U.S. DEPARTMENT OF ENERGY

HSS
Office of Health, Safety and Security

Department of Energy Consolidated Audit Program

SPADAT

HAPEP

Analytical Services Program

Fiscal Year 2011 Report

U.S. Department of Energy
Office of Health, Safety and Security

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Acronyms

ASP	Analytical Services Program
CDC	Centers for Disease Control
DHS	Department of Homeland Security
DoD	Department of Defense
DOE	Department of Energy
DOECAP	Department of Energy Consolidated Audit Program
EDS	Electronic Data System
EM	Office of Environmental Management
EMCBC	Environmental Management Consolidated Business Center
EPA	Environmental Protection Agency
ETTP	East Tennessee Technology Park
FY	Fiscal Year
HSS	Office of Health, Safety and Security
ISO	International Organization for Standardization
LLNL	Lawrence Livermore National Laboratory
LM	Office of Legacy Management
LOC	Letter of Concern
MAPEP	Mixed Analyte Performance Evaluation Program
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MI	Multiple Increment
NE	Office of Nuclear Energy
NELAC	National Environmental Laboratory Accreditation Conference
NIST	National Institute of Standards and Technology
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NRC	Nuclear Regulatory Commission
O	Order
ORNL	Oak Ridge National Laboratory
PNNL	Pacific Northwest National Laboratory
POC	Point of Contact
PT	Proficiency Testing
QA	Quality Assurance
QSAS	Quality Systems for Analytical Services
QSM	Quality Systems Manual
RESL	Radiological and Environmental Sciences Laboratory
RTP	Radiological Traceability Program
SPADAT	System Planning and Data Assessment Tools and Training
TNI	The National Environmental Laboratory Accreditation Conference Institute

TSDF	Treatment, Storage and Disposal Facility
US	United States
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 (FY) 2011. The ASP is managed through the Office of Health, Safety and Security (HSS), Office of Corporate Safety Analysis, Office of Corporate Safety Programs. Component elements of the ASP are the:

- DOE Consolidated Audit Program (DOECAP);
- Systematic Planning and Data Assessment Tools and Training (SPADAT) Program; and,
- Mixed Analyte Performance Evaluation Program (MAPEP).

These auditing, planning, and performance testing activities are key vehicles for assuring quality and reliable data are available for decision making to support ongoing Departmental critical operations, such as environmental remediation; clean-up projects; and long-term legacy management surveillance.

DOE Consolidated Audit Program (DOECAP)

DOECAP is an auditing program of subcontractor analytical laboratories and commercial waste treatment and disposal facilities. These auditing activities are a requirement of DOE Order (O) 435.1, *Radioactive Waste Management*, relative to commercial radiological waste vendors and as guidance in DOE O 414.1D, *Quality Assurance*. The DOECAP promoted and encouraged laboratory and treatment, storage and disposal facilities (TSDF) facility improvements, including efforts to correct, document, and close previously identified findings; implement proactive corrective actions; strengthen Quality Assurance programs; and increase focus toward meeting program requirements. The need for an estimated 90 additional independent field audits was eliminated by conducting consolidated reviews and resulted in an estimated annual cost savings to the Department in excess of $3.6M, along with additional savings to the audited laboratories and waste facilities. In FY11, a total of 37 DOECAP audits were conducted at analytical environmental laboratories and commercial waste facilities. The Program validated closures of over 85% of all open findings and documented improved performance by the laboratories and waste facilities.

In conjunction with these audit activities, the DOECAP promoted increased program participation. For example, over 120 volunteer DOE federal and contractor personnel have become DOECAP qualified auditors after having undergone a vigorous training program. The Lawrence Livermore National Laboratory utilized DOECAP identified Priority I Findings to make critical decisions regarding project support to its contracted laboratories. The Environmental Management programs at the Richland Operations Office and the Oak Ridge Office were able to confirm that aged legacy waste had been expeditiously processed by commercial waste facilities.

DOECAP continued its active involvement with national standards development programs to promote DOE missions and interests, and provided beneficial contributions to DOE field sites. For example, DOECAP is working with the Department of Defense to integrate the laboratory auditing requirements of both organizations, and actively improving laboratory and TSDF performance levels.

The key challenge confronting DOECAP is continued appropriate support from and involvement by the DOE field sites, relative to declining budgets, to preserve a pool of qualified auditors.

Systematic Planning and Data Assessment Tools and Training (SPADAT) Program

The SPADAT Visual Sampling Plan (VSP) is a software tool that supports the development of quality sampling plans based on statistical sampling theory and the statistical analysis of sample results. There are facilities and operations at virtually all DOE sites that are improving the quality, defensibility, and cost effectiveness of their sample-supported decisions on key environmental and cleanup projects, site closures, legacy management sites, and regulatory issues through the use of the this software tool. SPADAT focuses on ensuring that data of the right type, quality, and quantity are collected. SPADAT provides tools, guidance, and training in support of the following major DOE field activities:

- Optimization of sampling frequency and locations
- Characterization and remediation planning and assessment
- Effluent, environmental, and process monitoring
- Spatial mapping and temporal assessments
- Within-building sampling and visualization

In FY11, methods and tools were added to VSP and training was conducted to support outdoor radiological surveys, beryllium and radiological contamination within buildings, monitoring and assessing performance of groundwater remediation technologies, characterization of piles or drums, and many others. To support these additions, DOE leverages financial investments made by the United States (US) Department of Defense, Environmental Protection Agency, Department of Homeland Security, Centers for Disease Control, and the United Kingdom Atomic Weapons Establishment to develop the VSP software for a variety of uses. Continuing advances were made during FY11 to enhance and extend VSP's capabilities for contaminated indoor environments, quick and accurate data entry, more efficient handling of multiple analytes, process control charting, and sampling of heterogeneous populations.

These efforts support DOE goals to reduce work place exposure and protect the public and the environment.

VSP training sessions continue to support DOE site operations and intergovernmental agency personnel. These training sessions provided valuable cooperative opportunities between DOE site personnel and Federal and State regulators to facilitate communications and the development of data quality objectives and cost effective field sampling designs. In FY11, sessions were held at Los Alamos National Laboratory, the Nevada National Security Site, and the Hanford Natural Resource Trustee Council. Each session utilized leveraged interagency cost sharing approaches between the various participants.

Mixed Analyte Performance Evaluation Program (MAPEP)

The MAPEP is a set of performance evaluation samples designed to evaluate the quality of analytical facilities performing environmental measurements. All laboratories that perform environmental analytical measurements in support of DOE activities are required to participate in MAPEP. The participants included not only laboratories supporting DOE's environmental clean-up mission, but also national laboratories monitoring for environmental contaminants and international laboratories supporting radiological cross-calibration within the Middle East in cooperation with the US Department of State, the International Atomic Energy Agency, and Nuclear Test Ban Treaty participants. In FY11, MAPEP distributed performance evaluation samples to more than 100 domestic laboratories and 40 foreign laboratories resulting in over 12,000 analyses being reported and evaluated. MAPEP enhancements in the past year included: the improved accuracy in reporting results for gross alpha testing; reduction in the number of requests for remedial MAPEP Proficiency Test (PT) samples related to consecutive failed test analysis; inclusion of Iodine-129 PT's in routine MAPEP water samples; and an increase in participation by international laboratories.

The DOE Office of Nuclear Energy provides direction and funding to support the Radiological and Environmental Sciences Laboratory (RESL). Through RESL, the MAPEP has recently expanded to supporting federal, state government, international, or commercial laboratories in the areas of homeland security, public defense, environmental protection, nuclear waste, and worker protection programs. It is particularly noteworthy that RESL successfully achieved International Organization for Standardization (ISO) 17025 international accreditation for laboratory quality systems, ISO 17043 accreditation for performance testing providers, and ISO Guide 343 accreditation for certified reference material providers. No other laboratory in the US has received all three of these accreditations.

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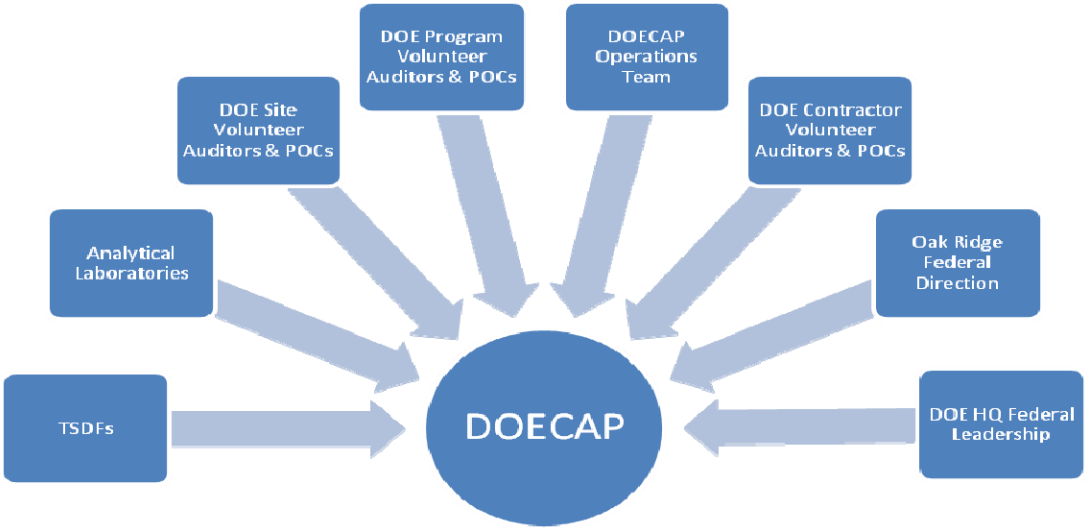
1.0 Department of Energy Consolidated Audit Program (DOECAP)

The DOECAP implements annual performance qualification audits of environmental analytical laboratories and commercial waste treatment, storage and disposal facilities (TSDF) to support complex-wide Department of Energy (DOE) mission activities. First formulated in 2002, the intent of this Departmental Program is to eliminate redundant audits of analytical laboratories and TSDFs by DOE field sites, achieve standardization, minimize DOE liabilities and risks, and reduce costs.

During Fiscal Year (FY) 2011, DOE subcontracted analytical laboratory and TSDF vendors continued to be critical components of the Department's missions. These analytical laboratories provided quality and defensible environmental data and services used by DOE sites in support of environmental remediation, site environmental monitoring, and waste management activities. TSDFs are responsible for proper treatment and disposal of the government's radiological and non-radiological hazardous waste materials. Auditing activities are a requirement of DOE Order (O) 435.1, *Radioactive Waste Management* relative to commercial radiological waste vendors, and as guidance in DOE O 414.1D, *Quality Assurance*. The DOECAP annual audits of laboratories and waste facilities provide DOE environmental and waste managers confidence that the services are compliant with DOE contractual agreement stipulations and conform to federal, state, and local requirements.



DOECAP is an integrated voluntary participation effort requiring contributions from all field elements and program office organizations. DOE field sites and program organizations (i.e., laboratory and TSDF contract holders) participate voluntarily in the DOECAP by providing lead auditors, auditors, and Points of Contact (POCs) to support the Program. This voluntary participation continues to be vital to the

success and viability of the Program. Additional Program information is available on the DOECAP Electronic Data System (EDS) at **https://doecap.oro.doe.gov/.**

1.1 Program Achievements and Benefits

Annual audits continue to motivate laboratories and TSDFs to maintain awareness and enhance the compliance with DOE contractual requirements; improve their efforts to meet federal, state, and local regulations; maintain consistency with programmatic requirements; ensure environmental data quality; and competently treat and dispose DOE radiological and non-radiological hazardous waste.

1.1.1 Achievements in FY11

During FY11, the DOECAP initiated and accomplished multiple activities that contributed to the overall success of DOE programs and projects. Some of these included:

- The DOECAP promoted and encouraged laboratory and TSDF facility improvements:
  - Efforts by IMPACT Services, Inc. following its first DOECAP audit in FY10 resulted in confirming closure of 14 of their 16 findings and documenting that previous observations were properly addressed.
  - Proactive implementation of corrective actions by GEL Laboratories, LLC following DOECAP interim findings regarding Proficiency Testing (PT) failures promptly corrected analytical deficiencies and mitigated data quality concerns.
  - Significant Quality Assurance (QA) program improvements were demonstrated at TSDFs, including PermaFix Environmental Services of Florida, IMPACT Services, Inc., and various non-radiological Clean Harbors facilities.
  - Increased attention towards timely processing wastes and legacy waste inventories through TSDFs; thereby, helping to ensure compliance with state and federal requirements.
  - Improved efforts at laboratory facilities were demonstrated for ensuring analytical processes met: reference method directions; QA program requirements; and documented in-house operating procedures.
- The Program achieved a cost savings for the Department, estimated at $3.6M for FY11 through the elimination of approximately 90 audits that would otherwise have been performed independently by DOE field element sites pursuant to DOE O 435.1 for the TSDF facilities and the requirements of the Quality Systems for Analytical Services (QSAS) for the laboratory facilities.
- The DOECAP Operations Team provided consistent audit planning, scheduling, and coordination, while maintaining standard audit procedures and producing high quality audit reports. The Team implemented standard auditor qualification requirements and maintained a cadre of DOE and contractor auditors and POCs across the DOE Complex. Audit findings and corrective actions were coordinated and centralized in the EDS prior to being disseminated to the DOE community. In addition to these Program-related activities, the Team implemented a successful contract transition and relocation of its offices.

- The DOECAP, in cooperation with its Department of Defense (DoD) counterparts, initiated integration of the DOE QSAS laboratory requirements document with DoD's Quality Systems Manual (QSM) document. It is anticipated this effort will unify DOE and DoD laboratory auditing expectations and requirements, as well as providing cross-Departmental efficiencies and overall improved consistency.
- The operational EDS during FY11 was based on older technology, built on a technically outdated platform, and continuing patches were needed to have it work effectively. During FY11, the Operations Team's cooperation with information technology support transitioned the database to a new system's platform to enable the EDS to match current technology and increase the functionality of the system. In conjunction with these upgrades, the Operations Team was able to implement significant paper reduction initiatives within the operations and auditing processes and improved auditor training and pre-audit information collection and dissemination.
- Interim Findings continue to be issued in a proactive manner to document poor performance identified during periods between audits. This may occur during analytical data review processes, PT evaluation processes, interactions during waste shipment processes, etc. The expectation to have the DOECAP community utilize this mechanism on a broader scope is continuing to be promoted and expanded.
- The DOECAP Operations Team organized and implemented a successful workshop for the DOE Analytical Services Program (ASP) in September of 2011. To foster program improvement, this workshop provided training and direct interactive communication with laboratory, TSDF, DOE, and contractor personnel. More than 135 professionals attended this workshop from throughout the DOE complex, as well as intergovernmental Federal and State representatives from the DoD and regulators from the United States (US) Environmental Protection Agency (EPA) and the State of California. The workshop focused on training sessions related to policy and procedural updates, audit checklist conformance, and audited facility and DOE site lessons learned.
- Selected members of the DOECAP Operations Team represented the ASP at the DoD Environmental Monitoring and Data Quality workshop, the National Environmental Laboratory Accreditation Conference, and the National Environmental Measurements Symposium. DOE interests and perspectives were promoted and incorporated into protocols and requirements at a national level.
- The DOECAP actively distributed audit reports to DOE Field Managers whose sites utilize the audited laboratories and facilities for analytical and waste treatment and disposal services. This communication with DOE field managers was intended to apprise them of various risks and liabilities associated with their contractual agreements with the laboratories and waste facilities, as well as to provide information on whether or not to continue future contracts with these entities.

1.1.2 Program Benefits to DOE

- The DOECAP, in coordination with HSS Headquarters management, initiated and conducted meetings with select Field Operations managers and personnel to promote the values, benefit, and cost savings of the Program and increase DOE field auditor participation. Meetings were held with personnel from the Oak Ridge Office, National Nuclear Security Administration (NNSA) Y-12 Site Office, Savannah River Site, Hanford Site, Lawrence Livermore National Laboratory (LLNL), and Idaho Operations Office. Benefits of these meetings include; increased program awareness and/or understanding, and increased commitments for auditor participation in FY12.
- Audit quality and consistency improved as a result of drawing from a large highly qualified pool of technical experts from across the DOE Complex and using standardized DOECAP processes (e.g., checklists).
- Improvement in analytical laboratory performance and data quality resulted from resolution of audit findings through the implementation of the DOECAP corrective action process.
- Safety in handling of DOE environmental samples and waste has improved through verification of facility compliance with applicable standards and regulations, including conduct of DOECAP regulatory agency reviews as part of TSDF audits.

1.1.3 Demonstrated Benefits and Values to DOE Field Sites

- The **Lawrence Livermore National Laboratory** stated that significant data quality issues (i.e., Priority I Findings) prompted immediate evaluation by each affected line organization with input from site operations. Based on these findings, important planning decisions were made relative to the continued use of the related facility. In addition, non-compliance with regulatory or laboratory procedure issues (i.e., Priority II Findings) are always evaluated for their potential impact on site programs and projects.
- The **Hanford Site** confirmed that low-level and mixed low-level radiological waste is being processed by DOECAP audited TSDFs and is not remaining in storage as long as previously documented. Facilities are becoming more proactive in their interactions, improving their use of procedures, and being more consistent in documenting proper calibration of instrumentation.
- The DOE **Environmental Management Consolidated Business Center** (EMCBC) deems that annual DOECAP audits have prompted TSDFs and laboratories to work toward continuous improvement and proactively implement internal surveillances and audits to self-identify issues. The Center now sees more robust QA, Safety, Environmental Compliance, and Radiological Protection programs at many of the TSDFs and attributes it, in part, to the DOECAP audit findings, observations, extent of condition reviews, and corrective action plans.
- The EMCBC also attributes the DOECAP structure with providing valuable training, experience, and skills in auditing, writing techniques to address findings and issues, interviewing techniques, and verbal communication to DOE participants.
- The **Oak Ridge Office, Oak Ridge Environmental Management Program, and Oak Ridge National Laboratory (ORNL)** have provided support to the DOECAP. Through the years they

have recognized and appreciated its benefit and value to their efforts to document the quality of support being provided by subcontracted laboratories and TSDFs.

- The **Nevada National Security Site (NNSS)**, the **Pantex Site Office**, and **Sandia National Laboratories (New Mexico)**, have stated their appreciation for the thoroughness of the DOECAP examinations and the depth of experience provided on audits. Collaboration with DOECAP auditors from around the Complex has allowed them to better assess the magnitude of an issue, understand the relevant root cause, and appropriate corrective action.

1.2 FY11 DOECAP Activities

1.2.1 Audit Performance

In FY11, a total of 37 DOECAP audits (all continuing audits) were conducted: 26 at environmental analytical laboratories; eight at commercial TSDFs accepting DOE mixed and low-level radioactive waste and chemical waste; and three at commercial TSDFs accepting DOE hazardous chemical non-radioactive waste. Figure 1.1 depicts the approximate locations of the various audited facilities.

The 26 DOECAP laboratory audits were conducted by teams filling a total of 124 audit positions, provided by 12 DOE sites, for a total of over 300 auditor-days and over 60 auditor-in-training-days on site at the audited laboratories. The 11 DOECAP TSDF audits were conducted by teams comprising a total of 81 audit positions, provided by 15 different DOE sites, for a total of 210 auditor-days and over 50 auditor-in-training-days on site at the audited TSDFs. A complete listing of laboratories and TSDFs audited by the DOECAP in FY11 is provided in Appendix A of this report.

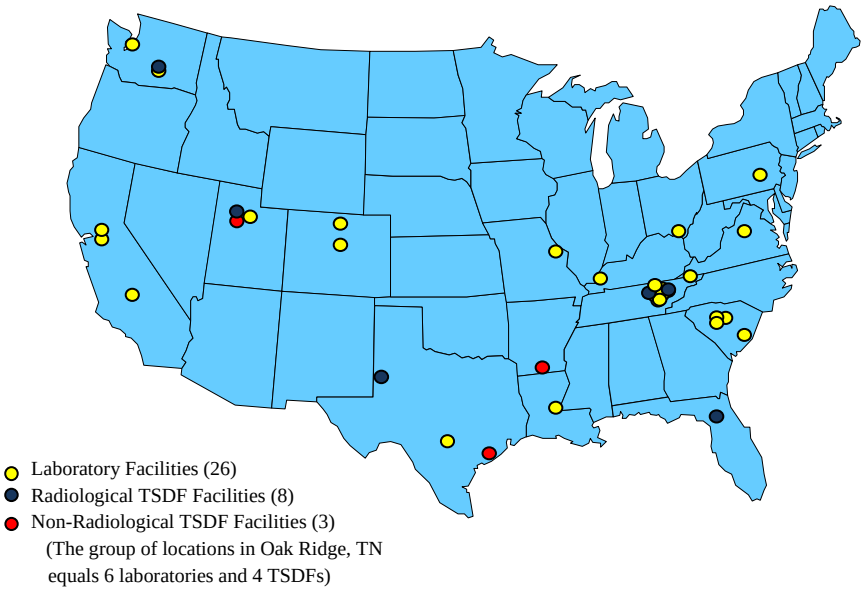


Figure 1.1 - FY11 DOECAP Evaluated Laboratories and TSDFs

A total of 157 laboratory audit findings were issued. Four were Priority I Findings related to multiple PT failures for the same analyte on sequential rounds of testing. Most have been adequately addressed and corrected by the affected facilities during the course of the annual audit cycle. However, a few audit findings still remain open at one laboratory. During the course of the TSDF audits, no Priority I Findings were identified, but 58 Priority II Findings were issued. The FY11 audit cycle was also able to document closure of 83 percent of previously issued DOECAP laboratory findings and 89 percent of previously issued TSDF findings. All active facilities in the Program have demonstrated acceptable performance and have quality systems to support DOE site activities and needs.

1.2.2 Auditor Qualification and Training

Prospective DOECAP auditors and lead auditors are recommended for qualification by DOE sites in a particular audit discipline or disciplines. DOECAP Procedure AD-1, *DOECAP Policies and Practices*, establishes formal requirements for auditor qualification documentation, evaluation, and approval. Continuing auditor qualifications are maintained by completing at least one DOECAP audit every two years and completing annual online required training. The Program was able to successfully train auditors and lead auditors during FY11 to maintain and increase the auditor pool. As illustrated in Table 1.1, the qualified DOECAP laboratory and TSDF auditor base increased during FY11.

	Lab	TSDF
Lead Auditors start of FY11	10	6
Lead Auditors ending FY11	11	11
Auditors start of FY11	53	54
Auditors ending FY11	61	66

Table 1.1 – FY11 DOECAP Lead Auditor and Auditor Qualification Status

Sites are encouraged to submit prospective auditors for qualification in all audit disciplines. As of the end of FY11, specific laboratory audit disciplines requiring additional qualified auditors are: Laboratory Information Management Systems and Electronic Data Management; Hazardous and Radioactive Materials Management; and Data Quality for Radiochemistry positions. Specific TSDF audit disciplines requiring additional qualified auditors include Sampling and Analytical Data Quality, Radiological Control, and Industrial and Chemical Safety.

1.2.3 Program Participation and Support

The DOECAP is based on the premise that DOE sites will provide qualified auditors and the DOECAP Operations Team will coordinate these resources to organize Complex-wide assessment teams to execute combined laboratory and TSDF audits. This overall consolidation of audits lowers cost to any given site, as well as to the Department. Program success has been enhanced by field sites designating POCs who are actively promoting and supporting program-related needs and submitting technically qualified personnel for participation on DOECAP audits.

Declining field site budgets has impacted Program participation to a certain degree. In order to ensure continuing Program sustainability and success, all sites need to maintain or increase their volunteer auditor contributions on a fair share basis commensurate with contractual agreements related to analytical and waste services.

The DOECAP continues to promote participation throughout the DOE Complex and cooperative efforts with POCs and auditors. Based on this participation, the Program filled 89% of the laboratory audit positions and 90% of the TSDF audit positions during the FY11 audit cycle. The Program was able to add lead and new auditors during the year even though leads and auditors were lost due to retirements and work assignment changes. The Program will continue to recruit additional auditors through correspondence and meetings with field managers. Active DOE site offices, DOE sites, and program office participants are listed in Table 1.2.

Brookhaven National Laboratory and the Brookhaven Site Office	Nevada National Security Site and the Nevada Site Office
Oak Ridge Environmental Management Program/ Oak Ridge Office	Oak Ridge National Laboratory and ORNL Site Office
Environmental Management Consolidated Business Center	Office of Legacy Management
Environmental Management Headquarters	EM Program at the Hanford Site and the Richland Operations Office, and the Office of River Protection
HSS Headquarters	Pacific Northwest National Laboratory and the Pacific Northwest Site Office
Idaho National Laboratory and the Idaho Operations Office	Pantex Site and the Pantex Site Office
Lawrence Berkeley National Laboratory and the Berkeley Site Office	Sandia National Laboratories and the NNSA Albuquerque Complex
Lawrence Livermore National Laboratory and the Livermore Site Office	Savannah River Site and the Savannah River Operations Office
Portsmouth/Paducah Sites and the Portsmouth/Paducah Project Office	Thomas Jefferson National Accelerator Facility and the Thomas Jefferson Site Office
Los Alamos National Laboratory and the Los Alamos Site Office	Y-12 National Security Site and the Y-12 Site Office

Table 1.2 – Active FY11 DOECAP Participants

1.2.4 Program National and International Interactions

The DOECAP increased its interactions within DOE and with other governmental agencies. Representatives participated in workshops and activities to promote the cooperation and sharing of lessons learned between various organizations. Interactions and influences included:

- The HSS ASP manager and DOECAP representatives met with several site management groups, including those at the Oak Ridge Office, the NNSA Y-12 Site Office, the Savannah River Site, the Richland Operations Office, LLNL, and Idaho Operations Office to discuss the benefits and values of the Program, gather feedback for continuous improvements, and promote the need for additional auditor participation.
- Participation in bi-weekly Mixed and Low Level Waste conference calls with the Office of Disposal Operations, EM-43, counterparts to obtain and contribute information regarding waste operations and audit activities.
- Attendance at The National Environmental Laboratory Accreditation Conference (NELAC) Institute (TNI) meetings, the DoD Environmental Monitoring and Data Quality workshop, and the National Environmental Measurements Conference. Participation continues to foster Program improvements, promote DOE Missions and interests toward the development of national consensus laboratory standards, share lessons learned (EPA, DoD, etc.), and clarify the challenges and issues associated with analytical laboratories and waste operations.
- Laboratories recognized as being audited by the DOECAP provided analytical support after the Fukushima nuclear incident. Several DOECAP audited laboratories were selected by government and mutual aid organization officials to perform supporting analyses for both governmental and commercial entities.
- As a measure of protecting their reputation in producing sound and defensible analytical environmental data, United Kingdom Nuclear Fuels inquired if United States laboratories they were interested in using were DOECAP audited. This was based upon the known credibility, rigor, and continual audits of these laboratories.
- A member of the DOECAP Operations Team continues to serve on the TNI Proficiency Testing Executive Committee and the Proficiency Testing workgroup. The ASP Manager (HSS) is on the TNI Board of Directors as an ex-officio member and on the TNI Laboratory Accreditation System Executive Committee. These interactions have successfully promoted Departmental auditing and PT policy and procedure into national consensus standards (e.g., TNI, Management and Technical Requirements for Laboratories Performing Environmental Analysis, Module 1 PT), including: implementation of biannual PT; inclusion of causal analyses into corrective action response; and sharing auditor resources and report information.

1.2.5 Program Challenges

The DOECAP has been supporting the Department for the past ten years in response to the DOE Office of the Inspector General and General Accounting Office reports citing inefficiency, redundancy, and ineffectiveness regarding previous audits conducted by the Department. The DOECAP now integrates a multi-site participation program: standardizes audit criteria, processes, and administration; establishes a cadre of technically competent and trained auditors; establishes a uniform system to track and document completion of corrective actions; provides a mechanism to disseminate information and lessons learned; and reduces audit redundancy. It actively contributes to development of national standards (i.e., Quality Systems Manual for Analytical Services merger of the DoD QSM, the DOE QSAS with the current

revision of TNI standard), and utilizes the national standards as the basis to implement DOE specific audits.

Key challenges to achieving continuing viability and sustainability during the coming years will include initiatives to:

- Promote DOECAP participation throughout the DOE Complex and encourage increased Complex-wide involvement. Increased DOE line management and field resources (additional POCs, auditors, and funding) are required to adequately support projected Program activities.
- Maintain the strength of the Program at a time of declining budgets at administrative and field operations levels of the Program.
- Obtain accurate information regarding laboratory and TSDF contracts and usage through the various DOE sites in order to appropriately prioritize audit schedules.
- Fully staff all disciplines with qualified auditors for the number of audits being performed and enlisting individuals as DOE site POCs who will actively promote the Program and educate each site regarding the benefits and importance of the Program. In certain instances during FY11, the Program was not able to fully staff audits or needed to rely too heavily on the DOECAP Operations Team to support on-site activities.

Operational challenges include:

- Completing the integration of the DOE and DoD laboratory requirements documents, new laboratory checklists, and associated auditor training.
- Exploring the long-term alternatives required for continued operation of the EDS.
- Promoting auditor pre-audit preparation processes and proper implementation.
- Improving audit team interactions to address potential DOE site issues and concerns.
- Improving pre-audit, on-site, and post-audit communication between auditors to enable adjustments to unforeseen circumstances.

2.0 Systematic Planning and Data Assessment Tools and Training (SPADAT) Program

Tools from the SPADAT Program are being employed for projects at every major DOE site to support key risk management decisions for environmental and facility operations. A systematic planning process facilitates effective acquisition of data and ensures reduced data uncertainty. By utilizing Visual Sample Plan (VSP), the DOE field sites are able to perform rigorous statistical data analyses that protect against erroneous decisions such as cleaning up a clean site or not cleaning up a contaminated site. Employing these systematic planning, sampling design, and statistical analysis tools developed within the SPADAT program, provides DOE decision makers, stakeholders, and regulators greater confidence that the right sample data are collected the first time resulting in significant cost and time savings and streamlined acceptance. Through SPADAT, DOE supports the development of Data Quality Objectives; provides training to facilitate better, faster, and cheaper approaches to meet regulators requirements; and minimizes data gathering and assessment burdens.

2.1 Program Achievements

DOE sites collect data through sampling to support decisions for numerous applications. Budget, time, and feasibility constraints limit the number of samples that can be obtained. Optimizing sample collection strategies using VSP modules provides key information required to assess uncertainties and impacts on Departmental decisions for the management and/or disposition of radiological and non-radiological hazardous materials. In FY11, several methods and tools were added to VSP along with many enhancements that provide the DOE users with approaches that more fully meet their application needs. Two new sampling and analysis methods added in FY11 were process control charts and multiple-increment hot spot sampling. The process control charts now provide DOE practitioners with a tool for monitoring processes (e.g. effluent monitoring) to detect unexpected changes. The multiple-increment hot spot sampling addresses a critical need for obtaining representative samples and reducing the analytical burden without losing important contaminant spatial information.

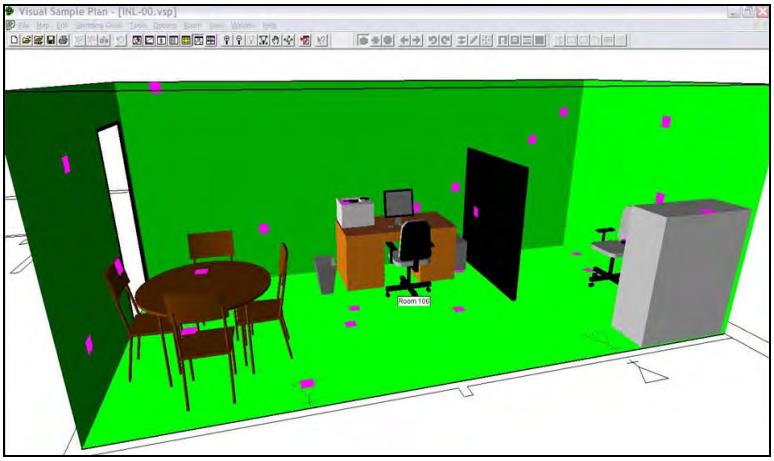


Figure 2.1 - Interior Sampling Locations on Furniture, Walls, Floors, Ceiling Surfaces at Idaho National Laboratory

To ensure ease of use, the SPADAT VSP tool is freely distributed via the web and is targeted towards the non-statistician. In FY11 other enhancements added to facilitate the use of VSP included sentence style input dialogs, unaligned grid sample placement, and improved furniture visualization and sampling capabilities (as shown in Figure 2.1 above). Intensive hands-on training sessions offered in FY11 have provided the DOE managers, contractors, and regulators with the know-how to properly use the VSP software.

2.1.1 Benefit and Value to DOE

The SPADAT tools provide DOE sites with technically defensible methods for determining the required number and location of samples to support sound decision making. They also provide statistically valid data analysis capabilities that quantify confidence levels and support uncertainty analyses. These tools are useful for reducing data collection and analysis costs, streamlining regulator acceptance, and communicating results to key decision makers. There are many examples across the DOE complex of successful VSP applications.

DOE has also been able to leverage significant VSP funding investments by EPA, DoD, Department of Homeland Security (DHS), Centers for Disease Control (CDC), and United Kingdom Atomic Weapons Establishment to minimize its own expenditure contributions. Likewise, those agencies also benefit from the DOE investment. The following VSP additions and enhancements supported by these other agencies have direct application and benefit at DOE sites.

- Furniture and surface sampling supported by CDC (see Figure 2.2);
- QA checker to test for correct operation of VSP functions sponsored by DHS;
- Hotspot delineation and costing routines that leverage DoD-sponsored methods;
- Development of case studies for VSP training purposes supported by Nuclear Regulatory Commission (NRC), and
- Stratified sampling of various surfaces within a building sponsored by DHS.

Figure 2.2 – VSP Idaho National Laboratory Facility with Furniture and Sample Locations

2.1.2 Example Applications and Benefits

Although there are many applications of VSP across the entire DOE complex, the SPADAT program developers only hear about a small subset of those. Recently, some VSP users affiliated with the DOE Oak Ridge Office provided input on VSP applications at the Oak Ridge Reservation (listed below). Although this represents only a small subset of all Oak Ridge applications (over 100 VSP users), it does provide a few examples that illustrate the variety of applications.

- Y-12 Environmental Compliance – Soil Excavation Planning and Landfill Waste Acceptance
- Y-12 Building Demolition – Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Radiological Release Surveys
- Y-12 Potentially Contaminated Areas – Sampling Designs and Analyses
- Oak Ridge Associated Universities/Oak Ridge Institute for Science Education – Independent Verification and Facility Characterization Surveys
- East Tennessee Technology Park (ETTP) – Peninsula and Laboratory Decommissioning/Decontamination to Verify Release Standards
- ORNL – Facility/Sites Initial Characterization Surveys
- ETTP – Soils Sampling and Building Decommissioning/Decontamination
- ETTP – Polychlorinated Biphenyls contamination at the K-33 and K-31 Buildings
- ORNL – Hot Cell Sampling to Determine Compliance with Environmental Management Waste Management Facility landfill Waste Acceptance Criteria
- Contaminated Borrow Soils – Time Critical Chemical/Radiological Survey on 45 Acre Site.

Similar VSP applications have been implemented by most of the DOE sites and have been included in past ASP annual reports. Based on feedback from DOE affiliated VSP users, field managers, trainees, and regulators, the goals of cost savings, streamlined acceptance, defensibility, and time reductions are being achieved across the DOE complex through the use of SPADAT tools.

2.1.3 FY12 SPADAT Program

To ensure that DOE site users have the best tools for sample design and analysis, the HSS investment in the SPADAT program is focused on the highest priority needs identified by its users. Within the SPADAT program, HSS's primary goals will continue to include: minimize sampling costs, streamlined timelines, and increased regulatory approval; provision of new VSP toolkit capabilities to support DOE missions; and transition the VSP technology to end users through targeted training. In support of these goals and the identified DOE user needs, the following additions to VSP are planned for FY12.

- Spatial contaminant mapping options beyond kriging to include nearest neighbor and least square distance approaches
- Multi-Agency Radiation Survey and Assessment of Materials and Equipment sampling approaches
- MARSSIM module enhancements
- Sampling and visualization of piles and subsurface 3-D volumes.

As evidenced by the high demand, there continues to be a significant need for training. In FY12, a 3.5 day VSP course will be offered at two DOE locations. One will be associated with the DOE Portsmouth/Paducah sites and the Ohio University. Cost sharing options will be implemented to benefit DOE program offices, as well as other governmental agencies, through communication with both line management, field site management, and various federal agencies (e.g., EPA, DoD, etc.). Courses sponsored by DoD and NRC are also planned in FY12.

2.2 FY11 SPADAT Activities

2.2.1 VSP New Developments

VSP program software is constantly being upgraded (in accordance with Pacific Northwest National Laboratory [PNNL] software QA requirements) with new features and statistical methods. As these are added, periodically a new version is released. In December 2011, VSP version 6.2 was released. This release included the following major improvements:

- Multiple-Increment hot spot sampling module
- I-chart (process control chart)
- Unaligned grid sample placement
- Sentence structure dialogs
- Default inputs
- Dynamic sample groupings
- Furniture and surface sampling

All online help, automatically generated reports, and the VSP users' manual were updated. The software is available without cost on the PNNL website (http://vsp.pnl.gov) along with the users' manual and technical documents that provide detailed background on the statistical methodologies. The FY11 new VSP developments and major accomplishments are outlined and illustrated in the following paragraphs.

- ***Multiple Incremental Sampling for Hotspots***

Multiple Increment (MI) sampling (Figure 2.3) involves selecting and physically combining several increment samples taken at spatially diverse locations. It is often employed to improve sample representativeness, especially when the constituents of

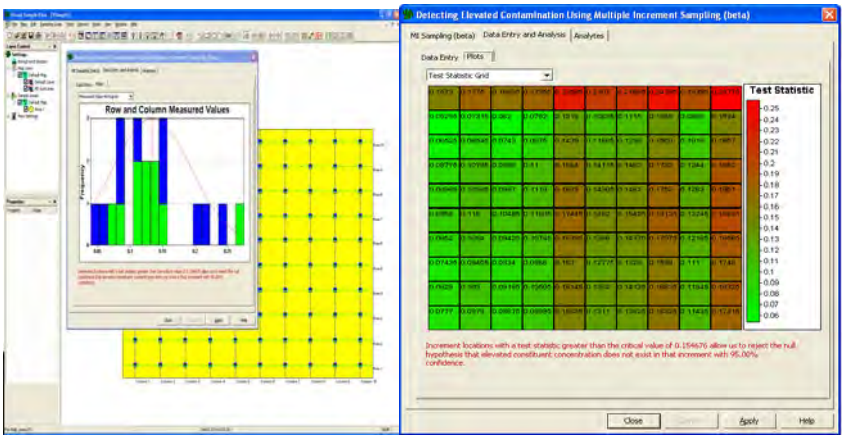


Figure 2.3 – Multiple Increment Sampling to Identify Hotspots

concern are heterogeneously distributed (nuggets of contamination). With typical MI sampling, if hotspots are present, the hotspot location is obscured through the compositing process. A new MI sampling methodology that preserves hotspot location information was developed under this SPADAT program in FY11 and has been implemented in VSP. This will allow DOE users to take advantage of the representativeness virtues of MI sampling and significant reductions in the number of samples that must be analyzed while overcoming concerns regarding hotspot detection.

- ***DOE Users' Highest Priority Requested Improvements***

During DOE VSP user training and throughout the year, many incremental enhancements in VSP are requested. In FY11, several of these improvements were completed, including the following.

- Complete switchover to sentence style dialogs (see Figure 2.4 below)
- Revised cost calculations for some modules to reflect actual sample placement and savings
- Added calculation of standard error to stratified sampling analysis

In FY10, the SPADAT program began the process of switching all VSP user dialogs to sentence style parameter inputs. Users have stated this improvement has provided substantial help for proper use of the VSP modules. In FY11, the changeover was completed for all VSP modules most pertinent to DOE applications (Figure 2.4 illustrates the dialogue box changes).

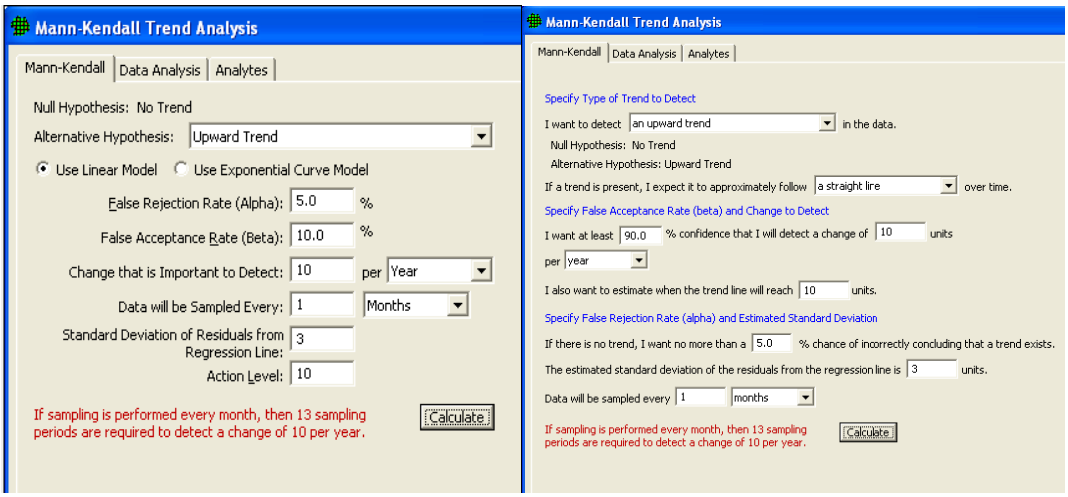


Figure 2.4 – Old VSP Dialog Box (left) versus New Sentence Structured Dialog (right)

- ***Unaligned Grid Sampling Addition***

Previously in VSP, the only two options for sample placement were random and systematic grid. A new sample placement option, unaligned grid sampling, was added at the request of several users. As seen in Figure 2.5, this allows for samples to be randomly placed within grid cells. This technique merges the systematic grid and random sampling concepts and ensures good spatial coverage.

- ***Multiple Analytes Capabilities Added***

DOE VSP users usually have multiple contaminants of concern. Previously with VSP, handling of multiple analytes was cumbersome if not impossible. In FY11, changes were made to allow users to more easily create sample designs, enter data, and perform statistical evaluations when multiple analytes are involved. This change will streamline analyses, reporting, and facilitate communications; thereby, reducing costs.

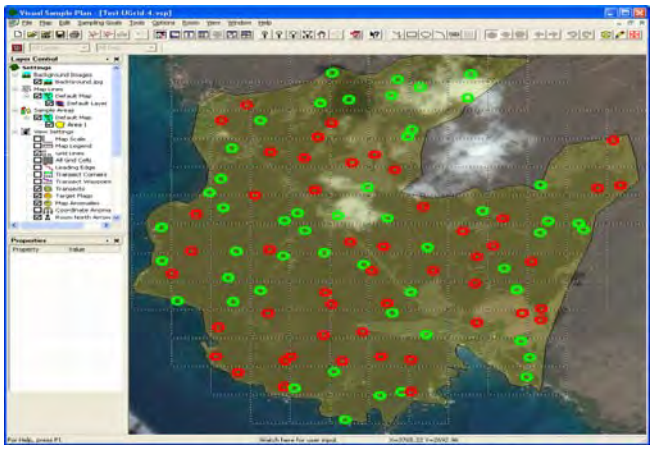


Figure 2.5 – VSP Screen Shot Showing Unaligned Grid Sampling

- ***Effluent and Process Monitoring through Control Charts***

With environmental monitoring occurring at most DOE sites, tools have been needed to track effluent streams, processes, or any system where samples are taken over time. Statistical control charts provide this function but are usually only available through the purchase of independent software. Implementation of control charts within VSP was completed in FY11. The behavior of contaminant concentrations can now be trended over time, changes can be detected, and statistical significance can be determined using this new VSP module (see Figure 2.6). Automatically generated reports and online help are also now available for this control chart feature.

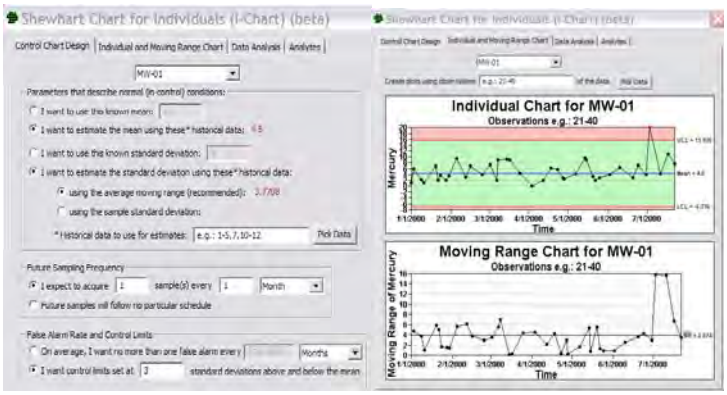


Figure 2.6 – Implementation of New VSP Control Charts to Monitor Temporal Systems

2.2.2 Training at DOE Sites

Demand for VSP training continues to be high. The objective is to get the tools into the hands of DOE site practitioners and ensure that they are sufficiently trained to maximize benefits and protect against misuse. As new methods are added, additional training materials are developed, often by leveraging other agency course additions. The current 3.5 day training course consists of a two day general course directly followed by a 1.5 day more advanced section. A two-day format has also been offered to specific groups at DOE sites who are interested in only a subset of the VSP capabilities. These courses are cost shared with the benefitting DOE site or another government agency. The hands-on 3.5 day VSP course provides the participants an opportunity to work through over 30 case studies using various VSP modules and gives them experience in manipulating and visualizing results.

Photo 2.1 – VSP Class Working Through Case Studies

The VSP training courses offered at DOE sites in FY11 included; the 3.5 day courses at Los Alamos National Laboratory, Hanford Site, and NNSS; and a two day course for the Hanford Natural Resource Trustee Council members (funded independently). Each of these courses was filled to capacity and people were turned away from some of the training sessions due to limited seating. The courses involve not only DOE managers, staff and contractors, but also State and EPA regulators. Due to training participation of regulators, this helped facilitate agreements and cost savings. Course evaluations continue to be extremely positive with many participants stating this has been the best, most useful training they have received in recent time.

3.0 Mixed-Analyte Performance Evaluation Program (MAPEP)

The MAPEP provides critical quality assurance testing for environmental analytical services. MAPEP's mission is to provide DOE and all stakeholders with the highest quality data on laboratory performance to make critical decisions in protecting DOE workers, the public, and the environment. Radiological and non-radiological (organic and inorganic) constituents are evaluated by performing semiannual PT of onsite DOE laboratories, commercial laboratories supporting DOE, other federal laboratories, state laboratories, and international laboratories. MAPEP PTs help ensure the accuracy of analytical data results reported to DOE and other stakeholders, while also providing an efficient means for laboratories to demonstrate analytical proficiency.

Photo 3.1 – Proficiency Testing Standards

3.1 Sample Distribution and International Expansion

MAPEP samples are distributed twice a year in test sessions identified as 'Series.' A MAPEP Series refers to the complete set of water, soil, vegetation, and air filters per distribution. Within a Series, the specific Study refers to the particular matrix and compound classification (e.g., Mixed Analyte Soil [MaS], Radiological Vegetation [RdV], etc.). Laboratory performance on these PT samples is reported by Radiological and Environmental Sciences Laboratory (RESL) as 'Acceptable' (A), 'Acceptable with Warning' (W), and 'Not Acceptable' (N) according to criteria described in the MAPEP Handbook, found on-line at http://www.inl.gov/resl/mapep. Performance results are reported to the individual participants and to the appropriate DOE Field Offices, Sample Management Offices, HSS, and other MAPEP stakeholders. Auditors from the DOECAP incorporate MAPEP PT result evaluations when conducting laboratory audits. The total PT distribution for Series 24 and 25 by the MAPEP in FY11 was 1050 samples to over 100 laboratories worldwide. The participating laboratories performed and reported over 12,000 analytical results to the MAPEP.

The MAPEP distributes seven sample types in four matrices: mixed-analyte soil, mixed-analyte water, semi-volatile organic water, gross alpha/beta water, radiological analyte vegetation, radiological analyte air filters, and gross alpha/beta air filters. In FY11, MAPEP continued to offer open participation for all laboratories performing radiological analyses and possessing a NRC radiological license. The number of international laboratories that support radiological cross-calibration with Middle Eastern laboratories in

coordination with the US Department of State, the International Atomic Energy Agency, Nuclear Test Ban Treaty countries, and laboratories monitoring Chernobyl increased from 25 in FY10 to 40 in FY11. Figure 3.1 illustrates the distribution of PT samples to participating laboratories from MAPEP Series 21 through Series 25 by sample matrix. Series 24 and Series 25 included the new organic contaminants in soil proficiency samples and the new Iodine-129 water test samples were sent in Series 25.

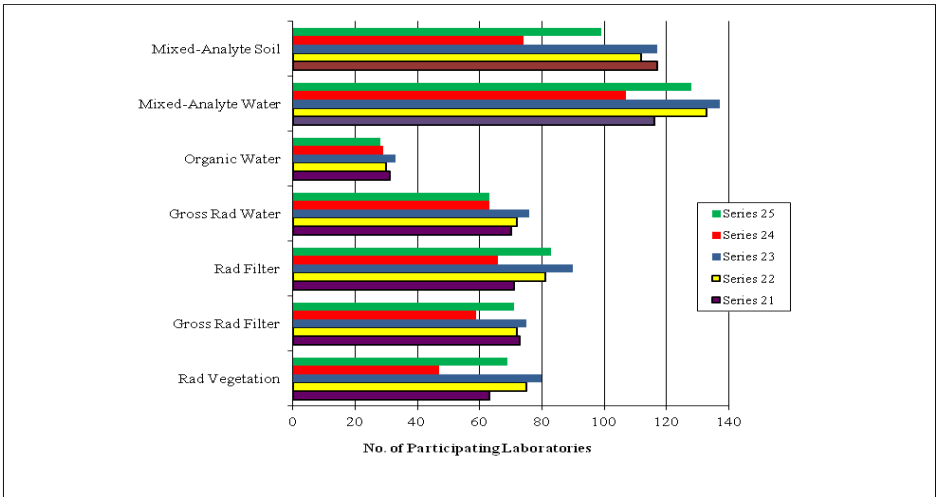


Figure 3.1 – MAPEP Distribution 2009 - 2011

The 1050 PT samples for the MAPEP Series 24 and 25 test sessions were distributed to over 100 laboratories in February and September of 2011 as nine distinct matrices (see Table 3.1). Appendix B lists the participating laboratories in Series 25, including the 40 international laboratories.

MAPEP Series 24 & 25	Matrix Code	Total Samples	Foreign Labs' Samples
Mixed-Analyte Soil	MaS	229	49
Mixed-Analyte Water	MaW	270	45
Iodine-129 Water	XWa	27	0
Semi-volatile Organic Water	OrW	63	0
Radiological Vegetation	RdV	155	41
Radiological Air Filters	RdF	171	33
Gross alpha/beta Water	GrW	148	30
Gross alpha/beta Filter	GrF	147	19

Table 3.1 – Samples Distributed to Participating Laboratories, MAPEP Series 24 and 25

3.2 Benefit and Value to DOE

The MAPEP program challenges analytical laboratories supporting DOE and its various missions by testing whether analytes in certain matrices can be identified, and whether the specific concentration level can be accurately replicated and reported. It is the only laboratory PT program that targets the performance of analytical laboratories based on low-level mixed-analytes in real world environmental sample matrices. MAPEP participants can effectively demonstrate their proficiency in radiological, stable inorganic and organic analyses from single-blind PT samples traceable to the National Institute of Standards and Technology (NIST) and accreditation to International Standards. MAPEP is performance-based and does not specify the methodology to be used for the various sample analyses. MAPEP also provides a forum in which analytical deficiencies and areas for improvement can be identified, technical assistance can be requested from MAPEP chemists, and various methodologies can be compared.

MAPEP supports DOE EM mission. The DOE EM mission is to complete the safe cleanup of the environmental legacy brought about from five decades of nuclear weapons development and government-sponsored nuclear energy research. MAPEP provides the assurance to DOE Office of Environmental Management (EM) cleanup sites that the analyses conducted by laboratories to evaluate and process the waste from these sites are accurate. DOE EM relies on the laboratories results to provide reliable and defendable analytical data that supports decisions for its cleanup programs under Comprehensive Environmental Response, Compensation, and Liability Act and Resource Conservation and Recovery Act.

Photo 3.2 – Preparing MAPEP Samples

MAPEP continues supporting DOE Office of Legacy Management (LM) mission. LM is responsible for the long-term monitoring of environmentally remediated sites. Residual contaminants must be monitored and sites managed for the long-term surveillance and monitoring. Analytes must be reported accurately when present near method detection limits for these sites. MAPEP includes special tests to evaluate laboratories' performance at or near the detection limit for false positives and sensitivity results. These special tests are especially crucial for the long-term monitoring of remediated sites. The radiological analyte activities at these sites are continually monitored for any increases that would indicate a breach of radioactive containment.

MAPEP supports DOE's NNSA. MAPEP offers national and international laboratories participation in MAPEP as they support NNSA's missions on nuclear non-proliferation and world-wide monitoring for nuclear terrorist or accident activities. Participation in MAPEP provides traceable 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; and
- Providing accurate environmental surveillance.

Participation in MAPEP improves laboratories' performance. Participating laboratories have dramatically improved 'Acceptable' results for their analysis over the years. Difficult analysis of radiological, stable inorganic and organic analytes that can harm the environment and cause health effects to the public are more accurately determined by participating laboratories since early in MAPEP's history. The trend for improved performance by laboratories is shown in Figure 3.2. MAPEP continues to challenge participating laboratories with unique new and improved proficiency tests not offered by other PT programs.

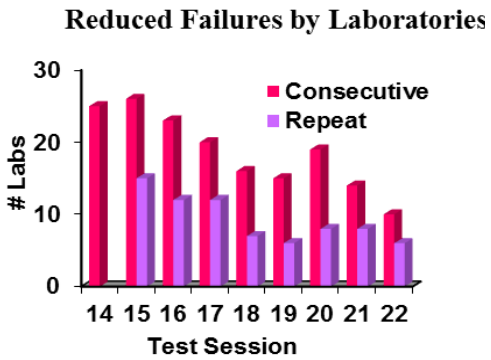
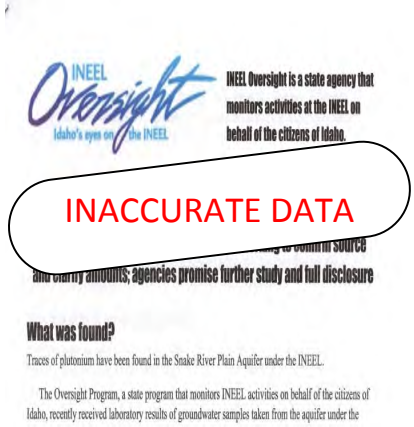


Figure 3.2 - MAPEP Participating Laboratories Show Improved Analytical Performance

MAPEP performs semi-annual testing. Laboratories are challenged to properly perform and report their analyses with a frequency that requires their complete attention throughout the year. Semi-annual PT allows trending of the analyses. Laboratories are tested for all aspects of laboratory results including: sample receipt protocol, proper method analysis, data reporting, and data evaluation.


INEEL Oversight
Idaho's eyes on the INEEL

INEEL Oversight is a state agency that monitors activities at the INEEL on behalf of the citizens of Idaho.

INACCURATE DATA

and clarify amounts; agencies promise further study and full disclosure

What was found?

Traces of plutonium have been found in the Snake River Plain Aquifer under the INEEL.

The Oversight Program, a state program that monitors INEEL activities on behalf of the citizens of Idaho, recently received laboratory results of groundwater samples taken from the aquifer under the

MAPEP impacts DOE's credibility with the public through testing for false positive/negative results. DOE is constantly under public scrutiny for the release of contaminants that can impact the environment. Reporting accurate results is critical for DOE's credibility with regulators and the public. As an example of the importance of reporting accurate data, in the past, headlines reported that DOE's Idaho Site had plutonium contaminating the groundwater. This resulted in adverse public attention for DOE. The laboratory results for plutonium, however, proved to be based on inaccurate data from a contract laboratory. Even though the water samples were reanalyzed and plutonium was not detected, DOE's credibility with the public was damaged. MAPEP actively tests and evaluates analytical performance at or near the parameter detection limits.

MAPEP adds Iodine-129 to Series 25 Semi-Annual Distribution (also known as Test Session). MAPEP continues to challenge participants by introducing new analytes in the performance evaluation samples important to DOE. Iodine-129 is a long-lived radionuclide analyzed for environmental clean-up and targeted for long-term monitoring at remediated environmental sites. Most DOE sites across the nation have to monitor for Iodine-129 for waste processing as part of their long-term monitoring. In the early 2000s, through DOECAP and MAPEP, DOE identified poor laboratory performance for laboratories analyzing Iodine-129. There was no PT program that included Iodine-129 testing available to monitor laboratories' performance for determination of Iodine-129. MAPEP designed and provided a stable PT water sample containing Iodine-129 and the performance evaluation matrix and new analyte was included in MAPEP test session 25 semi-annual distribution. Thirty-one domestic laboratories participated in the Iodine-129 PT study in Series 25. Only 11 laboratories reported results that were 'Acceptable,' five laboratories' results were 'Acceptable with Warning,' 11 laboratories reported results that were 'Not Acceptable,' and four laboratories did not report results for Iodine-129. In addition, of the 31 laboratories participating in the PT study, 15 of these laboratories were also being audited under the DOECAP. Of the DOECAP audited laboratories, six laboratories reported acceptable results while nine laboratories results were not acceptable. Therefore, approximately 60% of the laboratories participating in the Iodine-129 analytical tests produce unacceptable results, suggesting that Iodine-129 data reported to DOE maybe inaccurate or unreliable. Where Iodine-129 is a significant contributor to public dose or a driver for remediation plans, increased oversight of the data may be warranted. The next MAPEP performance test samples including Iodine-129 are scheduled for shipment in late March of 2012.

Why I-129?

- ✓ Thermal fission product of U-235 & Pu-239
- ✓ Long-term radionuclide
- ✓ Highly mobile in groundwater
- ✓ Concentrates in thyroid

3.3 New Quality Issues Identified by MAPEP Proficiency Testing

Laboratories participating in the MAPEP are continually reviewed and evaluated for their historical performance. Performance is evaluated over the last three test sessions and within each test session for each sample matrix. Reported analyses are evaluated for acceptable positive results, unreported analytes (false negative results), and false positive results or sensitivity evaluation. Beginning in Series 24, MAPEP started issuing 'Not Acceptable' performance for analytes that were not reported in that Series but were reported in previous series. This practice was instituted because certain laboratories were not reporting analytes to avoid 'Not Acceptable' performance when they suspected a sensitivity test was being provided. If an analytical data quality problem is identified, RESL issues a Letter of Concern (LOC) to help participants identify, investigate, and resolve potential quality issues.

Photo 3.3 – Analyzing MAPEP PT Samples

Comparison of information over the last few years indicates a small percentage of concerns relative to the number of analyses being reported. There were 12,100 analyses performed for consecutive test sessions 24 and 25. Fifty-three LOCs were generated from the 12,100 analyses, which is approximately 0.4%. The number of LOCs has remained fairly consistent over time. HSS, DOE Field Offices, and the appropriate site contractor personnel are sent copies of LOCs to ensure all stakeholders are aware of the PT results. As part of the DOECAP/MAPEP interactive cooperation, when a DOECAP audited laboratory fails PTs for the same analyte on sequential rounds of testing, it is issued a Priority I Finding and immediate corrective actions are required. MAPEP plays a crucial role in identifying analytical problems that are otherwise difficult to recognize and assists laboratories in correcting issues before they become a liability to DOE. A memo detailing the criteria used for issuing a LOC can be found at http://www.inl.gov/resl/mapep. The following paragraphs summarize the important quality issues identified by MAPEP during the Series 24 and 25 test sessions.

MAPEP evaluates laboratories for accuracy in false- positive and sensitivity testing. In addition to laboratories demonstrating the ability to accurately report analyte concentrations well above detection limits, they

Series 24 Matrix	False Positive Test	Sensitivity Test
Soil	Tc-99, Mn-54,	Pu-238
Water	Co-57, Zn-65	None
Air Filter	Am-241, Mn-54	None
Vegetation	Am-241, Cs-134	None
Series 25 Matrix	**False Positive Test**	**Sensitivity Test**
Soil	Cs-134, Ni-63	Am-241
Water	Cs-137, Fe-55, Mn-54, Ni-63, Tc-99	Pu-238
Air Filter	Cs-137, Mn-54	None
Vegetation	Cs-134, Co-60	Pu-239/240

Table 3.2 – False-Positive and Sensitivity Tests Included in MAPEP Series 24 and 25

must also be able to detect and accurately measure analyte concentrations at or near detection limits without incorrectly reporting false-positive results. The MAPEP program uses false-positive testing on a routine basis to identify laboratory results that indicate the presence of a particular radionuclide when, in fact, the actual activity of the radionuclide is below the detection limit of the measurement. Table 3.2 (above) shows the targeted analytes for false-positive and sensitivity tests included in MAPEP Series 24 and 25. MAPEP targeted radionuclides for false positive and sensitivity testing in the matrices to simulate the real DOE monitoring samples being analyzed by the laboratories.

In a sensitivity evaluation, the radionuclide is present at or near the detection level, and the difference between the reported result and the MAPEP reference value is evaluated based on the combined total uncertainties. Laboratories that do not detect the targeted radionuclide fail a sensitivity evaluation by reporting a false-negative. The sensitivity evaluations work in tandem with the false-positive tests. If the laboratory fails false positive or sensitivity evaluations for two or more consecutive test sessions, a LOC is forwarded to the laboratory. False-positive and sensitivity evaluation tests also evaluate total uncertainties at laboratory reporting levels.

Figure 3.3 graphically displays Series 25 False-Positive Test results from the November 2011 timeframe. Results are designated as 'Acceptable' or 'Not Acceptable.' Also included in these results are the laboratories not reporting the results to avoid evaluation for these special tests. These laboratories have routinely reported the analytes in previous test sessions. The laboratories show improvement over earlier performance for false-positive and sensitivity tests. Routine testing for false positive and sensitivity tests provides DOE confidence that low level results are accurate.

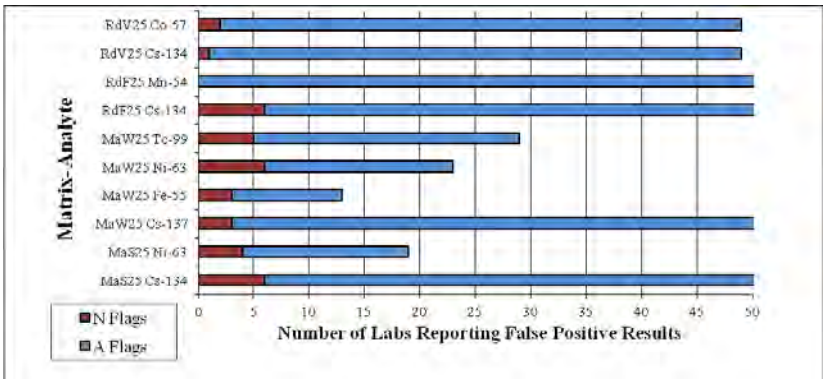
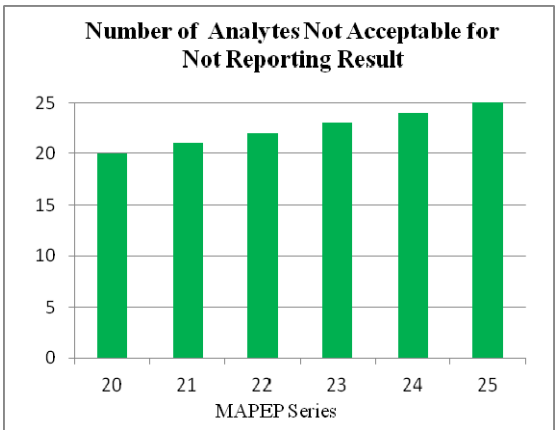


Figure 3.3 – Summary of False-Positive Tests in MAPEP Series 25 (November 2011)

New Performance Evaluation for Laboratories Not Reporting Results for Special Tests. MAPEP has observed that laboratories have difficulties reporting or not reporting analytes near detection levels. Accurate results near detection limits are difficult to achieve due to laboratory contamination, inferences, and analyst errors. Various mechanisms have been employed by some participant laboratories to avoid reporting unacceptable results including: simply not reporting a result for the analyte although they have reported that same analyte in previous studies; reporting results as exactly zero +/- zero (0 +/- 0); inflating the uncertainty on a false positive test ensuring a statistically positive result is not reported; and deflating the total uncertainty on a sensitivity test ensuring that the unknown activity is detected.



These laboratories have received 'Report Warning' flags in previous MAPEP Series. Laboratories are now clearly being directed to report the actual result and uncertainty for all radiological measurements they routinely perform for DOE. MAPEP instructions state "Failure to report results for requested analyses will result in a 'Not Acceptable' performance evaluation if the analysis is within the scope of the laboratories' routine function or contractual obligations." This report shows laboratories for which data was entered for any analyte in two consecutive series but not in the most recent series.

Starting in Series 24, MAPEP also evaluated a laboratory based on reporting the full suite of a class of analytes. For example, if any of the gamma nuclides were reported, then those gamma nuclides not reported were evaluated as 'Not Acceptable.' Similar performance evaluation was performed for alphas.

3.4 Program Updates

Increased Laboratory Participation in 2011

A goal set in 2010 was to expand MAPEP's laboratory participation. MAPEP initially was open to all analytical laboratories, but since 2004, laboratories were required to demonstrate direct or indirect support of the DOE missions and interests. During RESL's recent reorganization its mission scope was revised to include protecting the health, safety, and environment of the general public. MAPEP saw an increase in international laboratories in 2011 and maintained domestic laboratory participation. Maintaining an open participation to all laboratories providing radiological, inorganic, and organic analyses is not only to critical DOE EM for environmental remediation; but also, for DOE's other missions as described earlier for DOE's NNSA and LM's missions.

Photo 3.4 – Preparing MAPEP PT Samples for International Laboratories

MAPEP Remedial Samples Policy

MAPEP and DOECAP continue to work together to resolve poor laboratory performance. DOECAP will issue a Priority I Finding whenever a laboratory fails the same analyte in two or more consecutive test sessions. Priority I Findings have encouraged immediate corrective actions by laboratories in order to sustain their credibility to perform specific analyte determinations for DOE and other customers.

Performance is demonstrated by passing a similar PT test and confirming the problem has been resolved. RESL has issued a policy that addresses how laboratories can request remedial MAPEP samples between designated test sessions. In FY11, DOECAP identified Priority I Findings related to failing the same analyte in two consecutive PT test sessions. This resulted in the laboratories correcting the related analytical issues and successfully passing MAPEP Remedial PT samples.

RESL Now Accredited as a Proficiency Testing Provider and Certified Reference Material Provider

RESL maintained accreditation for both International Organization for Standardization (ISO) 17025:2005 *General Requirements for the Competency of Testing and Calibration Laboratories* and ISO 17043:2009 *General Requirements for Proficiency Testing* by the American Association for Laboratory Accreditation in 2011. RESL has also achieved accreditation as a Certified Reference Materials Producer according to ISO Guide 34 *General Requirements for the Competence of Reference Material Producers.* RESL is the only laboratory in the US that holds all three ISO accreditations for extensive radiological and stable inorganic analytes in complex matrices. The RESL Accreditation Certificates with associated scopes are available on the A2LA.org website under Certificate #2377.01, 2377.02, & 2377.03.

Traceability of RESL to the National Institute of Standards & Technology

RESL currently is designated by HSS as the only DOE reference laboratory for environmental analyses. RESL maintains direct radiological traceability to the NIST through an Interagency Agreement. The NIST/RESL Radiological Traceability Program (RTP) provides for an annual exchange between NIST and RESL of test materials containing a number of radionuclides in various sample matrices (soil, water, air filter, vegetation, synthetic urine, and synthetic fecal). It is 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. PT standards are prepared by NIST, sent to RESL and analyzed by RESL for subsequent evaluation by NIST. RESL sends prepared PT standards to NIST for verification of the known reference values. This assures that the preparation and measurement processes at RESL are traceable to NIST. RESL has successfully completed analytical performance for the preparation and analyses of the 2011 RTP samples. In FY11, a new Interagency Agreement was developed between DOE and NIST for the next four years assuring continued direct traceability to NIST.

Program Promotion/Technical Assistance

The MAPEP continues to provide and explore opportunities to promote the Program and demonstrate its relevance to present and future needs of the DOE Complex. Opportunities to offer technical assistance to national and international organizations have been and are continuing to be identified. Participation in conferences, workshops, and meetings promotes the importance of laboratory PT analyses, and presentations, reviews, and updates on MAPEP extend PT understanding. MAPEP continues to provide technical assistance to participating laboratories fostering improved performance levels and assisting in meeting Departmental expectations for quality data. In addition, the RESL will be hosting the ASP 2012 Workshop in Idaho Falls, Idaho.

Relocation of RESL Laboratories to Idaho Falls in July 2011

Through the efforts and direction of the DOE Office of Nuclear Energy (NE), DOE-Idaho Operations Office, and RESL management, the laboratory successfully relocated its laboratories and offices to the Idaho National Laboratory Research Center in Idaho Falls, Idaho. During the relocation, there was no damage to instrumentation and not even one beaker was broken. The new state-of-the-art facility is a major upgrade from the forty plus year old laboratory and allows RESL to continue improving its various programs. RESL management and staff are appreciative of DOE support from NE and HSS at Headquarters and Idaho Falls Operations Office in support of this relocation.

Photo 3.5 – Ribbon cutting ceremony for the new RESL in Idaho Falls, Idaho

Appendix A

FY11 DOECAP AUDITED LABORATORIES	
ACO - B&W Y-12 Analytical Chemistry Organization, Oak Ridge TN	ALSU - ALS Laboratory Group, Salt Lake City, UT
ALSC - ALS Laboratory Group, Fort Collins, CO	ARS - American Radiation Services, Inc., Port Allen, LA
BCL - BC Laboratories, Inc., Bakersfield, CA	CAL - Caltest Analytical Laboratory, Napa, CA
CAI - CEBAM Analytical, Inc., Bothell, WA	DFL - Davis and Floyd, Inc., Greenwood, SC
ESO - Eberline Services, Inc., Oak Ridge, TN	ESR - Eberline Services, Inc., Richmond, CA
GEL - GEL Laboratories, LLC, Charleston, SC	LLI - Lionville Laboratory, Inc., Lionville, PA
MBT - Microbac Laboratories, Johnson City, TN	MCL - Materials and Chemistry Laboratory, Oak Ridge, TN
ORISE - Oak Ridge Institute for Science and Education, Oak Ridge, TN	PAL - USEC Paducah Analytical Laboratory, Paducah, KY
PORTS - USEC Portsmouth Analytical Laboratory, Piketon, OH	RMAL - Radioactive Material Analysis Laboratory, Oak Ridge, TN
RACL - Radioisotope and Analytical Chemistry Laboratory, BWXT, Lynchburg, VA	SES - Shealy Environmental Services, Inc., Cayce, SC
Shealy Consulting, LLC, Lexington, SC	SRI - Southwest Research Institute, San Antonio, TX
TAA - Test America, Inc., Arvada, CO	TAR - Test America, Inc., Richland, WA
TAS - Test America, Inc. - St. Louis, Earth City, MO	TAK - Test America, Inc., Knoxville, TN

FY11 DOECAP AUDITED TSDFs	
ARG - Clean Harbors Aragonite, Aragonite, UT	DPT - Clean Harbors Environmental Services, Deer Park, TX
DSSI - Diversified Scientific Services, Inc., Kingston, TN	ELD - Clean Harbors El Dorado, El Dorado, AR
EST - Energy Solutions, LLC, Oak Ridge, TN	ESU - Energy Solutions of Utah, Clive, Utah
IMP - IMPACT Services, Inc. Oak Ridge, TN	MEC - Materials and Energy Corporation, Oak Ridge, TN
PFF- Perma-Fix of Florida, Gainesville, FL	PFN - Perma-Fix Northwest, Richland, WA
WCS - Waste Control Specialists, LLC, Andrews, TX	

Appendix B

MAPEP Series 25 Laboratories, 2011

Domestic Laboratories Mixed-Analyte Water (MaW24)			
Lab Code	**Laboratory Name**	**City**	**State**
ADEM01	Alabama Department of Environmental Management	Montgomery	AL
ANLA01	Argonne National Laboratory/Analytical Chemistry Lab.	Idaho Falls	ID
ANLB01	Argonne National Laboratory	Idaho Falls	ID
ANTE01	ALS Environmental	Fort Collins	CO
AREV01	AREVA - CMC	Westboro	MA
ARGO01	Idaho National Laboratory	Idaho Falls	ID
ARPL01	Analytical Support Operations - Radiochemical Processing Lab	Idaho Falls	ID
ARSL01	American Radiation Services Inc.	Port Allen	LA
AY1201	B&W Y-12, Analytical Chemistry Organization Laboratory	Idaho Falls	ID
CDHS01	California Department of Public Health	Richmond	CA
CESL01	Lawrence Livermore National Laboratory - EMRL	Livermore	CA
CHMH01	222-S Laboratory	Richland	WA
CHPR01	CHPRC Central Count Room	Idaho Falls	ID
CMRC01	Carlsbad Environmental Monitoring and Research Center	Carlsbad	NM
CORE02	TestAmerica Denver	Arvada	CO
DAFI01	Davis & Floyd, Inc.	Greenwood	SC
DEHS01	Department of Environmental Health & Safety	Raleigh	NC
DLEA01	DLE Associates	Hercules	CA
DPHE01	Colorado Dept. of Public Health & Env. / Laboratory Services Div.	Denver	CO
DRMG01	B&W Pantex - D&RMG	Amarillo	TX
EMAX01	EMAX Laboratories, Inc	Torrance	CA
EPAL01	US EPA Office of Radiation and Indoor Air	Las Vegas	NV
ERAD01	Lawrence Livermore National Laboratory ERAD	Livermore	CA
ERCL01	Washington State Public Health Laboratories	Shoreline	WA
ERLG01	Environmental Radiation Laboratory	Atlanta	GA
ESDE01	Region 5 EQC Tritium Lab	Aiken	SC
ETTP01	MCL Inc, ETTP	Oak Ridge	TN
EULC01	EnergySolutions, LLC	Clive	UT
FDHE01	Florida Dept of Health Environmental Laboratory	Orlando	FL
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	Orlando	FL
FERM01	Fernald Project	Harrison	OH
FSCL01	Lawrence Livermore Laboratory	Livermore	CA
GENE01	GEL Laboratories, LLC	Charleston	SC
GPCL01	Georgia Power Company Environmental Laboratory	Smyrna	GA
HCAL01	Hazards Control Analytical Lab	Livermore	CA
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	Columbia	SC
IDGR01	Oak Ridge National Laboratory-Internal Dosimetry Group	Oak Ridge	TN
ISUP01	ISU - Department of Physics/Health Physics/EAL	Pocatello	ID
JLNN01	Jefferson Laboratory	Newport News	VA

Domestic Laboratories Mixed-Analyte Water (MaW24)			
Lab Code	**Laboratory Name**	**City**	**State**
KDHE01	Kansas Dept. of Health & Environment	Topeka	KS
LANL01	Los Alamos National Laboratory	Los Alamos	NM
LAWR01	Lawrence Berkeley National Laboratory	Berkeley	CA
LAWR02	Lawrence Livermore National Laboratory	Livermore	CA
LOCK03	Advanced Test Reactor (ATR) Complex Radioanalytical Laboratory	Idaho Falls	ID
MART01	USEC, Inc.	Piketon	OH
MART02	United States Enrichment Corporation	Paducah	KY
MART03	Radioactive Material Analysis Laboratory	Oak Ridge	TN
MDPH01	MDPH-Radiation Control Program	Jamaica Plain	MA
MLIL01	Microbac Laboratories, Inc	Marietta	OH
MSCL01	MSC	Oak Ridge	TN
NARL01	National Air and Radiation Environmental Laboratory	Montgomery	AL
NARL02	USEPA - NAREL - MERL	Montgomery	AL
NESI01	B&W Technical Services-Radioisotope & Analytical Chemistry Laboratory	Idaho Falls	ID
NTSI01	Nuclear Technology Services, Inc.	Roswell	GA
OBGL01	Life Science Laboratories, Inc.	East Syracuse	NY
ODHL01	Ohio Department of Health Laboratory	Reynoldsburg	OH
ORIS01	ORISE/IEAV	Oak Ridge	TN
OTLI01	Outreach Technologies, Inc.	Broken Arrow	OK
PESL01	Environmental Science Lab PNNL/ESL	Richland	WA
QUAN01	TestAmerica St. Louis	Earth City	MO
QUAN02	TestAmerica Knoxville	Knoxville	TN
QUAN03	TestAmerica	Richland	WA
RSAL01	RSA Laboratories, Inc.	Hebron	CT
SAVA01	Savannah River Nuclear Solutions (SRNS)	Aiken	SC
SEML01	SRS Environmental Monitoring Laboratory	Aiken	SC
SLAC01	SLAC DOE National Accelerator Laboratory	Menlo Park	CA
SOUT01	Southwest Research Institute	San Antonio	TX
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	Albuquerque	NM
TDHL01	Texas Department of State Health Services Laboratory	Austin	TX
TELE01	Teledyne Brown Engineering - Environmental Services	Knoxville	TN
TELE02	Environmental, Inc., Midwest Lab	Northbrook	IL
TMAO01	Everline Services Oak Ridge Laboratory	Oak Ridge	TN
TMAR01	Eberline Analytical Corp. Richmond CA Lab	Richmond	CA
TNUT01	FUSRAP	Berkeley	MO
UNTE01	UniTech-235	Barnwell	SC
WEST01	Lionville Laboratory	Exton	PA
WEST03	Waste Sampling and Characterization Facility, MSA/RJLG	Richland	WA
WEST04	Pace Analytical Services, Pittsburgh	Greensburg	PA
WIPH01	WI, DPH, Radiation Protection Section	Madison	WI
WIPP01	WIPP Laboratories	Carlsbad	NM

Domestic Laboratories Mixed-Analyte Water (MaW24)			
Lab Code	**Laboratory Name**	**City**	**State**
WSHL01	Wisconsin State Laboratory of Hygiene	Madison	WI
WVDP01	WVDP Environmental Laboratory	West Valley	NY
YPGA01	US Army Yuma Proving Ground / Material Analysis Lab	Yuma	AZ

Domestic Laboratories Mixed-Analyte Soil (MaS24)			
Lab Code	**Laboratory Name**	**City**	**State**
ANTE01	ALS Environmental	Fort Collins	CO
AREV01	AREVA - CMC	Westboro	MA
ARSL01	American Radiation Services Inc.	Port Allen	LA
AY1201	B&W Y-12, Analytical Chemistry Organization Laboratory	Idaho Falls	ID
CDHS01	California Department of Public Health	Richmond	CA
CESL01	Lawrence Livermore National Laboratory - EMRL	Livermore	CA
CHMH01	222-S Laboratory	Richland	WA
CHPR01	CHPRC Central Count Room	Idaho Falls	ID
CMRC01	Carlsbad Environmental Monitoring and Research Center	Carlsbad	NM
CORE02	TestAmerica Denver	Arvada	CO
DAFI01	Davis & Floyd, Inc.	Greenwood	SC
DPHE01	Colorado Dept. of Public Health & Env. / Laboratory Services Div.	Denver	CO
EMAX01	EMAX Laboratories, Inc	Torrance	CA
EPAL01	U. S. EPA Office of Radiation and Indoor Air	Las Vegas	NV
ERCL01	Washington State Public Health Laboratories	Shoreline	WA
ERLG01	Environmental Radiation Laboratory	Atlanta	GA
ETTP01	MCL Inc, ETTP	Oak Ridge	TN
EULC01	EnergySolutions, LLC	Clive	UT
FDHE01	Florida Dept of Health Environmental Laboratory	Orlando	FL
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	Orlando	FL
FSCL01	Lawrence Livermore Laboratory	Livermore	CA
GENE01	GEL Laboratories, LLC	Charleston	SC
GPCL01	Georgia Power Company Environmental Laboratory	Smyrna	GA
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	Columbia	SC
HERR01	Washington Closure Hanford	Richland	WA
ISUP01	ISU - Department of Physics/Health Physics/EAL	Pocatello	ID
JLNN01	Jefferson Laboratory	Newport News	VA
KDHE01	Kansas Dept. of Health & Environment	Topeka	KS
LANL01	Los Alamos National Laboratory	Los Alamos	NM
LAWR01	Lawrence Berkeley National Laboratory	Berkeley	CA
LAWR02	Lawrence Livermore National Laboratory	Livermore	CA
LIND01	Linde FUSRAP Laboratory	Tonawanda	NY
LOCK01	AMWTP Analytical Chemistry Laboratory	Idaho Falls	ID
LOCK03	Advanced Test Reactor (ATR) Complex Radioanalytical Laboratory	Idaho Falls	ID
MART01	USEC, Inc.	Piketon	OH

Domestic Laboratories Mixed-Analyte Soil (MaS24)			
Lab Code	**Laboratory Name**	**City**	**State**
MART02	United States Enrichment Corporation	Paducah	KY
MART03	Radioactive Material Analysis Laboratory	Oak Ridge	TN
MDPH01	MDPH-Radiation Control Program	Jamaica Plain	MA
MKME01	PIKA International	McClellan	CA
MLIL01	Microbac Laboratories, Inc	Marietta	OH
MSCL01	MSC	Oak Ridge	TN
NARL01	National Air and Radiation Environmental Laboratory	Montgomery	AL
NARL02	USEPA - NAREL - MERL	Montgomery	AL
NESI01	B&W Technical Services-Radioisotope & Analytical Chemistry Laboratory	Idaho Falls	ID
NTSI01	Nuclear Technology Services, Inc.	Roswell	GA
OBGL01	Life Science Laboratories, Inc.	East Syracuse	NY
ODHL01	Ohio Department of Health Laboratory	Reynoldsburg	OH
OLML01	Outreach Laboratory Mobile Laboratory	Broken Arrow	OK
ORIS01	ORISE/IEAV	Oak Ridge	TN
OTLI01	Outreach Technologies, Inc.	Broken Arrow	OK
PBRF01	NASA Plum Brook Reactor Facility Lab	Sandusky	OH
PESL01	Environmental Science Lab PNNL/ESL	Richland	WA
QUAN01	TestAmerica St. Louis	Earth City	MO
QUAN02	TestAmerica Knoxville	Knoxville	TN
QUAN03	TestAmerica	Richland	WA
RSAL01	RSA Laboratories, Inc.	Hebron	CT
SEML01	SRS Environmental Monitoring Laboratory	Aiken	SC
SLAC01	SLAC DOE National Accelerator Laboratory	Menlo Park	CA
SOUT01	Southwest Research Institute	San Antonio	TX
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	Albuquerque	NM
TDHL01	Texas Department of State Health Services Laboratory	Austin	TX
TELE01	Teledyne Brown Engineering - Environmental Services	Knoxville	TN
TELE02	Environmental, Inc., Midwest Lab	Northbrook	IL
TMAO01	Everline Services Oak Ridge Laboratory	Oak Ridge	TN
TMAR01	Eberline Analytical Corp. Richmond CA Lab	Richmond	CA
TNUT01	FUSRAP	Berkeley	MO
URSL01	UNLV Radioanalytical Services Laboratory	Las Vegas	NV
WEST01	Lionville Laboratory	Exton	PA
WEST03	Waste Sampling and Characterization Facility, MSA/RJLG	Richland	WA
WEST04	Pace Analytical Services, Pittsburgh	Greensburg	PA
WIPH01	WI, DPH, Radiation Protection Section	Madison	WI
WIPP01	WIPP Laboratories	Carlsbad	NM
WSHL01	Wisconsin State Laboratory of Hygiene	Madison	WI
YPGA01	US Army Yuma Proving Ground / Material Analysis Lab	Yuma	AZ

Domestic Laboratories Radiological Filter (RdF24)			
Lab Code	**Laboratory Name**	**City**	**State**
ADEM01	Alabama Department of Environmental Management	Montgomery	AL
ANLB01	Argonne National Laboratory	Idaho Falls	ID
ANTE01	ALS Environmental	Fort Collins	CO
AREV01	AREVA - CMC	Westboro	MA
ARGO01	Idaho National Laboratory	Idaho Falls	ID
ARPL01	Analytical Support Operations - Radiochemical Processing Lab	Idaho Falls	ID
ARSL01	American Radiation Services Inc.	Port Allen	LA
AY1201	B&W Y-12, Analytical Chemistry Organization Laboratory	Idaho Falls	ID
CDHS01	California Department of Public Health	Richmond	CA
CESL01	Lawrence Livermore National Laboratory - EMRL	Livermore	CA
CHMH01	222-S Laboratory	Richland	WA
CHPR01	CHPRC Central Count Room	Idaho Falls	ID
CMRC01	Carlsbad Environmental Monitoring and Research Center	Carlsbad	NM
DEHS01	Department of Environmental Health & Safety	Raleigh	NC
DPHE01	Colorado Dept. of Public Health & Env. / Laboratory Services Div.	Denver	CO
DRMG01	B&W Pantex - D&RMG	Amarillo	TX
EPAL01	US EPA Office of Radiation and Indoor Air	Las Vegas	NV
ERCL01	Washington State Public Health Laboratories	Shoreline	WA
ERLG01	Environmental Radiation Laboratory	Atlanta	GA
EULC01	EnergySolutions, LLC	Clive	UT
FDHE01	Florida Dept of Health Environmental Laboratory	Orlando	FL
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	Orlando	FL
FSCL01	Lawrence Livermore Laboratory	Livermore	CA
GENE01	GEL Laboratories, LLC	Charleston	SC
GPCL01	Georgia Power Company Environmental Laboratory	Smyrna	GA
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	Columbia	SC
ISUP01	ISU - Department of Physics/Health Physics/EAL	Pocatello	ID
JLNN01	Jefferson Laboratory	Newport News	VA
KDHE01	Kansas Dept. of Health & Environment	Topeka	KS
LANL01	Los Alamos National Laboratory	Los Alamos	NM
LAWR01	Lawrence Berkeley National Laboratory	Berkeley	CA
LOCK01	AMWTP Analytical Chemistry Laboratory	Idaho Falls	ID
LOCK03	Advanced Test Reactor (ATR) Complex Radioanalytical Laboratory	Idaho Falls	ID
MART01	USEC, Inc.	Piketon	OH
MART02	United States Enrichment Corporation	Paducah	KY
MART03	Radioactive Material Analysis Laboratory	Oak Ridge	TN
MDPH01	MDPH-Radiation Control Program	Jamaica Plain	MA
MKME01	PIKA International	McClellan	CA
MSCL01	MSC	Oak Ridge	TN
NARL01	National Air and Radiation Environmental Laboratory	Montgomery	AL

Domestic Laboratories Radiological Filter (RdF24)			
Lab Code	**Laboratory Name**	**City**	**State**
NARL02	USEPA - NAREL - MERL	Montgomery	AL
NESI01	B&W Technical Services-Radioisotope & Analytical Chemistry Laboratory	Idaho Falls	ID
NTSI01	Nuclear Technology Services, Inc.	Roswell	GA
ODHL01	Ohio Department of Health Laboratory	Reynoldsburg	OH
ORIS01	ORISE/IEAV	Oak Ridge	TN
OTLI01	Outreach Technologies, Inc.	Broken Arrow	OK
PBRF01	NASA Plum Brook Reactor Facility Lab	Sandusky	OH
QUAN01	TestAmerica St. Louis	Earth City	MO
QUAN03	TestAmerica	Richland	WA
RSAL01	RSA Laboratories, Inc.	Hebron	CT
SEML01	SRS Environmental Monitoring Laboratory	Aiken	SC
SOUT01	Southwest Research Institute	San Antonio	TX
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	Albuquerque	NM
TDHL01	Texas Department of State Health Services Laboratory	Austin	TX
TELE01	Teledyne Brown Engineering - Environmental Services	Knoxville	TN
TELE02	Environmental, Inc., Midwest Lab	Northbrook	IL
TMAO01	Everline Services Oak Ridge Laboratory	Oak Ridge	TN
TMAR01	Eberline Analytical Corp. Richmond CA Lab	Richmond	CA
URSL01	UNLV Radioanalytical Services Laboratory	Las Vegas	NV
WEST03	Waste Sampling and Characterization Facility, MSA/RJLG	Richland	WA
WEST04	Pace Analytical Services, Pittsburgh	Greensburg	PA
WIPH01	WI, DPH, Radiation Protection Section	Madison	WI
WIPP01	WIPP Laboratories	Carlsbad	NM
WSHL01	Wisconsin State Laboratory of Hygiene	Madison	WI
WVDP01	WVDP Environmental Laboratory	West Valley	NY
WVPL01	WVDP Radiation Protection Lab	West Valley	NY
YPGA01	US Army Yuma Proving Ground / Material Analysis Lab	Yuma	AZ

Domestic Laboratories Radiological Vegetation (RdV24)			
Lab Code	**Laboratory Name**	**City**	**State**
ADEM01	Alabama Department of Environmental Management	Montgomery	AL
ANTE01	ALS Environmental	Fort Collins	CO
ARSL01	American Radiation Services Inc.	Port Allen	LA
CDHS01	California Department of Public Health	Richmond	CA
DEHS01	Department of Environmental Health & Safety	Raleigh	NC
DPHE01	Colorado Dept. of Public Health & Env. / Laboratory Services Div.	Denver	CO
EPAL01	U. S. EPA Office of Radiation and Indoor Air	Las Vegas	NV
ERCL01	Washington State Public Health Laboratories	Shoreline	WA
ERLG01	Environmental Radiation Laboratory	Atlanta	GA
FDHE01	Florida Dept of Health Environmental Laboratory	Orlando	FL
FDOH01	Florida Dept. of Health, Mobile Environmental Radiological Lab	Orlando	FL

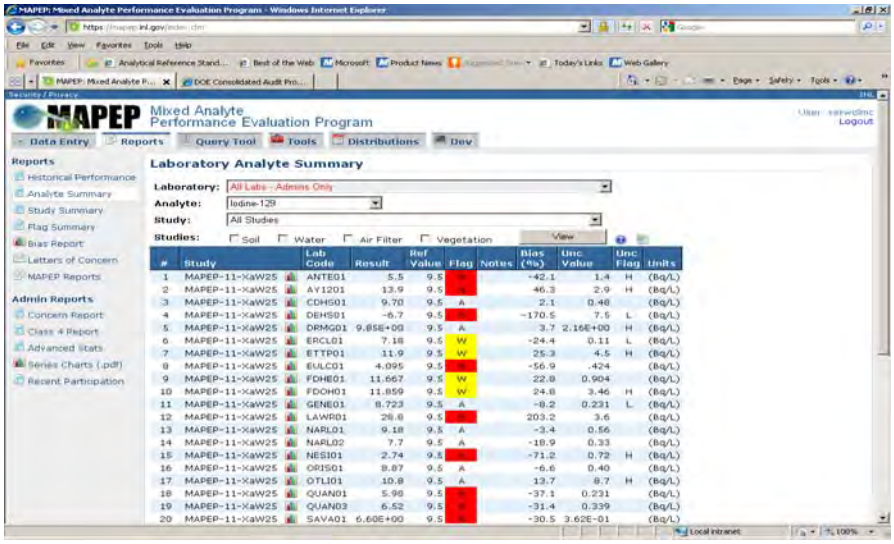
Domestic Laboratories Radiological Vegetation (RdV24)			
Lab Code	**Laboratory Name**	**City**	**State**
GENE01	GEL Laboratories, LLC	Charleston	SC
GPCL01	Georgia Power Company Environmental Laboratory	Smyrna	GA
HECR01	SC Dept. Health and Environmental Control Radiological Laboratory	Columbia	SC
ISUP01	ISU - Department of Physics/Health Physics/EAL	Pocatello	ID
KDHE01	Kansas Dept. of Health & Environment	Topeka	KS
LAWR01	Lawrence Berkeley National Laboratory	Berkeley	CA
LAWR02	Lawrence Livermore National Laboratory	Livermore	CA
LOCK03	Advanced Test Reactor (ATR) Complex Radioanalytical Laboratory	Idaho Falls	ID
MART01	USEC, Inc.	Piketon	OH
MART02	United States Enrichment Corporation	Paducah	KY
MART03	Radioactive Material Analysis Laboratory	Oak Ridge	TN
MDPH01	MDPH-Radiation Control Program	Jamaica Plain	MA
MSCL01	MSC	Oak Ridge	TN
NARL01	National Air and Radiation Environmental Laboratory	Montgomery	AL
NARL02	USEPA - NAREL - MERL	Montgomery	AL
NTSI01	Nuclear Technology Services, Inc.	Roswell	GA
ODHL01	Ohio Department of Health Laboratory	Reynoldsburg	OH
ORIS01	ORISE/IEAV	Oak Ridge	TN
OTLI01	Outreach Technologies, Inc.	Broken Arrow	OK
QUAN01	TestAmerica St. Louis	Earth City	MO
QUAN03	TestAmerica	Richland	WA
SEML01	SRS Environmental Monitoring Laboratory	Aiken	SC
SOUT01	Southwest Research Institute	San Antonio	TX
SRPD01	Sandia National Laboratories, Radiation Protection Sample Diagnostics	Albuquerque	NM
TDHL01	Texas Department of State Health Services Laboratory	Austin	TX
TELE01	Teledyne Brown Engineering - Environmental Services	Knoxville	TN
TELE02	Environmental, Inc., Midwest Lab	Northbrook	IL
TMAO01	Everline Services Oak Ridge Laboratory	Oak Ridge	TN
TMAR01	Eberline Analytical Corp. Richmond CA Lab	Richmond	CA
WEST03	Waste Sampling and Characterization Facility, MSA/RJLG	Richland	WA
WEST04	Pace Analytical Services, Pittsburgh	Greensburg	PA
WIPH01	WI, DPH, Radiation Protection Section	Madison	WI
WIPP01	WIPP Laboratories	Carlsbad	NM
WSHL01	Wisconsin State Laboratory of Hygiene	Madison	WI

Appendix C
MAPEP Password Protected Web Site for Reporting and Query System

MAPEP updated the password protected data reporting and data review site at https://mapep.inl.gov. The User Interface was updated for Series 25 to enhance the ease of participants' data entry, program managers' review, and operation personnel utilization of MAPEP. The enhancements streamlined the reporting and query aspects of the MAPEP database. Options are available within the MAPEP web site to query the MAPEP historical database for review of specific laboratory data or an analyte's historical performance by all laboratories. These enhanced options offer ready built query tools for DOE and other authorized personnel to evaluate laboratories in support of awarding new laboratory contracts, reviewing performance by existing laboratories, and monitoring laboratory performance on an ongoing basis. DOECAP auditors routinely utilize the web for reviewing performance of the audited laboratories related to the performance evaluation samples.

The MAPEP's historical database contains performance data for the last ten years for laboratories participating in MAPEP. Other federal agencies, international and standard organizations have requested historical queries to be performed on the MAPEP database. Additional queries of MAPEP's database of results can provide not only laboratory performance information, but information related to method and instrumentation performance since MAPEP has always requested this information with the reported result.

The Query Tool within the MAPEP website assists the program user with setting a specialized query using various fields to search on. Some of the main query fields that can be specifically identified for a query are the MAPEP Series; Study; Matrix Code; Analyte Name; Lab Name; Preparation Method; Detection Method; Lab Results; Reference Value; Bias; and Result Flag. Figure 1 illustrates an analyte query for Iodine-129.



MAPEP Updated Web Site Analyte Summary for Iodine-129