

04-19-06

Bob,

I hope you will attend tomorrow's meeting on the Gypsum Disposal Area. I will not be there, but thought some issues should be brought up. I'm enclosing a copy of the Operations Manual Revision that was sent to the State and a copy of the State's reply that was received today. I'm not sure if anyone in TVA received this letter except Mike Beckham, so there may be requests for copies.

The States Letter request six (6) additional pieces of information.

Issues in the Operations Manual to the state (I've highlighted)

1. Page 2, I was rather embarrassed when the State Regulator called and said his letter had been returned due to incorrect address. We have not had this address in over 6 years. I have just sent an email to Larry Bowers, Lynn Petty, and Steve Strunk about this.
2. Page 4, disposal at KIF or from **other TVA fossil generating facilities**. When did we start taking other plants wastes????
3. Page 5, same as #2. Ash and gypsum from other plants????
4. Page 6, Under gypsum. This is contrary to what was said yesterday.
5. Any reference to drawings - I did not receive any drawing with this - probably be distributed at today's meeting. ✓
6. Page 9 was cut off.

This was as far as I got --- too many questions. Maybe you can brief me when I return.

Thanks,
Linda

BRAD, I NEED QTY'S SIMILAR TO THIS FOR KIF DREDGE LATERAL EXPANSION

TABLE A1 - COMPACTED CLAY FINAL COVER			
ITEM	DESCRIPTION	UNITS	Quantity
1.00	1' of Compacted Clay Soil 95% Std Proctor ^{1/3 YD} Placed in 6" lift	bcy	103907
2.00	1' of Vegetated Clay Layer 90% Std.	bcy	103907
3.00	Seeding	ac	64.4
4.00	Erosion Control Matting	sy	311722

SEE 10W425-75

*SURF AREA

THESE 2 ARE APPROXIMATELY THE SAME (i.e. SURFACE AREA?)

TABLE A2 - GEOCOMPOSITE FINAL COVER			
ITEM	DESCRIPTION	UNITS	Quantity
1.00	Geomembrane	sy	311722
2.00	Geocomposite Drainage Layer	sy	311722
3.00	1' Cover Soil	bcy	103907
4.00	6" Vegetation Layer ^{1/6 YD}	bcy	51954
5.00	Seed	ac	64.4
6.00	Erosion Control Matting	sy	311722

SEE 10W425-76

120

4839.963 SY

9 SF
SY

SUBJECT _____ PROJECT _____

COMPUTED BY _____ DATE _____ CHECKED BY _____ DATE _____

2.2.1 EXISTING DRUDGE

10/03 → 10.5 YRS

x
x x x
x

#5 2 φ1 LAT EXP

2.5 YRS

3 φ2 & 3

14,370,417 CY - 148,178 CY (COVER)

2.2.4 FAC LIFE

T22 2047 ^{CLAS} ~~2077~~ ~~POST CLAS.~~ *REMOVE BEAMS*

DATE OF CLOSURE

10 W 425-48

49

58-61

} FINAL CLOSURE CONTOURS

COVER QTY

#3 1' LOW PERM SOIL

1' SOIL FOR VEG

10 W 425-75

} 7 OPTION

10 W 425-76

1' SOIL

1/2' SOIL FOR VEG

ANOTHER OPTION

APP J MATL/INSTRUMENTATION SHEETS

Carver, Bradley D

From: Dotson, V James
Sent: Wednesday, May 03, 2006 3:48 PM
To: Carver, Bradley D
Subject: KIF NOD response

Brad,

Could you send me the drawing numbers (10WXXX-YY to ZZ) that were revised to include the 100 yr flood plain?

Thanks.

Jamey Dotson
Civil Engineer - Site Section
FPG - Engineering Design Services
1101 Market Street, LP 2G-C
Chattanooga, TN 37402-2801
(423)751-6421
(423)751-7094 Fax

10W425-21 Thru
10W425-61



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
KNOXVILLE ENVIRONMENTAL FIELD OFFICE

2700 MIDDLEBROOK PIKE, SUITE 220
KNOXVILLE, TENNESSEE 37921-5602

PHONE (865) 594-6035

STATEWIDE 1-888-891-8332

FAX (865) 594-6105

March 30, 2006

Mr. Michael T. Beckham, Plant Manager
Tennessee Valley Authority
Kingston Fossil Plant
714 Swan Pond Road
Harriman, Tennessee 37748

RE: Review of construction and operation plans for proposed
TVA Kingston Power Plant Sluiced Coal Ash Landfill
Expansion

Dear Mr. Beckham:

The construction and operation plans for this facility, as prepared by Tennessee Valley Authority Fossil Engineering Services, including the operation manual originally submitted to our office in June of 2004 with revisions submitted on March 28, 2006; and construction plans submitted on March 15, 2006; have been reviewed in accordance with Rule Chapter 1200-1-7, Solid Waste Processing and Disposal. Specifically this review is based on the permit application content and format requirements of Rule 1200-1-7-.04(9), and the design and operation requirements of Rules 1200-1-7-.04(2-8). The following items have been found to be deficient or in need of additional information or clarification:

(1) Rule 1200-1-7-.04(9)(b)1.(xiii) requires the applicant to clearly show, in the engineering plans, the 100-year flood plain boundaries in the vicinity of the fill areas.

None of the plan sheets show the 100-year flood plain boundary as required.

~~(2) Rule 1200-1-7-.04(9)(c)6. requires the applicant to describe, in the narrative, the types and anticipated volumes of solid wastes to be disposed.~~

*Exempt
All items
except
1-10*

ALL WASTE

According to the application, a substantial portion of the waste (all of the waste except in the last stages of development) will be dredged coal ash with the possibility of gypsum slurry disposed there also; this will be a liquid or semi-solid material containing free liquids. Rule 1200-1-7-.04 (2)(k)2. prohibits disposal of any bulk or non-containerized liquids in a landfill, other than domestic waste or leachate or gas condensate collected from the landfill. This landfill could only be issued a permit to accept such wastes if a waiver from the referenced Rule is requested in the permit application and is approved through the permit process in accordance with Rule 1200-1-7-.01(5). This Rule provides that any standard or requirement in these Rules may be waived by the Commissioner if the applicant can demonstrate to the satisfaction of the Commissioner that the standard is inapplicable, inappropriate, or unnecessary to his facility, or that it is equaled in effect by alternative standards or requirements. Such waivers may be granted only as part of a final permit decision and must be requested in writing by the applicant as part of the permit application; requests for a waiver must include the following:

- (a) An identification of the specific requirement(s) for which a waiver is requested;
- (b) An explanation of the reason(s) why the requirement(s) should be considered inapplicable, inappropriate, or unnecessary, and/or a description of the alternative procedures or mechanisms to be utilized and why they should be considered equal in effect to the standard(s) proposed to be waived; and
- (c) Any other such information as the Commissioner deems necessary for his evaluation of the request.

✓ *(P7)*

For this request, it is suggested that TVA should point out that slurried coal ash is managed using the same procedures in an adjacent, permitted landfill; and that slurried gypsum is also managed using the same procedures in other permitted landfills in Tennessee.

(3) Rule 1200-1-7-.04(9)(c)8.(iii) requires the applicant to describe, in the narrative, the waste handling and covering program, to include a description of the cover material to be utilized, including the estimated volumes to be needed with earthwork calculations, and their sources and availability.

There is no determination of the quantity of soil that will be needed for the final cover.

(IN ESTIMATE) *BEF* *APP H* *CLOS 4-1-06* *EST.* *APP AS* *CLOS*

(4) Rule 1200-1-7-.04(9)(d) requires the applicant to include, with the "Part 2" permit application, a copy of his closure and post-closure care plans.

The vegetation specifications for closure include sericea lesdedeza. This plant develops a very deep root system and is therefore unsuitable for use on landfills. The roots could deteriorate the barrier soil layer, or could clog the drainage layer if geonet/geomembrane is used as part of the cap. Only species that develop their root system within the depth allowed for the vegetative/protective cover (i.e., most grasses and clover) should be used.

VEG SPEC
LIVE BREF

BREF GOBY
APPH, CLOS/POST
113 EXP. TR
CF CLOSURE
11/22/06
11/22/06

(5) The closure plan is required to include the estimated date of closure. The plan submitted refers to another section for this. However, the closure plan should be a complete document so the estimated closure date needs to be included in the text of the plan.

SUMMARIZE
DAYS BETWEEN
13/02/04 & 04/04/04

(6) The closure/post-closure care plan does not include a cost estimate. You are correct that federal facilities are exempted from financial assurance, but they are not exempted from the requirement to prepare a cost estimate for closure and post-closure.

XCEL SHT
4/1/06

NO GOBY IN BREF PERMIT / CRM

Please submit revised drawings and narrative supplements to address the deficiencies noted in this letter. We request that you also submit one complete set of plans with the latest revisions to the Nashville Central Office of the Division of Solid Waste Management so that they can have an opportunity to co-review the plans before the Permit review Committee meeting. If you have any questions concerning our review comments or if you wish to schedule a meeting to discuss some of the issues involved, do not hesitate to contact me.

Yours truly,

Rick Brown
Rick Brown
Environmental Engineer

Ryan Miller
Ryan Miller
Solid Waste Field Office Supervisor
Division of Solid Waste Management

Mr. Michael Beckham
March 30, 2006
Page 4

cc: Nashville Office - Division of Solid Waste Management

RSB /tvakingstnrx.doc

PRMTRVW

KIF - Inter. Dredge Coll

Final Cap Area =

4,417,878.11 SQ FT,

101.42 Acres = 490869
sq

120 = 4839.963 sq

101.42 ac

A60 060327 500
Env. Document Type: Solid Waste Correspondence

March 27, 2006

Mr. Rick Brown
Environmental Engineer
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
2700 Middlebrook Pike, Suite 220
Knoxville, Tennessee 37921-5602

TENNESSEE VALLEY AUTHORITY (TVA) – OPERATIONS MANUAL REVISION–
KINGSTON FOSSIL PLANT- IDL 73-0094

Dear Mr. Brown:

As you requested, enclosed are revisions to the Operations Manual which is included in our pending lateral expansion permit request. These revisions include modifications to the Geologic Buffer Section on page 4 and an update to the contact information on page 2. Please replace all 19 pages of the Operations Manual with the enclosed document. TVA will provide additional copies if required.

If you have any questions, please contact Larry C. Bowers at (423) 751-4947 in Chattanooga. Mr. Bowers is the TVA point of contact for this project.

Sincerely,

Gordon G. Park
Manager of Environmental Affairs
5D Lookout Place

LCB:SMF
Enclosures

cc: Mr. Glen Pugh (w/o Enclosures)
Division of Solid Waste Management
5th Floor, L&C Tower
401 Church Street
Nashville, Tennessee 37243-1535

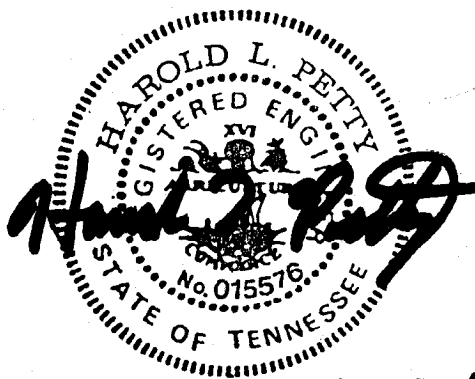
L. F. Campbell, KFP 1A-KST
EDM, WT CA-K

U:\media files\sldwaste\general\KIF operational rev. manual lcb 3-06.doc

Title: OPERATIONS MANUAL DREDGE CELL LATERAL EXPANSION		DCN #
		Plant/Unit: KINGSTON FOSSIL PLANT
Vendor	Contract No.	Key Nouns: Permit, Closure/Post-Closure Plan
Applicable Design Documents	REV	RIMS NUMBER
	R0	
References		DESCRIPTION
	R0	June, 2004 Parsons Engineering Proposed Major Modification IDL 73-0094
	R1	Updated contact names and added reference to waiver request in section 1.6

R2

TENNESSEE VALLEY AUTHORITY
FOSSIL POWER GROUP
FOSSIL ENGINEERING SERVICES
SITE AND ENVIRONMENTAL ENGINEERING



3.24.06

	Revision 0	R1
Date	June, 2004	March, 2006
Prepared	D.R. Smith	LCB
Checked	W.R. Taylor	HLP
Supervised	Harold L. Petty	HLP

R2

**OPERATIONS MANUAL
DREDGE CELL LATERAL EXPANSION
TENNESSEE VALLEY AUTHORITY
KINGSTON FOSSIL PLANT**

**Prepared By:
Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37401-2801**

**Revision 0
June 7, 2004**

**Revision 1
March 24, 2006**

RZ

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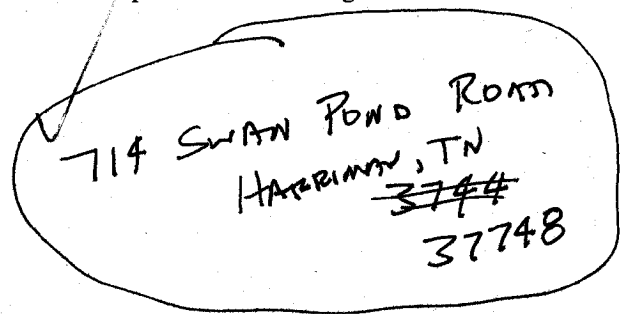
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1 SITE INFORMATION

1.1 Responsible Officials

The following is a list of responsible parties involved with the permitting, design, operation, maintenance, quality control/assurance of the Dredge Cell Lateral Expansion at the Kingston Fossil Plant (KIF).

1. Owner: Tennessee Valley Authority (TVA)
Contact: Plant Manager
Tennessee Valley Authority
Kingston Fossil Plant
P.O. Box 2000
Kingston, Tennessee 37763
(865) 717-2501



As of the date of this revision, the plant manager is Mr. Michael T. Beckham.

- ~~2.~~ *Robert Powers as contact*
2. State: Tennessee Department of Environment and Conservation
Division of Solid Waste Management
Tennessee Department of Environment and Conservation
2700 Middlebrook Pike, Suite 220
Knoxville, Tennessee 37921-5602
Phone: (865) 594-6035
Fax: (865) 594-6115

Contact as of the date of this manual is Mr. Larry Cook, Environmental Field Office Manager.

Tennessee Department of Conservation
Division of Solid Waste Management
Central Office
401 Church Street
5th Floor, L&C Tower
Nashville, Tennessee 37243-1535
Phone: (615) 532-0780
Fax: (615) 532-0886

Contact as of the date of this manual is Mr. Mike Apple, Division Director.

1.2 Site Location

The TVA KIF is located near the confluence of the Clinch and Emory Rivers (Watts Bar Lake) at Clinch River mile 2 (Emory River mile 2) in Roane Co. Tennessee, approximately 1 mi northwest of the City of Kingston. Access to the site is by state Highway 70 and Swan Pond Road. Refer to drawing 10W425-21, which depicts the plant layout and location of the existing dredge cells, and proposed dredge cell expansion.

1.3 Site Description

The site selected for the disposal facility is the existing fly ash pond, and is an expansion of the existing dredge cells, as shown on drawing 10W425-21. The ash pond is entirely within the KIF Reservation. Existing benchmarks are located as shown on the drawings.

The area surrounding the KIF is primarily agricultural, industrial, and rural in nature (refer to Drawing 10W425-21). The fossil plant powerhouse is just south of the proposed location for this disposal facility.

The methods of placement of gypsum and coal ash in this facility are discussed in subsequent sections of this operations manual. Ash conveyance to the pond is by sluicing from the plant, and ash is dredged from the pond to the dredge cells. Dikes are progressively raised as cells are filled with waste material. Gypsum will be sluiced to the dredge cell lateral expansion area from the plant or a proposed drying facility, depending on future circumstances regarding the market for gypsum.

1.4 Site Geology and Hydrogeology

The following section briefly summarizes the geology and hydrogeology for this site. Additional detailed information is contained in the hydrogeologic investigation contained in Appendix E. The plant site is located in the Valley and Ridge physiographic province of the Appalachian Highland region. The ash pond area is underlain by the Conasauga Group (middle to upper Cambrian Age) with the exception of the northern tip of the area, where the Rome formation (lower Cambrian Age) is present. Specific geologic groups within the Conasauga Group represented at the site include the Maynardville, Nolichucky, Maryville, Rogersville, Rutledge, and Pumpkin Valley formations. These formations are locally of low water-producing capacity, and predominantly consist of shale with interbedded siltstones, limestones, and conglomerates. Total thickness of the Conasauga Group beneath the site is unknown, but is estimated to be approximately 1500 ft. Pine Ridge, which borders the ash pond area to the northwest, is underlain by interbedded shale, sandstone, and siltstone of the Rome formation.

Field and laboratory measurements of hydraulic conductivity for soil, ash, and shallow bedrock were performed for this site and are summarized in Appendix E. In general, the field conductivity measurements are about an order of magnitude larger than the laboratory estimates for the same material. Such differences between field and laboratory measures are commonly observed and are attributed to differences in measurement scale.

The upper weathered bedrock zone exhibited the highest field-measured horizontal hydraulic conductivity (K_h), with values averaging about 2×10^{-5} cm/s. Field estimates of K_h for the "silty clay" alluvium averaged approximately 7×10^{-7} cm/s. A conductivity of approximately 2×10^{-5} cm/s was indicated for the permeameter-tested fly ash sample. During the recent geotechnical investigation for the lateral expansion, field hydraulic conductivity testing was conducted for insitu ash in the outer dike at two locations (B-1 and B-2) near the area that experienced seepage in November 2003. For both locations, vertical hydraulic conductivity was measured at 5.13×10^{-6} cm/s and 3.59×10^{-6} cm/s respectively. Horizontal hydraulic conductivity was measured at 1.42×10^{-5} cm/s and 3.67×10^{-6} cm/s respectively. Laboratory hydraulic conductivity testing was also performed on remolded samples, with hydraulic conductivities ranging from 1.67×10^{-5} to 1.87×10^{-5} cm/s.

Groundwater movement at the plant is generally eastward and southeastward from Pine Ridge toward the reservoir. Because the ash pond area is bounded on two sides by the reservoir, groundwater originating on or upgradient ultimately discharges to the reservoir. Recently acquired potentiometric head data from the interior of the existing dredge cell, along with groundwater level data from MW 16A seem to indicate that the continuous recharge by ash sluice water in the active ash pond produces local on-site mounding of the water table. Similarly, temporary local mounding of the water table may occur during periodic slucing/dredging of ash to the dredge cells.

1.5 Buffer Zone Compliance

The dredge cell lateral expansion is in compliance with all applicable buffer zone standards listed in Tennessee Rule 1200-1-7-.04(3). Reference is made to drawing 10W425-24. Specifically, the lateral expansion is at least 100 feet from the TVA reservation boundary, and at least 500 ft from any residences. The lateral expansion is more than 200 ft from the normal boundary of any stream or lake, although the ash pond itself is adjacent to Watts Bar Lake, because the facility was built in the 1950's. No constructed appurtenances for the fill area are located within 50 ft of the TVA reservation boundary. No private water-supply wells exist down-gradient of the site. Furthermore, there is no potential for development of such wells because Watts Bar Lake bounds the ash pond on two sides. Water wells within a two-mile radius of the proposed disposal facility are listed in the hydrogeological evaluation for this facility (see Appendix E).

1.6 Geologic Buffer System

A mantle of predominantly alluvial soils generally lies above the bedrock in the ash pond area, as described in Appendix E. Soil thickness is highly variable, ranging from about 5 feet along a portion of the northern perimeter of the site to a maximum of 65 feet on the western boundary. The alluvial deposits are unconsolidated and lenticular, and consist of clay, silt, and sand with occasional gravel. A thin layer of residuum is occasionally present directly above the bedrock. The residuum is composed of clay and silt with weathered shale fragments.

The ash and ash-soil fill materials present above the alluvium/bedrock ranged up to 70 feet in thickness at the time Appendix E was prepared (June 1995). Presently the thickness ranges up to 90 feet in thickness, as ash has continued to be dredged into the dredge cells.

On April 26, 2005 TVA received a notice from TDEC that a waiver from the geologic buffer requirements, Rule 12-1-7-.04(4)(b), would be required. On May 10, 2005 TVA requested this waiver. Following this request, TDEC issued a Notice of Completeness on May 13, 2005.

1.7 Access Control

The Dredge Cell Lateral Expansion is located within the TVA KIF Reservation. Access to this facility is via internal plant roads. During normal operating hours, operations personnel are at the site performing dredging operations, maintenance, and inspections as required. TVA security maintains 24-hour surveillance at the plant. The Dredge Cell Lateral Expansion will only be used for disposal of gypsum and coal combustion ash at the KIF or from other TVA fossil generation facilities. Shipments of non-waste will not be accepted for disposal at this facility.

2 DESCRIPTION OF SOLID WASTES, DISPOSAL CAPACITY, AND FACILITY LIFE

2.1 Types of Waste

The plant consists of nine coal-fired units with a maximum generating capacity of approximately 1600 megawatts (MW). The only wastes that will be disposed of in the dredge cells/dredge cell expansion is ash and gypsum from coal combustion at the KIF or other TVA fossil generation facilities. Bottom ash from the Bull Run Fossil Plant (BRF) may be used if necessary in constructing drains and as filter material as shown on the drawings. This facility may also accept gypsum byproduct material from BRF or dispose of ash from other TVA plants if TVA needs additional disposal capacity. No other waste materials from any non-TVA sources or plants will be accepted for disposal.

Coal combustion ash is composed of the non-combustible mineral components contained within the coal during its formation. Fly ash is inert, non-combustible, and does not decay biologically. This ash is sluiced to the ash pond, then dredged into the dredge cells located within the ash pond. The ash sluiced to the ash pond from the plant consists of about 100 percent fly ash (fine particles removed from the flue gases). Bottom ash is sluiced to a separate pond, and is used to construct dikes as the dredge cells are raised. As the facility is operated (see the following section), the ash will eventually dry into a relatively inert, structurally stable material. Additional data regarding the typical characteristics of fly ash and testing of KIF ash pond samples is included in Appendix A.

TVA is proposing to construct and operate a wet scrubber system to remove SO₃ emissions from the flue gas emissions from the plant. This system is expected to become operational in FY 2009. Wet gypsum will be sluiced to the ash pond where the Phase 2 and 3 disposal cells will be constructed as depicted on the 10W425 series drawings. Depending on market availability, TVA may be able to market up to 50% of the wet gypsum generated at KIF to private companies involved in the manufacture of various products. It is uncertain as to the actual percentage of gypsum that can be marketed; therefore, life projections will be made for worst case (no marketing) and best case (50% marketing). Gypsum is inert, non-combustible, and does not decay biologically. It is utilized in the manufacture of gypsum wallboard. Additional data regarding the typical characteristics of gypsum and typical chemical composition (based on TVA's Cumberland Fossil Plant Gypsum) is included in Appendix A.

It should also be noted that this facility is also designed to accept fly ash only without gypsum. The stability analysis (Appendix G) analyzed the facility for both gypsum and ash, or ash only. Stacking configurations and limitations are discussed in Appendix G, and herein.

2.2 Anticipated Volumes and Facility Life

Fly and Bottom Ash

The KIF produces approximately 360,000 tons of fly ash annually (398,000 cubic yards (cy) based on an average of 67 lbs/cubic foot (cf) density). For planning purposes, gypsum production for KIF is expected to be 372,000 tons (327,360 cy) per year, based on a density of 0.88 tons/cy. This is the best available information that TVA has for KIF at this time, as the fuel supply for future years has not yet been determined. Depending on the sulfur content of coal, gypsum production could vary from the estimates presented here. KIF also generates 88,000 tons/year of bottom ash (77,600 cy/year). Bottom ash is used along with fly ash to construct the outer ash dikes when they are raised. TVA has not yet established a start date for gypsum disposal operations, but will notify TDEC at least 180 days before a planned start

date for operation. For facility life projections, the scrubber is assumed to become operational in 2009. As described in the attached Closure/Post Closure Plan, TDEC will be notified prior to TVA undertaking any closure activities. Closure is expected to be completed within about two years.

Gypsum

Removed

For planning purposes, gypsum production for KIF is expected to be 372,000 tons (327,360 cy) per year. ~~_____ as an upper limit. The following sections discuss disposal of each waste stream individually with respect to expansion, and the last section presents projections for facility life using the worst- and best-case waste disposal scenarios.~~

2.2.1 Existing Dredge Cells

Drawings for the dredge cells have been revised for this permit application. The dredge cells are currently built to elevation 805-810. As-built topography was used for revising these drawings. The final grade is shown on the 10W425 series drawings with the revised as-built topography. The closure contour elevations for the existing dredge cells are unchanged from the last revision, and projected volumes are based on the as-built topography dated October 2003, and the revised final cover design. As of October 2003, there are 4,985,355 cy of disposal capacity available. Assuming a disposal rate of 475,600 cy annually (including bottom and fly ash), there are 10.5 years of capacity remaining.

Completion of disposal in ex dr cells is exp to be complete in

2014

2.2.2 Phase 1 Lateral Expansion

In order to provide additional fly ash disposal capacity, TVA is constructing an additional dredge cell (Phase 1 expansion) south of the existing dredge cells into the main ash pond. This dredge cell is expected to have 1,169,563 cy of disposal capacity available, and should provide an additional 2.5 years of disposal capacity for fly and bottom ash.

2.2.3 Phase 2 & 3 Lateral Expansion

The disposal capacity of both Phase 2 and 3 are summarized here. Initially, Phase 1 will be constructed, and Phase 2 will be constructed at a later date as determined by TVA. Table 2.1 presents the disposal volume and area of each stage for both Phases 2 and 3.

Table 2.1

Stage	Volume (cy) ¹
Stage 1	2,431,261
Stage 2	3,097,708
Stage 3	3,170,647
Stage 4	2,660,897
Stage 5	1,718,399
Stage 6	1,291,505
Total	14,370,417

¹Capacity includes approximately 148,178 cy for a 1.5 ft thick cover

2.2.4 Projections for Facility Life

Tennessee Valley Authority
 Kingston Fossil Plant - Dredge Cell Lateral Expansion
 Operations Plan

The following table depicts the overall life of the facility on gypsum disposal and continued fly and bottom ash disposal production volumes currently available. The type of coal and amount of gypsum produced, and is not finalized at this time. Estimates from KIF in the near future, and will advise TD.

If 50 percent of gypsum is marketed, the facility life will be included in the table at this time.

Learn,
These are the dates ↓

Table 2

Phase	Facility	Waste	Start Date	End Date	
1	Existing ash dredge cells 1-3	Sluiced ash to el. 844	2004	2015	
		Dry ash above 844	2015	2017	
	Ash dredge cell expansion	Wet sluiced ash	2004	2015	
	Ash dredge cell expansion	Dry stacked ash	2015	2017	
2	Gypsum areas A and B	Wet gypsum to el. 870	2009	2019	Initial filling will be gypsum - assume all gypsum until 2017
		Wet ash until 870	2017	2020	Wet ash disposal in Phase 2
2&3	Gypsum and ash disposal	Wet gypsum/dry ash	2020	2029	Wet gypsum fill to elev 930
		Dry gypsum/dry ash	2029	2030	Dry waste above elev 930
NA	Wet ash disposal Phase 2	Wet ash	2017	2029	Wet ash disposal Phase 2 only to el 870
		Dry ash disposal Phase 2/3	2029	2047	Dry ash disposal
Closure	Entire disposal area	Ash, gypsum	2047	2077	

These are in APH W/300F

Date ?

2.3 Permitted Area

The area within the ash disposal boundary is depicted on drawing [redacted] and is approximately 244 acres overall, not including the stilling basin. The stilling pond occupies an approximate 25-acre area. The existing dredge cells occupy approximately 129 acres, Phase 1 approximately 13.5 acres, and Phases 2 and 3 approximately 64 acres. Existing dredge cell areas and lateral expansion areas do not sum to the total area because the remaining ash pond area is not fully developed for the lateral expansion, allowing

for an approximate 200-foot setback from the outer dike at elevation 765. The groundwater compliance boundary is defined by the monitoring wells shown on the drawings included in this permit application.

3 WASTE HANDLING

3.1 Waste Handling Operations

3.1.1 Current Ash Handling Operations

Existing Dredge Cells

Bottom ash and fly ash are sluiced through a series of pipes to a point southwest of the active ash pond. Bottom ash is sluiced through separate pipes to a long channel that drains to the active ash pond. The heavier bottom ash settles out in this channel prior to reaching the active ash pond. The bottom ash is removed from the pond using draglines, long reach trackhoes, and scrapers on a continuous basis to be used to construct the dredge cells. Lighter fly ash continues to be sluiced to the active ash pond through a lined channel.

The fly ash and bottom ash effluent drain to the active ash pond. In this area a series of divider dikes and spillway skimmers separate the sluicing effluent from the transported ash. Fly ash is transported to the active ash pond, along with finer particles of bottom ash. Lime can be added to effluent discharging from the active ash pond to the stilling basin when required for pH adjustment. The sluicing effluent is discharged through weirs to the stilling basin, where it is discharged to the intake channel. Recent modifications were made to this discharge due to the construction of the selective catalytic reduction (SCR) system currently being installed at KIF. Ductile iron pipes equipped with spargers have been attached to the existing discharge pipe from the stilling basin to dissipate ammonia concentrations during times when ash comes in contact with ammonia from the SCR process.

During normal operations, a portable-floating dredge is located in the active ash pond. During normal operation, the dredge is connected to piping that conveys ash to the existing dredge cells located at the north end of the ash pond. Approximately 360,000 tons (398,000 cy) of fly ash are generated annually. The slurry will enter the dredge cells at the northern end, and will flow through the pond. The ash will settle out, and excess water will flow out of the diked area through a metal spillway located as shown on drawing 10W425-28. All dredge water and storm water will exit the facility through this spillway (or the underdrain system) and is directed to the stilling basin located south of the ash pond. The stilling basin discharges to an NPDES permitted out fall as discussed in Section 3.10.

The water level in the dredge cells will be maintained at an elevation at least four ft below the dike elevation. This freeboard will ensure that rainfall and wave action can be contained. The 25-year, 24-hour storm event is estimated to raise the water elevation only 5.5 inches, if no water is discharged from the pond. As the initial volume of ash is conveyed to the facility, water will decant through the metal spillway, and drain to allow ash consolidation.

s are constructed out of bottom ash material collected from the bottom ash channel. This ash is collected and transported by scrapers to the dredge cell area. Dry fly ash is placed in the inactive ash pond and also hauled to the dredge cell area. Scrapers, dozers, front-end loaders, and dump trucks are used to place and compact the fly and bottom ash as shown on the drawings included with this permit application. Construction of the ash ponds in accordance with the attached QA/QC Plan. Dust is controlled by utilizing a water truck as roads and dikes.

When dredging is not possible, fly ash is removed from the active ash pond by front-end loaders or other appropriate equipment, hauled to the dredge cell area by use of pans or compacted by use of appropriate equipment.

The construction is an essentially continuous incremental procedure. No daily earth cover will be placed. Earth cover may be placed and vegetation established in areas (typically the outer cell) that do not achieve final contours during inactive phases of operation. The ash is stable, nonputrescible, and does not attract animal vectors or diseases.

Fly Ash Dredge Cell (Phase 1)

The fly ash dredge cell is located as shown on the 10W425 series drawings. A dike consisting of earth is constructed along the southern boundary of the dredge cells. The construction is as those described in Section 3.1.1. As ash is dredged into each cell, bottom and side dikes are raised to create the cell to the next stage. The height of each cell is as shown on the drawings, and have terraces that roughly coincide with the existing dredge cells for ease of construction.

Installation of Slope Drains and Toe Drain for Existing Dredge Cells

In this permit application, TVA has investigated causes of the recent seepage in the existing ash ponds. A review of groundwater data, and a seepage analysis (see Appendix K), the seepage has been raised in the dredge cells as the height of the dredge cells has increased. A model was developed to simulate conditions at the time the seepage occurred using recently acquired technical field program. The model was then used to simulate future conditions to determine the best remedy. Slope drains can be retrofitted on the slopes of the existing dredge cells at approximately 775, 783, and 795 on three sides. In addition, a toe drain is proposed along the base of the slope in the ditch adjacent to Swan Pond Road (Detail A73 on the drawings for its installation). Initially, the underdrain will be constructed along the dike (original location of Swan Pond Road). This segment will drain to a manhole/lift station installed at the end of the dredge cells. Effluent collected in the manhole/lift station will be pumped to the Swan Pond Road.

TVA is currently evaluating the financial impacts of this and other options for controlling seepage in the ash ponds. TVA will make a final determination and discuss with TDEC DSWM regarding the completion of this permit application. Dredging of wet ash from the ash pond to the inactive ash pond will resume pending review and concurrence by TDEC on the final approach to be taken.

Operating Operations and Construction of Phases 2 and 3

Initial Construction of the Phase 2 Expansion

The following discussion is an approximate sequence of activities that will occur in the construction of the Phase 2 expansion. Because the scrubber is not expected to become operational until about FY2009, detailed schedules for construction have not yet been developed. However, this Operation Plan outlines the sequence of construction activities required, and TVA will develop a schedule in concert with Plant Operations staff and TVA Yard Operations/Heavy Equipment Division, the organization that will oversee and implement construction.

The Phase 2 expansion will be initially constructed as shown on ~~drawing 10W425-65~~ Detail A65 on 10W425-65 depicts a typical cross-section for construction of the expansion. New weirs will be installed at the southeast corner of the main ash pond, and the existing discharge weirs will be plugged and abandoned in place. The discharge pipes from the weirs will be equipped with valves so that the water level in the ash pond can be temporarily raised to elevation 760 as part of normal dredging operations. A metal spillway will be installed with stoplogs set at elevation 760. The pond can then be raised by closing the valves and allowing the water to rise to elevation 760, where it will overflow into the metal spillway.

In order to maintain the required free water volume, the dredge located in the main ash pond will deepen the western half of the remaining main ash pond area (drawing 10W425-22 and 24). The dredge will discharge this ash in the eastern area of the main ash pond until the elevation of the ash is raised at or above the pond elevation. Trackhoes will also excavate fly ash out of the pond along the western side as ash is continuously sluiced from the plant. This ash will be dried to a moisture content suitable for placement in dry form. Fly ash will be loaded into dump trucks or scrapers and hauled to the Phase 2 construction area. A base of fly ash will be constructed to form the base of the Phase 2 lateral expansion. The QA/QC plan (Appendix I) contains requirements for construction of the base. The base will slope at a grade less than 1% from the existing dredge cells towards the stilling basin. Initially, bottom ash may be used to create access ramps out into the pond to support equipment. Fly ash will be placed in approximately 6-7 inch loose lifts and compacted using compactors and/or other suitable equipment to achieve the required density as described in the QA/QC Plan. Water trucks will provide moisture control to achieve the desired density as well as suppress dust during construction. The boundary of the Phase 2 expansion is set back 200 feet from existing dikes, as was done for the existing dredge cells.

Upon completion of construction of the fly ash base, a drainage filter layer will be constructed on top of the fly ash base. A two and one half-foot thick layer of bottom ash will be placed, with the lower two feet functioning as a drainage layer. The drainage layer will be placed in 6-7 inch thick loose lifts and lightly compacted with a roller. A six-inch layer of fly ash will then be placed on top of the bottom ash and the fly ash will then be mixed with the uppermost six-inches of bottom ash to form a 1-foot thick filter layer. The bottom ash will also be utilized to construct starter dikes to enclose the Phase 2 area to allow later disposal of gypsum, as described in subsequent paragraphs. A testing program was initiated to study the use of existing materials (fly and bottom ash) as drainage and filter media (Boschuk, 2004). This testing program utilized fly and bottom ash samples taken from KIF, as well as gypsum slurry from TVA's Cumberland Fossil Plant (CUF) to evaluate the drainage characteristics each material, to ensure the filter drainage layer will not clog, yet will retain the gypsum particles while allowing water to drain from the stack. Channels will be constructed to allow the facility to receive gypsum sluiced from the dewatering facility without eroding the filter drainage layer. Metal spillways will be installed as shown on the drawings.

Initial Gypsum Placement into Phase 2/Stage 1

Gypsum slurry will be sluiced from the dewatering facility to the Phase 2 expansion area, and allowed to settle. Decant structures (metal spillways) will be installed to maintain the water surfaced at an appropriate level. Because the bottom will slope, initial filling operations may only partially fill Phase 2 area. Construction of the wet cast gypsum dikes will utilize the upstream method of construction. This method has been employed at other TVA plants for gypsum disposal. Trackhoes will excavate the gypsum from the ponded area and stack the gypsum on the outer slope of the bottom ash starter dike. As the outer dike is constructed, a rim ditch and inner dike will be constructed. The outer dike and rim ditch will be constructed around a portion of the periphery of the Phase 2 expansion area, as shown on drawings 10W425-28 through 31, and -34 through -37. A perimeter underdrain will be installed in each 10-foot lift when the outer dikes are raised as shown on drawing 10W425-68. The perimeter drain will be fitted with outlets spaced throughout the circumference of the drain. The drain will be constructed with a nominal one percent slope with the outlets located at low points. After sufficient gypsum is sluiced into the pond, the Phase 2 Area will be subdivided into three distinct ponds, to allow gypsum sluicing operations to continue in one pond while stacking can continue in the inactive pond. The third (center) pond can be used for ash and/or gypsum disposal, once dikes separating the three ponds are completed. The rim ditches surrounding the gypsum disposal ponds will be elevated above the ponded area to allow the coarser-sized particles to settle out in the rim ditch. It is important that the outlet of the rim ditch remain above the level of the pond. The nominal slope of the rim ditch is 0.25 percent (2.5 feet vertical per 1000 feet horizontal). The ditch will be constructed to the dimensions shown on the drawings. Gypsum sluicing will continue to be sluiced into the rim ditch and allowed to decant into the ponded area. The rim ditch can be operated by allowing gypsum to flow along the entire ditch, or the inner wall of the ditch can be breached (sluice cuts) sequentially at various points along the ditch to allow more even distribution of gypsum into the pond. This can be accomplished by plugging existing sluice cuts, and opening new ones opened sequentially throughout the length of the ditch. Another option would be to allow gypsum entry at both the north and south ends of the gypsum area. At the completion of the Stage 1 dikes, the nominal elevation will be 780, less the thickness of the final cover, expected to be between one and one-half and two feet thick.

As an alternative to the rim ditch operation, TVA can provide multiple ports to introduce gypsum along various points along the periphery of the Phase 2 expansion.

Dike Raising in Phase 2/Stage 2

After a sufficient amount of gypsum is placed in the pond, the outer dike of the entire Phase 2 area will be raised in five-foot increments along with the rim ditch and inner dike until the top of the dike is at elevation 810, as shown on 10W425-38 through 41. The metal spillways will be raised and rim ditching activities will continue. After the invert elevation of the rim ditch is above elevation 780, the rim ditch can be constructed completely around the periphery of both gypsum ponds A&B. The subsequent operations will involve continued gypsum sluicing into the pond through the rim ditch and construction of divider dikes to maintain three separate ponds. Ash or gypsum can be dredged into the center area.

After the wet-cast outer dikes have been raised to approximately elevation 790, TVA may decide to sluice fly ash into Phase 2, or continue to sluice into the existing dredge cells and Phase 1 until they are filled. Fly ash will be sluiced into the center pond cell for fly ash disposal. This will ensure that gypsum is segregated from the fly ash so that pure gypsum can be utilized for construction of the wet cast outer dikes.

Dike Raising in Phase 2/Stage 3

Stage 3 operation for Phase 2 will likely transition into Phase 3 development, because Gypsum Area B continues to shrink in area due to dike raising. This is evident from examining the plan drawings for the various stages, as well as the cross section shown on 10W425-63. For continued operation of Phase 2 without Phase 3, Gypsum Area A will have to be subdivided to maintain separate filling and dike raising activities. The exact sequence of this transition depends on the ultimate rate of gypsum production from the scrubber, the ability of TVA to market gypsum at KIF, and also the ability to market fly and/or bottom ash. The decision as to when to build Phase 3 will also depend on the need for additional fly ash disposal capacity versus the production of gypsum. For instance, if 50 percent of gypsum is marketed over a consistent timeframe, construction of wet cast outer dikes may not keep pace with ash production.

Alternative internal configurations for separate or combined gypsum and ash disposal are currently being studied by TVA FES and Yard Operations group, in a effort to simplify operational aspects yet allow a flexible disposal facility capable of managing differing waste streams and volumes.

Dike Raising in Phase 3/Stages 1-3

Construction and operation of Phase 3 will be accomplished in a manner similar to that previously discussed for Phase 2. Gypsum disposal areas are located along the outer dike to provide wet gypsum for stacking operations. The only difference is that once Phase 3 is under construction, the plant will have had to convert to dry fly ash disposal due to the loss of free water volume from the ash pond. Dry fly ash can be stacked by using dump truck or scrapers and dozers. Material will be placed in thin lifts and compacted using vehicular traffic from hauling operations. Supplemental compaction can be provided if necessary to obtain the desired compactive effort, which is 90 percent standard proctor density as a minimum.

Subsequent Dike Raising and Stages 4 Through 6

Wet cast dikes will continue to be raised in 5-foot increments, and will be fitted with the peripheral underdrain system, as shown on 10W425-68. At every 30 feet in vertical elevation, the dikes will be constructed with a 15-foot wide (after final cover construction) bench for stability and equipment access.

At 60-foot intervals (nominal elevations 840 and 900), bottom ash horizontal blanket drains will be constructed to provide vertical and lateral drainage within the stack and to keep the phreatic surface as low as possible within the stack. The blanket drains will be tied to the perimeter drain, and cross sections for stack development are shown on drawings 10W425-62 through 10W425-64.

3.1.5 Fly Ash Disposal in Phases 2 and 3

Phases 2 and 3 have been designed to dispose of fly ash only, if TVA decides not to dispose of gypsum within the dredge cell area expansion. Briefly, Phase 2 can be constructed in a similar manner described for dike raising and operation of the existing dredge cells and Phase 1. Ash can be disposed of in Phase 2 up to elevation 870. At that point, Phase 3 must become operational and dry fly ash disposal would begin. Dry fly ash only must be placed above elevation 870.

3.2 Covering Program

3.2.1 Daily and Intermediate Cover

No daily or intermediate cover will be required for this facility. The fly ash and gypsum are inert, physically stable, do not biodegrade, and do not attract animals. Therefore, vector control is not needed.

3.2.2 Final Cover

Final closure of the disposal facility will be undertaken as described in the Closure Plan for this facility (Parsons E&C, 2004a). Drawing 10W425-48, 49, and 58-61 depict final closure contours (including the thickness of the final cover). The fill contours of the ash are at 1.5 to 2 ft below the contours shown.

The **final cover** will consist of a **one foot** layer of low-permeability soil compacted to achieve a maximum hydraulic conductivity of 1×10^{-6} cm/s overlain by a **one foot thick** soil layer suitable for sustaining vegetation, as shown on drawing 10W425-75, if a compacted clay liner is constructed. **Another option** for the final cover consists of the following components (see drawing 10W425-76) placed on top of the final ash and/or gypsum grade: (1) **a low density polyethylene geomembrane, 40 mil thick**; (2) **a geocomposite drainage layer (consisting of an extruded polyethylene net heat bonded on both sides to a non-woven, needlepunched geotextile)**; (3) **a one foot thick layer of soil placed above the geocomposite drainage layer**; and (4) **a one-half ft thick vegetative soil layer**. Material and installation specifications for geocomposite materials for the final cover are included as Appendix J to this document.

NEED QTY'S

The design of the final cover meets or exceeds the requirements contained in TDEC Policy Memorandum SW-93 (formerly Policy Memorandum SW-91-2) for coal ash disposal facilities. TVA can obtain soil for the low-permeability soil layer construction from suitable on-reservation borrow areas. The vegetative soil layer will also be constructed using locally available soil from the KIF TVA reservation, or from off-reservation material provided the soil meets the requirements contained in the drawings. Upon placement of the vegetative layer, the soil will be prepared and seeded using the appropriate methods outlined in Appendix B. Additional provisions for quality assurance and quality control are contained in the QA/QC plan for this facility (Parsons, 2004b).

3.3 Operating Equipment

Operating equipment for ash disposal operations is as follows:

- long-reach track-hoes (excavators);
- Hydraulic dredge. The dredge pump is a 14-inch discharge trash pump rated at 15,000 gpm;
- bulldozers;
- scrapers (pans);
- water trucks.

Ash is sluiced from the powerhouse with a solids content approximately 60 to 70 percent. TVA currently conducts dredging with in-house dredging operations. TVA may also supplement disposal operations by contracting with a private company. TVA can provide additional equipment within 24 hours for disposal operations in the event of equipment breakdown.

Operating equipment for gypsum stacking operations consists of:

- long-reach trackhoes;
- bulldozers;
- water trucks.

Gypsum will be sluiced to the dredge cell expansion area using pumps located at the proposed dewatering facility. The solids content of gypsum sludge will be approximately 30 percent.

3.4 Dust and Litter Control

Litter control is not applicable to this disposal facility. Ash will not generate litter. During normal dredging operations, dust will not be generated. If fly or bottom ash is hauled to the facility for disposal at any time, dust control measures are provided at the JOF to prevent a nuisance to adjacent landowners and TVA employees/operations. Water will be used for providing dust suppression when needed. No oil or other chemical substances will be used for dust suppression. Temporary soil cover may be used as needed for dust control. Chemical binding agents, such as Soil Cement or Posi-Shell, may also be used as needed.

3.5 Erosion Control

This site is an existing ash pond and construction of the dredge cell expansion will occur within the pond itself. Therefore, all runoff is directed to the existing stilling basin. Storm water controls to be utilized during construction and operation of the dredge cell lateral expansion are limited to the northeast area where runoff is diverted offsite. Otherwise, stormwater controls used to prevent erosion of soils (i.e., silt fences, etc) are not required during the construction and operation phase of this project. However, during closure activities, when soil is brought to the site for final cover construction, erosion controls may be utilized to reduce sediment loading to the stilling basin, as described in Appendix H.

3.6 Leachate Control and Management System

A mantle of predominantly alluvial soils generally lies above the bedrock in the ash pond area, as described in Appendix E. Soil thickness is highly variable, ranging from about 5 feet along a portion of the northern perimeter of the site to a maximum of 65 feet on the western boundary. The alluvial deposits are unconsolidated and lenticular, and consist of clay, silt, and sand with occasional gravel. A thin layer of residuum is occasionally present directly above the bedrock. The residuum is composed of clay and silt with weathered shale fragments.

The ash and ash-soil fill materials present above the alluvium/bedrock ranged up to 70 feet in thickness at the time Appendix E was prepared (June 1995). Presently the thickness ranges up to 90 feet in thickness, as ash has continued to be dredged into the dredge cells. The construction of the new facility will incorporate blanket drains which will collect and channel drainage from within the stack area. Based upon the results and conclusions presented in the Hydrogeologic Evaluation Report dated June 1995 (Report No. WR28-2-36-124) and submitted as Appendix D of the Dredge Cell Closure Plan, it is anticipated that the development and closure of the proposed dry fly ash and gypsum stacks will ultimately result in a significant reduction of leachate quantity from current conditions. The Hydrogeologic Evaluation Report dated June 1995 (Report No. WR28-2-36-124) is being revised and will address this issue more thoroughly.

3.7 Safety Precautions

Ash from the KIF is a by-product produced by the combustion of coal, and therefore poses no threat as a potential fire hazard. Gypsum likewise is an inert material derived from limestone used in the scrubber process, and also poses no threat as a potential fire hazard. However, properly maintained fire suppression equipment will be provided for all ash disposal equipment and vehicles. This will consist of

fire extinguishers of the size and type required extinguish the type of fire that may potentially occur in the types of equipment and vehicles required for conducting disposal operations.

3.8 Personnel Facilities

The following personnel facilities are available at the KIF plant site:

- A utility building is on-site for equipment maintenance and yard operations personnel that is accessible by any facility personnel and has adequate screening, heating facilities, and lighting.
- Safe drinking water.
- Sanitary hand-washing facilities.
- Toilet facilities.
- A two-way radio and/or telephone for communications.
- A first aid kit.

All of the above services and facilities are readily available for operations personnel at the KIF.

3.9 Containment of Explosive Gas

Gas collection for coal combustion ash disposal facilities is not applicable per DSWM Policy, February 27, 1991, Item 3 (Appendix C).

3.10 Surface Water Management System

The surface water management system for final closure is depicted on drawings 10W425-48, 49 and 58 through 61. Drawing 10W425-77 depicts an overall view with references to ditch details. During operations, all storm water and dredge water will collect and discharge through a temporary metal spillway to the sediment pond. When sediment within the sediment pond accumulates to the clean-out elevation shown on the drawings, it will be removed and disposed as directed by TVA. The KIF currently discharges various effluents generated during plant operations under NPDES permit number TN0005452 DSN001. Ash pond effluent is discharged from the disposal facility to the Stilling Basin, then through 36-in diameter and 24-in diameter pipes through an NPDES permitted outfall. The outfall was recently modified to include a sparger system recently constructed as part of the SCR modifications at KIF.

3.10.1 Existing Dredge Cell Surface Water Management System

The existing dredge cells are constructed with outer dikes consisting of a mixture of bottom and fly ashes. The exterior dikes form the interior dredge cells. Temporary spillways are constructed as shown on 10W425-27 and 27 to control the height of water over dredged ash, and maintain the maximum water surface within the cell below the elevation of the outer dikes.

The exterior portion of the existing dredge cells are constructed with terrace ditches every 30 feet in vertical height. Terrace ditches are sloped from high to low elevation, and riprap-lined let down channels are provided as shown on 10W425-48 and 49, to allow surface water to drain to collector channels at the base of the dredge cells, and on to the main ash pond and stilling basin.

3.10.2 Phase 1 Lateral Expansion Surface Water Management System

The same concept used for the existing dredge cells will be applied to the Phase 1 Lateral Expansion. The initial dike will be constructed to elevation 780, and ash dredged inside. Temporary spillways will

be utilized to maintain the surface water level below the elevation of the top of dike. As the cells are filled, the outer dikes will be raised using a mixture of bottom and fly ashes. Terraces will be constructed every 30 feet in height, and drainage channels constructed to convey stormwater to low point along the terrace ditches.

3.10.3 Phase 2 Lateral Expansion Surface Water Management System

After completion of the initial Stage 1 dike construction to elevation 775, dredging activities for gypsum disposal for the lateral expansion will commence, and the temporary spillway will be abandoned or removed, and constructed (or relocated) as shown on drawings 10W425-28-31. A temporary let down channel will be constructed to receive discharge from the temporary metal spillway to prevent erosion of the dike slope constructed for Stage 1. Wet gypsum stacking operations will raise this dike to elevation 780 to complete Stage 1 dike construction. As the Stage 1 dredging operation is completed, the initial Stage 2 dike will be constructed using the wet cast method of construction. This process will be repeated for subsequent stages. Terraces will be constructed at the beginning of each new stage, as discussed earlier. The terraces will be graded to convey storm water to additional let down channels away from dredging operations.

Drawings 10W425-48, 49, and 58-61 show the final configuration of the closed facility, including drainage features. Terrace ditches will convey storm water from the uppermost portion of the facility to the base of the facility by use of riprap-lined letdown channels, and on to the stilling basin. Surface water drainage was designed in accordance with Rule 1200-1-7, and calculations are included in Appendix D.

4 PLANNED GROUNDWATER MONITORING PROGRAM

4.1 Compliance Monitoring Boundary and Monitoring Program

The groundwater compliance monitoring boundary is defined by the segment of the ash pond area perimeter lying between the three down-gradient monitoring wells. The approximate location of the groundwater monitoring wells is shown on 10W425-26-33, and in Appendix E. The approach to the detection groundwater monitoring program is a conventional program of monitoring one up-gradient and three down-gradient wells. The up-gradient monitoring well is 16A. The down-gradient monitoring wells are 4B, and 6A, and 13B. Other wells that have been monitored groundwater levels include 13A, 13B, 16B, and 6B. Construction logs for all wells constructed for this facility are in Appendix E.

4.2 Detection Monitoring Program

4.2.1 Monitoring Well Design and Construction

All monitoring wells for this facility were installed, developed, and sampled previously prior to submittal of the Closure/Post Closure Plan for the existing dredge cells. Monitoring wells were drilled with hollow stem auger and constructed of two-inch diameter PVC casing. Wells generally have a 10 ft length slotted PVC well screen (0.1 in slots) installed in 11 inch diameter boreholes, packed with filter sand and sealed with bentonite and grout. All wells have vented PVC caps, lockable steel outer casing secured in a concrete pad, and are protected with steel bollards set in concrete. Construction logs for monitoring wells are included in Appendix E.

4.2.2 Sampling and Analysis Program

The sampling and analysis program will be conducted at the following frequencies:

Preconstruction – Four independent samples have been collected and analyzed from each monitoring well for the constituents listed below. The results are listed in Appendix E.

Operation, closure, and post-closure period – collect and analyze one sample from each monitoring well for the constituents listed below, on a semi-annual basis.

Should a statistically significant increase in constituent concentrations be observed, TDEC will be contacted in accordance with Rule 1200-1-7-.04 (7).

The samples will be analyzed for the following constituents listed in Tables 1 and 2:

Table 1 - Groundwater Parameter List

Field Analyses

Acidity	Dissolved Oxygen
Alkalinity	Temperature
Conductivity	pH
Depth to Water	ORP

Laboratory Analyses - Unfiltered samples

ICP2: Copper, zinc;

ICP: Barium, beryllium, silver, vanadium;

GFAA: Antimony, arsenic, cadmium, chromium, cobalt, lead, nickel, selenium, thallium;

OTHER: Fluoride, mercury.

Table 2 - Analytical Methods For Specific Parameters

<u>Parameter</u>	<u>Instrument</u>	<u>Method</u>
Fluoride	ISE	1-EPA 340.2
Ag, Ba, Be, Cu, V, Zn	ICP	2-EPA 6010B
As	ICP-MS	2-EPA 6020
Sb	ICP-MS	2-EPA 6020
Cd	ICP-MS	2-EPA 6020
Co	ICP-MS	2-EPA 6020
Cr	ICP-MS	2-EPA 6020
Pb	ICP-MS	2-EPA 6020
Se	ICP-MS	2-EPA 6020
Tl	ICP-MS	2-EPA 6020
Ni	ICP-MS	2-EPA 6020

Hg CVAA 2-EPA 7470A

Method Key

Code

Reference

- 1-EPA Methods for Chemical Analysis of Water and Wastes, EPS-600/4-79-020, Revised March 1983.
- 2-EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Revision 3, May, 1997.

Samples will be collected according to procedures detailed in TVA's Quality Assurance Procedure *Groundwater Sample Collection Techniques* (See Appendix F). It contains requirements for sample collection, preservation, shipment, chain of custody, and quality assurance and quality control.

4.2.3 Recordkeeping and Reporting

Results for each sample, including analysts' initials, date of analysis, and method number for each parameter will be reported. Records of compliance groundwater sample results will be kept at the facility. Results will be submitted to the Tennessee Division of Solid Waste Management within 30 days after all analyses are completed.

5 ENVIRONMENTAL PROTECTION STATEMENTS

5.1 Floodplain

This facility is not in a 100-year floodplain. The toe of the outermost slope adjacent is elevation XXX. The 100-year flood elevation taken from TVA data is 746 feet above mean sea level, and is lower than the top of the outer dike (elevation 765).

5.2 Other Environmental Impacts

Because construction activities on this project would occur within the existing footprint of the ash pond, which is sufficiently removed from the Clinch River/Watts Bar Lake and Emory River, as well as any tributary streams, there would be no adverse impacts to sensitive aquatic animals from this proposed project. Environmental impacts to groundwater are addressed in Appendix E.

The construction of this lateral expansion of the dredge cells and the associated operational activities are not expected to have negative effects on any federal- or state-listed plant species or sensitive habitat for such species.

6 RANDOM INSPECTION PROGRAM

A random inspection program for this facility is not required. This is because the disposal facility will only dispose of ash and gypsum from TVA facilities. In addition, minor quantities of bottom ash (for use in constructing drainage filters and gypsum from BRF may be co-disposed with KIF waste streams, in the event additional bottom ash is needed for KIF, or due to lack of disposal space at BRF. Therefore, a

random inspection program for unauthorized wastes is not required. See DSWM Policy, February 27, 1991 Item 5 (Appendix C).

7 CLOSURE AND POST CLOSURE

Closure and post-closure provisions for this facility are discussed in the Closure Plan (Parsons, 2004a) appended to this Operations Manual (see Appendix H).

8 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance and quality control for construction and closure of this facility are addressed in the Quality Assurance and Quality Control Plan for the KIF Dredge Cell Lateral Expansion Quality Assurance and Quality Control Plan (Parsons, 2004b) appended to this Operations Manual (see Appendix I).

9 REFERENCES

Parsons2004a, *Closure/Post-Closure Plan Dredge Cell Lateral Expansion, Kingston Fossil Plant, June 2004*

Parsons2004b, *Construction Quality Assurance/Quality Control Plan, Closure Plan Dredge Cell Lateral Expansion, Kingston Fossil Plant, June 2004*

TVA 2004, *Kingston Fossil Plant Hydrogeologic Evaluation of Dredge Cell Lateral Expansion, River System Operations and Environment, Norris, TN (Currently being prepared for delivery to TDEC in July 2004).*

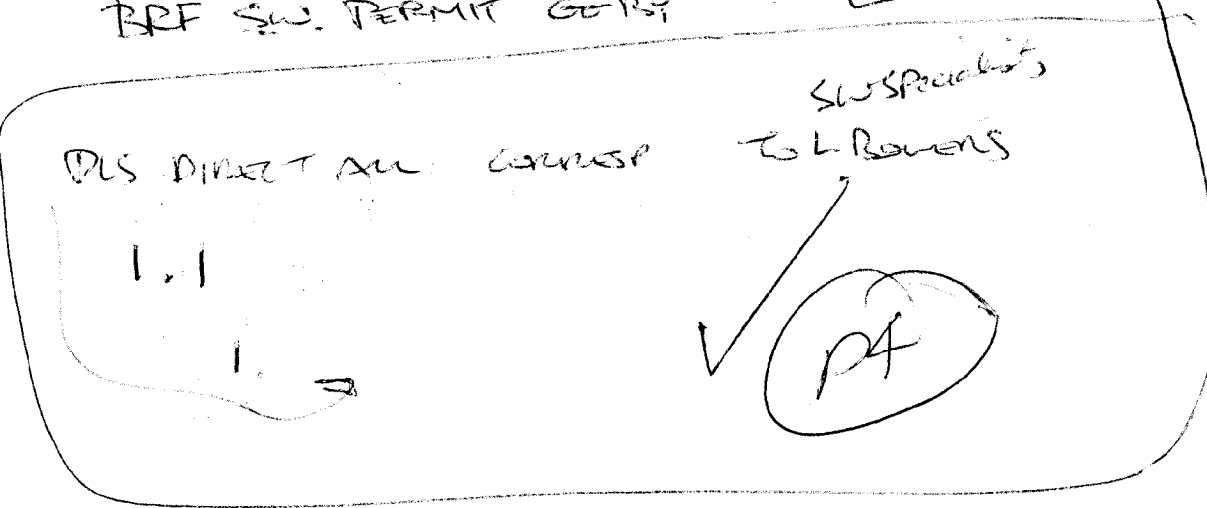
Boschuk, John 2004, *TVA Kingston Fossil Plant - Dredge Cell Lateral Expansion - Bottom Ash Filter Drain Study, JLT Laboratories*

K-11
COUPLE YRS
ABC

IN-POND OPTION

R-2

BRF SW. PERMIT GO-RSY



ZTRIVE

⊗ NEW ELEC CODES - LYNN
- SEND NEW SET TO DOE

⊗ S/C FROM BAUGH - LYNN

⊗ Response to new comments
GO-RSY FROM BOWERS

→ INTERACTIVE Spreadsheet

CN SITE KIF IN POND (R5 FILES)

3/16

BRF TOE HLP
OF M. Manned

JOB NO: 40794211
CLIENT: TVA

DRAWING INDEX

02.012B E & I CONSTRUCTION - FGD & IPS AREAS
PARADISE UNIT NO 3 FLUE GAS DESULFURIZATION

DATE: 13-Apr-06

ELECTRICAL

SCN 02.012B-19

Document No	Title	REV	DATE	REV	DATE	REV	DATE	REV	DATE	REV	DATE	REV	DATE
35W402	SECTIONS & DETAILS INTAKE STR. FL. EL. 371.0, 407.0 & 420.0	X0											
35W801	CONDUIT AND GROUNDING FLOOR EL. 407.0 PLAN AND DETAILS	4/5/2005											
38N214	MISCELLANEOUS STEEL CABLE TRAYS & SUPPORTS PLANS, SECTIONS & DETAILS	R7											
38W215	MISCELLANEOUS STEEL CABLE TRAYS & SUPPORTS DETAILS	0A	3/4/2005										
45W2825	CONDUIT & GROUNDING CABLE TUNNEL PLAN & SECTIONS	0A	10/29/2004										
45W3808-1	CONDUIT & GROUNDING CABLE TUNNEL PLAN & DETAILS	5A	10/29/2004										
45W3818-2	CONDUIT & GROUNDING EL. 422.0 - COL 24-28 PLAN	7A	10/29/2004										
45W3820-8	CONDUIT, GROUNDING AND CABLE TRAY, FL EL 422, COL 24-28 PLAN	5A	10/29/2004										
45W3822-2	CONDUIT & GROUNDING FLOOR EL. 422.0 COL 24-28 PLAN & DETAILS	9A	10/29/2004	9B	12/21/2004	9C	3/4/2005	10	4/5/2005	11	8/31/2005		
45W821	CONDUIT & GROUNDING CABLE TUNNEL PLAN & SECTIONS	4A	10/29/2004	4B	12/21/2004	4C	3/4/2005	5	4/5/2005	6A	4/5/2005		
47W800-41B	FIRE PROTECTION BLOCK DIAGRAM FIRE SUPPRESSION & ALARM SYSTEM	X1D	10/29/2004	X3A	12/21/2004	X4	4/5/2005						
47W800-41D	PIPING & INSTRUMENT DIAGRAM FIRE PROTECTION ABSORBER AREA	X0E	10/29/2004	X0F	12/21/2004	X1	4/5/2005						
55W806	CONDUIT & GROUNDING FLOOR EL 410 0 PLAN & SECTIONS	R16A	10/29/2004										
85W3220-1	KEY PLOT PLAN		10/29/2004										
85W3221-1	EQUIPMENT ARRANGEMENT PLAN 1ST FLOOR ELEC. ROOM & XFMR YARD	X1D	10/29/2004	X2A	12/21/2004	X3	4/5/2005	X4	8/31/2005				