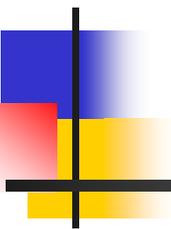


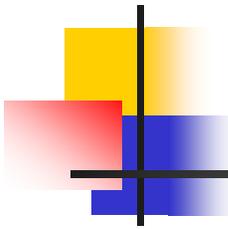
Key Considerations for Ensuring Quality Radioanalytical Laboratory Services for Superfund Sites Activities



John Griggs, Director

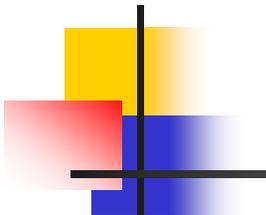
Center for Radioanalytical Laboratory
Science (CERLS)

National Air and Radiation Environmental
Laboratory, (NAREL) EPA



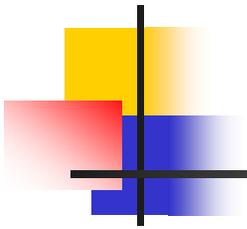
Presentation Outline

- Agency Assets
- The Statement of Work
- The Laboratory Qualifications
- Data Review Protocols
- Electronic Data Management
- DOE's Approach



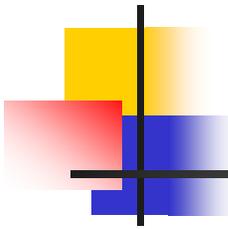
Agency Assets

- EPA has two radioanalytical laboratories
 - National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama
 - Radiation & Indoor Environmental National Laboratory (RIENL) in Las Vegas, Nevada
- Both laboratories can perform radiochemical analyses on environmental matrices in support of characterization and clean up activities at SF sites



NAREL

- NAREL can analyze for a broad range of radionuclides in a variety of environmental matrices
- NAREL can also perform organic and metals analysis on “mixed waste” samples
- Given capacity limitations, NAREL is best suited for smaller projects in terms of samples and serving a quality assurance role on large projects



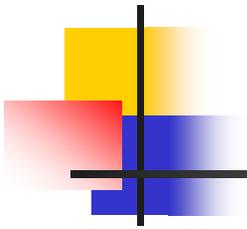
NAREL

- NAREL has provided technical support for SF site activities in the past in the form of:
 - radioanalytical methods review
 - assistance in developing radioanalytical data requirements for projects
 - evaluating radioanalytical laboratory performance
 - limited data review



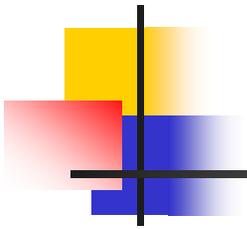
Agency Assets

- Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual published in 2004 was developed by representatives from EPA, DOE, DoD, DHS, NRC, FDA, USGS and NIST
- MARLALP Part 1 provides guidance to project planners and managers for any kind of project requiring radioanalytical laboratory data



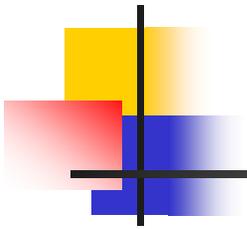
MARLAP

- MARLAP Part 1 provides guidance in the following areas
 - developing radioanalytical measurement quality objectives (MQOs) for laboratory analyses
 - radioanalytical laboratory selection and qualification criteria
 - evaluating radiochemical methods and laboratories



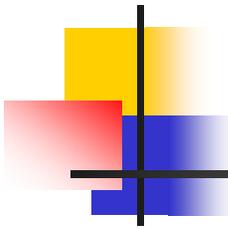
MARLAP (cont'd)

- contracting radioanalytical laboratory services
- radiochemical data verification and validation



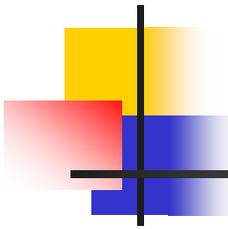
MARLAP Training

- 3-day training course for project managers and planners on topics in Part 1 of MARLAP
- course has been offered at 6 of the EPA regional Offices during past 3 years
- 2 offerings are planned this year



The Statement of Work:

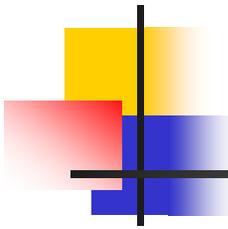
- Use a Directed Planning Process to develop the SOW.
- Create performance and data quality objectives (DQOs) that specifically address the site-specific remediation goals.
- Use a Performance-Based approach in developing the radioanalytical data requirements



The Statement of Work:

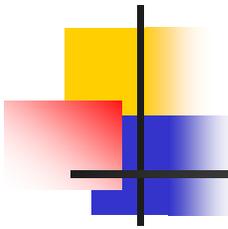
- The Directed Planning Process.
 - In some cases, increasing the number of samples collected or requiring more rigorous field QC can be less expensive and burdensome than mandating lower laboratory uncertainties
 - Vice-versa in other cases.

The Statement of Work:



- Create Appropriate DQOs and MQOs.
 - Involve laboratory experts early in determining analytical DQOs /MQOs.
 - Ensure that the DQOs/MQOs support the decision making process, but are not unrealistically burdensome.





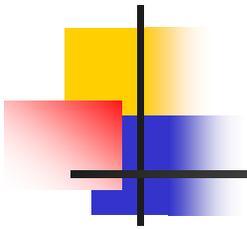
The Statement of Work:

- Remember that Rad analyses may be significantly different from traditional chemical analyses.
 - MQOs, such as Minimum Detectable Concentration (MDC) and uncertainty are more flexible.
 - Performance-based methodology may allow for greater adaptability to the project requirements.

Common Mistakes:



Remember that driving down the MQOs, (e.g. MDC, uncertainty) often has hidden pitfalls, such as increased cost and increased failure rates, which may cause data remediation or rejection issues later.



Common Mistakes:



Avoid asking the laboratory “How low can you go?”

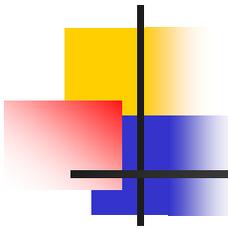


Avoid the temptation of using overly burdensome laboratory MQOs to unnecessarily reduce field planning and sampling requirements.

Common Mistakes:

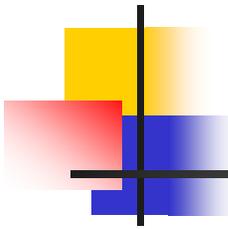


Use radioanalytical professionals to review proposed changes to the SOW, not just contract specialists



Qualifying the Laboratory:

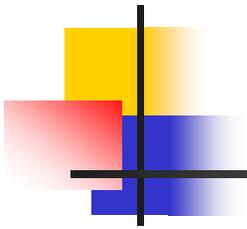
- Check Accreditations / Certifications
- Review Participation in Performance Evaluation (PE) Studies
- Conduct Independent Review of Example Data if Possible
- Consider Independent Laboratory Audits for Large Projects



Laboratory Accreditation:

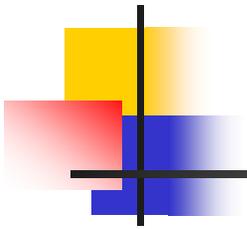
Accreditation / Certification

- National Environmental Laboratory Accreditation Conference (NELAC/TNI).
- State Certification for specific analyses.



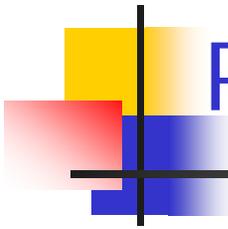
Federal Laboratory Evaluation Activities:

- Department of Energy Consolidated Audit Program (DOECAP)
- US Army Corps of Engineers (USACE)
- Air Force Center for Engineering and Environment (AFCEE)
- Comprehensive Long-Term Environmental Action, Navy (CLEAN),



Federal Laboratory Evaluation Activities:

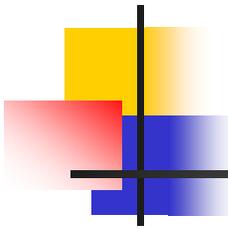
- DOECAP, USACE, AFCEE, CLEAN, etc.
- Do not certify laboratories, but may consider a lab “approved”, “in good standing”, or as having “completed evaluation process”.



Performance Evaluation (PE) Programs:

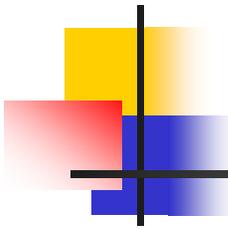
Participation in PE Studies

- DOE-MAPEP
- ERA
 - Both have soil, water, air filter, vegetation matrices with a wide variety of radionuclides for testing.
 - Check lab record for success rates and range of analyses.



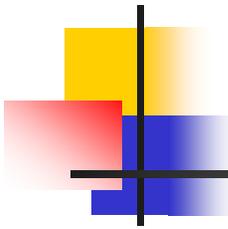
Conduct Independent Review of Example Data:

- Can the lab provide an example data package that would indicate that compliance with the statement of work is within its capabilities?
- If an example data package cannot be readily produced, the lab may not be prepared to perform to the statement of work.



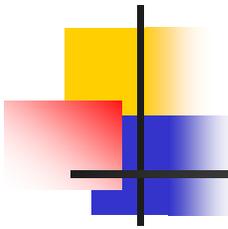
Data Review and V&V (Verification and Validation)

- If the laboratory data are to undergo data V&V them:
 - Define V&V process, criteria and frequency during project planning
 - Document the approach in the V&V Plan or project documents such as the QAPP



Data V&V: Communicate Criteria to the Laboratory

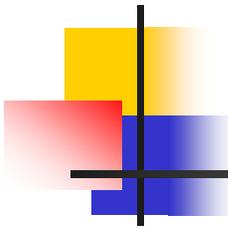
- communicate not only the MQOs but also the V&V criteria to the laboratory in the SOW
 - This allows labs to provide feedback on the reasonability of criteria
 - Update criteria, if appropriate, but ensure that MQOs can still be met



Data Review and V&V: Validate Early – Validate Often

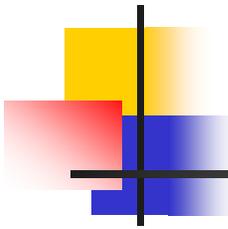
- Realize time and cost savings with timely course corrections
- Identify problems early
 - V&V the 1st data package(s)
 - Clarify issues in real-time before the analyses are completed





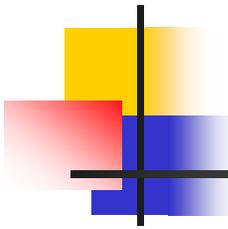
Electronic Data Management:

- There is currently no consensus on a uniform standard for the electronic data deliverables (EDDs) for radiochemical data.
- Some work has been done to allow the use of SEED for radiochemical data



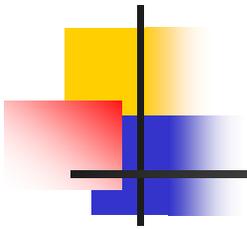
Electronic Data Management:

- Existing EDD formats for traditional chemical analyses are poorly suited for rad data.
- The reporting requirements for rad data should include Minimum Detectable Concentrations, Critical Levels, counting uncertainties, total uncertainties, chemical yield determinations, etc.



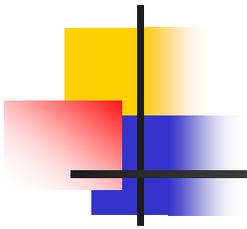
History of Radioanalytical Capabilities in DOE

- Manhattan Project / Cold War
 - Numerous sites shrouded in secrecy,
 - Coordination across the Complex limited
- Each site independently developed and supported environmental programs using onsite lab capabilities
- Main reason for lack of uniformity in the field of radiochemistry



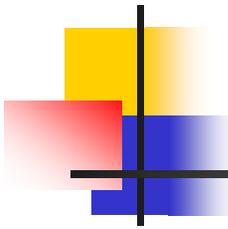
Radiochemical Methods

- Labs analyze for many radionuclides in a number of matrices
- Very few promulgated radiochemistry methods
 - (short list available for drinking and wastewater compliance)
- Promulgated water methods are poorly suited for analyzing most environmental samples



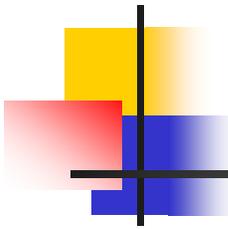
Radiochemical Methods

- Radiochemistry labs rely heavily on performance-based methodology
- Methods and practices
 - Vary significantly from lab to lab
 - Often modified from referenced method



Late 1980s and 1990s Change in the DOE Mission

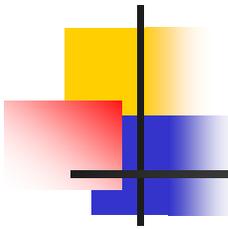
- End of Cold War
- DOE Mission shifts from weapons development to clean-up and Site D&D
 - Estimates of \$50 billion clean-up costs
 - DOE realizes that internal resources not sufficient to support tremendous D&D effort



Late 1980s and 1990s

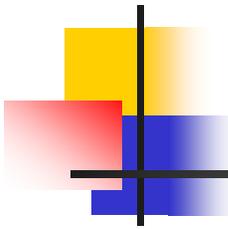
Change in the DOE Mission

- DOE Site Contractors were pushed to minimize D&D costs
 - Turned increasingly to commercial labs for radiochemical testing
 - Recognized that using commercial labs helps foster trust of regulators and public



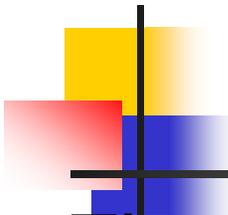
Outsourcing Analytical Services - Unintended Consequences...

- DOE Sites began to explore procurements to commercial labs
 - Over time, the sites had developed methods and lab practices that addressed site-specific concerns and requirements
 - There were concerns about data quality and historical comparability of data from commercial labs



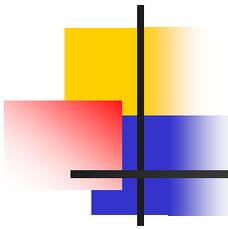
Outsourcing Analytical Services - Unintended Consequences...

- Sites developed complex SOWs for commercial labs
 - Prescriptive approach attempted to ensure data comparability and quality by recreating site lab processes at contract labs
 - Labs overwhelmed by detailed and different requirements from multiple sites
 - Resulted in increased costs and lower data quality



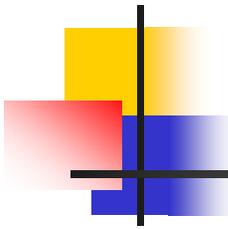
Integrated Contractor Procurement Team Basic Ordering Agreement (ICPT BOA)

- The ICPT BOA is a
 - Single contract vehicle for multiple sites
 - Uniform, non-prescriptive requirements
 - Recognized performance-based methods
 - Quality improved since labs concentrated efforts on a single set of more effective requirements
- Site-specific contracts still permit site-specific requirements to be addressed



DOE Analytical Services Program (ASP)

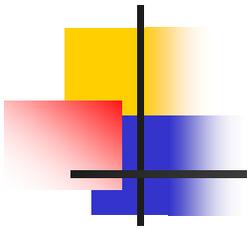
- ICPT BOA provided the foundation for the DOE Analytical Services Program, which includes:
 - DOE Consolidated Audit Program (DOECAP)
 - Quality Systems for Analytical Services (QSAS)
 - Mixed Analyte Performance Evaluation Program (MAPEP)



DOE Mixed Analyte Performance Evaluation Program (MAPEP)

- Two studies each year
 - 17 radionuclides
 - 4 matrices (water, air, soil, vegetation)
- Study results for each lab are published on the internet at:

<http://www.inl.gov/resl/mapep/>



Questions

- Any questions ?
- Contact information:
 - John Griggs
(334) 270-3450
griggs.john@epa.gov