-seven laboratories were sent letters of concern pointing out potential quality issues based on historical and Series 13 results. These letters were sent to laboratories that demonstrated two consecutive failures or significantly biased (i.e., warning level) results for any given analyte. DOE HQ, DOE Field Offices, and appropriate site contractor personnel were also notified. The sections below summarize important quality issues identified by the MAPEP.

False Positive and Sensitivity Tests

In addition to demonstrating the ability to report analyte concentrations well above detection limits, laboratories should also be able to detect and accurately measure analytes concentrations at or near detection limits without incorrectly reporting analytes that are not present. The MAPEP uses false positive testing on a routine basis to identify laboratory results that indicate the presence of a particular radionuclide in a MAPEP sample when, in fact, the actual activity of the radionuclide is far





below the detection limit of the measurement. In a sensitivity evaluation, the radionuclide is present at or near the detection level. Laboratories that do not detect the targeted radionuclide are identified. It is also possible to fail a sensitivity evaluation by reporting a false negative. In this scenario, based on the reported sensitivity of the measurement, the specific activity of the targeted radionuclide in the sample should have been detected, but was not. In addition to identifying false positive and false negative results, the false positive and sensitivity evaluation tests are designed to help participants ensure they are not under estimating or over inflating their total uncertainties.

False positive tests in earlier MAPEP Series occasionally showed as many as 50 percent of laboratories reported false positives for some radionuclides. The MAPEP will continue to include false positive tests while including more sensitivity evaluations. Table 2.3 and Figures 2.2 and 2.3 provide results of false positive and sensitivity tests included in MAPEP Series 13. Results are designated as Acceptable (A), Acceptable with Warning (W), or Not Acceptable (N).

Series 13 Matrix	False Positive Test	Sensitivity Test
Soil	Se	Pu-238
Water	Sb, As, Tl, Sr-90	Ni-63, Pu-238
Air Filter	NA	NA
Vegetation	NA	Pu-239, -240

Table 2.3 – False Positive and Sensitivity Tests Included in MAPEP Series 13

Antimony Analysis in Soil

The MAPEP has recently identified an area of concern for most laboratories that analyze for antimony in soil. NIST-traceable antimony standards have been spiked into the last four MAPEP soil standards (i.e., S10, MaS12, MaS13, and

MaS14). The diluent soil contains negligible amounts of antimony so there is essentially no background contribution. In the completed test sessions, only 3 of 24 labs (S10), 2 of 23 labs (MaS12), and 6 of 23 labs (MaS13) were “Acceptable” or “Acceptable with Warning.” Letters of Concern were sent to laboratories that consecutively submitted results in the “Not Acceptable” performance for antimony in soil.

Most laboratories are determining antimony with the hot acid leaching methods associated with EPA Method 3050. EPA Method 3050 (and the updated EPA Method 3050B) utilizes multiple techniques for the preparation of soil samples, which means a laboratory must choose (if allowed by the DOE contract) the appropriate analytical technique for the specific analyte determination. The wording of EPA Method 3050B may also lend itself to varying interpretations on which sample preparation technique should be used. However, Method 3050B states:

Section 7.5 may be used to improve the solubilities and recoveries of antimony, barium, lead, and silver when necessary. These steps are optional and are not required on a routine basis.

During the MAPEP review described in Section 2.3.1, the representative from EPA Headquarters, Office of Solid Waste, confirmed that antimony in soil requires the use of the alternative digestion technique to recover the environmentally available antimony in soil.

Misidentification of Isomers in Organic Compounds

The largest issue of concern for the target organic components has historically been the misidentification of isomers that exhibit chromatographic retention times very close to one



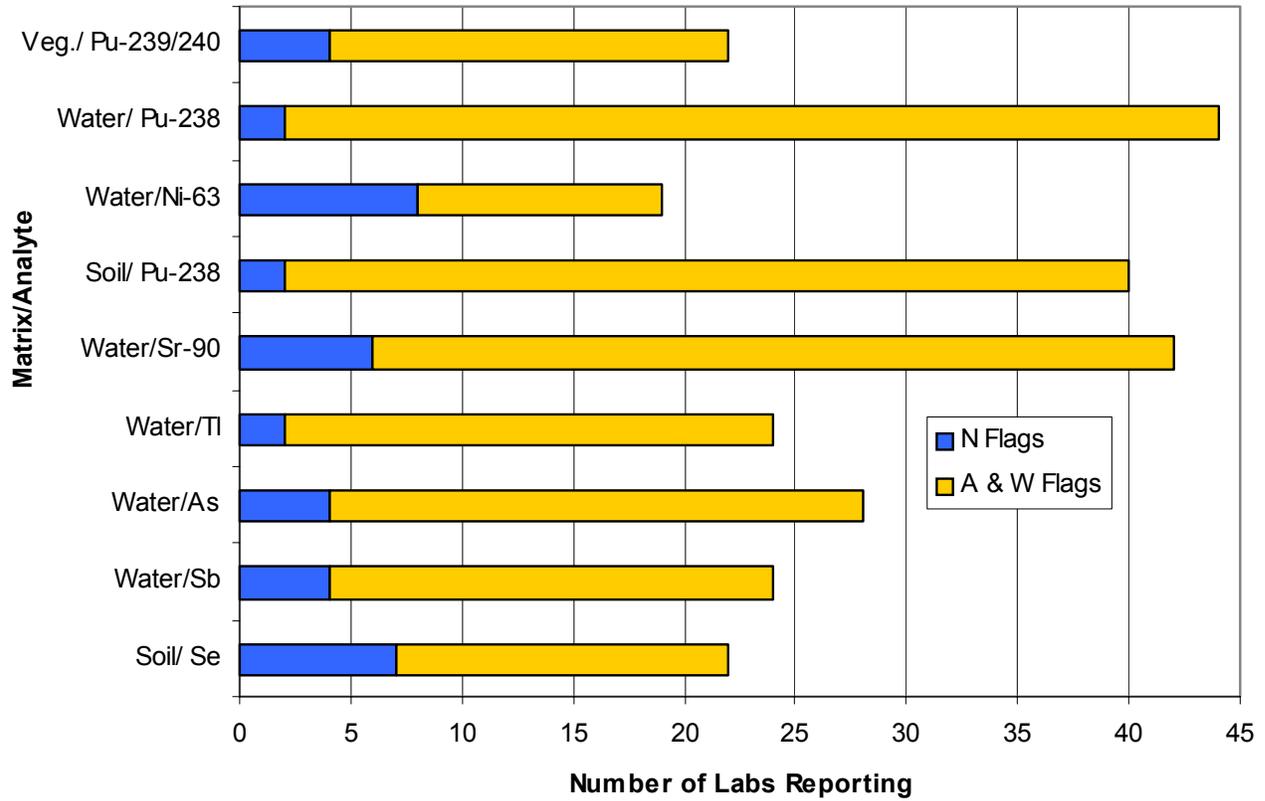


Figure 2-2 - Summary of False Positive Tests in MAPEP Series 13

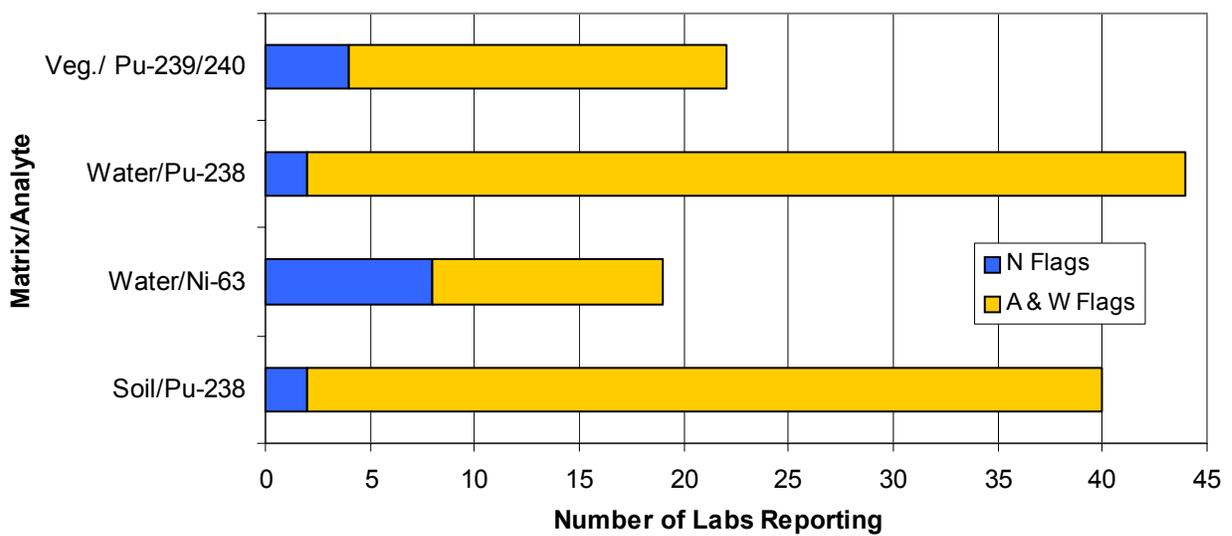


Figure 2.3 – Summary of Sensitivity Testing for Series 13





another. Reporting laboratories that fail to accurately validate the quantitation of components reported received Letters of Concern for misidentification of those isomers. The number of letters being issued has remained small, usually about one per sample distribution.

2.2.3 *Developments in MAPEP Web Based Reporting and Query System*

The MAPEP has been continually improved the data reporting and data review portion of the website (<http://mapep.inel.gov>) over the past three years. This effort has been a progressive approach to:

- Improve data entry and review by the laboratories,
- Provide auditors and DOE site personnel with tools necessary to rapidly and accurately access laboratory historical performance,
- Provide graphic tools for laboratories and auditors to view and review laboratory performance, and
- Assist RESL personnel in rapidly assessing performance data at the close of each MAPEP Series.

These changes in the current MAPEP system are a continuation of the effort to fully automate the MAPEP data reporting, data evaluation and customer reports portions of the MAPEP system. Although improvements to date shouldn't be construed as a final effort, the circle will eventually be closed on the MAPEP initiative to create a fully automated data handling system for the administration of the MAPEP as well as for the reporting of customer data.

2.3 **FY06 Goals and Challenges**

The following summarizes management assessment of the MAPEP, including opportunities for improvement.

2.3.1 *MAPEP Review Board*

An independent, interagency, ad-hoc committee of seven members met at the RESL in June 2005 to review and potentially provide recommendations for enhancing the MAPEP. The ad-hoc committee was composed of scientific experts from the DOE Federal and contractor field sites, DOE HQ, Department of Homeland Security, EPA, and a private technical consultant.

The ad-hoc committee developed 12 recommendations for the MAPEP team to review that may potentially enhance the overall effectiveness of the MAPEP. In response, RESL is incorporating several of the recommendations, including:

- Assignment of an independent Quality Assurance Officer,
- Development of a fully documented Quality Assurance Project Plan,
- Providing additional information on tables and graphs in MAPEP reports,
- Continuing to conduct statistical evaluations on data collected in MAPEP studies,
- Developing strategies to sustain the quality of the MAPEP, and
- Conducted a MAPEP survey of DOECAP Federal and contractor POCs, and drafted a report.

Other recommendations in the process of being implemented included having a similar independent





ad-hoc committee meet approximately every two to three years to review the MAPEP, evaluation of the potential for automation of PE processes, development of new acceptance criteria for the organic analytes, and verification that the organic analyte list targets DOE needs (i.e., results from the MAPEP Survey). It was also recommended that various policy-related and contractual methods be explored further to strengthen overall laboratory participation in the MAPEP, and ensure that laboratories participate in and report results for appropriate test analytes.

The ASP Manager intends to receive an onsite status in the summer of 2006 regarding actions taken to implement committee recommendations.

2.3.2 ISO 17025 Accreditation Status

RESL has been actively realigning the laboratory's quality systems and procedures to ISO 17025, *General Requirements for Competence of Testing and Calibration Laboratories*. An application has been submitted to the American Association for Laboratory Accreditation (A2LA) for accreditation of the RESL chemistry measurement systems. An on-site assessment will be conducted early in FY06 by the A2LA. It is anticipated that RESL will address any findings from the assessment for completion of ISO 17025:2005 accreditation status.

2.3.3 Traceability of RESL to the National Institute of Standards & Technology (NIST)

RESL currently is designated by DOE EH-31 as the reference laboratory for the DOE Laboratory Accreditation Program (DOELAP) and the MAPEP. The Radiological Traceability Program (RTP) provides for an annual exchange by NIST and RESL of test materials containing a number of radionuclides in various sample matrices (i.e., soil, water, air filter,

vegetation, synthetic urine, and synthetic fecal); designed to provide a mechanism for evaluating the ability of RESL scientists both to prepare test materials of known radionuclide activities, and to correctly analyze test materials of unknown activities. Performance testing standards prepared by NIST are sent to and analyzed by RESL for evaluation by NIST. In addition to assuring the measurement processes of RESL are traceable, RESL also sends prepared performance testing standards to NIST for verification of the known reference values. The two-way exchange of performance testing standards assures preparation and measurement processes at RESL are traceable to NIST.

2.3.4 MAPEP Survey of DOECAP Points of Contact

The MAPEP maintains a close working relationship with the DOECAP. At the recommendation of the MAPEP Review Team, and to evaluate customer satisfaction, MAPEP personnel have conducted a comprehensive survey of DOECAP points of contact for the sites and/or programs. Initially this survey was designed to give information to the MAPEP related to the classification of analytes most important to the DOE complex. Results of the survey were presented and reviewed at the annual DOECAP meeting in September 2005. As the need arises, more detailed information will be gathered on the DOECAP bi-monthly calls or at future annual meetings.

2.3.5 Strengthen MAPEP Participation

An opportunity exists to strengthen overall MAPEP participation by developing more specific language for performance testing and evaluation. The Office of Quality Assurance Programs is evaluating the potential for, and need to incorporate, necessary requirements in a future revision of the DOE Quality Assurance Order and other associated documents.





3.0 Development of Environmental Field Sampling Systematic Planning and Data Assessment Tools, and Associated Training

In the era of accelerated cleanup, facility decommissioning, and long-term monitoring, DOE sites must ensure environmental field sampling data of the right type, quality, and quantity are gathered and appropriately assessed accounting for inherent uncertainties to support defensible, confident decisions. DOE-EH is supporting the development of Data Quality Objectives (DQO)-based methods and tools and providing training to facilitate better, faster, and cheaper approaches to meet regulatory requirements while minimizing data gathering and assessment burdens for DOE sites. Additional information regarding software development and training may be obtained online at <http://www.hanford.gov/dqo/dqa/dqahome.html>.

3.1 Background and Scope

Expert, user-friendly software that hides the complexity of sophisticated statistical methods is providing critical tools for negotiations between DOE and regulatory entities. This DOE-EH led program for systematic planning and data assessment tools development and training is benefiting nearly every DOE site.

3.1.1 Visual Sample Plan (VSP)

VSP is a DQO-based statistical software tool that facilitates optimal sampling design and defensible statistical assessment for environmental applications. Leveraging VSP acceptance and investments by EPA, DoD, and Department of Homeland Security, DOE-EH is supporting several features in VSP aimed at accelerated cleanup, long-term monitoring, and decommissioning. VSP is being used on at least 17 major DOE sites with multiple applications at each

site. Additional information regarding VSP, including a downloadable version, can be obtained online at <http://dqo.pnl.gov/vsp>.

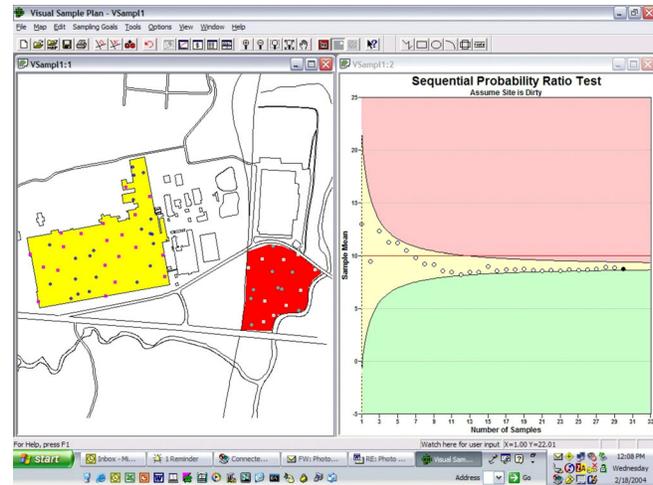


Figure 3.1 - VSP Screen Shot Showing Samples on Map and Sequential Decision Diagram

3.1.2 Visual DQA

The goal of Visual Data Quality Assessment (VDQA) is to enable environmental professionals to use the EPA Data Quality Assessment (DQA) process to make cost-effective, defensible decisions as quickly and easily as possible. Visual DQA as part of the big picture is shown in Figure 3.2.

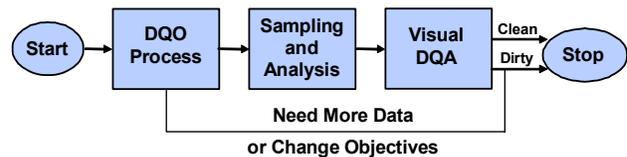


Figure 3.2 - Data Quality Assessment Process





3.1.3 DQO, DQA, and VSP Training at DOE Sites

EH-31 has developed several training courses in support of DOE sites making defensible decisions by managing uncertainty via systematic planning. The objective is to institutionalize systematic planning for environmental decision-making by adopting the EPA's 7-Step Data Quality Objectives Process throughout the DOE complex. The five courses are:

- Managing Uncertainty with Systematic Planning for Environmental Decision-Making,
- Data Quality Objectives Applications,
- Data Quality Assessment,
- Visual Sample Plan Primer, and
- Visual Sample Plan Advanced.

3.1.4 VSP Endorsements

Systematic planning is essential to ensuring the right type, quality, and quantity of data is efficiently gathered to support confident decisions. These systematic planning tools and software help streamline regulator acceptance and ensure technically defensible sampling designs and environmental decisions. The importance and utility of VSP to DOE is best summarized by comments from a few selected users illustrating how it is being employed across the DOE complex, provided in Table 3.1. Many other such testimonials have been provided and are available elsewhere.

3.2 FY05 Activities and Accomplishments

3.2.1 VSP Development

Several new features were added to VSP in FY05, including:

Data Quality Assessment and Statistical Analysis

Functions: These functions allow data to be brought into VSP and evaluated as to whether original DQOs have been met, tested as to validity of design assumptions, and statistical tests of hypotheses and confidence intervals performed to support decision making.

Background Comparison Module: This addition allows the comparison of site data against background data when sample sizes are unequal.

Concurrent Hotspot and Mean Designs: This feature allows the selection of multiple decision criteria (e.g., Hotspot detection and Mean Comparison against a regulatory threshold) and development of a single sampling design simultaneously that satisfies DQO for both decision criteria.

The major VSP development accomplishment was the release of VSP Version 4.0 in July 2005, which can be downloaded from <http://dgo.pnl.gov/vsp>.





DOE Site	Specific VSP Application, Comments, Savings
Hanford	Demolition of U Plant Ancillary buildings and assessment of footprint. VSP provides quick and easy methodology and plan with maps that are very easy for RCTs to use. Saving \$\$\$ in planning, surveying, and sampling costs – Rick Swallow
INL	Used VSP to support several (i.e., at least 15) QAPjPs, DQO Workbooks, and Sampling and Analysis Plans at the INEEL and Hanford Site. Provides defensible calculations, excellent graphics, and the ability to determine quickly. – Cliff Watkins
Oak Ridge	Bechtel Jacobs is using VSP on an almost daily basis to design sampling plans and determine statistically valid numbers and locations of environmental samples. The ease and reliability of the VSP software make its use quite efficient. Much time and effort are saved using VSP, and that equates to major cost savings – Ann Masvidal
Mound	I design MARSSIM FSS plans for the site structures. I find VSP very useful to confirm survey parameters both prospectively and retrospectively. As we move toward land area release, VSP will be very helpful in planning large area surveys – Roderick Case
Paducah	Used VSP to assess some sampling approach for Sections 1 and 2 of the NSDD. Cost-effective and efficient. Real-time cleanup would be in line with DOE's accelerated sitewide cleanup plans. – John Volpe
Argonne	Used at ANL-E and ANL-W and considering the use of VSP for determining sampling requirements from an energetic radiological plume/particulate dispersal event. Use of VSP could save dozens to hundreds of person-hours effort. – Paul Hart
Savannah River	VSP has been used for all CMP Pits and K sludge land application unit sample planning since January 2003. Statistical basis for planning has bolstered regulator confidence in our characterization of units. Have saved money by getting regulator buy-off to do less sampling than traditional, non-stat based plans would have required. – Lisel Shoffner
LANL	To plan environmental monitoring and environmental restoration verification investigations. – Tim Michael
Pantex	To develop Final Pantex Plant Radiological Investigation Report, a critical milestone for meeting 2008 closure requirements and to evaluate residual contamination in a building. For hazardous waste permit applications and environmental monitoring program. "VSP is an exceptional product endorsed at Pantex." – Bill Wyatt

Table 3.1 – VSP Endorsements from the DOE Complex

3.2.2 VDQA Development

In FY05, a prototype VDQA system was designed. VDQA uses the Dynamic Help System concept “Help Drives the Program” to guide the user through the DQA process. A Visual DQA screen shot, shown in Figure 3.3, illustrates some key features in Visual DQA that help simplify the DQA process for the user. Visual DQA is designed to help the user

through the DQA process in as direct, simple, and defensible a manner as possible.

3.2.3 Training at DOE Sites

Several training activities were accomplished during FY05. Following is a summary of courses conducted at various DOE sites, as well as other available courses.



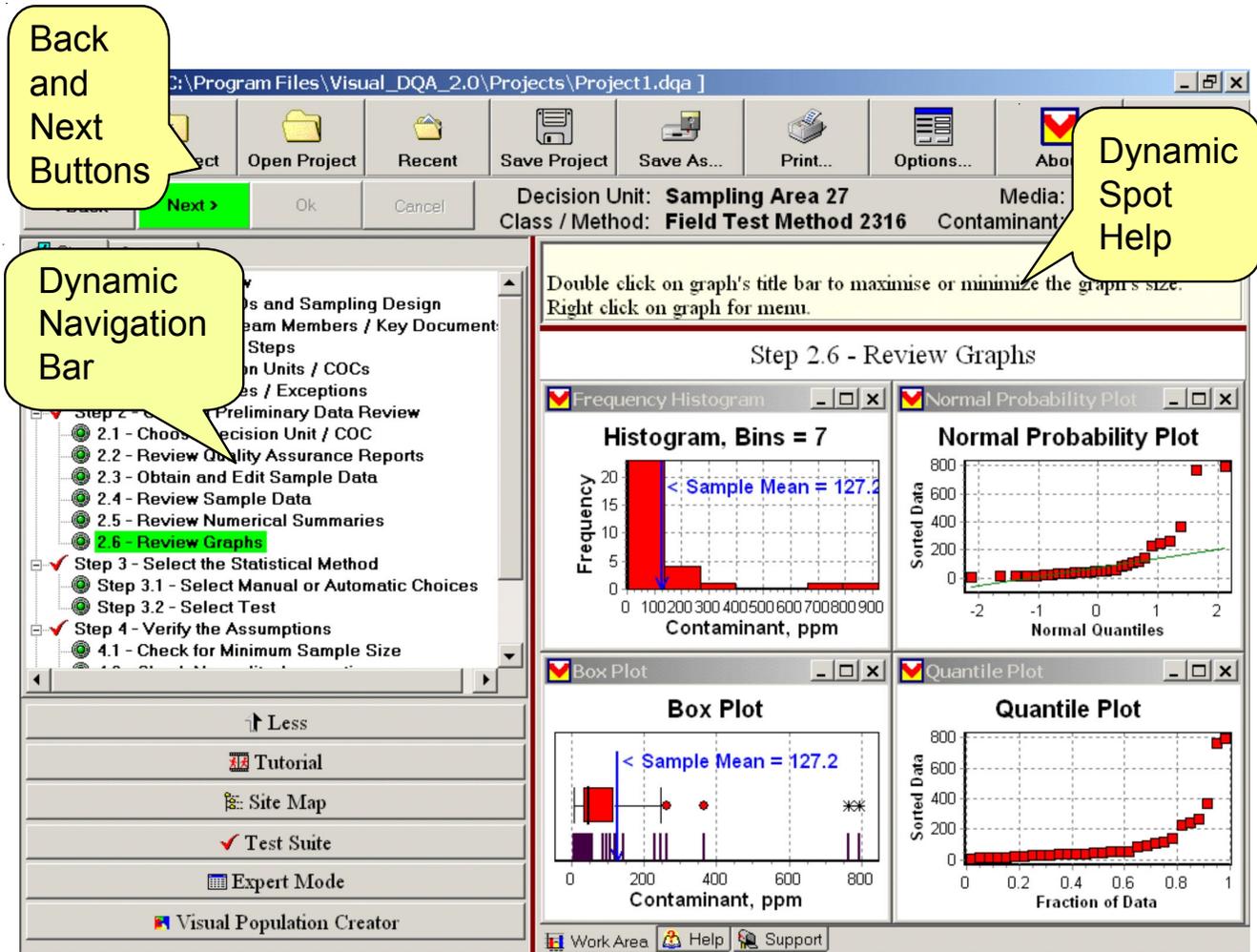


Figure 3.3 - Visual DQA Screen Shot Showing Menu Layout, Dynamic Help, and Graphical Summaries

Managing Uncertainty with Systematic Planning for Environmental Decision-Making

This 3-day training course, developed by DOE-EH in cooperation with the EPA Office of Solid Waste and Emergency Response (OSWER), provides instruction on the practical management and implementation of the EPA 7-Step DQO Process. The target audience is DOE project managers and technical support staff (i.e., CERCLA, RCRA, CWA, CAA); DOE contractors; state regulators and their

contractors; EPA Remedial Project Managers (RPMs) and technical support staff, their contractor project managers/engineers, and their technical support staff; as well as Federal, state, and local stakeholders. The first day of the course explains the big picture and presents the many free tools available on the DOE Hanford DQO website, while the last two days provide details regarding implementation of the 7-Step DQO Process including a case study. The focus is to streamline and document the process and provide a standard approach to systematic planning for environmental decision-making.





Since inception, the course has been presented to almost 2,000 professionals throughout the U.S. and the United Kingdom. Most recently, the course has been presented to DOE management, staff, and contractors as well as Washington State regulators at the DOE Hanford Site on two occasions in FY05. The course was also presented in FY05 at EPA Regions in which DOE has a presence: Region 2 (West Valley, and Brookhaven National Laboratory); Region 4 (Oak Ridge, Savannah River, Paducah); Region 5 (Argonne National Laboratory); Region 6 (Pantex); Region 8 (Rocky Flats). More information regarding this and other DOE sponsored training is available on the DOE Hanford DQO web page at <http://www.hanford.gov/dqo>.

DQO Applications

After attending the 3-day DQO training class (i.e., Managing Uncertainty with Systematic Planning for Environmental Decision-Making), the DQO Trainer meets the following week with individual project teams to take them through the EPA 7-Step DQO Process as it applies to their site. Site-specific background information gathered by the Project RPM is used during the DQO Applications meeting, during which the DQO Trainer questions project team members to develop information necessary to implement the 7-Step DQO Process for that project. The goal is to have project team members learn how to apply the EPA 7-Step DQO Process to future projects.

Data Quality Assessment for Environmental Decision-Making Training

The Data Quality Assessment (DQA) process seeks to determine whether the type, quantity, and quality of environmental data needed to support a decision has been achieved. This one-day course introduces environmental professionals to the DQA process using a combination of lectures, hands-on exercises,

and computer simulations tied to the exercises. Students experience data quality assessment by analyzing data collected by the class; some of this data is collected from simulated populations with known properties and some is collected with field instrumentation.

Visual Sample Plan Training: Primer Course

This 3-hour course provides practical, hands-on training in the use of the VSP software in the context of the DQO approach. After a short introduction, students are given a course handout containing several in-class exercises which they complete at their own pace. The course consists of a short instructor-led overview of the VSP software menu structure, a demonstration of key tasks required to use VSP, and a set of self-guided Introductory Exercises that take the student on a step-by-step tour of many VSP key features. This course has been presented to several hundred students since its inception and serves as primer to the 20-hour Advanced VSP course offered by Pacific Northwest National Laboratory.

VSP Expert Training Course

Pacific Northwest National Laboratory has developed and offered a 2½-day VSP training course at several DOE sites including Las Vegas, Hanford, Mound, and Pantex. Future courses are planned for Oak Ridge, Los Alamos National Laboratory, and Albuquerque Operations Office; and possibly at Idaho National Laboratory, Savannah River Site, Argonne National Laboratory, Lawrence Livermore National Laboratory, or other DOE sites. These courses have been well received with very positive comments. Site personnel are armed with valuable tools and become experts in VSP applications. All participants stated they were either using VSP regularly or planned on using VSP to streamline efforts to develop and gain regulator acceptance of





more cost effective sampling and analysis plans. These courses are being offered at several EPA Regions, and regulators are encouraged to participate in DOE sponsored courses; the hands-on interactive environment of the VSP courses has enhanced DOE and regulator relationships. By using VSP site managers working with regulators can quickly evaluate tradeoffs between sampling designs and together develop optimal, acceptable approaches.



VSP Expert Training Course in Session

3.3 FY06 Goals and Challenges

The following provides a management assessment of opportunities for improvement regarding environmental field sampling systematic planning and data assessment tools development and associated training.

3.3.1 *Appropriate Use of Software Tools*

Although use of VSP is widespread, the number of sophisticated, trained users is limited. Some users still don't completely understand the implications of parameter specifications, and few are familiar with some of the more extensive and often more cost

effective VSP procedures. Efforts to conduct more widespread 2½-day VSP Expert training courses will help this situation. The addition of an expert system to guide the user through the appropriate selection of a statistical sampling design approach and optimal parameter settings will also help ensure that DOE gets the most out of this investment. Continued training and VSP development should be pursued.

3.3.2 *Implementing Systematic Planning*

It is evident that some DOE projects continue to struggle with taking a systematic approach to determining how many samples must be obtained to ensure confident decisions. The training provided in the Managing Uncertainty with Systematic Planning for Environmental Decision-Making course will assist DOE managers in making sound and defensible environmental decisions. Continued training and development of tools for strengthening systematic planning efforts should be supported.





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Appendix A

FY05 DOECAP Audited Laboratories and TSDFs

DOECAP Audited Laboratories	
AAL - Assagai Analytical Laboratory, Albuquerque, NM	ACC - Accura Laboratories, Inc., Norcross, GA
ACO - BWXT ACO at Y-12, Oak Ridge, TN	ARS - American Radiation Services, Inc., Port Allen, LA
BCL - BC Laboratories, Inc., Bakersfield, CA	CAL - Caltest Analytical Laboratory, Napa, CA
CAI - CEBAM Analytical, Inc., Seattle, WA	DCC - DataChem Laboratories, Inc., Cincinnati, OH
DCS - DataChem Laboratories, Inc., Salt Lake City, UT	DFL - Davis and Floyd, Inc., Greenwood, SC
EMAX - EMAX Laboratories, Inc, Torrance, CA	ESA - Eberline Services, Inc., Albuquerque, NM
FGL - FGL Environmental Laboratory, Santa Paula, CA	ESR - Eberline Services, Inc., Richmond, CA
GEO - General Engineering Laboratories, LLC, Cincinnati, OH	GEL - General Engineering Laboratories, LLC, Charleston, SC
LLI - Lionville Laboratory, Inc., Lionville, PA	JML - Johns Manville Analytical and Testing Labs, Littleton, CO
NEO - BWXT Services, Inc., NEO, Lynchburg, VA	MCL - Materials and Chemistry Laboratory, Inc., Oak Ridge, TN
PAR - Paragon Analytics, Inc., Fort Collins, CO	PAL - USEC Paducah Analytical Laboratory, Paducah, KY
RACL - BWXT Services, Inc., RACL, Lynchburg, VA	PORTS - USEC Portsmouth Analytical Laboratory, Piketon, OH
SCA - Sanford Cohen and Associates, Montgomery, AL	RMAL - ORNL, RMAL, Oak Ridge, TN
SEQ - Sequoia Analytical, Morgan Hill, CA	SEI - Shaw Environmental and Infrastructure, Kingston, TN
SRI - Southwest Research Institute, San Antonio, TX	SES - Shealy Environmental Services, Inc., Cayce, SC
STB - Severn Trent Laboratories, Inc. - Buffalo, Amherst, NY	STA - Severn Trent Laboratories, Inc. - Colorado, Arvada, CO
STR - Severn Trent Laboratories, Inc. - Richland, Richland, WA	STK - Severn Trent Laboratories, Inc. - Knoxville, Knoxville, TN
TBE - Teledyne Brown Engineering, Knoxville, TN	STS - Severn Trent Laboratories, Inc. - St. Louis, Earth City, MO
DOECAP Audited TSDFs	
DSSI - Diversified Scientific Services, Inc., Oak Ridge, TN	PEC - Pacific EcoSolutions LLC, Richland, WA
DUR - Duratek, Inc., Oak Ridge, TN	PFF - Perma-Fix of Florida, Gainesville, FL
EC - Envirocare of Utah, Clive, Utah	WCS - Waste Control Specialists, LLC, Andrews, TX
M&EC - Materials and Energy Corporation, Oak Ridge, TN	





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Appendix B MAPEP Series 14 Participating Laboratories

U.S. Laboratories		
Accura Analytical Laboratory, Inc.	Norcross	GA
AFIOH/SDRR	Brooks City - Base	TX
Alabama Department of Environmental Management	Montgomery	AL
American Radiation Services, Inc.	Port Allen	LA
Analytical Support Operations - Radiochemical Processing Lab	Richland	WA
Argonne National Laboratory	Argonne	IL
Argonne National Laboratory - Analytical Chemistry Lab	Argonne	IL
Assagai Analytical Laboratories	Albuquerque	NM
ATL 222-S Laboratory	Richland	WA
ATL International, Inc.	Germantown	MD
BC Laboratories, Inc.	Bakersfield	CA
BWXT Pantex - D&RMG	Amarillo	TX
BWXT Services - Nuclear Environmental Laboratory Services	Lynchburg	VA
BWXT Y-12, Analytical Chemistry Organization Laboratory	Oak Ridge	TN
California Department of Health Services	Richmond	CA
Caltest Analytical Laboratory	Napa	CA
Carlsbad Environmental Monitoring and Research Center	Carlsbad	NM
CH2M Hill Mound Inc., Mound, Environmental Monitoring	Miamisburg	OH
Davis & Floyd, Inc.	Greenwood	SC
Department of Environmental Health and Safety	Raleigh	NC
Direct Push Analytical	Findlay	OH
Duratek, Inc. - Bear Creek Lab	Oak Ridge	TN
Eberline Services	Richmond	CA
Eberline Services Oak Ridge Laboratory	Oak Ridge	TN





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U.S. Laboratories (cont'd.)		
Eberline Services, Inc.	Albuquerque	NM
Edisto Savannah District EQC Tritium Lab	Aiken	SC
Environmental Radiation Laboratory	Atlanta	GA
Environmental Science Lab PNNL/ESL	Richland	WA
Environmental, Inc., Midwest Lab	Northbrook	IL
ETTP	Oak Ridge	TN
Fermi National Accelerator Laboratory (FermiLab)	Batavia	IL
FGL Environmental	Santa Paula	CA
Florida Department of Health Environmental Laboratory	Orlando	FL
Florida Department of Health Mobile Environmental Radiological Lab	Orlando	FL
Fluor Fernald	Cincinnati	OH
Framatome ANP Environmental Laboratory	Westboro	MA
FUSRAP	Berkeley	MO
GEL Laboratories of Ohio, LLC	Cincinnati	OH
General Engineering Laboratories, LLC	Charleston	SC
Georgia Power Company Environmental Laboratory	Smyrna	GA
Hanford Environmental Restoration Contractor	Richland	WA
Hazards Control Analytical Lab	Livermore	CA
ICP Analytical Laboratories Department	Idaho Falls	ID
Idaho National Laboratory	Idaho Falls	ID
ISU - Department of Physics/Health Physics/EAL	Pocatello	ID
Jefferson Laboratory	Newport News	VA
Kennedy Space Center HP Laboratory	Kennedy Space Center	FL
Lawrence Berkeley National Laboratory	Berkeley	CA





U.S. Laboratories (cont'd.)		
Lawrence Livermore Laboratory	Livermore	CA
Lawrence Livermore National Laboratory	Livermore	CA
Lawrence Livermore National Laboratory - EMRL	Livermore	CA
Lawrence Livermore National Laboratory - HWRL	Livermore	CA
Lawrence Livermore National Laboratory ERAD	Livermore	CA
Lionville Laboratory, Incorporated	Lionville	PA
MDPH - Radiation Control Program	Jamaica Plain	MA
NASA Plum Brook Reactor Facility Lab	Sandusky	OH
National Air and Radiation Environmental Laboratory	Montgomery	AL
New Jersey Department of Health and Senior Services, PHEL, ECLS	Trenton	NJ
Northeast Laboratory Services, Inc.	Waterville	ME
Nuclear Technology Services, Inc.	Roswell	GA
Oak Ridge National Laboratory - Internal Dosimetry Group	Oak Ridge	TN
O'Brien and Gere Laboratories, Inc.	Syracuse	NY
Ohio Department of Health Laboratory	Columbus	OH
ORISE/ESSAP	Oak Ridge	TN
Outreach Technologies, Inc.	Broken Arrow	OK
Pace Analytical Services Waltz Mill Site	Madison	PA
Paragon Analytics - a Division of DataChem Laboratories, Inc.	Fort Collins	CO
Public Health Laboratories	Shoreline	WA
Radiation Measurements Laboratory/AEDL	Idaho Falls	ID
RSA Laboratories, Inc.	Hebron	CT
SAIC On-Site Laboratory	Denver	COI
Sandia National Laboratories - Industrial Hygiene Analytical Lab	Albuquerque	NM





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U.S. Laboratories (cont'd.)		
Sandia National Laboratories, Radiation Protection	Albuquerque	NM
Sanford Cohen and Associates, Inc.	Montgomery	AL
Santa Susana Field Laboratory	Near Chatsworth	CA
SC Department of Health and Environmental Control Radiological Lab.	Columbia	SC
Scientific Laboratory Division	Albuquerque	NM
SECRA 3005 Count Lab - ORNL	Oak Ridge	TN
Sequoia Analytical	Morgan Hill	CA
Severn Trent Laboratories - Denver	Arvada	CO
Severn Trent Laboratories - Knoxville	Knoxville	TN
Severn Trent Laboratories - Richland	Richland	WA
Severn Trent Laboratories - St. Louis	Earth City	MO
Southwest Research Institute	San Antonio	TX
SRS Environmental Monitoring Laboratory	Aiken	SC
Stanford Linear Accelerator Center	Menlo Park	CA
Teledyne Brown Engineering	Knoxville	TN
Texas Department of State Health Services Laboratory	Austin	TX
U.S. EPA Office of Radiation and Indoor Air	Las Vegas	NV
UniTech Services Group	Springfield	MA
United States Enrichment Corporation	Paducah	KY
U.S. Army Yuma Proving Ground Material Analysis Lab	Yuma	AZ
USEC, Inc.	Piketon	OH
Waste Sampling and Characterization Facility	Richland	WA
West Valley Nuclear Services	West Valley	NY
Wisconsin Department of Public Health Radiation Protection Section	Madison	WI





U.S. Laboratories (cont'd.)

WIPP Laboratories	Carlsbad	NM
Wisconsin State Laboratory of Hygiene	Madison	WI
WSRC/Savannah River National Laboratory/ADS	Aiken	SC
WVDP Environmental Laboratory	West Valley	NY
WVDP Radiation Protection Lab	West Valley	NY

International Laboratories

Environmental Radiation Protection Division	Sharq	Kuwait
Environmental Studies Laboratory	Riyadh	Saudi Arabia
Instituto de Radioprotecao e Dosimetria	Rio de Janeiro	Brazil
International Atomic Energy Agency	Seibersdorf	Austria
National Radiation Laboratory	Christchurch	New Zealand
Radiation Measurements Laboratory	Amman	Jordan
Radiation Protection Bureau ERHD NMS	Ottawa	Ontario
Radiation Protection Service	Weston	Ontario
Royal Scientific Society - Radiation Measurements Laboratory	Al-Jubaiha	Jordan
Soreq NRC	Yavne	Israel
The Supreme Council for the Environment and Natural Resources	Doha	Qatar





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