

Attachment 21 to

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Entergy Nuclear Waste Minimization Plan, Revision 1. August 4, 2008

ENTERGY NUCLEAR

WASTE MINIMIZATION PLAN

Approved By: *Rick Buckley* / August 4, 2008
Environmental Focus Group Date

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1.0 Introduction

Entergy Nuclear's (EN) Waste Minimization Plan provides information and descriptions of activities to reduce, to the extent feasible, hazardous, hazardous/radioactive and nonhazardous wastes generated, treated, accumulated or disposed. This includes any source reduction that eliminates or reduces the generation of a waste at the source or recycling activity that uses, reuses or reclaims a material.

This Plan is to be used in conjunction with Entergy Nuclear's fleet Procedures EN-EV-104, "Waste Minimization", EN-EV-106, "Waste Management Program" and EN-EV-112, "Chemical Control Program", and site-specific procedures to minimize waste generation to the maximum extent practicable.

The Environmental Focus Group is responsible for:

- Implementing site waste minimization programs relating to hazardous, hazardous/radioactive and nonhazardous wastes.
- Maintaining this Plan.
- Assessing and evaluating waste streams for minimization opportunities.

2.0 Policy

EN encourages innovative economical techniques and practices that effectively reduce the volume or quantity of wastes so long as these reductions minimize present and future threats to human health and the environment. EN will reuse or recycle waste materials, when economically practical, and ensure that unusable waste is disposed of in accordance with applicable state and federal regulations.

EN's environmental guidelines include the following:

- Environmental protection is every employee's responsibility. Environmental Protection is valued and displays our commitment and obligation as Entergy employees to serve as socially responsible corporate citizens in protecting the environment.
- Reducing and if possible, eliminating the generation of hazardous, hazardous/radioactive and nonhazardous wastes and emissions at the source is a prime consideration in design and plant operations.
- Methods and new technologies which substitute nonhazardous materials or utilize other source reduction techniques will be given priority in assessing or modifying current or potential waste streams.
- Economical reuse and recycling of materials will continue to be the first consideration prior to classification and disposal as waste.
- EN will demonstrate its commitment to responsible corporate citizenship by complying with applicable state and federal regulations, promoting cooperation and coordination between departments, facilities, industry, government, and customers, and sharing the goal of minimal adverse impact to air, water and land through excellence in environmental control.

3.0 Facility Information

3.1 Facility Owners

- ANO: Entergy Arkansas
Little Rock, Arkansas
- GGNS: System Energy Resources, Inc.
Jackson, Mississippi
Southwest Mississippi Electric Power Association
Hattiesburg, Mississippi
- IP2: Entergy Nuclear Indian Point 2, LLC
Buchanan, New York
- IP3: Entergy Nuclear Indian Point 3, LLC
Buchanan, New York
- JAF: Entergy Nuclear FitzPatrick, LLC
Lycoming, New York
- PLP: Entergy Nuclear Palisades, LLC
Covert, Michigan
- PNPS: Entergy Nuclear Pilgrim Station, LLC
Plymouth, Massachusetts
- RBS: Entergy Gulf States
Beaumont, Texas
- VY: Entergy Nuclear Vermont Yankee, LLC
Brattleboro, Vermont
- W3: Entergy Louisiana, LLC
New Orleans, Louisiana

3.2 Facility Operator

- Entergy Operations, Inc. (ANO, GGNS, RBS & W3)
- Entergy Nuclear Operations, Inc. (IP2, IP3, JAF, PLP, PNPS & VY)

3.3 Facility EPA Identification Numbers

- ANO - ARD000632752
- GGNS - MSD000644617

- IP2 – NYD991304411
- IP3 – NYD085503746
- JAF – NYD000765073
- PLP – MID098644685
- PNPS - MAR000014167
- RBS - LAD070664818
- VY - VTR000504167
- W3 - LAD000757450

3.4 Responsible Facility Representative

- Site Vice Presidents, Operations

4.0 Scope and Objectives

4.1 Scope

EN's waste minimization efforts are primarily directed toward hazardous and hazardous/radioactive waste streams but nonhazardous waste streams are also minimized where feasible. Priorities of these efforts are as follows:

- First – Hazardous/Radioactive Waste Minimization.
- Second – Hazardous Waste Minimization.
- Third – Solid Waste Minimization.
- Fourth – Other Media Waste Minimization (see 40CFR261.4).

The hierarchy of waste minimization options is:

- First – Source Reduction.
- Second – Reuse/Reuse Sound Environmental Recycling.
- Third – Treatment to Reduce Volume and/or Toxicity.
- Fourth – Disposal.

Waste minimization activities, including evaluations and alternative product uses, are typically coordinated through Chemistry personnel. Best management practices and techniques utilized at other facilities to foster and improve waste minimization efforts are shared among EN Environmental Focus Group members.

Any employee, after consulting with the site Chemistry group, may implement waste minimization ideas and actions if they prove to be practical and cost-effective.

4.2 Objectives

EN's overall objective is to minimize hazardous and hazardous/radioactive waste generation to the maximum extent practicable, with nonhazardous waste generation minimized where feasible. Goals established by the EN Environmental Focus Group are as follows:

- Hazardous/Radioactive Waste: Minimize and eliminate its' generation by controlling chemical usage in radiological controlled areas through the chemical control program and other internal site programs.
- Hazardous Waste: Consistently attain small quantity generator status as defined by the EPA and if feasible conditionally exempt small quantity generator status.

- Nonhazardous Waste: Minimize generation where feasible.

5.0 Alternative Waste Reductions

5.1 Source Reduction

The following are source reduction activities currently occurring within EN:

- **RBS:** Fax cover sheets have been reduced and replaced by fax labels.
- **EN Sites:** Only the amount of chemical to be used for a particular job is allowed.
- **EN Sites:** Excess paints are utilized in additional areas of the plant when unused paints remain.
- **EN Sites:** Amount of chemicals maintained in the Warehouse is minimized by optimizing the Min/Max inventories.

5.2 Solvent Recovery

The following are recovery/reuse activities currently occurring within EN:

- **RBS & W3:** Solvent recovery distillation units are utilized to recover usable solvents from paint wastes. These units reduce paint waste quantities shipped off-site for disposal and the amount of solvent purchased. Estimated recovery of reusable solvents is approximately 65%.

The following are recovery/reuse activities that are no longer occurring within EN:

- **GGNS:** Previously utilized a solvent recovery distillation unit. However, the quantities of waste paint solvent currently generated does not economically warrant its' use. Therefore, the unit has been decommissioned.

5.3 Recycling

The following are materials currently being recycled within EN:

- **EN Sites:** Cathode ray tubes, circuit boards, fluorescent lights, freon, lead-acid and nickel-cadmium batteries & scrap metals.
- **ENS Sites:** Industrial lubricants, greases, automotive crankcase, gear & lube oils, electrohydraulic fluids, laser copier & printer toner cartridges, paper & used oil filters.
- **ANO:** Silver cartridges, paper, cardboard, plastic and toner cartridges.
- **GGNS:** Used tires.
- **JAF:** Used oil & SACON blocks.

- **PNPS:** Plastic soda bottles.
- **RBS:** Photographic waste & film containing silver, oily debris & ethylene glycol.

In addition, recycled paper has also replaced traditional paper (non-recycled) for use in all company fax machines, and black and white printers and copiers.

5.4 Hazardous Materials Substitution

The following are hazardous materials substitution activities currently occurring within EN:

- **EN Sites:** Water-based epoxy paints have been approved for plant use in an effort to reduce VOC content and hazardous waste generation. In addition, water-based epoxy paints have been approved for radiological use companywide to help reduce the potential for mixed hazardous/radioactive waste generation.
- **EN Sites:** Fluorescent lamps high in mercury content are being phased out with low-mercury content fluorescent lights that are nonhazardous.
- **ANO:** Electron has been utilized in place of mineral spirits during turbine outages and throughout the plant. In addition, SD/20 is being used as an alternative degreaser to ZEP aerosol, which contains trichloroethane.
- **GGNS:** EPA 2000 is utilized routinely instead of mineral spirits in outage work activities and GFC2000 is used by Security in cleaning firearms. In addition, high flash point stoddard solvent used in parts washers in the maintenance and automotive areas has been replaced with citra solv and GFC2000.
- **RBS:** Varsol was replaced by EPA 2000, a citric-based nonhazardous solvent, for parts cleaning activities. In addition, EPA 2000 is also used for specific work projects during outage activities.
- **ANO & W3:** Citra solv, which is a nonhazardous citric-based material, is utilized in parts washers and other cleaning applications.

5.5 Product Reuse/Alternative Use

EN routinely initiates efforts to minimize hazardous/nonhazardous wastes by finding applications for usable products. Interface with product users and help in locating alternative uses have resulted in some use of products that had previously been discarded.

For example, various solvents recovered through the distillation units can be utilized by painters in cleaning and paint preparation activities, and unused materials destined for disposal are surplus when feasible.

When feasible and practicable, Investment Recovery is also utilized to find alternative applications for certain products.

5.6 Waste Segregation

The following waste materials are currently being segregated at all EN sites:

- Lead-acid and nickel-cadmium batteries are stored in specific areas and shipped to a smelter for recycling.
- PCB capacitors are stored in designated areas and disposed of at a TSCA approved facility.
- Lead wastes (i.e., tech-sil penetrants, paint) are segregated from other waste materials.
- Metals are collected in designated receptacles and sold for scrap.
- Solvents are segregated, when possible, to prevent mixing with other wastes.
- Used oils are segregated based upon test results and knowledge of oil contents.

5.7 Elimination of Waste Streams

The following waste streams have been eliminated within EN:

EN Sites: Site records are processed electronically. This system, which requires no chemicals for processing, replaced the microfilm process, thereby, eliminating the associated hazardous waste stream.

GGNS: Changes to the microfilm process were made that eliminated the need for chromic acid, which had previously been used to soak and clean silver deposits from processor rollers. In addition, high flash point stoddard solvent used in parts washing activities was replaced with GFC2000 and citra solv, which are nonhazardous products.

PNPS: Fluorescent lighting ballasts containing PCBs have been replaced with non-PCB lighting ballasts.

GGNS, VYNPS & W3: Transformers containing PCBs have either been retrofilled or removed from the site to eliminate this waste stream.

W3: Varsol, naphtha and other hazardous waste producing solvent cleaners have been eliminated and replaced with a nonhazardous citra solv product.

GGNS & RBS: Freon parts cleaning solution has been replaced with EPA2000, GFC2000 and citra solv, thereby eliminating the associated hazardous waste stream.

5.8 Chemical Review Forms

Chemicals brought and used on-site are controlled through EN's chemical control program (Fleet Procedure EN-EV-112). Chemistry personnel evaluate chemicals for potential hazardous characteristics and make recommendations to the user concerning quantity, use and potential disposal. The use of nonhazardous products is strongly encouraged to the extent possible. As part of the chemical control program, Purchasing is also utilized in evaluating the use of nonhazardous products, along with ensuring that only chemicals approved by Chemistry are allowed on-site.

5.9 Site Inspections

Site inspections are performed to ensure that products do not have an expired shelf-life, are properly stored and not leaking, and that empty containers are properly handled. Products or waste materials found out of place are returned to owners for proper storage. Any leaks or other problems are immediately repaired. If any deficiencies are identified during these inspections, a condition report is initiated in accordance with EN fleet procedure EN-LI-102, "Corrective Action Process" to ensure that the deficiency is corrected.

Products found, that are not being used or those having an expired shelf-life, are evaluated for reuse or recycling, and as a last resort, disposal recommendations are made.

6.0 Equipment Waste Reduction Devices

The following equipment is currently being utilized within EN in an effort to reduce waste generation and disposal volume companywide:

- **EN Sites:** Freon Recovery Systems (recovers freon for reuse) & garbage compactors.
- **W3:** Hand Pump Spray Bottles (minimizes product loss).
- **RBS & W3:** Solvent Recovery Distillation Unit (recovers solvent for reuse).

Previous equipment that had been utilized to reduce waste but has since been discontinued is as follows:

- **GGNS:** Snap-On Kleen Coolant Recycle System (recovers/recycles antifreeze).

7.0 Waste Minimization Training Program

EN uses procedures, newsletters, awareness handbooks, posted signs and annual training to provide waste minimization guidance and practices to employees. Training areas include hazardous, hazardous/radioactive and nonhazardous waste, chemical control and environmental awareness.

The actual training related to minimizing hazardous and nonhazardous waste is accomplished through two avenues as follows:

- Annual environmental awareness training
- Section specific training conducted by Chemistry personnel.

Another avenue of training that occurs on a daily basis is each sites chemical control program (Fleet Procedure EN-EV-112). The chemical control program works in conjunction with Chemistry personnel by performing plant inspections and screening materials before their use on-site. This program provides information to plant personnel and includes the proper use, handling and disposal of materials, as well as stressing waste minimization importance. This program also encourages all employees to seek alternative materials that are less hazardous or nonhazardous and to minimize waste whenever possible.

8.0 Establishment of Performance Goals

EN's philosophy in regard to performance goals is as follows:

Eliminate or minimize the generation of mixed hazardous/radioactive wastes through source reduction and EN's chemical control program.

Maintain hazardous waste generation quantities at less than 500 pounds per calendar month at each facility.

Minimize nonhazardous waste generation to the extent practicable and feasible.

These goals may be more easily attained during non-outage years, when fewer personnel are at the EN sites and fewer maintenance projects occur. Outages are scheduled anywhere from approximately every 18 – 24 months. Therefore, outage activities may make the goal more challenging to achieve.

9.0 Prior Waste Minimization Efforts

Sections 5.0 and 6.0 of this Plan lists and describes waste reduction efforts currently in place within EN.

10.0 Waste Stream Analysis/Minimization Opportunities

Listed below is a summary of the hazardous, hazardous/radioactive and nonhazardous waste streams generated within EN. If an "X" is noted in a sites column, then the waste stream is either currently being generated or has the potential to be generated. These waste streams are periodically evaluated for minimization opportunities in accordance with Section 11.0 of this Plan.

• Hazardous Waste Streams:										
Waste Stream	ANO	GGNS	IP2	IP3	JAF	PLP	PNPS	RBS	VY	W3
Aerosols	X	X	X				X		X	
Broken Fluorescent Lamps	X	X	X	X	X		X	X	X	X
Intermittent Miscellaneous Wastes *	X	X	X	X	X		X	X	X	X
Mercury	X	X	X	X	X		X	X	X	X
Off-Specification/Expired Chemicals	X	X	X	X	X		X	X	X	X
Oil Lab Wastes	X	X			X			X	X	X
Oil/Solvent Waste	X	X			X			X	X	X
Paint Wastes (Liquid & Solid)	X	X	X	X	X		X	X	X	X
Photographic Wastes					X			X		X
Polychlorinated Biphenyl Wastes (>50 ppm)			X	X	X					
Used/Waste Oil							X			
* Intermittent miscellaneous wastes are those waste streams that may not fall into other waste categories.										

• **Hazardous/Radioactive Waste Streams:**

Waste Stream	ANO	GGNS	IP2	IP3	JAF	PLP	PNPS	RBS	VY	W3
Intermittent Miscellaneous Wastes *	X	X	X	X	X		X	X	X	X
Oil/Solvent Waste	X	X	X	X	X		X	X	X	X
Off-Specification Chemicals	X	X			X		X	X	X	X
Paint Wastes (Liquid & Solid)	X	X	X	X	X		X	X	X	X

* Intermittent miscellaneous wastes are those waste streams that may not fall into other waste categories.

• **Universal Waste Streams:**

Waste Stream	ANO	GGNS	IP2	IP3	JAF	PLP	PNPS	RBS	VY	W3
Batteries	X	X	X	X	X		X	X	X	X
Cathode Ray Tubes	X							X	X	X
Electronics	X							X		X
Fluorescent Lamps	X	X	X	X	X		X	X	X	X
Fluorescent PCB Lighting Ballast									X	

Mercury-Containing Equipment	X	X	X	X	X		X	X	X	X
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• **Nonhazardous Waste Streams:**

Waste Stream	ANO	GGNS	IP2	IP3	JAF	PLP	PNPS	RBS	VY	W3
Activated Carbon	X	X	X	X	X		X	X	X	X
Asbestos	X	X	X	X	X		X	X	X	X
Biomedical Wastes	X	X			X		X	X	X	X
Cathode Ray Tubes		X	X	X	X		X		X	
Construction Debris	X	X	X	X	X		X	X	X	X
Desiccant	X	X	X	X	X			X	X	X
Electrohydraulic Fluid	X	X			X		X	X		X
Electronics		X	X	X	X		X		X	
Empty Containers (Drums)	X	X	X	X	X			X	X	X
Ethylene Glycol	X	X	X	X	X		X	X	X	X
Freon	X	X	X	X	X		X	X	X	X
Garbage	X	X	X	X	X		X	X	X	X
Grease	X	X	X	X	X		X	X	X	X

• **Nonhazardous Waste Streams: (continued)**

Waste Stream	ANO	GGNS	IP2	IP3	JAF	PLP	PNPS	RBS	VY	W3
Insulation	X	X					X	X		X
Intermittent Miscellaneous Wastes *	X	X	X	X	X		X	X	X	X
Off-Specification/Expired Chemicals	X	X	X	X	X		X	X	X	X
Oil Contaminated Liquids	X	X	X	X	X		X	X	X	X
Oil Contaminated Solids	X	X	X	X	X		X	X	X	X
Polychlorinated Biphenyl Wastes	X	X						X	X	X
Resins	X	X	X	X	X		X	X	X	X
Sandblasting Media	X	X	X	X	X			X		X
Scrap Metals	X	X	X	X	X		X	X	X	X
Toner Cartridges	X	X						X	X	X
Used/Waste Oil	X	X	X	X	X			X	X	X
Used Oil Filters	X	X						X	X	X

* Intermittent miscellaneous wastes are those waste streams that may not fall into other waste categories.

• **Nonhazardous Waste Streams: (continued)**

Waste Stream	ANO	GGNS	IP2	IP3	JAF	PLP	PNPS	RBS	VY	W3
Used Tires		X								
Wastewater/Wastewater Sludges	X	X					X	X		X
Water-Based Paint Wastewater	X	X						X		X
Water Filters	X	X						X		X

11.0 Waste Minimization Reports

The quarterly and annual environmental performance indicator report prepared by the Environmental Focus Group is utilized to measure waste minimization success and assess waste streams for further minimization opportunities. These reports are reviewed and discussed in detail by the Focus Group, with necessary strategies developed to address problem areas such as excess generation or costs. In order to ensure that each site is aware of their waste minimization performance as compared to fleet goals, the annual report is sent to all levels of management (site & corporate).