Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
Non-Time- Critical Removal Action Field Change Notice for Lime Addition

Date Submitted:
12/14/2010

Submitted to whom
Craig Zeller, EPA

Concurrence

Received	Not Applicable	TVA
☐	☒	Steve McCracken
☒	☐	Kathryn Nash
☒	☐	Steve Cherry
☒	☐	Michelle Cagley

Received	Not Applicable	Jacobs
☒	☐	Jack Howard
☒	☐	Bruce Haas
☐	☐	_____
☐	☐	_____
☐	☐	_____
☐	☐	_____

Approvals

TVA Kathryn Nash Date 12/14/10

EPA _____ Date 1/05/11

cc:

- ☒ Anda Ray, TVA
- ☒ Barbara Scott, TDEC
- ☒ Brenda Brickhouse, TVA
- ☒ John Dizer, TVA
- ☒ Craig Zeller, EPA
- ☒ Dennis Yankee, TVA
- ☒ Kathryn Nash, TVA
- ☒ Cynthia Anderson, TVA
- ☒ Steve McCracken, TVA
- ☒ EDM
- ☒ Julie Pfeffer, Jacobs
- ☒ Jack Howard, Jacobs
- ☒ Michelle Cagley, TVA
- ☒ Greg Signer, TVA
- ☒ KIF Incident Document Control
- ☒ Katie Kline, TVA
- ☒ Dannena Bowman, EPA
- ☒ Robert Pullen, Jacobs

TVA JACOBS

KINGSTON ASH RECOVERY PROJECT
FIELD CHANGE NOTICE (FCN)

FCN Number:	FCN-006	**FCN Title:**	Lime Addition
Project Name:	WBS 0112 Embayment Restoration; WBS 0113 Failed Dredge Cell		

DOCUMENT(S) AFFECTED BY THIS FIELD CHANGE NOTICE		
Document Number	**Revision**	**Document Title**
RDP-0113-C	100%	Interim Ash Stacking & Instrumentation
RDP-0112-A	100%	Swan Pond Embayment Ash Removal (Phase 1)

References/Work Package (if applicable): RAWP-072A, Ash Leaching Test Results. Results concluded that lime applied at 6% by weight is acceptable for use in treating the ash to reduce its moisture content.

Reason for Change/Information Requested: Design specifications for RDP-0112-A and RDP-0113-C do not address addition of lime to reduce the moisture content in the excavation ash and associated sediment material to meet the percent moisture content required for completed ash stacking lifts. This change would allow application of lime, either in the embayment at the time of excavation or in the Dredge Cell at the time of compaction, so as to meet moisture content requirements.

Existing Condition: Ash stacking specifications require a moisture content range of -4 to +2% of optimum for completed lifts. Heavy rains and wet subgrade conditions have resulted in ash in the embayment and in the surface of the Dredge Cell that exceed the 2% maximum limit.

Description of Change: Lime may be added at a rate no greater than 6% by dry weight of embankment material, as described in attached scope of work.

Requested Date of FCN Disposition:			
Requestor	**Date**	**Field Engineer**	**Date**
Steve Cherry	12/13/2010	Randy Denton	12/13/2010

RESPONSE/DISPOSITION OF THE FIELD CHANGE NOTICE	
FCN Approval:	☐ **Approved** (see remarks below, if any) ☐ **Disapproved** (see remarks below)
FCN Incorporation by DCN Required:	☐ Yes ☒ No

Response/Remarks : Lime application will not adversely affect embankment material strength; instead will likely increase its strength. Therefore, no DCN required.

Name	**Signature**	**Date**
Don Fuller Lead Engineer / Engineer of Record	Don Fuller	12/14/10
Bruce Haas Project Manager		12/14/10

Lime Kiln Dust (LKD) is a by-product of the production of Quicklime (lime). Quicklime is produced by calcining limestone in high temperature rotary kilns. During production, the kiln draft pushes fine particles (LKD) into the bag house for collection. The resulting chemistry of LKD is 70% - 80% CaO (lime), 2% - 8% MgO, and small amounts of Al2O3 and SiO2. Lime Kiln Dust is primarily used in soil drying and soil stabilization applications and in several environmental applications such as coal mine refuse treatment, flue-gas treatment, and site remediation applications.

Work Plan for TVA Kingston Lime will be added to the ash and associated sediment material, either in the embayment at the time of excavation or in the Dredge Cell at the time of compaction, so as to meet moisture content requirements for stacking in the Dredge Cell.

1. Lime will be added only as needed. Because of the additional cost and time to add lime to the excavated material, it is preferred to use untreated ash whenever possible. CP will use a combination of surface grading to shed rainwater runoff, stockpiling to enhance drying by drainage, windrowing and/or disking to enhance drying by evaporation, and similar traditional construction techniques to optimize dewatering without the need for lime addition. When conditions are wet and material cannot be adequately dried, then lime may be added.

2. Lime will be added to a maximum of 6% by dry weight. The LKD application rate will be determined based on the moisture content of the ash and the desired moisture content upon completion of mixing. The amount of lime to be added to a given area will be determined by measuring the size of the treatment area (square feet) and depth of treatment zone (feet) to obtain untreated volume. Excavated ash may be placed in "pits" for use in mixing lime. In-place density and in-place moisture content tests will be measured at a minimum of 5 points within the treatment area to obtain the average dry unit weight (pounds per square foot) of untreated material. The volume will be multiplied by the dry unit weight to obtain the dry weight (pounds) of untreated material. The dry weight will be multiplied by 0.06 to obtain the maximum weight of lime that may be added. During lime addition, the actual weight of lime spread across the treatment area will be determined by counting the number (weight) of bags used. The following LKD application rate chart is based on a dry ash weight of 75 lbs/cubic foot (or 2,025 lbs/cubic yard).

LKD Application Rate (LKD lbs/CY)	LKD Application Rate Percentage of Ash
20.5	1%
41	2%
61.5	3%
82	4%
102.5	5%
123	**6%**
143.5	7%
167	8%
187.5	9%
208	10%
228.5	11%
249	12%

The 6% highlighted application rate will be the maximum rate of application for this project, and will be controlled based on the amount of ash being treating in a given area. Based on these figures, 1 ton of LKD can treat up to 16.3 CY of ash. The application rate will vary based on moisture content, with the goal being to spread and mix the minimum amount of LKD in order to effectively dry the ash.

3. Lime will be applied uniformly across the treatment area using an Ecto-Spreader™, then disked into the surface using a specialized mixing attachment. Lime application will use the following method:

    a. The first step in the process is the delivery of the dry bulk LKD (Figure 1). The LKD will be delivered to the site in pneumatic tankers and transported to the area where lime is being applied.

    b. The pneumatic tankers will be connected by a hose to the Ecto-Spreader™ mounted on a track-hoe excavator (Figure 2). The LKD will be blown from the tanker into the Ecto-Spreader™ constantly during spreading. LKD will be blown into the hopper and gravity fed to the rotary vein-feeder, allowing the LKD to exit the spreader at a controlled rate. The speed of the vein-feeder can be adjusted to increase or decrease the application rate of the LKD. To accomplish spreading over a large area, the excavator arm will be moved back and forth and side to side.

    c. The Ecto-Spreader™ is equipped with several dust control features. Bags (Figure 3) mounted to the top of the spreader serve a dual purpose: (1) they act as an air vent so the hopper can receive material pneumatically and (2) they also act as dust collectors during transfer of material to the hopper. Material collected in the bags will return to the hopper once it is no longer pressurized.

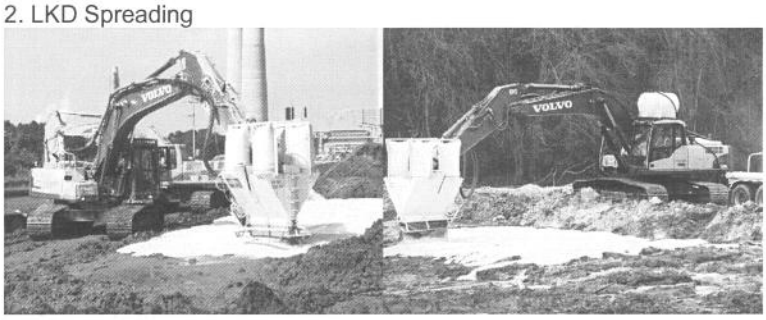
d. Another dust control feature (Figure 4) is a shrouded spray system that uses atomized water to blow small amounts of water under high pressure down from the vein feeder to the ground. This system aids in reducing or eliminating what little fugitive dusting may occur during spreading. The water is contained in a small reservoir on the excavator. There is also a shroud made of lightweight, very durable and flexible material that extends from the hopper to the ground. The shroud will drag on the ground and prevent the LKD from being exposed to the open air during spreading. The LKD material will travel from the vein feeder, through the shroud, to the ash being treated. This eliminates the LKD free-falling in the open air, which is the main cause of fugitive dust during spreading.

e. Mixing the LKD and ash will begin immediately after the LKD is spread and will be accomplished using a specialized mixing attachment on the track hoe excavator (Figure 5). This mixer attachment was used previous during the time-critical work for the Kingston Ash Recover Project. The mixer provides thorough mixing of the ash and LKD to a depth of over 3 feet. Once the LKD and ash are mixed, the ash is ready for loading and transport to the area where it will be stacked.

f. Each Ecto-Spreader™ has the capability to spread a 25-ton load of LKD in approximately 40 minutes. Site conditions will likely allow the spreading of 6-9 loads of LKD per day per spreader.

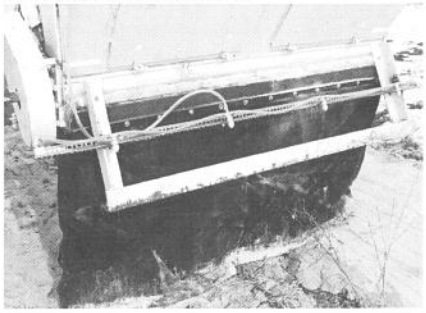
1. LKD Delivery

2. LKD Spreading



3. Dust Control: Bags

4. Dust Control: Shroud



5. LKD Mixing