

Clean Closure Verification of CCR Surface Impoundments

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Introduction

- Butch Parton
 - 35 years of civil engineering experience
 - 6 ½ years as field engineer for Kingston Ash Recovery Project
 - Other CCR clients and other environmental clean-up clients
- Emme Mayle
 - BS in geology, MS in geospatial sciences
 - Manages field sampling teams for all media
 - Experienced in data acquisition, data management and GIS modeling

CCR Rule

- 40 CFR Part D 257.102(a)
 - Closure of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit must be completed either by leaving the CCR in place and installing a final cover system or **through removal of the CCR and decontamination of the CCR unit**, as described in paragraphs (b) through (j) of this section

CCR Rule Continued

- 40 CFR Part D 257.102(c)
 - Closure by removal of CCR. An owner or operator may elect to close a CCR unit by removing and decontaminating all area affected by releases from the CCR unit. CCR removal and **decontamination of the CCR are complete when the constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed** and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to 257.95(h) for constituents listed in appendix IV to this part

Clean Closure Verification

- Stepwise method for determining “clean” closure of CCR impoundments
 - Relatively simple
 - Based on scientific statistical analysis
- Method accepted by EPA and other regulatory agencies

Step 1 – Removal of All Visible Ash

- Use typical earth moving equipment to remove ash to lines and grades of excavation plans

Step 2 – Field Screening

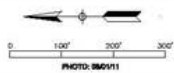
- Accomplished using one or combination of following:
 - Visual observation
 - “Feel” test
 - On-site microscope

Step 3 – Sampling Approach

- Visual Sampling Plan (VSP)
 - Software tool developed for Department of Energy (DOE)
 - Supports development of defensible sampling plan based on:
 - Statistical sampling theory
 - Statistical analysis of sample results to support confident decision making
- VSP couples site and sample location visualization capabilities with optimal sampling design and statistical sample analysis strategy



- ① RJ LEE SAMPLE RESULTS SATISFACTORY
- ① KRP SAMPLE RESULTS SATISFACTORY / RJ LEE RESULTS PENDING
- ① SAMPLE RESULTS UNSATISFACTORY
- ① TO BE SAMPLED
- GRIDS CONCURRED



10/3/11	NORTH EMBAYMENT SAMPLING AS OF 10-13-11				
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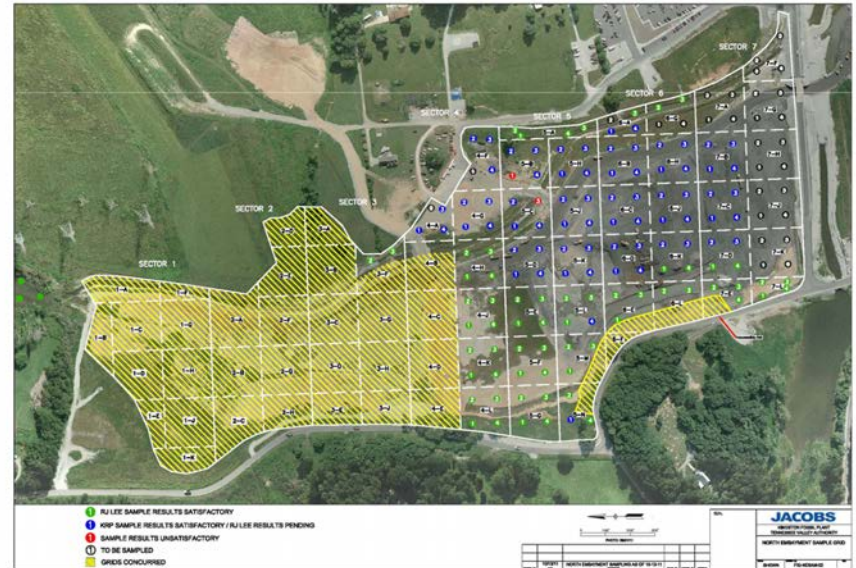
SEAL	JACOBS
	KINGSTON FOSSIL PLANT TENNESSEE VALLEY AUTHORITY
	NORTH EMBAYMENT SAMPLE GRID
SHOWN	FIG-NEBAM-02

Step 4 – Quality Assurance Project Plan (QAPP)

- EPA: Describes the activities of an environmental data operations project involved with the acquisition of environmental information
- EPA: Documents the results of a project's technical planning process, providing clear, concise, and complete plan for the environmental data operation and its quality objectives and identifying key project personnel.

Step 5 – Collecting Samples

- Surveying
- Grid layout
- Sample location
- Sampling equipment
- Sampling techniques
- Documentation of sampling procedures
- GIS mapping



Step 5 – Collecting Samples

- Soil samples collected directly into glass jars using clean tools and disposable nitrile gloves
 - Prevents cross-contamination
- Duplicates collected
- Packed in containers
- Sent to laboratory with chain of custody

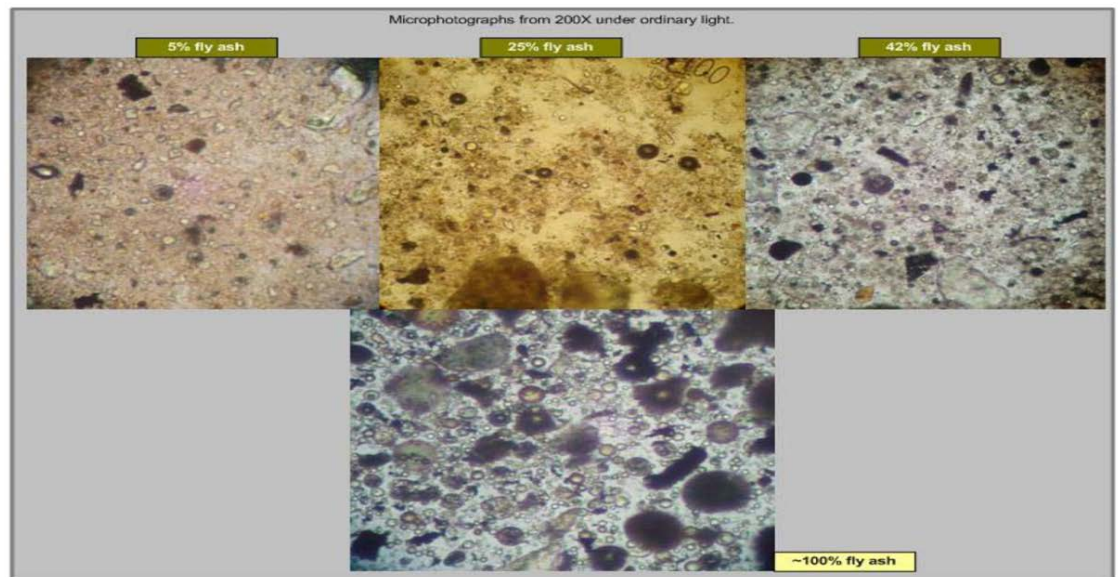


Step 6 – Polarized Light Microscopy (PLM)

- Microscope with pair of polarizing devices in optical train
- First polarizer defines initial plane of polarization for light entering microscope
- Other polarizer defines plane of polarization of light reaching ocular tube

Step 6 – Polarized Light Microscopy (PLM) Continued

- Polarized light microscopy allows viewing of absorption color and optical path boundaries between minerals of differing refractive indices
- Distinguish between isotropic and anisotropic substances
 - Revealing detailed structure and composition of materials



Step 7 – Results

▪ Results Validated

- Data validation = Reviewing analytical laboratory data to ensure data were generated in compliance with proper analytical methods and procedures
- Typically performed by party independent of laboratory generating data

▪ Certification Report

- Compiles all drawings, data and other information in single document
- Certified by Professional Engineer for compliance to CCR Rule

Summary

- Simple procedure based on scientific statistical analysis
- Accepted by EPA and other regulatory agencies
- Procedure is documented by surveying, GIS mapping, chain-of-custody procedures, and laboratory reports
- Certification Report documents compliance with CCR Rule

Questions?

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