

DRAFT ENVIRONMENTAL ASSESSMENT

**INSTALLATION OF FLUE GAS DESULFURIZATION
SYSTEM ON PARADISE FOSSIL PLANT UNIT 3**

Muhlenberg County, Kentucky

TENNESSEE VALLEY AUTHORITY

DECEMBER 2002

Direct Comments to:

Bruce Yeager
Tennessee Valley Authority
400 West Summit Hill Drive (WT 8C)
Knoxville, TN 37902
Phone: (865) 632-8051
Fax: (865) 632-6855
e-mail: blyeager@tva.gov

Draft Environmental Assessment**November 2002**

Proposed project: Installation of Flue Gas Desulfurization (Scrubber) System on Paradise Fossil Plant Unit 3
Muhlenberg County, Kentucky

Lead agency: Tennessee Valley Authority

**For further information,
contact:**

Bruce Yeager
NEPA Team Leader
Tennessee Valley Authority
400 West Summit Hill Drive (WT 8C)
Knoxville, TN 37902
Phone: (865) 632-8051
Fax: (865) 632-6855
e-mail: blyeager@tva.gov

**Comments must be
submitted by** January 10, 2003

Abstract: TVA has prepared a Draft Environmental Assessment (DEA) of a proposal to reduce sulfur dioxide (SO_2) emissions from Unit 3 at Paradise Fossil Plant (PAF) by installing flue gas desulfurization (FGD) equipment that employs the wet limestone forced oxidation (LSFO) technology. TVA needs to reduce SO_2 emissions at PAF to meet requirements under the 1990 Clean Air Act (CAA) amendments. This DEA considers the impacts of two alternatives: No Action and The Proposed Action.

Issue areas identified in scoping of potential environmental impacts and subsequently analyzed in the EA were: air quality; vegetation, wildlife, and natural areas; protected and sensitive species; wetlands and floodplains; land use, visual aesthetics, and noise; cultural resources; coal combustion byproduct generation, handling, and disposal; surface water and wastewater; groundwater quality; aquatic ecology; socioeconomic; and transportation.

Impacts of the Proposed Action are insignificant with incorporation of the following commitments. Operational and technological controls to meet limits of the PAF National Pollutant Discharge Elimination System (NPDES) permit would avoid aquatic toxicity in discharges from PAF. Selection in the timeframe of years 2005-2006 of a supplier for delivery of limestone for the Unit 3 scrubber may result in a need for consultation with the Kentucky State Historic Preservation Officer at that time. Use of Best Management and Engineering Practices, elevation or flood proofing of critical system components, and provision of portable toilets for project construction personnel ensure that construction-related discharges would comply with applicable regulations and Executive Orders.

TABLE OF CONTENTS

1.	PURPOSE, NEED, BACKGROUND, AND SCOPING	1
1.1.	Purpose and Need for the Proposed Action.....	1
1.2.	Background	1
1.3.	The Scoping Process	3
1.4.	Related National Environmental Policy Act (NEPA) Documents.....	3
1.5.	Public and Agency Involvement	3
2.	ALTERNATIVES INCLUDING THE PROPOSED ACTION	5
2.1.	The Proposed Action	5
2.1.1.	The Absorber	6
2.1.2.	The Limestone Reagent Preparation System.....	6
2.1.3.	Limestone Purchase and Transport.....	6
2.1.4.	On-Site Rail Refurbishment	9
2.1.5.	Gypsum Slurry Storage and Transfer System	9
2.1.6.	Utility Connections and Laydown Areas	12
2.1.7.	Power Consumption.....	15
2.1.8.	Water Intake and Usage.....	15
2.1.9.	Staffing and Workforce Management	16
2.2.	Alternatives to the Proposed Action.....	17
2.3.	Comparison of Alternatives	19
2.4.	Summary of Environmental Commitments	21
2.5.	Environmental Permits and Applicable Regulations	22
3.	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	23
3.1.	Air Quality.....	23
3.1.1.	Affected Environment	23
3.1.2.	Environmental Consequences	26
3.2.	Vegetation, Wildlife, and Natural Areas	30
3.2.1.	Affected Environment.....	30
3.2.2.	Environmental Consequences	31
3.3.	Protected and Sensitive Species	32
3.3.1.	Affected Environment	32
3.3.2.	Environmental Consequences	33
3.4.	Wetlands and Floodplains	34
3.4.1.	Affected Environment	34
3.4.2.	Environmental Consequences	34
3.5.	Land Use, Visual Aesthetics, and Noise.....	35
3.5.1.	Affected Environment	35
3.5.2.	Environmental Consequences	39
3.6.	Cultural Resources	47
3.6.1.	Affected Environment	47
3.6.2.	Environmental Consequences	48
3.7.	Coal Combustion Byproduct Generation, Handling, and Disposal	49
3.7.1.	Affected Environment	49
3.7.2.	Environmental Consequences	51

Installation of Flue Gas Desulfurization System on
Paradise Fossil Plant Unit 3

3.8.	Surface Water and Wastewater	51
3.8.1.	Affected Environment and Existing Wastewater Treatment Systems.....	51
3.8.2.	Environmental Consequences	54
3.9.	Groundwater Quality.....	61
3.9.1.	Affected Environment	61
3.9.2.	Environmental Consequences	62
3.10.	Aquatic Ecology	63
3.10.1.	Affected Environment	63
3.10.2.	Environmental Consequences	65
3.11.	Socioeconomics	66
3.11.1.	Affected Environment	66
3.11.2.	Environmental Consequences of Construction	67
3.11.3.	Environmental Consequences of Operation	69
3.12.	Transportation	69
3.12.1.	Affected Environment	69
3.12.2.	Environmental Consequences	70
4.	LIST OF PREPARERS	73
5.	LIST OF AGENCIES AND PERSONS CONSULTED	75
6.	SUPPORTING INFORMATION	77
6.1.	Literature Cited.....	77
6.2.	Acronyms, Symbols, and Abbreviations	79

LIST OF APPENDICES

APPENDIX A – AGENCY CORRESPONDENCE AND COMMENTS

APPENDIX B – FLUE GAS DESULFURIZATION COMPONENTS

APPENDIX C – PARADISE MATRIX OF OPERATIONAL FLOWS FOR PAF 3 FGD ADDITION AND
DBA/AA TOXICITY TESTING

APPENDIX D – NOISE MODELING APPROACH

LIST OF TABLES

Table 2-1.	Projected Power Consumption.....	15
Table 2-2.	Scrubber Water Balance	16
Table 2-3.	Summary and Comparison of Alternatives By Resource Area.....	19
Table 3-1.	National Ambient Air Quality Standards	24

Table 3-2. Ambient Concentrations of Criteria Air Pollutants Compared With Air Quality Standards	25
Table 3-3. Stack Locations and Physical Dimensions	27
Table 3-4. Worst-Case Emissions	28
Table 3-5. Summary of Estimated Local Impacts on Air Quality	29
Table 3-6. Rare Terrestrial Animals Reported From Areas Within a 3-Mile Radius of Paradise Fossil Plant	32
Table 3-7. Sensitive Aquatic Species Known From the Green River, Muhlenberg and Ohio Counties, Kentucky.....	33
Table 3-8. Remote Noise Monitoring Results.....	38
Table 3-9. Plant Area Noise Monitoring Results.....	39
Table 3-10. Haul Road No. 1 Noise Monitoring Results.....	39
Table 3-11. Typical Noise Source Levels	41
Table 3-12. Noise Impacts From Limestone Truck Delivery	44
Table 3-13. Noise Impacts for Unit 3 FGD System.....	46
Table 3-14. Distance at Which Additional Operating Noise Dissipates to Background and "Not Noticeable" Noise Levels	47
Table 3-15. Inflow Sources to Jacobs Creek Ash Pond, Average Annual Flows, and Percent of Total Discharge DSN001	52
Table 3-16. Paradise Matrix of Operational Flows for PAF Unit 3 FGD Addition and DBA or Adipic Acid Toxicity Testing – October 2002.....	58
Table 3-17. PAF Unit 3 Scrubber Addition - Studies - Summary of Toxicity Test Conditions and Results, September-October 2002	59

LIST OF FIGURES

Figure 2-1. Routes for Moving Limestone to Paradise Fossil Plant by Rail and Truck	7
Figure 2-2. Gypsum Sluice Lines Near the Plant	10
Figure 2-3. Gypsum Sluice Lines to Pond A	11
Figure 2-4. Scrubber Utility Route Alternatives	13
Figure 2-5. Vendor A On-Site Manpower Projections	18
Figure 2-6. Vendor B On-Site Manpower Projections	18
Figure 3-1. Noise Monitoring Locations	37
Figure 3-2. Groundwater Potentiometric Surface in Soil Overburden for August 1995	64
Figure 3-3. Transportation Network in the Vicinity of Paradise Fossil Plant	70