



Quality Assurance Program for the TVA Kingston Ash Recovery Project

EMDQ Workshop

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Agenda

- Client Background/
Tennessee Valley
Authority (TVA)
- Project Background/
Event Facts
- Environmental
Standards' Involvement
- Activities, Challenges, and
Notes of Interest
- Project Accomplishments
- Conclusions



TVA Kingston Fossil Plant

- Tennessee Valley Authority (TVA)
Kingston Fossil Plant
 - 1.7-GW coal-burning power plant
 - Bordered by two rivers – Emory and Clinch
 - Uses on average 14,000 tons coal/day



June 2007

Project Background/Event Facts

- December 22, 2008, shortly before 1 AM
- Ash dyke of 84-acre containment pond ruptured
 - 5.4 million cubic yards of fly ash into the Emory River
 - 1.1 Billion Gallons
 - Impacted over 300 acres



December 23, 2008

Challenges?

- Many challenges in the initial response:
 - Organization
 - Resources
 - Planning
 - Health and Safety
 - Data Quality



Incident Command

- TVA sample collection and environmental management in action within hours
- Sample collection begins with minimal documentation
- Regulatory agencies arrive
- Incident Command System (ICS) set up within days



A banner image showing a sunset over a body of water with silhouettes of trees and birds in the sky.

Decision-Making

- Rapid decision-making but still, disorganization
- “Who is in charge” in spite of ICS and team efforts
- TVA environmental specialists rotate in on weekly basis but have substantial responsibilities elsewhere

Field Sample Collection

- Understaffed TVA field sample collectors
 - Previous downsizing by TVA and elimination of Field Manual
 - No Standard Operating Procedures (SOPs) applicable to specific project collection activities
 - No consistent nomenclature



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Data Management

- TVA IT staff rotated members on-site to manage Scribe Access™ and implement data reasonableness rules
- It becomes obvious that assistance is needed and there were needs for longer term
 - Planning
 - Staffing
 - Niche consulting expertise

Environmental Standards' Involvement

- Contracted January 21, 2009 - One month after event
- Provided
 - Observations and concerns
 - Global and specific recommendations
 - Initiated immediate actions to assist

Immediate Observations

- Amazing effort from TVA personnel
 - Sustainable?
- Plans - Lack of overall QA plan and SOPs
- DM tools and process
 - Very manual
- TVA personnel
 - need to return to pre-December 22 roles and have project structure put into place



Immediate Concerns

- Concern about integrity and quality of data
 - Initially lab data
- Need bulletproof, legally defensible data
 - Sampling issues
 - Laboratory issues
 - Data issues
- Crisis management
 - December 22, 2008 to March 2009



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Global Recommendations

- Move away from Crisis to Project Management
 - Overall program/process
 - Sampling Point of Contact
 - Chemistry Point of Contact
 - Data Point of Contact
 - Step back and reassess
 - Roles and responsibilities
 - Business process/supporting functionality
 - Vendors/assist procurement



Specific Recommendations

- Initial steps
 - Develop overall QA Plan document
 - Insert quality system, oversight for lab services, lab procurement
 - Transition from existing business process – day 1 forward
 - Real time data assessment of current data
 - Assume sampling oversight and training – develop SOPs
 - Implement data management process
- Assessment and loading of past data
 - Depends on lab production of data packages
 - Proofing output from database
 - Rigorous data validation

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Immediate Actions: Data Management

- Implement a full cycle Data Management Process
- Implement an Enterprise Level Data Management System
 - Automating to maximum extent
 - Sample planning
 - Correctness / completeness checking
 - Automated data review - verification
 - Data validation support
 - Web Reporting (Self Service)
- Develop Data Management Plan

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Immediate Actions: Quality Management

- Quality Assurance Plan - even though approval was months in coming
- Review/Add Laboratories
 - Time, quality, cost – pick two
 - Capable of electronic data deliverables

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Immediate Actions: Laboratories

- Laboratory site visits
- EDD specifications in contract
- Data deliverables (Level I, Level IV)
- Helping client understand that the typical laboratory cannot provide 24-hour turn-around-time for extended periods

Immediate Actions: Field Oversight

- Review Field Sampling Plans
- Sample crew training – consistency.
- Implement SOPs.
- Sub-contractor brought in excellent work ethic and quality process – no “recalibration”



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Activities & Challenges

- Technical Tasks
 - Prepare Technical Requirements and RFP for the Procurement of Laboratories
 - Assess comparability of inter-laboratory data
 - Establish a Long Term Sample Retain Program
 - Establish a Rugged Laboratory PE Program
 - Support and Oversee Plaintiff/Third Party Sampling requests

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Activities

- TVA collected data for many reasons – Community Outreach, Worker Safety, Spill Investigation, Characterization, and Delineation, Regulatory Compliance, Waste Characterization, and many special studies
 - 310 Ash samples
 - 1686 Biota samples (Amphibians, Birds, Fish, Mammals, Vegetation, *etc.*)
 - 113 Ground Water samples
 - 4055 Particulate Matter samples
 - 354 Sediment samples
 - 87 Soil samples
 - 4053 Surface Water samples
- Over 600K analytical records, >1.2M related parameters, and >2M monitoring readings for Air and river water

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Accomplishments

- Develop and support a business process that minimizes time from sample collection to release while ensuring that data were releasable.
- Establish a Quality Assurance Protocol and QAPP.
- Established a laboratory program.
- Prepared over 55 SOPs.
- Performed training and field oversights.



Interesting things along the way...

- Dry-weight versus wet-weight versus as received reporting
- Laboratories don't always follow the published method or their own SOP
- Lead contamination – weights used for surface water sampling points were sources of contamination
- Defensible (truly) reporting down to a project method detection limit
- Legacy contamination of sediments prior to spill



Interesting things along the way...

- Evaluation of custody seals.
- Using disposable in line 0.45 micron filters, although expensive, saves time, money and minimize the potential of contamination from excessive sample handling
- Blue ice does not cool samples. An ice bath is needed to cool samples.
- Proper fly ash homogenization requires tremendous effort.

Interesting things along the way...

- Catching snapping turtles is tricky business



A banner image showing a sunset over a body of water with silhouettes of trees and birds in the sky. The word "Conclusions" is written in white on a dark blue background.

Conclusions

- Every Emergency Response starts off on the wrong foot...and behind in data reporting
- Emergency Response requires a different type of project planning and implementation – optimize for speed while appropriately adding control
- Labs and consultants that are nearest and dearest to the organization are not necessarily the best fit for the emergency.
- Understand that some data collected is not going to meet your needs.

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Conclusions (Cont.)

- Plans, Processes, and Partners
 - Things to contemplate that should help
 - Have “on the shelf”
 - Quality Assurance Plan
 - Data Management Plan
 - Record Retention Plans
 - Framework for SOPs
- Making it up on the fly during the emergency response is too hard.

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Conclusions (Cont.)

- If that doesn't work....more things to contemplate that should help
 - Difficult to staff an emergency response with internal personnel who already have jobs
 - Have Relationships/Partners “on the shelf” as well
 - Quality and Data Management
 - Field Sampling
 - Analytical Laboratories
 - Data Interpreters/Risk Assessors

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Conclusions (Cont.)

- One cannot do enough to reduce confusion!
 - Until formal plans are in place, consider using an Analytical Request Form (ARF) in the early going!
 - Easy to implement
 - Collects information on
 - Reason for sample / data collection
 - What test / analytical sensitivities are desired
 - Who receives results or interprets the data

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Conclusions (Cont.)

- Why am I harping on Quality Assurance and Data Management?
 - In the end all you have is data...

Contact



“Setting the Standards for Innovative Environmental Solutions”

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