**Crystal River Unit 3 Nuclear Generating Plant License Renewal** 

# **Revised Environmental Site Audit Needs List**

# **NON-RADIOLOGICAL WASTE**

# **RADIATION PROTECTION**

# SOCIOECONOMICS

# **TERRESTRIAL ECOLOGY**

# Non-Radiological Waste

#### NRW-1

- 1. Description of hazardous and non-hazardous waste, 2 pages
- 2. CR-3 Procedure AI-1820, Hazardous and Non-Hazardous Waste Management
- 3. CR-3 Procedure SP-909, Inspection of CR-3 hazardous & Mixed Waste Satellite Accumulation Areas and Containers

	UNIVER	RSAL W	ASTE				
WASTE STREAMS	2002	2003	2004	2005	2006	2007	2008
2' Fluorescent Lamps - Per Lamp	12						
4' Fluorescent Lamps - Per Lamp	2415	1320	3085	2784	714	962	2172
8' Fluorescent Lamps - Per Lamp	233	143	275	195	30	45	160
U-Shaped Fluorescent Lamps - Per Lamp	26	6	72	40		8	
HID - Per Lamp	13		183	12		95	90
Broken Fluorescent Lamps - Pounds		24	65	25	324	30	10
Lithium Batteries - Pounds	40	37		40	11	· · ·	21
Nickel Cadmium Batteries - Pounds		55	50		47	80	138
Lead Acid Batteries - Pounds		2000			126	1632	3406
Potassium Hydroxide Batteries - Pounds				140			-
Mercury Batteries - Pounds					36	5	
Mercury Containing Articles - Pounds						26	43
Nickel Hydride Batteries - Pounds							12

Nickel Hyunue batteries - Pounus		1					
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	HAZARI	DOUS V	VASTE				
WASTE STREAMS	2002	2003	2004	2005	2006	2007	2008
Halogenated Oil - Pounds	1100	400		454			1200
t nt Rags - Pounds	125			154		215	-
Aerosols - Pounds	450	20	65	15	90	65	
Paint Related Material - Pounds	2400	550	250				
Parts Cleaner w/Gas, Oil, Diesel - Pounds	400						
Propane - Pounds	10						
Scrap Chemicals - Pounds	1725	1100	872	667	97	1403	
Lithium Hydroxide - Pounds						160	
Phosphoric Acid - Pounds						900	
Snubber Oil (Benzene) - Gallons							55

	U	sed Oil	······································				
WASTE STREAMS	_2002	-z003	2004	2005	2006	2007	2008
Used Oil - Gallons	530		1425	880	8855	365	1650
Uncrushed Oil Filters - Pounds	3500	3250	4250	2000	3200	1410	4000
Used Oil Pads/Absorbant - Pounds	4000	5000	250	4750		3750	3500
Oily Rags - Pounds			2400				
Oily Water - Gallons					880		
Oily Sludge - Gallons						220	

WASTE STREAMS	2002	2003	2004	2005	2006	2007	2008
Antifreeze - Gallons	220	1555	2550		2455	55	2276
Empty Drums - Per Drum	43	58	62	·		123	
Grease - Pounds	8000					250	3250
Lime - Pounds	4700					2500	
Scrap Chemicals - Pounds	1500	200	675		450		,
Floor Stripper - Pounds						5030	
Dessicant - Pounds						2000	
Blast Media - Pounds	wax and					30000	13000
EHC Fluid - Gallons							275
Diesel Fuel Sludge - Gallons						·	55
PE-55 - Gallons							55
loal - Gallons							110



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#### 1.0 **PURPOSE**

The purpose of this procedure is to establish written guidelines for Hazardous and Non-hazardous Waste Management.

#### 2.0 **REFERENCES**

- 2.1 Implementing References
- 2.1.1 Florida Power Corporation's Operations Manual, Section II-67, "Polychlorinated Biphenyl (PCB's)."
- 2.1.2 SP-909, Inspection of Hazardous/Mixed Waste Satellite Accumulation Areas.
- 2.1.3 Corporate Environmental Assurance Program, Compliance Manual.
- 2.1.4 40CFR260, "Environmental Protection Agency General Regulations for Hazardous Waste Management."
- 2.1.5 40CFR261, "Environmental Protection Agency Regulations for Identifying Hazardous Waste."
- 2.1.6 40CFR262, "Environmental Protection Agency Regulations for Hazardous Waste Generators."
- 2.1.7 40CFR265, "Environmental Protection Agency Interim Status Standards for Owners and Operators of Hazardous Waste Facilities."
- 2.1.8 40CFR266, "Environmental Protection Agency Standards for Management of Specific Hazardous Wastes and Facilities."

#### 3.0 **PERSONNEL INDOCTRINATION**

- 3.1 Definitons
- 3.1.1 Acute Hazardous Waste

Acute hazardous waste is a special category of hazardous waste determined to be extremely hazardous or toxic (e.g., discarded material containing penta-chlorophenol). Florida Power rarely generates this type of waste.

3.1.2 CFR

Code of Federal Regulations

3.1.3 CR-3 Hazardous Waste Satellite Accumulation buildings

An area located on southeast berm with buildings approved to accumulate waste(s) limited to a total of 55 gallons of hazardous waste or 1 quart of acutely hazardous waste per each building. These buildings are designed with installed fire suppression systems.

	<ul> <li>CR-3 Administration Buildings</li> <li>CR-3 Warehouse &amp; Associated Areas</li> </ul>
	CR-3 Intake and Discharge Areas
,	CR-3 Maintenance Training Facility
3.1.5	DOT
	Department of Transportation
3.1.6	EPA
	Environmental Protection Agency
317	EDA Identification Number
3.1.7	
	All Large Quantity Generators (LQG's) must have an identification number from the EPA to comply with pre-transport, manifesting, record keeping and reporting requirements.
3.1.8	FDEP
	Florida Department of Environmental Protection
3.1.9	Generator Any person, by site, whose act or process produces hazardous wastes. (Ref. 40 CFR 261)
3.1.10	Hazardous Waste (excluding radioactive material)
	Hazardous Waste is a subset of "solid waste." A solid waste may be determined to be hazardous in any of the following ways:
	By exhibiting one of these four characteristics:
	<ul> <li>Ignitability (flash point less than 140° F)</li> </ul>
	<ul> <li>Corrositivity (pH less than 2.0 or greater than 12.5)</li> </ul>
	<ul> <li>Reactivity (reacts violently with water or other substances)</li> </ul>
1	<ul> <li>Toxicity (contains certain heavy metals and other toxic substances in excess of specific limits).</li> </ul>
	OR
	<ul> <li>OR</li> <li>Is listed in Subpart D of the hazardous waste regulations (lists of process wastes and specific commercial chemical products) [40 CFR 261.2 – 261.4]</li> </ul>
	<ul> <li>OR</li> <li>Is listed in Subpart D of the hazardous waste regulations (lists of process wastes and specific commercial chemical products) [40 CFR 261.2 – 261.4]</li> <li>OR</li> </ul>
	<ul> <li>OR</li> <li>Is listed in Subpart D of the hazardous waste regulations (lists of process wastes and specific commercial chemical products) [40 CFR 261.2 – 261.4]</li> <li>OR</li> <li>by being used oil with total organic halogen content of &gt; 1000 ppm.</li> </ul>

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3.1.11 Hazardous Waste Storage Area

The Flammable/Chemical Storeroom is the designated location for storing hazardous waste and other waste types prior to shipment off-site.

The warehouse is located east of the North Coal Plant, CR-4&5.

Designated hazardous waste containers are stored no longer than 90 days prior to shipment to a designated disposal facility.

3.1.12 HWC

Hazardous Waste Coordinator

3.1.13 Large Quantity Generator (LQG)

LQG's generate more than 1000 Kg per month of non-acutely hazardous waste or greater than 1 Kg per month of acute hazardous waste. CR-3 is designated a LQG. This designation encompasses Unit's 1, 2, 3, 4 and 5.

3.1.14 LDR

Land Disposal Restriction

3.1.15 Mixed Waste

Mixed waste is defined as "any listed hazardous waste mixed with radioactivity".

3.1.16 MSDS

Material Safety Data Sheet

3.1.17 Non-hazardous Waste (excluding radioactive material)

Non-hazardous waste is solid waste that does not meet the criteria to be considered hazardous.

3.1.18 Satellite Accumulation

Satellite Accumulation Areas are designated locations near where wastes are normally generated, that are set up to collect known hazardous wastes such as solvents, cutting fluids, potentially hazardous wastes such as used lubricants, and other wastes generated during maintenance activities. As much as 55 gallons of hazardous waste or 1 quart of acutely hazardous waste may be accumulated in a Satellite Accumulation Area.

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#### 3.1.19 Solid Waste

Any discarded material (solid, liquid, semi-solid, containerized gas under pressure) which is abandoned, recycled, or considered "inherently waste-like." (40 CFR 261, Subparts A, B, and C)

Specifically excluded from the definition of solid waste are domestic sewage wastes, industrial effluent discharges subject to permits under Section 402 of the Clean Water Act, and specified nuclear materials subject to regulation under the Atomic Energy Act.

#### 3.1.20 Start Date

Date placed on the outside of the container when it is deemed full.

3.1.21 Surplus Chemicals

Any chemical having an expired shelf life or deemed unwanted.

3.1.22 Transporter

A person or contractor engaged in the off-site transportation of hazardous wastes by air, rail, highway, or water.

3.1.23 TSD

Treatment, Storage, and Disposal Facility – A facility that treats, stores or disposes of hazardous wastes.

#### 3.1.24 Universal Waste

Universal wastes are specific hazardous wastes that are not fully regulated as hazardous wastes. Currently batteries, spent or unusable pesticides, certain devices containing mercury, manometers, switches and mercury-containing lamps (fluorescent and high-intensity discharge) destined for recycling are included in this group.

Mercury containing lights that are not recycled are not included in this waste group.

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3.2 Responsibilities

#### 3.2.1 Hazardous Waste Coordinator

- Implement the Florida Power programs and procedures, as required by Federal, State, and Local regulations, concerning collection, segregation, characterization, labeling, interim storage and manifesting of hazardous waste.
- Designate and control Satellite Accumulation Areas at the CR-3 Site.
- Sample and analyze potentially hazardous waste.
- Arrange for appropriate disposition of analyzed wastes that are determined to be non-hazardous.
- Coordinate funding for contracts associated with CR-3's hazardous waste disposal.
- Providing to the Nuclear Training Department, the names, titles, and job descriptions of CR-3 personnel requiring training on hazardous waste management.

#### 3.2.2 Manager/Supervisor

The manager/supervisor of each work group are responsible for the following:

- Ensuring that all employees under their supervision are provided appropriate information concerning waste management.
- Reviewing the job processes/tasks for which they are responsible to discover any resultant hazardous waste streams.
- Communicating to the Hazardous Waste Coordinator any identified change(s) in hazardous waste streams.
- Preventing the generation of excessive hazardous waste volume through the mixing of materials, that creates a larger volume of hazardous waste. As an example, the combining of solvents with oils for no specific use or purpose creates a larger volume of hazardous waste requiring disposal.
- Ensuring proper labeling of waste containers with the location of collection, container type, set-up date, waste type, and responsible supervisor.
- Ensuring that the waste material is transported to the Satellite Accumulation Area.
- Ensuring that the appropriate individuals attend hazardous waste training annually.
- 3.2.3 Materials and Contract Services Group
  - Control storage of hazardous and non-hazardous materials within approved, designated storage area(s).
  - Control the reuse and resale of non-hazardous recyclable material.
  - Control the reuse and resale of expired hazardous and non-hazardous materials in inventory.

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3.2.4 NWST

Nuclear Waste Systems Technician's are responsible for the proper handling, packaging, transporting to Hazardous Waste Storage Facility and manifesting of hazardous, non-hazardous and universal wastes. NWST's will provide proper labels, containers and direction to all shop personnel on waste matters.

3.2.5 Individual's Responsibilities

3.2.6 It is the responsibility of all personnel to keep the generation of hazardous waste to a minimum. Use the following techniques to effectively reduce the generation of hazardous waste:

- Follow instructions in section 4.0 for proper waste handling.
- Do not mix waste streams together.
- Products should be carefully reviewed to minimize the use of those materials that are potential hazardous waste.
- When possible, prior to disposing, use the entire contents of containers such as grease, epoxy, spray solvents, sealers, etc.
- If a listed hazardous waste is mixed with other non-hazardous material, the resulting mixture must be handled as hazardous waste.
- 3.3 Description
- 3.3.1 Ensure that the segregation, labeling, transport, storage, and disposal of waste types are performed in accordance with Federal, State, and Local regulations.

3.3.2 A key component of the Hazardous Waste Management Program is the minimization of hazardous wastes generated. Every employee should examine each of their work processes for opportunities to eliminate or reduce the amount of hazardous and non-hazardous wastes produced. Waste minimization will result in a direct cost savings in the form of disposal and administration cost avoidance and reduced liability associated with the management of hazardous wastes.

#### 4.0 WASTE HANDLING INSTRUCTIONS

- 4.1 Aerosol Cans (Hazardous Waste)
  - Individuals should DISPOSE of empty cans containing no product or propellant in normal trash. If spray nozzle is missing or broken, it may be possible to borrow a good nozzle from a can containing the same product and use the contents until it is empty.
  - Individuals should RETURN all partially full cans to the respective tool rooms for reuse or proper disposition of cans deemed unusable.
  - Individuals should TREAT all partially full cans still containing product or propellant, which are deemed unusable, as hazardous waste.
  - NWST's will DISPOSITION expired aerosol cans from tool rooms during performance of SP-909.

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- 4.2
- Ballasts Lighting (Fluorescent)
  - Individuals should CONTACT NWST's for direction on where to bring spent ballast for proper disposition.
  - NWST's will COLLECT all ballast waste in an approved container.
  - NWST's will LABEL all containers as "Fluorescent Lighting Ballasts Unknown • PCB Content - Assumed PCB Contaminated" and have the start date written on the outside of the container. Start date is the date the first ballast is placed in the container.
  - NWST's will DISPOSITION full container of spent ballast.
- 4.3 Batteries – Alkaline (Non-hazardous Waste)
  - Individuals should BRING spent Alkaline batteries to one of the following approved collection sites.
    - Cold side tool room
    - Hot Shop tool room
    - Health Physics Calibration Lab (HP Use Only)
    - 293 Warehouse
  - NWST's will REMOVE spent Alkaline batteries from collection sites.
- 4.4 Batteries – Gel Cell (Universal Waste)
  - CONTACT NWST's for direction on where to bring spent Gel Cell batteries for proper disposition.
  - NWST's will COLLECT Gel Cell batteries in an approved container.
  - NWST's will LABEL collection container with a Universal Waste label affixed to the outside of the container and start date written on the outside of the container. Start date is the date the first battery is placed in the container.
- 4.5 Batteries – Lead Acid (Universal Waste)
  - CONTACT NWST's for direction on where to bring spent Lead Acid batteries for proper disposition.
  - NWST's will COLLECT Lead Acid batteries in an approved container.
  - NWST's will LABEL collection container with a Universal Waste label affixed to the outside of the container and a start date written on the outside of the container. Start date is the date the first battery is placed in container.
- 4.6 Batteries – Lithium (Universal Waste)
  - CONTACT NWST's for direction on where to bring spent Lithium batteries for • disposition.
  - NWST's will COLLECT Lithium batteries in an approved container.
  - NWST's will LABEL collection container with a Universal Waste label affixed to the outside of the container and a start date written on the outside of the container. Start date is the date the first battery is placed in container.

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- 4.7 Batteries Mercury (Universal Waste)
  - CONTACT NWST's for direction on where to bring spent Mercury batteries for proper disposition.
  - NWST's will COLLECT Mercury batteries in an approved container.
  - NWST's will LABEL collection container with a Universal Waste label affixed to the outside of the container and a start date written on the outside of the container. Start date is the date the first battery is placed in the container.
- 4.8 Batteries Nickel Cadmium Dry Cell (Universal Waste)
  - CONTACT NWST's for direction on where to bring spent Nickel Cadmium Dry Cell batteries for proper disposition.
  - NWST's will COLLECT Nickel Cadmium batteries in an approved container.
  - NWST's will LABEL collection container with a Universal Waste label affixed to the outside of the container and a start date written on the outside of the container. Start date is the date the first battery is placed in the container.
- 4.9 Batteries Nickel Cadmium Wet Cell (Universal Waste)
  - CONTACT NWST's for direction on where to bring spent Nickel Cadmium Wet Cell batteries for proper disposition.
  - NWST's will COLLECT Nickel Cadmium batteries in an approved container.
  - NWST's will LABEL collection container with a Universal Waste label affixed to the outside of the container and a start date written on the outside of the container. Start date is the date the first battery is placed in the container.

#### 4.10 Blast Media

- Individuals must DISCUSS with Hazardous Waste Coordinator the generation of this waste prior to job commencement.
- HWC will DETERMINE method of collection based on the scope.
- HWC will DETERMINE if Blast Media must be sampled and analyzed to determine if hazardous waste.
- NWST's will SAMPLE material for analysis.
- NWST's will ENSURE collection container is labeled prior to generation of waste.

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#### CAUTION

If a fluorescent bulb is broken: DO NOT ATTEMPT TO CLEAN UP. Immediately contact the Hazardous Waste Coordinator or designee for resolution.

- Fluorescent bulbs are recycled to an approved vendor.
- Individuals should DELIVER all spent fluorescent bulbs to the respective tool rooms for collection.
- Tool room attendant will COLLECT spent bulbs in an empty bulb box.
- NWST's will LABEL boxes with a Universal Waste label affixed to the outside of the box and start date written on the outside of the box. Start date is the date the first spent bulb is placed inside.
- NWST's will MONITOR collection boxes and REMOVE boxes when full.

4.12 Bulbs – High Intensity Device (Universal Waste)

#### CAUTION

If a HID bulb is broken: DO NOT ATTEMPT TO CLEAN UP. Immediately contact the Hazardous Waste Coordinator or designee for resolution.

- HID bulbs are recycled to an approved vendor.
- Individuals should BRING all spent HID bulbs to respective tool room for collection.
- Tool room attendant will COLLECT spent HID bulbs in a lined 55-gallon drum.
- NWST's will LABEL collection drum with a label affixed to the outside of the drum and start date written on the outside of the drum. Start date is the date the first spent bulb is placed inside the drum.
- NWST's will monitor collection container and disposition when full.
- 4.13 Chemicals Expired, New

#### NOTE

Applicable to new chemicals, in the warehouse inventory, that have expired.

- Warehouse personnel will REMOVE chemicals from inventory and store in designated area.
- These chemicals will be marketed to other Progress Energy plants, sold to contractors or to employees.

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### 4.14 Chemicals – Expired, Used (Hazardous Waste)

#### NOTE

All expired, used chemicals must be treated as hazardous waste until analysis indicates chemicals are non-hazardous.

- Individuals should RETURN all chemicals to the respective tool rooms.
- NWST's will PICK-UP expired, used chemicals from the tool rooms during the performance of SP-909.

#### 4.15 Drums – Empty (Used)

#### CAUTION

Empty used drums must not be given or sold to employees or other individuals.

#### NOTE

Empty is defined as "empty as can be achieved using the practices commonly employed to remove material from that type of container, e.g., pouring or pumping".

- Individuals should ENSURE that all bungs and ring tops are in place and vents are plugged.
- Individuals must ENSRE drum is empty prior to contacting NWST's.
- Individuals should ENSURE there is no more than one (1) inch of residue in the drum.
- LEAVE all product labeling on drums intact.
- NWST's will PROVIDE direction as to where to bring empty used drums.

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#### NOTE

Filters generated from lube oil, motor oil and fuel oil systems.

- Individuals should ENSURE all oil is drained from filter.
- Individuals should COLLECT spent filters in a suitable container.
- NWST's will PROVIDE directions as to where to bring spent filters for disposition.
- NWST's will COLLECT spent filters in a drum.
- NWST's will ENSURE collection drum has correct marking on outside prior to placing filter inside.
- NWST's will PLACE filters into drum and secure lid with ring and bolt.
- 4.17 Mercury Containing Devices (Universal Waste)

#### CAUTION

Should mercury spill occur: DO NOT ATTEMPT TO CLEAN UP. Immediately contact Hazardous Waste Coordinator or designee for resolution.

#### NOTE

Mercury containing devices are recycled to an approved vendor for final disposition.

- NWST's will PROVIDE proper collection container.
- Individuals should CONTACT NWST's for direction as to where to bring spent Mercury Containing Devices for disposition.
- Individuals should COLLECT Mercury Containing Devices in an approved container.
- NWST's will ENSURE collection container has a Universal Waste label affixed to the outside of the container and a start date written on the outside of the container. Start date is the date the first mercury containing device is placed in the container.

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#### 4.18 Oil – Contaminated with Solvents (Hazardous Waste)

#### NOTE

#### DO NOT COMBINE DIFFERENT WASTE MATERIALS.

- Individuals should ENSURE collection containers are marked with date of generation, system material was removed from, and name of shop supervisor.
- CONTACT NWST's for direction on where to bring waste oil for proper disposition.
- NWST's will COLLECT oil contaminated with solvents in a 55-gallon drum.
- NWST's will ENSURE collection drum has a Hazardous Waste label affixed to the outside of the container.

#### Oil - Used (Non-hazardous Waste)

- Individuals should ENSURE collection containers are marked with date of generation, system used oil removed from, and name of shop supervisor.
- CONTACT NWST's for direction as to where to bring used oil for proper disposition.
- NWST's will PROVIDE proper label and container for the collection of large amounts of used oil.
- NWST's will ENSURE collection drums are marked Used Oil on the outside of the container.

#### Paint Waste (Hazardous Waste)

#### NOTE

All paint waste must be treated as hazardous waste until analysis indicates paint waste is non-hazardous.

- Individuals should RETURN all partially full paint cans to the respective tool • rooms for re-issue.
- Individuals should ENSURE paint cans are empty and dry prior to disposal. Empty is defined as only a residue inside the can.
- CONTACT NWST's or HWC for location of approved paint drying areas.
- Individuals should BRING all waste paint materials generated inside the RCA to the Hot Shop for release by Health Physics personnel.
- Individuals should ENSURE all materials are dry prior to being brought to the Hot Shop.
- Individuals should BRING waste materials generated outside the RCA to Satellite Accumulation Area, building #1 for disposition by NWST's.
- Individuals should ENSURE all materials are dry prior to being brought to building #1.

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4.21 PCB

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- Florida Power Operations Manual, Section II-67, "Polychlorinated Biphenyl (PCB)," requires the identification of all remaining PCB Containing Electrical Components. CR3 has a few remaining components identified by stickers as containing PCB's. Oil, Contaminated Soil, and Cleanup Debris resulting from a leak or maintenance work involving these components must be segregated from all other oils and disposed of in accordance with the above referenced manual.
- Individuals must CONTACT Hazardous Waste Coordinator prior to generation of any PCP waste.
- 4.22 Photo Chemical Waste
  - NWST's will CHECK this waste container during the performance of SP-909.
  - NWST's will REMOVE full container for proper disposition.
- 4.23 Rags Contaminated with Hazardous Waste

#### NOTE

All rags suspected of containing a hazardous waste must be identified and collected.

- CONTACT NWST's for direction on where to bring waste rags for proper disposition.
- NWST's will INSPECT and properly disposition all rags contaminated with hazardous waste.
- 4.24 Rags Oil Soaked Only (Non-hazardous Waste)
  - All oil soaked rags are collected in used oily rag cans located throughout the plant..
  - Oil soaked rags are collected in a clear plastic bag and brought to Building #1..
  - NWST's will INPSECT and properly disposition oil soaked rags..
- 4.25 Rags Not Soaked with chemicals or oil
  - Individuals can DISPOSE of these type rags in facility dumpster.
- 4.26 Satellite Accumulation Container Set-Up
  - Individuals must DISCUSS the type of waste that will be generated with the Hazardous Waste Coordinator.
  - Individuals should REVIEW Enclosure 1, Satellite Accumulation Log, and Enclosure 2, Regulated Chemical Guide.
  - Individuals must REQUEST a satellite accumulation container set-up from the Hazardous Waste Coordinator.

#### Satellite Accumulation Container Use

#### CAUTION

Adding or mixing incompatible waste materials may generate rapid high heat temperatures, temporary uncontrolled boiling or splattering, or vapor or gas release, which may result in serious bodily harm.

Items listed on Enclosure 2 must not be mixed together in the satellite accumulation container. Failure to comply may cause serious bodily injury or create a mixed waste situation.

#### NOTE

This section only applies to temporary Satellite Accumulation Area(s) established with permission from the Hazardous Waste Coordinator. These instructions do not apply to Satellite Accumulation Areas designated in buildings 1, 2 and 3.

- Individuals should REMOVE the lid and add waste to the Satellite Accumulation Container.
- Individuals must NOTIFY the Hazardous Waste Coordinator if waste causes a reaction when added to the Satellite Accumulation Container.
- Individuals must RECORD the waste addition to the Satellite Accumulation Container on Enclosure 1, "Satellite Accumulation Log" located in the satellite accumulation cabinet.
- Individuals must REPLACE the lid and lock ring on the container after the waste has been added.
- Individuals must CLOSE the satellite accumulation cabinet.
- Individuals must NOTIFY the Hazardous Waste Coordinator when the Satellite Accumulation Container is approximately 90 % full.

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#### Solvent Waste (Hazardous Waste)

#### NOTE

The following types of materials at CR-3 would be classified as Solvent waste: Mineral spirits, Lacquer thinner, Acetone, Freon, and Methyl ethyl ketone.

- Individuals must NOTIFY the Hazardous Waste Coordinator prior to the generation of hazardous waste.
- NWST's will PROVIDE directions on where to deliver hazardous waste that has been generated.
- All hazardous waste packaging will be the PERFORMED by NWST's.

#### Welding Rods

- Individuals should RETURN all waste materials to tool rooms for disposition.
- Individuals should PLACE waste material into designated collection drum.
- NWST will ENSURE outside of drum is marked "Scrap Welding Rods".
- NWST's will PROVIDE directions for proper disposition when collection drum is full.
- Individuals must PLACE all waste welding rod materials from collection drum into the scrap steel collection bin for final disposition.

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#### **ENCLOSURE 1**

# HAZARDOUS WASTE ACCUMULATION DATA SHEET

FACILITY: CONTACT:	CONTAINER PHONE #:	R ID#:			
WASTE TYPE:	WEIGHT:			4	
RESPONSIBLE SUPERVISOR:		· .	2		
HAZARDOUS WASTE COORDINATOR APPROVAL:					
-					

DATE	PRINT NAME OF PERSON ADDING	PRODUCT NAME	MSDS #	QUANTITY
,			·.	
	,			
····				
		·		
<u>.</u>				
	<b>4</b>			
		·		

ACCUMULATION START DATE (Date when container is full):

Date container transferred to Hazardous Waste Storage building:

#### REGULATED CHEMICALS GUIDE

# **NOTE** It is a violation of Federal and State law to dispose of any of the listed chemicals or items using methods other than those methods approved by the United States Environmental Protection Agency and the State of Florida.

Acids

Asbestos and Asbestos containing items All Lab Chemicals Any spill of Chemicals other than Water Bases (caustics) Batteries - (all types) **Battery Acids** Cadmium **Chemical Coatings** Chemicals, Chemicals and Oils from the Radiation Controlled Area EHC Fluids **Epoxies** Flammable or ignitable Waste Freon and Air Condition Fluids **Fuel Oils Gasket Removers** Grit Blasting Residue Hydrazine Waste Lacquers Lead **Magnaflux Cleaners** Mercury or mercury containing items Nalco Fluids Oil or Oil soaked materials Out of date or non-usable Chemicals Paints Pesticides, Herbicides or Rodenticide Solvents Spot Check or Spot Check items **Snubber Oils** Transformer Oils Used Oils Waste Bathroom Cleaners Waste Paints and Paint related Solvents Waste from systems under chemical control

Summary of Changes

Table of Contents	Added waste handling instructions for different	
Table of Contents	Enhanced responsibility section	
Pg 3 Section 1	Enhanced responsionity section	
	of waste minimization	
Section 3.1	Added the following definitions to this section:	
	1 Acute hazardous Waste	
	2 CER	
	3 CR-3 Hazardous Waste Satellite	
	Accumulation Buildings	
	4. DOT	
	5. EPA	
	6. EPA Identification number	
	7. FDEP	
	8. Generator	
	9. Hazardous Waste Storage Area	
	10. HWC	
	11. Large Quantity Generator	
	12. LDR	
	13. MSDS	
	14. NWST	
	15. Start Date	
	16. Surplus Chemicals	
	17. Transporter	
	18. TSD	
	19. Universal Waste	
Section 3.2.3	Deleted Store Supervisor and added Materials	
	And Contract Services group	
Section 4	Added waste handling instructions for	
	materials that are generated and handled at	
	CR-3	
Enclosure 1	Renamed enclosure 1 to Hazardous Waste	
	Accumulation Data Sheet and revised data	
	sheet to add HWC approval signoff,	
	accumulation start date and date transferred to	
	Hazardous Waste Storage Area	
	· · · · · · · · · · · · · · · · · · ·	



# Progress Energy

R Reference Use

PROGRESS ENERGY

**CRYSTAL RIVER UNIT 3** 

PLANT OPERATING MANUAL

# SP-909

# **INSPECTION OF CR3**

# **HAZARDOUS & MIXED WASTE**

# SATELLITE ACCUMULATION AREAS

### AND CONTAINERS

**Revision 18** 



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#### 1.0 **PURPOSE**

The purpose of this procedure is to ensure compliance with USEPA Code of Federal Regulations Title 40, Protection of Environment, Parts 262-265 by providing instructions to the Nuclear Waste System Technician for inspection of:

The CR3 Hazardous/Mixed Waste Satellite Accumulation Area / Buildings(s)

- Hazardous / Mixed Waste Satellite Accumulation Containers
- Hazardous Waste Storage Building
- Spill Response Kits
- Asbestos Supply Stations
- Paint Drying Areas
- Expired chemicals

#### 2.0 **REFERENCES**

- 2.1 **Developmental References**
- 2.1.1 EVC-SUBS-00016, Hazardous Waste Management
- 2.1.2 USEPA Code of Federal Regulations Title 40, "Protection of Environment", Part 262
- 2.1.3 USEPA Code of Federal Regulations Title 40, "Protection of Environment", Part 265
- 2.1.4 USEPA Code of Federal Regulations Title 40, "Protection of Environment", Part 261.33(e).
- 2.1.5 Corporate Environmental Assurance Program / Environmental Compliance Manual
- 2.1.6 Surveillance References

Applicable	Surv. Perform	Requirements	Surv.	Freq.
ReferencesDuring	g Modes	During Modes	Freq.	Notes
CP-443	1 thru 6	At all times	W	None
40 CFR 265.174	1 thru 6	At all times	W	None

SURVEILANCE FREQUENCY DESIGNATION:

W – At least once per 7 days

3.0

3.1

#### PERSONNEL INDOCTRINATION

#### Set points

None

#### 3.2 **Description**

3.2.1 Areas used to accumulate hazardous / mixed waste must be inspected on a weekly basis (40 CFR 265.174) by Nuclear Waste Systems technicians. Inspections will include, but not be limited to cleanliness of area, leak inspections, volume accumulated, type of materials and emergency response supplies.

#### 3.3 **Definitions**

- 3.3.1 Acutely Hazardous Waste as defined and listed in USEPA Title 40 CFR 261.33(e).
- 3.3.2 CAT. ID Catalog Identification
- 3.3.3 Closed container a container with the container lid and lock-ring installed on the container with the lock-ring securely attached.
- 3.3.4 Corrective Actions For the purpose of this procedure, corrective action is defined two (2) ways:
  - Immediate Corrective Actions Action taken while performing this procedure to satisfy procedural requirements. Document the condition and corrective action taken in the comments section of the applicable enclosures for the section being performed. This type of corrective action does not constitute an un-sat procedural condition. The corrective action will be reviewed by the Hazardous Waste Coordinator.
  - 72 Hour Corrective Actions Action not taken immediately while performing this
    procedure to satisfy procedural requirements. Document this condition as a
    procedurally un-sat condition in the comments section of the applicable enclosures
    for the section being performed. The Hazardous Waste Coordinator is responsible
    for and must ensure that corrective action will be taken within 72 hours after this
    type of condition is documented.
- 3.3.5 CR3 Site Hazardous Waste Satellite Accumulation Buildings Buildings approved to accumulate waste(s) limited to a total of 55 gallons of Hazardous Waste, 55 gallons of Mixed Waste, or 1 quart of acutely hazardous or mixed waste per each building and unlimited quantities of non-hazardous waste types for disposition. Mixed wastes are subject to radioactive material regulations for handling, storage, and disposal.
- 3.3.6 Hazardous / Mixed Waste Satellite Accumulation Container a collection container in an area approved by the Hazardous Waste Coordinator for waste produced at or near a job site, limited to a total of 55 gallons of Hazardous Waste, 55 gallons of Mixed Waste or 1 quart of acutely hazardous or mixed waste. Mixed wastes are subject to radioactive material regulations for handling, storage, and disposal.

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3.3.7 Hazardous Waste - A solid waste or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when not properly treated, stored, transported, disposed of or otherwise managed.

3.3.8 Hazardous Waste Storage Building - The Flammable Chemical Warehouse or Storeroom is a designated location for storing hazardous waste and other waste types from CR3 prior to shipment off-site. The warehouse is located east of the North Coal Plant, CR-4&5. Hazardous waste containers must not be stored in this area longer than Site Generator Status criteria allows prior to shipment to a designated disposal facility. Mixed wastes must not be stored in the Flammable / Chemical Storeroom without authorization from Radiation Control and the Hazardous Waste Coordinator.

3.3.9 Incompatible Waste – Waste in a chemically stable form that contain chemical constituent characteristics at concentrations if mixed or contacts other types of waste(s) will cause a reaction from mild to violent. An example would include but not limited to acids and bases.

3.3.10 Job-Site Hazardous / Mixed Waste Satellite Accumulation Area(s) - Waste produced at or near job site locations. Each Job-site Hazardous / Mixed Waste Satellite Accumulation Area is limited to total of 55 gallons of Hazardous Waste, 55 gallons of Mixed Waste, or 1 quart of Acutely Hazardous or Mixed Waste. Mixed wastes are subject to radioactive material regulations for handling, storage, and disposal.

3.3.11 Mixed Waste - According to the United States Environmental Protection Agency, mixed waste is a waste type defined as waste that contains both hazardous waste (as defined by RCRA and its amendments) and radioactive waste (as defined by AEA and its amendments). Mixed wastes are subject to radioactive material regulations for handling, storage, and disposal.

3.3.12 Salvage Drum - a large metal or plastic drum used to contain a leaking drum of hazardous and non-hazardous material.

3.3.13 Satisfactory (Sat) – Satisfactory limits, conditions, or results that are found to be within procedural requirements. Documented actions taken while performing this procedure to satisfy procedural requirements are considered corrective actions and considered satisfactory. These documented actions will be reviewed by the Hazardous Waste Coordinator.

3.3.14 Small Quantity Generator – A Small Quantity Generator (SQG) generates less than 1,000 Kg (2200 lbs) of hazardous waste per month or no more than 1.0 Kg (2.2 lbs) of acutely hazardous waste per month. Currently, the Site Complex (Units 1, 2, 3, 4, and 5) are classified as a Small Quantity Generator (SQG). This classification is subject to change.

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Solid Waste – any garbage; refuse; sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material including solid, liquid, semi-solid or contained gaseous material resulting from industry, commercial, mining and agricultural operations, and from community activities; but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

3.3.16 Spill Kit - Readily available kits of equipment and supplies used to mitigate, contain, and clean up oil, fuel, and chemical spills that may include hazardous and non-hazardous waste.

3.3.17 Surplus Chemicals - Chemicals having an expired shelf life or deemed unwanted. These chemicals may be marketed to other plants, contractors, or employees subject to current Company disposal policies.

3.3.18 Universal Waste - The Universal Waste Rule is a modification of the Hazardous Waste Rules, enacted under the Resource Conservation and Recovery Act (RCRA), which is designed to reduce regulatory management requirements to foster the environmentally sound recycling or disposal of certain specified categories of commonly generated hazardous wastes. The effect of the Universal Waste Rule is to reduce the regulatory requirements applying to the handling of these specific wastes, which otherwise would be subject to full hazardous waste regulation under RCRA. This in turn serves as an incentive to channel these wastes into collection and recycling programs, diverting them from less environmentally desirable modes of disposal such as landfills or incineration.

3.3.19 Un-satisfactory (Un-Sat) – Unsatisfactory limits, conditions, or results that do not meet procedural criteria or requirements. Any condition or inaction not taken while performing this procedure to satisfy procedural requirements. The Hazardous Waste Coordinator must ensure that unsatisfactory conditions or inactions are corrected within 72 hours of a documented condition.

3.3.20 USEPA - United States Environmental Protection Agency.

#### 3.4 **Responsibilities**

3.3.15

- 3.4.1 Nuclear Waste Systems Technicians are responsible for:
  - Performing this procedure.
  - Documenting corrective or unsatisfactory conditions.
  - Performing follow- up corrective actions as directed by the Hazardous Waste Coordinator.
- 3.4.2 The Hazardous Waste Coordinator (HWC) is responsible for:
  - Reviewing the completed procedure.
  - Correcting unsatisfactory limits, conditions, or results that fail to meet procedural criteria or requirements within specified time limits.
  - Transmitting the completed procedure to Document Services for retention.

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#### 3.5 Limits and Precautions

- 3.5.1 Polychlorinated biphenyls (PCBs) are a group of chemicals found in some substances, such as but not limited to; the oil in older transformers and capacitors. There are numerous PCB fluid trade products that contain concentrations of PCB. This chemical has been classified as a probable human carcinogen by the Environmental Protection Agency (EPA). Noncompliance, including inappropriate storage, failure to label, and improper disposal, is punishable by severe civil and criminal penalties.
- 3.5.2 PCB Classifications Equipment and material containing PCBs have special use, handling, servicing, and disposal requirements based on each item's PCB concentration. The categories include PCB concentrations of < 50 ppm, ≥ 50 but < 500 ppm, and ≥ 500 ppm. PCBs must be disposed of based on the actual concentration. Gas chromatography is currently the only chemical analysis method recognized by EPA for determining actual PCB concentration for disposal and spill cleanup verification.</p>
- 3.5.3 Electrical equipment including capacitors manufactured after July 2, 1979 and capacitors marked "NO PCBs" at the time of manufacture are considered to have a concentration of < 50 ppm and are considered non-PCB. All equipment that has the potential to contain PCB fluids, but that are known to contain less than 50 ppm PCBs, should be marked "Non-PCB." Although these capacitors are considered non-PCB, they must be collected and disposed of appropriately.
- 3.5.4 Components or equipment that is not clearly identified with PCB concentration must be evaluated by the Hazardous Waste Coordinator for disposition.
- 3.5.5 PCB contaminated items shall be dated when they are removed from service. PCB "contaminated waste" shall be disposed of within one year from removal from service.
- 3.5.6 PCB waste must be shipped to Wildwood or to an approved disposal facility for proper disposal.
- 3.5.7 Leaking containers Immediate action must be taken to transfer the contents of a leaking container to a container in good condition or place the leaking container into a waste compatible salvage drum.
- 3.5.8 55 gallons of Hazardous Waste or 1 quart of Acutely Hazardous Waste must be transferred to a designated Site (Crystal River) Hazardous Waste Storage Area within 72 hours of collection or shipped off-site (CR3) at the discretion of the Hazardous Waste Coordinator.
- 3.5.9 Discovery of Emergency Situation This procedure is to be terminated immediately and EM-205 initiated if an emergency situation is discovered.
- 3.5.10 Time Limit for Surveillance Procedure Acceptance All unsatisfactory conditions must be addressed, corrected, and accepted within 72 hours of discovery of an un-sat condition.
- 3.5.11 All Hazardous Waste collection containers must be marked with a "Hazardous Waste" Department of Transportation (D.O.T) approved label.

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- 3.5.12 "For work located in Radiation Controlled Areas, due consideration must be given to the ALARA Program. This may result in a determination that special preparations and/or precautions are necessary."
- 3.5.13 The CR3 Hazardous Waste Coordinator is the only individual authorized to establish a Hazardous or Mixed Waste Satellite Accumulation Area at CR3.
- 3.5.14 Ignitable or reactive Waste must be located inside the owner's property at least 50 feet inside the boundary.
- 3.5.15 Fluorescent ballasts labeled "No PCBs" or those manufactured and dated after July 1, 1998 may be recycled or disposed of as solid waste.
- 3.5.16 Fluorescent non-leaking and leaking ballasts that must be considered PCB contaminated and disposed of includes:
  - Ballasts manufactured prior to July 1, 1978.
  - Unlabeled or undated ballasts that cannot be positively identified with PCB content.
- 3.5.17 Fluorescent non-leaking PCB ballasts may be collected until the container is full. The date the container becomes full is the "removal from service" date. These ballasts must be sent to Wildwood or an approved disposal facility within 30 days of the removal from service date.
- 3.5.18 Fluorescent leaking PCB ballasts must be collected and disposed of via Wildwood or an approved disposal facility within 30 days of the removal from service date. For leaking ballasts, the removal from service date is when the first ballast is placed in the container.
- 3.5.19 Fluorescent PCB leaking and PCB non-leaking ballasts must be placed in a covered DOT approved drum or plastic bucket labeled "PCB Leaking Ballasts" or "PCB Non-leaking Ballasts". Collection containers must be labeled with the removal from service date and an appropriate PCB Label.
- 3.5.20 Non-PCB capacitors must be collected and disposed of via Wildwood or an approved disposal facility within 30 days of the removal from service date. For non-PCB capacitors, the removal from service date is when the first capacitor is placed in the container. The non-PCB capacitor collection containers must be labeled "Non-PCB Capacitors" with the removal from service date.
- 3.5.21 Equipment such as, but not limited to, transformers, circuit breakers, re-closures, rectifiers, electrical equipment such as capacitors or other equipment suspected of containing PCB must be evaluated by the Hazardous Waste Coordinator for identification, establishing PCB concentration, material handling precautions, responding to equipment spills and applicable disposal requirements.
- 3.5.22 The outside of all collection containers must exhibit markings or labels indicating the contents.

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- 3.5.23 Batteries such as Nickel-Cadmium, (Ni-Cad), Lithium, Mercury, lead-acid, leadcalcium, Gel Cell batteries must be shipped to an approved facility (Progress Energy or vendor) within twelve (12) months from the date they are removed from service. The "removed from service date" is the date the first battery is placed into the disposal container, not when the container is full.
- 3.5.24 Alkaline batteries are not universal wastes and may be disposed of as solid waste.
- 3.5.25 Lamps such as Fluorescent, High Intensity Discharge (HID), Neon, Mercury Vapor lamps must be shipped to an approved disposal facility (Progress Energy or vendor) within twelve (12) months from the date they are removed from service.
- 3.5.26 Incandescent lamps are not universal wastes.
- 3.5.27 Mercury Containing Equipment such as Thermostats Pressure Relief Gauges, Flow Meters Mercury Light Switches, Switches Mercury Regulators, Manometers Gas Safety Relays, and Barometers Water Treatment Gauges must be shipped to an approved disposal facility (Progress Energy or vendor) within twelve (12) months from the date they are removed from service.
- 3.5.28 Equipment that has had mercury and / or mercury containing components removed may be managed as nonhazardous waste with the CR3 Hazardous Waste Coordinator approval and as long as it doesn't exhibit a hazardous waste characteristic.
- 3.5.29 The weight of entire mercury containing devices must be considered when determining handler status if mercury has not been removed. The maximum weight of mercury containing devices for a Small Quantity Generator (SQG) is <11,023 pounds at any time.
- 3.5.30 Universal Wastes do not count toward a facility's monthly hazardous waste generation.
- 3.5.31 Paint drying areas are designated for items such as paint buckets containing residual amounts of paint to be left until dried. Paint drying areas are not considered and must not be used as storage areas.
- 3.5.32 CAT ID numbers for the Spill Response Kits and the Asbestos Supply Stations are provided for the convenience for reordering supplies and are subject to change without notice.

#### 3.6 Acceptance Criteria

- 3.6.1 Instructional sections in this procedure may be completed in any order.
- 3.6.2 This surveillance procedure may be accepted as complete if requirements, conditions, and results are procedurally satisfied.
- 3.6.3 This surveillance is to be performed weekly. (40 CFR 265.174)
- 3.6.4 Broken seals on Spill Response Kits indicate an un-satisfactory condition on the Spill Response Kit(s).
- 3.6.5 Residual amount of paint is defined as a fine coat of paint left over in paint containers or paint cans. Standing amounts of liquid is not considered residual.

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- 3.6.6 Supply quantities for the Spill Response Kits and the Asbestos Supply Stations are the minimum required amount. Quantities of supplies greater than the amount required in these areas are considered satisfactory.
- 3.6.7 Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed. These steps must be reviewed by the Hazardous Waste Coordinator.
- 3.6.8 If no place keeping aids are provided, such as initial blocks, check blocks, check boxes or check marks, the circle-and-slash method of place keeping must be used to clearly demonstrate what steps were completed.
- 3.7 **Prerequisites**
- 3.7.1 None

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#### 4.0 **INSTRUCTIONS**

4.1

#### Satellite Accumulation Areas, Buildings, and Container Inspections

#### NOTE

The CR-3 Hazardous Waste Satellite Accumulation Area / Building(s) are approved to accumulate waste(s) limited to a total of 55 gallons of Hazardous or Mixed Waste, or one (1) quart of acutely hazardous or mixed waste per each building and unlimited quantities of non-hazardous and universal waste types for disposal.

#### NOTE

Job-Site Hazardous Waste Satellite Accumulation Areas is for waste produced at or near job site locations. Each Job-site Hazardous Waste Satellite Accumulation Area is limited to total of 55 gallons of Hazardous or Mixed Waste, or 1 quart of Acutely Hazardous or Mixed Waste.

#### NOTE

Corrective actions may be taken to correct a condition while performing this procedure to satisfy procedural requirements. This condition must be documented on applicable enclosures and is not considered an unsatisfactory condition. However, if corrective action cannot be taken while performing this procedure, the condition must be documented as an unsatisfactory condition and must be corrected within 72 hours.

#### NOTE

Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed. Initials must be used for place keeping.

- 4.1.2 \_\_\_\_ CONTACT the CR3 Hazardous Waste Coordinator for locations of Hazardous and Mixed Waste Satellite Accumulation Buildings or Areas.
- 4.1.3 \_\_\_\_ RECORD the following information on Enclosure 1, Hazardous and Mixed Waste Accumulation Report:
  - 1. \_\_\_\_ Locations of the Hazardous Waste Satellite Accumulation Buildings and Areas.
  - 2. \_\_\_\_ Locations of the Mixed Waste Satellite Accumulation Buildings and Areas.
  - 3. \_\_\_\_ Waste types, volumes, and accumulation dates for Hazardous and Mixed Wastes.
  - 4. \_\_\_\_ GO TO Step 4.1.4.

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4.1.4 INSPECT the Hazardous and Mixed Waste Satellite and Area(s) for:			INSPECT the Hazardous and Mixed Waste Satellite Accu and Area(s) for:	umulation	1 Buildings
			Incompatible ignitable material, waste, or chemicals	[]Sat	[] Un-sat
			Incompatible reactive materials, waste, or chemicals	[]Sat	[] Un-sat
			Incompatible materials, waste, or chemicals	[]Sat	[] Un-sat
			Loose trash or debris	[] Sat	[] Un-sat
			Indication or evidence of spills	[]Sat	[] Un-sat
	4.1.5	·	INSPECT the Hazardous and Mixed Waste Satellite Accurand Area(s) to ensure that aisle space between drums are the unobstructed movement of:	umulatior e mainta	ו Buildings iined to allow
		·	Personnel	[] Sat	[] Un-sat
			Fire protection equipment	[] Sat	[] Un-sat
			Spill control equipment	[] Sat	[] Un-sat
			Decontamination equipment	[] Sat	[] Un-sat
	4.1.6		INSPECT waste containers in the Hazardous and Mixed Accumulation Buildings and Area(s) (40 CFR 265.174) to container is:	Waste S ensure	atellite that each
			Closed	[] Sat	[] Un-sat
	•		Free of leaks	[] Sat	[] Un-sat
			Free of deterioration	[] Sat	[] Un-sat
			Labeled properly and labels are easily visible	[] Sat	[] Un-sat
			Marked properly and not faded	[] Sat	[] Un-sat
			Contents identified	[] Sat	[] Un-sat
	4.1.7	4.1.7	VERIFY that the Hazardous and Mixed Waste Satellite A and Area (s) do not contain more than:	ccumula	tion Buildings
			$\_$ $\leq$ 55 gallons of Hazardous / Mixed Waste	[] Sat	[] Un-sat
			$\_$ $\leq$ 1 quart of acutely Hazardous / Mixed Waste	[] Sat	[] Un-sat

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4.1.8 \_\_\_\_

VERIFY the operability of local Communications Equipment at the Hazardous or Mixed Waste Accumulation Area(s) (telephones, radios, etc.). (40 CFR 265.32(a),(b))

[] Sat

[] Un-sat

4.1.9

VERIFY the Fire Extinguisher or Fire Service System(s) at the Hazardous Waste Accumulation Area(s) is charged and within the inspection expiration date (40 CFR 265.32(c)):

[] Sat

[] Un-sat

### CAUTION

Currently, each of the CR3 Hazardous Waste Satellite Accumulation Buildings being used has a sump capacity of 660 gallons of liquid. The sump is designed to contain the equivalent of 12 full 55-Gallon Drums of liquid if all the drums would leak the contents. An inventory greater than 12 full 55-gallon Drums of liquid exceeds the rated holding capacity of the sump and would not be contained inside the building should a catastrophic leak occur from the drums.

- 4.1.10 \_\_\_\_ COUNT the number of full 55-Gallon Drums of liquid stored in the CR3 Hazardous and Mixed Waste Satellite Accumulation Building(s).
  - [] Sat (< than 12)
  - [] Un-sat (> than 12)
- 4.1.11 <u>IF</u> more than 12 full 55-Gallon Drums of liquid are stored in the CR3 Hazardous and Mixed Waste Satellite Accumulation Building(s), <u>THEN</u> RECORD as unsatisfactory condition on Enclosure 1, Hazardous and Mixed Waste Accumulation Report.
- 4.1.12 <u>IF</u> the Hazardous and Mixed Waste Satellite Accumulation Buildings and Area contain 55 gallons or more of hazardous or mixed waste, or one quart or more of acutely hazardous or mixed waste, THEN RECORD as unsatisfactory condition and the total volume of the waste

on Enclosure 1, Hazardous and Mixed Waste Accumulation Report.

- 4.1.13 \_\_\_\_ ENSURE Ignitable or Reactive Wastes are located inside the owner controlled property boundary at least 50 feet.
  - [] Sat
  - [] Un-sat

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4.1.14 INSPECT collection containers for leaks and container deterioration.

[] Sat

[] Un-sat

- 4.1.15 \_\_\_\_ VERIFY that hazardous waste containers are labeled with the words "HAZARDOUS WASTE". (40 CFR 262.34(c)(I)(ii)).
  - [] Sat
    - [] Un-sat
- 4.1.16 \_\_\_\_ VERIFY that mixed waste containers are labeled with the words "HAZARDOUS WASTE" and labeled or tagged as radioactive material.
  - [] Sat
    - [] Un-sat
- 4.1.17 <u>IF</u> Incompatible Waste are stored together, <u>THEN</u> SEGREGATE the wastes with a protected dike, wall, or other device. 40 CFR 265.177(c)
  - [] Sat.
  - [] Un-sat

4.1.18

<u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists,

<u>THEN</u> RECORD them on Enclosure 1, Hazardous and Mixed Waste Accumulation Report.

### Universal Waste Inspections

## NOTE

Universal Wastes must be collected and disposed of via an approved disposal vendor / facility within 12 months from the removal from service date. For universal waste, the removal from service date is when the first item is placed in the collection container. Universal waste collection containers must be labeled with the appropriate waste label, waste description, and removal from service date.

### NOTE

Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed.

- 4.2.1 PERFORM Nickel-Cadmium Battery Inspection.
  - 1. \_\_\_\_ IF there are no Nickel-Cadmium Batteries to report this surveillance period,
    - <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type Nickel-Cadmium Batteries block.
  - 2. \_\_\_\_ IF there is Nickel-Cadmium Battery collection container to report this surveillance period, THEN ENSURE that the collection container is labeled as follows:
    - a. \_\_\_ Universal Waste Label
    - b. \_\_\_\_ Nickel-Cadmium Batteries with full Universal Waste name
    - c. \_\_\_\_ Start Date
  - 3. \_\_\_\_ RECORD the Accumulation Start Date on Enclosure 2 (Inspection Report) for Nickel-Cadmium Batteries.
  - 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
  - 5. <u>IF</u> collection containers is greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
  - 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Nickel-Cadmium Batteries

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4.2.2

### PERFORM Lithium Battery Inspection.

- 1. <u>IF</u> there are no Lithium Batteries to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Lithium Battery block.
- 2. <u>IF</u> there is Lithium Battery collection container to report this surveillance period,

THEN ENSURE that the collection container is labeled as follows :

- a. \_\_\_\_ Universal Waste Label
- b. \_\_\_\_ Lithium Batteries with full Universal Waste name
- c. \_\_\_\_ Start Date.
- 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Lithium Batteries.
- 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
- 5. <u>IF</u> collection containers is greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Lithium Batteries.
- 4.2.3 PERFORM Mercury Battery Inspection.
  - 1. <u>IF</u> there are no Mercury Batteries to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Mercury Batteries block.
  - 2. <u>IF</u> there is Mercury Battery collection container to report this surveillance period, <u>THEN</u> ENSURE that the collection container is labeled as follows:
    - a. \_\_\_\_ Universal Waste Label
    - b. \_\_\_\_ Mercury Batteries with full Universal Waste name
    - c. \_\_\_\_ Start Date.
  - 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Mercury Batteries.
  - 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
  - 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
  - 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Mercury Batteries.

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- PERFORM Lead–Acid Battery Inspection.
  - 1. \_\_\_\_ IF there are no Lead–Acid Batteries to report this surveillance period,

<u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Lead–Acid Batteries block.

2. <u>IF</u> there is Lead–Acid Battery collection container to report this surveillance period,

THEN ENSURE that the collection container is labeled as follows:

- a. \_\_\_\_ Universal Waste Label
- b. \_\_\_\_ Lead–Acid Batteries with full Universal Waste name
- c. <u>Start Date</u>.
- 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Lead–Acid Batteries.
- 4. \_\_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
- 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Lead– Acid Batteries.

## 4.2.5 PERFORM Lead–Calcium Battery Inspection.

- 1. <u>IF</u> there are no Lead–Calcium Batteries to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Lead–Calcium Batteries block.
- 2. <u>IF</u> there is Lead–Calcium Battery collection container to report this surveillance period,

<u>THEN</u> ENSURE that the collection container is labeled as follows:

- a. \_\_\_\_ Universal Waste Label
- b. \_\_\_\_ Lead–Calcium Batteries with full Universal Waste name
- c. \_\_\_\_ Start Date.
- 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Lead–Calcium Batteries.
- 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.

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4.2.4

- 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Lead-Calcium Batteries.
- PERFORM Gel-Cell Battery Inspection.

4.2.6

- 1. <u>IF</u> there are no Gel–Cell Batteries to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Gel–Cell Batteries block.
- 2. <u>IF</u> there is Gel–Cell Battery collection container to report this surveillance period,
  - THEN ENSURE that the collection container is labeled as follows :
  - a. \_\_\_\_ Universal Waste Label
  - b. \_\_\_\_ Gel–Cell Batteries with full Universal Waste name
  - c. \_\_\_\_ Start Date.
- 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Gel–Cell Batteries.
- 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
- 5. <u>IF</u> collection containers is greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. \_\_\_\_ IF corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Gel– Cell Batteries.
- 4.2.7 DISPOSE of Alkaline batteries as solid waste.
- 4.2.8 \_\_\_\_ PERFORM Fluorescent Lamp Inspection.
  - 1. <u>IF</u> there are no Fluorescent Lamps to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Fluorescent Lamp block.
  - 2. \_\_\_\_ IF there is Fluorescent Lamp collection containers to report this surveillance period,
    - THEN ENSURE the collection containers are labeled as follows:
      - a. \_\_\_ Universal Waste Label
      - b. \_\_\_\_ Fluorescent Lamps with full Universal Waste name
      - c. Start Date

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- 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Fluorescent Lamps.
- 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
- 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Fluorescent Lamps.
- 4.2.9 PERFORM High Intensity Discharge (HID) Lamp Inspection.
  - 1. \_\_\_\_ IF there are no High Intensity Discharge (HID) Lamps to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - High Intensity Discharge (HID) Lamp block.
  - 2. <u>IF</u> there are High Intensity Discharge (HID) Lamp collection containers to report this surveillance period, <u>THEN</u> ENSURE the collection containers are labeled as follows:
    - a. \_\_\_\_ Universal Waste Label
    - b. \_\_\_\_ High Intensity Discharge (HID) Lamps with full Universal Waste name
    - c. \_\_\_\_ Start Date
  - 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for High Intensity Discharge (HID) Lamps.
  - 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
  - 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
  - 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for High Intensity Discharge (HID) Lamps.

- 4.2.10
- PERFORM Neon Lamp Inspection.
  - 1. <u>IF</u> there are no Neon Lamps to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Neon Lamps block.
  - 2. <u>IF</u> there is Neon Lamp collection containers to report this surveillance period,
    - THEN ENSURE the collection containers are labeled as follows:
    - a. \_\_\_\_ Universal Waste Label
    - b. \_\_\_\_ Neon Lamps with full Universal Waste name
    - c. <u>Start Date</u>.
  - 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Neon Lamps.
- 4. \_\_\_\_ VERIFY that the collection container is less than twelve (12) months old.
- 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Neon Lamps.
- 4.2.11
- \_\_\_\_ PERFORM Mercury Vapor Lamp Inspection.
  - 1. \_\_\_\_ IF there are no Mercury Vapor Lamps to report this surveillance period, THEN RECORD on Enclosure 2 (Inspection Report) in the Universal

Waste Type - Mercury Vapor Lamp block.

- 2. <u>IF</u> there are Mercury Vapor Lamp collection containers to report this surveillance period,
  - THEN ENSURE the collection containers are labeled as follows:
  - a. \_\_\_\_ Universal Waste Label
  - b. \_\_\_\_ Mercury Vapor Lamps with full Universal Waste name
  - c. Start Date.
- 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Mercury Vapor Lamps.
- 4. \_\_\_\_ VERIFY that the collection containers are less than twelve (12) months old.

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- 5. \_\_\_\_ <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
- 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Mercury Vapor Lamps.
- 4.2.12 \_\_\_\_ PERFORM Mercury Containing Device Inspection.
  - 1. <u>IF</u> there are no Mercury Containing Devices to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Universal Waste Type - Mercury Containing Device block.
  - 2. <u>IF there are Mercury Containing Device collection containers to</u> report this surveillance period, <u>THEN ENSURE the collection containers are labeled as follows:</u>
    - a. Universal Waste Label
    - b. \_\_\_\_ Mercury Containing Devices with full Universal Waste name
    - c. \_\_\_ Start Date.
  - 3. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Mercury Containing Devices.
  - 4. \_\_\_\_ VERIFY that the collection containers are less than twelve (12) months old.
  - 5. <u>IF</u> collection containers are greater than twelve (12) months old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).
  - 6. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report for Mercury Containing Devices.

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### Ballast Inspection

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### NOTE

Non-Leaking PCB Ballasts must be collected and disposed of via an approved disposal vendor / facility 30 days from the removal from service date. For Non-Leaking PCB Ballasts, the removal from service date is when the collection container is completely full. Non-Leaking PCB Ballast collection containers must be labeled with the waste description and removal from service date.

### NOTE

Ballasts manufactured after July 1, 1998 do not contain PCBs and therefore, can be disposed of as solid waste.

## NOTE

Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed.

### NOTE

Initials must be used for place keeping.

4.3.1

PERFORM Non-Leaking PCB Ballasts Inspection.

1. \_\_\_\_ IF there are no Non-Leaking PCB Ballasts to report this surveillance period,

<u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Ballast Inspection - Non-Leaking PCB Ballasts block.

2. <u>IF</u> there are Non-Leaking PCB Ballasts to report this surveillance period,

<u>THEN</u>SEGREGATE undated, unlabeled, leaking, or non-leaking ballasts for PCB determination and disposition.

- 3. \_\_\_\_ DISPOSE of ballasts labeled "No PCB's" or ballasts identified as manufactured after July 1, 1998 as solid waste.
- 4. \_\_\_\_ PERFORM inspection on the Non-Leaking PCB Ballast collection containers for leaks.
- 5. \_\_\_\_ IF collection containers are leaking, THEN:
  - a. \_\_\_\_ RECORD as un-sat condition on Enclosure 2, Inspection Report – Ballast Inspection.

b. \_\_\_\_ OBTAIN a new collection container to replace leaking container.

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- 6. \_\_\_\_ ENSURE the Non-Leaking PCB Ballasts collection containers are labeled as follows:
  - a. \_\_\_ PCB Label
  - b. \_\_\_\_ Non-Leaking PCB Ballasts with full Universal Waste name
- 7. <u>IF Non-Leaking PCB Ballast collection containers are completely full</u> <u>THEN</u>:
  - a. \_\_\_\_ RECORD the accumulation Start Date on the collection container.
  - b. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Non-Leaking PCB Ballasts.
  - c. \_\_\_\_ PREPARE the container to be shipped to an approved facility (Progress Energy or vendor) for disposal.
- 8. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Non-Leaking PCB Ballast Block).

### NOTE

Leaking PCB Ballasts must be collected and disposed of via an approved disposal vendor / facility 30 days from the removal from service date. Leaking PCB Ballasts, the removal from service date is when the first leaking PCB ballast is placed into the collection container. Leaking PCB Ballast collection containers must be labeled with the waste description and removal from service date.

4.3.2

\_\_\_\_ PERFORM Leaking PCB Ballasts Inspection.

- 1. <u>IF</u> there are no Leaking PCB Ballasts to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Ballast Inspection - Leaking PCB Ballasts block.
- 2. <u>IF</u> there are Leaking PCB Ballasts to report this surveillance period, <u>THEN</u> SEGREGATE undated, unlabeled, leaking, or non-leaking ballasts for PCB determination and disposition.
- 3. \_\_\_\_ DISPOSE of ballasts labeled "No PCB's" or ballasts identified as manufactured after July 1, 1998 as solid waste.
- 4. \_\_\_\_ PERFORM inspection on the Leaking PCB Ballast collection containers for leaks.

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- 5. \_\_\_\_ IF collection containers are leaking, THEN:
  - a. \_\_\_\_ RECORD as un-sat condition on Enclosure 2, Inspection Report – Ballast Inspection block.
  - b. \_\_\_\_ OBTAIN a new collection container to replace leaking container.
- 6. \_\_\_\_ ENSURE the Leaking PCB Ballasts collection containers are labeled as follows:
  - a. \_\_\_\_ PCB Label
  - b. \_\_\_\_ Leaking PCB Ballasts with full Universal Waste name
  - c. \_\_\_\_ Start Date
  - 7. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Leaking PCB Ballasts.
- 8. <u>IF</u> the Leaking PCB Ballast collection containers are  $\geq$  30 days old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report) for Leaking PCB Ballasts.
- 9. \_\_\_\_ PREPARE the container to be shipped to an approved facility (Progress Energy or vendor) for disposal.
- 10. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Leaking PCB Ballast Block).

### **Capacitor Inspection**

### NOTE

Electrical equipment including capacitors manufactured after July 2, 1979 and capacitors marked "NO PCBs" at the time of manufacture are considered to have a concentration of < 50 ppm and are considered to be non-PCB. All equipment that have the potential to contain PCB fluids, but that are known to contain less than 50 ppm PCBs, should be marked "Non-PCB".

### NOTE

Non-Leaking Non-PCB Capacitors must be collected and disposed of via Wildwood or an approved disposal facility within 30 days of the removal from service date. For Non-Leaking Non-PCB Capacitors, the removal from service date is when the first capacitor is placed in the container. The Non-Leaking Non-PCB Capacitor collection containers must be labeled "Non-Leaking Non-PCB Capacitors" with the removal from service date.

#### NOTE

Equipment such as, but not limited to, transformers, circuit breakers, reclosures, rectifiers, electrical equipment such as capacitors or other equipment suspected of containing PCB must be evaluated by the Hazardous Waste Coordinator for identification, establishing PCB concentration, evaluated by the Hazardous Waste Coordinator for identification, establishing PCB concentration, material handling precautions, responding to equipment spills and applicable disposal requirements.

#### NOTE

Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed. However, initials must be used for place keeping for steps that are applicable.

4.4.2

PERFORM Non-Leaking Non-PCB Capacitor Inspection.

1. <u>IF</u> there are no Non-Leaking Non-PCB Capacitors to report this surveillance period,

<u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Capacitor Inspection – Non-Leaking Non-PCB Capacitor block.

2. <u>IF there are Non-Leaking Non-PCB Capacitors to report this</u> surveillance period,

<u>THEN</u> SEGREGATE undated, unlabeled, leaking, or non-PCB Capacitors for determination and disposition.

3. \_\_\_\_ PERFORM inspection on the Non-Leaking Non-PCB Capacitor collection containers for leaks.

- 4. <u>IF Non-Leaking Non-PCB Capacitor collection containers are</u> leaking, THEN:

  - a. \_\_\_\_ RECORD as un-sat condition on Enclosure 2, Inspection Report – Non-Leaking Non-PCB Capacitor block.
  - b. \_\_\_\_ OBTAIN a new collection container to replace leaking container.
- 5. \_\_\_\_ ENSURE the Non-Leaking Non-PCB Capacitor collection containers are labeled as follows:
  - a. \_\_\_\_ Non-Leaking Non-PCB Capacitors with full Universal Waste name
  - b. \_\_\_\_ Start Date
- 6. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Non-Leaking Non-PCB Capacitors.
- 7. \_\_\_\_ IF the Non-Leaking Non-PCB Capacitors collection containers are  $\geq$  30 days old,

THEN RECORD as un-sat condition on Enclosure 2 (Inspection Report) for Non-Leaking Non-PCB Capacitors.

- 8. \_\_\_\_ PREPARE the container to be shipped to an approved facility (Progress Energy or vendor) for disposal.
- 9. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Non-Leaking Non-PCB Capacitor Block).

### NOTE

Leaking PCB Capacitors ( $\geq$  50 ppm) must be collected and disposed of via Wildwood or an approved disposal facility within 30 days of the removal from service date. For Leaking PCB Capacitors, the removal from service date is when the first capacitor is placed in the container. The Leaking PCB Capacitor collection containers must be labeled "Leaking PCB Capacitors" with the removal from service date.

- 4.4.3 PERFORM Leaking PCB Capacitor Inspection.
  - 1. \_\_\_\_ IF there are no Leaking PCB Capacitors to report this surveillance period,

<u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Capacitor Inspection – Leaking PCB Capacitor block.

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2. <u>IF there are Leaking PCB Capacitors to report this surveillance</u> period,

<u>THEN</u> SEGREGATE undated, unlabeled, leaking, or non-PCB Capacitors for determination and disposition.

- 3. \_\_\_\_ PERFORM inspection on the Leaking PCB Capacitor collection containers for leaks.
- 4. <u>IF</u> Leaking PCB Capacitor collection containers are leaking, <u>THEN</u>:
  - a. \_\_\_\_ RECORD as un-sat condition on Enclosure 2, Inspection Report – Leaking PCB Capacitor block.
  - b. \_\_\_\_ OBTAIN a new collection container to replace leaking container.
- 5. \_\_\_\_ ENSURE the Leaking PCB Capacitor collection containers are labeled as follows:
  - a. \_\_\_\_ PBC Labels
  - b. \_\_\_\_ Leaking PCB Capacitors with full Universal Waste name
  - c. \_\_\_\_ Start Date
  - 6. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for Leaking PCB Capacitors.
  - 7. \_\_\_\_ IF the Leaking PCB Capacitor collection containers are  $\geq$  30 days old,

<u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report) for Leaking PCB Capacitors.

- 8. \_\_\_\_ PREPARE the container to be shipped to an approved facility (Progress Energy or vendor) for disposal.
- 9. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Leaking PCB Capacitor Block).

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PCB Capacitors must be collected and disposed of via Wildwood or an approved disposal facility within 30 days of the removal from service date. For PCB Capacitors, the removal from service date is when the first capacitor is placed in the container. The PCB capacitor collection containers must be labeled "PCB Capacitors" with the removal from service date.

4.4.4

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- PERFORM PCB Capacitor Inspection.
- 1. <u>IF</u> there are no PCB Capacitors to report this surveillance period, <u>THEN</u> RECORD on Enclosure 2 (Inspection Report) in the Capacitor Inspection – PCB Capacitors block.
- 2. <u>IF there are PCB Capacitors to report this surveillance period,</u> <u>THEN SEGREGATE undated, unlabeled, leaking, or non-PCB</u> Capacitors for determination and disposition.
- 3. \_\_\_\_ PERFORM inspection on the PCB Capacitor collection containers for leaks.
- 4. \_\_\_\_ IF PCB Capacitor collection containers are leaking, THEN:
  - a. \_\_\_\_ RECORD the condition on Enclosure 2, Inspection Report -PCB Capacitor block.
  - b. \_\_\_\_ OBTAIN a new collection container to replace leaking container.
  - c. \_\_\_\_ RECORD the collection container as leaking PCB Capacitirs.
- 5. \_\_\_\_ ENSURE the PCB Capacitor collection containers are labeled as follows:
  - a. \_\_\_\_ PCB Label
  - b. \_\_\_\_ PCB Capacitors with full Universal Waste name,

OR

\_\_\_\_ IF Leaking,

THEN LABEL as Leaking-PCB Capacitors.

c. \_\_\_\_ Start Date

- 6. \_\_\_\_ RECORD the accumulation Start Date on Enclosure 2 (Inspection Report) for PCB Capacitors.
- 7. <u>IF</u> the PCB Capacitor collection containers are  $\geq$  30 days old, <u>THEN</u> RECORD as un-sat condition on Enclosure 2 (Inspection Report).

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- 8. \_\_\_\_ PREPARE the container to be shipped to an approved facility (Progress Energy or vendor) for disposal.
- 9. <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (PCB Capacitor Inspection Block).

## 4.5 Chemical Collection / Inspection

### NOTE

Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed. However, initials must be used for place keeping for steps that are applicable.

- 4.5.1 \_\_\_\_ OBTAIN discarded lab chemicals, chemicals that are expired, and chemicals that have been used and ready for disposition / disposal from Chemistry Lab(s) and from Tool Rooms outside Radiation Controlled Areas (RCA), and chemicals that have been released from the RCA by Health Physics Technicians.
  - Lab Wastes, expired wastes, and used chemicals picked up
  - \_\_ No Lab Wastes, Expired Wastes, or Used Chemicals to pick up
- 4.5.2 <u>IF chemical containers are located in Radiation Controlled Areas (RCA),</u> <u>THEN PERFORM the follow steps to remove the containers from the RCA:</u>
  - REQUEST HP to survey / release containers that do not have internal contamination (sealed aerosol cans, calking tubes etc.)
  - REMOVE chemicals or chemical containers that are ready / have been released from the RCA by Health Physics Technicians.
  - No Lab Wastes, Expired Wastes, or Used Chemicals to remove from RCA.
  - 4.5.3 \_\_\_\_\_ TRANSPORT discarded lab chemicals, expired chemicals, and used chemicals ready for disposition / disposal from Chemistry Lab(s) and from Tool Rooms outside Radiation Controlled Areas (RCA) and chemicals that have been released from the RCA by Health Physics Technicians to the designated accumulation building / area for waste disposition.
  - 4.5.4 \_\_\_\_ TRANSPORT discarded lab chemicals, expired chemicals, and used chemicals ready for disposition / disposal from Chemistry Lab(s) and from Tool Rooms inside Radiation Controlled Areas (RCA) to designated accumulation building /area for waste disposition.
  - 4.5.5 INSPECT discarded lab chemicals, expired chemicals, and used chemical containers in the accumulation buildings /areas for leaks.

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- 4.5.6 <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, THEN RECORD them on Enclosure 2, Inspection Report (Section 4.5
  - Chemical Collection / Inspection Block)

## 4.6 **Spill Response Kit Inspection**

# NOTE

Spill Response Kits are located in specific locations on-site. However, the Spill Response Kits may be temporarily relocated to different locations based on work activities if authorized by the Hazardous Waste Coordinator.

4.6.1 INSPECT the "Spill Response Kit Seal" and determine if seals are broken on each Spill Response Kit located in the following areas;

95 Turbine Building	[] Sat	[] Un-sat
95 Auxiliary Building	[] Sat	[] Un-sat
119 Hazmat Area	[] Sat	[] Un-sat
Warehouse Area	[] Sat	[] Un-sat
CR-3 Waterfront Intake Area	[] Sat	[] Un-sat
IF the Spill Response Kit Seal(s) are not bro	ken,	

- 4.6.2 <u>IF</u> the Spill Response Kit Seal(s) are not broke <u>THEN</u> inventory is not required.
- 4.6.3 <u>IF Spill Response Kit Seal(s) are broken,</u> <u>THEN</u> inventory is required.
- 4.6.4 <u>IF Spill Response Kit Seal(s) are broken,</u> <u>THEN PERFORM the following:</u>

### NOTE

The quantities of supplies listed on Enclosure 3, 4, 5, 6, and 7 for the Spill Response Kits are recommended quantities that should be maintained. Quantities of supplies greater than the amount listed on these enclosures are considered satisfactory.

- 1. \_\_\_\_ INVENTORY the supplies according to the designated Enclosure.
  - 95 Turbine Building (Enclosure 3)
     [] N/A
     [] Sat
  - 95 Auxiliary Building (Enclosure 4) [] N/A [] Sat
  - 119 Hazmat Area (Enclosure 5)
     [] N/A
     [] Sat
  - 293 Warehouse Area (Enclosure 6)
     [] N/A
     [] Sat
  - Waterfront Intake Area (Enclosure 7)
     [] N/A
     [] Sat
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### NOTE

Enclosure 8 provides CAT ID numbers for ordering supplies for the Spill Response Kits. CAT ID numbers listed on Enclosure 8 are provided for the convenience for reordering and are subject to change. Supplies may be obtained directly from supply vendors to resupply spill response kits without being assigned a CAT ID number.

- 2. \_\_\_\_ USE Enclosure 8 (Spill Response Supply List) to replace missing supplies from stores.
- 3. \_\_\_\_ OBTAIN supplies directly from a vendor if supplies are unavailable from stores.

### NOTE

To ensure the supplies in the spill response kits are available and in a condition that is spill response ready, the supplies in the kits need to be inspected and degraded supplies replaced during specified inspection periods. This step may be N/A during non-applicable inspection periods of March through July and September through January. This step may be performed any time there is a need to replace supplies.

4.6.5

PERFORM an inspection on the condition of the supplies in each of the following Spill Response kits during the month of February and August.

- 95 Turbine Building (Enc. 3) [] Sat [] Un-sat
  95 Auxiliary Building (Enc. 4) [] Sat [] Un-Sat
  119 Hazmat Area (Enc. 5) [] Sat [] Un-sat
- Warehouse Area (Enc. 6)
   [] Sat [] Un-sat
  - CR-3 Waterfront Intake Area (Enc. 7) [] Sat [] Un-sat

# 4.6.6 <u>IF</u> supplies are degraded or missing, <u>THEN</u> REPLACE supplies using Enclosure 8 (Spill Response Supply List) from stores or directly from a vendor if supplies are unavailable from stores.

4.6.7 <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Section 4.6 Spill Response Kit Inspection Block).

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### 4.7 Asbestos Supply Station Inspection

**NOTE** The quantities of supplies listed on Enclosure 9 (Asbestos Supply Station Inventory) are recommended quantities that should be maintained for the convenience of supporting minor asbestos work activities. Quantities of supplies greater than the amount listed on Enclosure 9 are considered satisfactory. Since these supplies will be used periodically, an inventory of supplies less than the recommended quantities is not considered an Un-Sat condition.

4.7.1

- PERFORM an inventory of the following Asbestos Supply Stations using Enclosure 9 (Asbestos Supply Station Inventory).
- \_\_\_\_ 119' Hot Machine Shop, east wall, inside cabinet
  - 119' Hallway between Cold Machine Shop and the I & C shop

### NOTE

CAT ID numbers for supplies listed on Enclosure 9 for the Asbestos Supply Station Inventory are provided for the convenience for reordering supplies, but are subject to change. Supplies may be obtained directly from supply vendors to resupply the asbestos supply stations without being assigned a CAT ID number.

- 4.7.2 <u>IF</u> supplies are degraded or missing, <u>THEN</u> REPLACE supplies using Enclosure 9 (Asbestos Supply Station Inventory) or directly from supply vendors.
- 4.7.3 <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Section 4.7 Asbestos Supply Kit Inspection Block).

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### 4.8 Inspection Requirements for Paint Drying Areas

4.8.1

\_\_\_\_ RECORD the Paint Drying Areas on Enclosure 2 (Inspection Report).

NOTE

Paint drying areas are designated for paint buckets, paint cans, paint brushes, and paint rollers containing residual amounts of paint to be left until dried. More than residual amounts of paint are considered an unsatisfactory condition. Paint drying areas are not considered and must not be used as a paint storage area.

- 4.8.2 VERIFY that only residual amounts of paint are being "dried".
- 4.8.3 \_\_\_\_ REMOVE dried paint buckets, cans, brushes and rollers from paint drying areas.
- 4.8.4 <u>IF</u> paint drying area is in the RCA, <u>THEN</u> TRANSPORT dried paint buckets, cans, brushes and rollers to the Hot Machine Shop for disposition / disposal.
- 4.8.5 <u>IF</u> corrective actions were taken, comments need to be documented, or unsatisfactory conditions exists, <u>THEN</u> RECORD them on Enclosure 2, Inspection Report (Section 4.8 Paint Drying Area Inspection Block).

4.9 Hazardous Waste Storage Building Container Inspection

# NOTE

Steps that are not applicable may be N/A, initialed, and justification provided in the body of the procedure for steps that will not be performed. However, initials must be used for place keeping for steps that are applicable.

### NOTE

The Hazardous Waste Storage Building / Area (also known as the Flammable / Chemical Storeroom or warehouse) may be used for storing hazardous waste and non-hazardous wastes from CR3 prior to off-site shipment with approval from the Hazardous Waste Coordinator. This building is located east of the North Fossil Power Plants Units CR – 4&5. Designated hazardous waste containers in this area are stored no longer than generator status criteria prior to shipment to a designated disposal facility. Mixed wastes must not be stored in the Flammable / Chemical Storeroom / Warehouse without authorization from CR3 Radiation Control.

4.9.1 <u>IF</u> CR3 generated Hazardous Waste is being stored at the Hazardous Waste Storage Building,

THEN PERFORM inspection of CR3 containers using Enclosure 10.

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## 5.0 **FOLLOW-UP ACTIONS**

## 5.1 **Restoration Instructions**

### 5.1.1 NWST must:

- REVIEW the procedure for completeness.
- REVIEW each Enclosure for completeness.
- SIGN and date Enclosures.
- SUBMIT the procedure to the Hazardous Waste Coordinator for review and approval.
- 5.1.2 The Hazardous Waste Coordinator must:
  - REVIEW the procedure for completeness.
  - REVIEW each Enclosure for completeness.
  - REVIEW documented corrective actions or unsatisfactory conditions.
  - ENSURE corrective actions are taken to satisfy the requirements of the procedure within 72 hours of documented unsatisfactory conditions.
  - SIGN and date Enclosures.

### 5.2 **Contingencies**

5.2.1 <u>IF</u> an emergency is discovered, <u>THEN</u> INITIATE EM-205, "Personnel Emergency Responsibilities Regarding Discovery, Assembly, Evacuation, and Accountability Within the Protected Area."

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### HAZARDOUS AND MIXED WASTE ACCUMULATION REPORT

NOTE

The Accumulation Start Date for Hazardous and Mixed Waste is the date the 55 gallon container becomes full.

Section 4.1		HAZARDOUS WASTE		
Waste Ty	pe	Location	Volume	Accumulation Start Date
·		······		
		· · · · · · · · · · · · · · · · · · ·		
· · · · · · · · · · · · · · · · · · ·		······································		
				······································
Check (√) all that [] Sat and Comp [] Un-Sat Condit [] Corrective Act [] Comments	apply: lete ion ions Taken			· · · · · · · · · · · · · · · · · · ·
Provide Details:				<u>`</u> `

Section 4.1	MIXED WASTE		
Waste Type	Location	Volume	Accumulation Start Date
	• •	<u>`</u>	
	· · · · · · · · · · · · · · · · · · ·		
[] Sat and Complete [] Un-Sat Condition			
[] Corrective Actions Taken			
Provide Details:			
NWST Signature:		Date:	
HWC Signature:	quuuuuuuuuuu_	Date:	
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### **INSPECTION REPORT**

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## NOTE

For Universal Waste, the Accumulation Start Date or the removal from service date is when the first item is placed in the collection container.

Universal Waste Inspection			
Step	Universal Waste Type	Accumulation Start Date	
4.2.1	Nickel Cadmium Batteries		
	[] None to report this surveillance period		
4.2.2	Lithium Batteries		
	[] None to report this surveillance period		
4.2.3	Mercury Batteries		
	[] None to report this surveillance period		
4.2.4	Lead Acid Batteries		
	[] None to report this surveillance period	· · · ·	
4.2.5	Lead Calcium		
	[] None to report this surveillance period	· · · · · · · · · · · · · · · · · · ·	
4.2.6	Gell Cell Batteries		
	I None to report this surveillance period		
4.2.8	Huorescent Lamps		
	[] None to report this surveillance period		
4.2.9	High Density Discharge (HID) Lamps		
	[] None to report this surveillance period		
4.2.10	Neon Lamps		
	[] None to report this surveillance period		
4.2.11	Mercury Vapor Lamps		
	[] None to report this surveillance period	· · · · · · · · · · · · · · · · · · ·	
4.2.12	Mercury Containing Devices		
	[] None to report this surveillance period		
	· · · · · · · · · · · · · · · · · · ·		
Check (	all that apply:		
[]Sata	and Complete		
[jUn-S	Sat Condition		
[]Corr	ective Actions Taken		
[]Com	ments		
Provide	Details:		
NIMOT	Pignoturo:	Data:	
INVOIC	วเขาสเขาย		
HWC Si	HWC Signature: Date:		
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## **INSPECTION REPORT**

## NOTE

For Non-Leaking PCB Ballasts, the Accumulation Start Date or the removal from service date is when the collection container is completely full.

### NOTE

For Leaking PCB Ballasts, the Accumulation Start Date or the removal from service date is when the first leaking PCB ballast is placed into the collection container.

Ballast Inspection			
Ballast Waste Type	Accumulation Start Dates		
Non-Leaking PCB Ballasts			
[] None to report this surveillance period			
Leaking PCB Ballasts			
[] None to report this surveillance period	· · · · · · · · · · · · · · · · · · ·		
(√) all that apply: and Complete Sat Condition rective Actions Taken mments e Details:			
	Ballast Inspec         Ballast Waste Type       Point Second Se		

NWST Signature:		Date:
HWC Signature:		Date:
		2
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## **INSPECTION REPORT**

## NOTE

For Non-Leaking Non-PCB Capacitors, Leaking PCB Capacitors, and PCB Capacitors the Accumulation Start Date or the removal from service date is when the first capacitor is placed in the collection container.

Capacitor Inspection			
Step	Capacitor Waste Type	Accumulation Start Dates	
4.4.1	Non-Leaking Non-PCB Capacitors	· · · · · · · · · · · · · · · · · · ·	
	[] None to report this surveillance period		
4.4.2	Leaking PCB Capacitors		
	[] None to report this surveillance period		
4.4.3	PCB Capacitors		
	[] None to report this surveillance period		
Check	() all that apply:	,	
[]Sat	and Complete		
[] Un-	Sat Condition		
[]Cori	rective Actions Taken		
[]Con	nments		
Provide	e Details:	· · · · · · · · · · · · · · · · · · ·	

NWST Signature:		Date:
HWC Signature:		Date:
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# **INSPECTION REPORT**

Section 4.5	Chemical Colle	ection / Ins	pection	 	
Check (√) all that apply: [ ] Sat and Complete [ ] Un-Sat Condition [ ] Corrective Actions Tak	en	· >			
] Comments Provide Details:				 	
				 	······································
· · · · · · · · · · · · · · · · · · ·				 	

Section 4.6	Spill Response Kit inspection
Check ( $$ ) all that apply:	
[] Sat and Complete	· · · · · · · · · · · · · · · · · · ·
[] Un-Sat Condition	
[] Corrective Actions Taken	
[] Comments	
Provide Details:	
·····	

Section 4.7	Asbestos Supply Kit Inspection	
Check ( $$ ) all that apply:		
[] Sat and Complete		
[] Un-Sat Condition		
[] Corrective Actions Taken		
[] Comments		
Provide Details:		
	<u> </u>	
Ļ <u>,</u>		·····
NWST Signature:		Date:

HWC Signature: \_\_\_\_\_

Date: \_\_\_\_

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# INSPECTION REPORT

Section 4.8	Paint Drying Area Inspection	
Paint Drying Locations	· · · · · · · · · · · · · · · · · · ·	
1.)		
2.)		·····
3.)		
Check ( $$ ) all that apply:		
[] Sat and Complete	and the second	
[] Un-Sat Condition	• • • • •	
[] Corrective Actions Taken		
[] Comments		
Provide Details:		
	······································	<u>`</u>
		· · · · · · · · · · · · · · · · · · ·

NWST Signature:		Date:
HWC Signature:		Date:
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# 95' TURBINE BUILDING SPILL RESPONSE KIT INVENTORY

Description of Item	Quantity	On Hand Quantity
Pink Absorbent Socks (acid/base)	15 each	
White Absorbent Socks (oil)	15 each	
Blue Absorbent Socks (general use)	15 each	
White Paper Absorbent Pads (oil)	50 each	
Gray Absorbent Pads (general use)	50 each	
Plastic Suits Large	2 each	
Plastic Suits X-Large	2 each	
Plastic Suits XX-Large	2 each	
Level "A" Suits (tyke)	2 each	
Rubber Shoe Covers X-Large	3 pair	
Rubber Shoe Covers Large	3 pair	
Silver Shield Gloves (maximum protect)	1 pack	
Yellow Rubber Gloves (general use)	6 pair	
Blue Rubber Gloves (general use)	6 pair	
Green Rubber Gloves (acid/bases)	6 pair	
Cotton Liners	30 each	
Safety Goggles	2 pair	
Hard Hat Face Shields	2 each	
Yellow Ribbon (warm zone)	1 roll	
Red Ribbon (hot zone)	1 roll	
Red Ribbon(danger do not enter)	1 roll	
Duct Tape	2 rolls	
Acid Neutralizer	2 boxes	
Caustic Neutralizer	2 boxes	
Solvent Absorbent	2 boxes	
4" x 4" Corrosive Stickers	10 each	

		*
4" x 4" Flammable Stickers	10 Each	
pH Paper	2 Packs	
Large Clear Plastic Bags	4 Each	
Spill Response Book	1 Each	
DOT Emergency Response Book	1 Each	
1/2" Ratchet & 15/16 Socket	1 Each	
15/16" Combination Wrench	1 Each	
Combination Bung Hole Wrench	1 Each	
Drum Patch Kit	1 Each	
Floor Drain Plug	1 Each	
Yellow Paint Markers	2 Each	
Knife	2 Each	·
Rubber Aprons	2 Each	
Vinegar	5 Gals	
Incident Commander Vest	1 Each	
Drain Blacker Pad 16" x 16"	2 Each	
Bio Hazard Kit	1 Each	
San Cloth Wipes for SCBAs	1 Each	

# 95' TURBINE BUILDING SPILL RESPONSE KIT INVENTORY

NWST Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Description of Item	Quantity	On Hand Quantity
Pink Absorbent Socks (acid/base)	15 Each	
White Absorbent Socks (oil)	15 Each	
Blue Absorbent Socks (general use)	15 Each	
White Paper Absorbent Pads (oil)	50 Each	
Gray Absorbent Pads (general use)	50 Each	
Plastic Suits Large	2 Each	
Plastic Suits X-Large	2 Each	
Plastic Suits XX-Large	2 Each	
Level "A" Suits (tyke)	2 Each	
Rubber Shoe Covers X-Large	3 Pair	
Rubber Shoe Covers Large	3 Pair	
Silver Shield Gloves (maximum protect)	1 Pack	
Yellow Rubber Gloves (general use)	6 Pair	
Blue Rubber Gloves (general use)	6 Pair	
Green Rubber Gloves (acid/bases)	6 Pair	
Cotton Liners	30 Each	
Safety Goggles	2 Pair	
Hard Hat Face Shields	2 Each	
Yellow Ribbon (warm zone)	1 Roll	
Red Ribbon (hot zone)	1 Roll	
Red Ribbon (danger do not enter)	1 Roll	
Duct Tape	2 Rolls	
Acid Neutralizer	2 Boxes	
Caustic Neutralizer	2 Boxes	
Solvent Absorbent	2 Boxes	
4" x 4" Corrosive Stickers	10 Each	

# 95' AUXILIARY BUILDING SPILL RESPONSE KIT INVENTORY

<b>1919 - 1919</b> - 1919 - 1910 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1919 - 1910 - 1919 - 19		
4" x 4" Flammable Stickers	10 Each	
pH Paper	2 Packs	
Large Clear Plastic Bags	4 Each	
Spill Response Book	1 Each	
DOT Emergency Response Book	1 Each	÷ .
1/2" Ratchet & 15/16" Socket	1 Each	
15/16 Combination Wrench	1 Each	
Combination Bung Hole Wrench	1 Each	
Drum Patch Kit	1 Each	
Floor Drain Plug	1 Each	
Yellow Paint Markers	2 Each	
Knife	2 Each	
Rubber Aprons	2 Each	
Vinegar	5 Gals	
Incident Commander Vest	1 Each	
Drain Blacker Pads 16" x 16"	2 Each	
Bio Hazard Kit	1 Each	
San Cloth Wipes for SCBAs	1 Each	

# 95' AUXILIARY BUILDING SPILL RESPONSE KIT INVENTORY

NWST Signature: \_\_\_\_\_

Date:

# 119' BERM HAZMAT AREA SPILL RESPONSE KIT INVENTORY

Description of Item	Quantity	On Hand Quantity
Pink Absorbent Socks (acid/base)	15 Each	
White Absorbent Socks (oil)	15 Each	
Blue Absorbent Socks (general use)	15 Each	
White Paper Absorbent Pads (oil)	50 Each	
Gray Absorbent Pads (general use)	50 Each	
Plastic Suits Large	2 Each	
Plastic Suits X-Large	2 Each	
Plastic Suits XX-Large	2 Each	
Level "A" Suits (TYVEK)	2 Each	
Rubber Shoe Covers X-Large	3 Pair	
Rubber Shoe Covers Large	3 Pair	
Silver Shield Gloves (maximum protect)	1 Pack	
Yellow Rubber Gloves (general use)	6 Pair	
Blue Rubber Gloves (general use)	6 Pair	
Green Rubber Gloves (acid/bases)	6 Pair	
Cotton Liners	30 Each	
Safety Goggles	2 Pair	
Hard Hat Face Shields	2 Each	
Yellow Ribbon (warm zone)	1 Roll	
Red Ribbon (hot zone)	1 Roll	
Red Ribbon(danger do not enter)	1 Roll	
Duct Tape	2 Rolls	
Acid Neutralizer	2 Boxes	
Caustic Neutralizer	2 Boxes	
Solvent Absorbent	2 Boxes	
4" x 4" Corrosive Stickers	10 Each	

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4461						
3 3 6 1	ULDRA		COLL	DECDIN		
			<b>SPU 1</b>	RESEUN	<b>n</b>	

4" x 4" Flammable Stickers	10 Each	
pH Paper	2 Packs	
Large Clear Plastic Bags	4 Each	· · · · · · · · · · · · · · · · · · ·
Spill Response Book	1 Each	
DOT Emergency Response Book	1 Each	
1⁄2" Ratchet & 15/16" Socket	1 Each	
15/16" Combination Wrench	1 Each	-
Combination Bung Hole Wrench	1 Each	-
Drum Patch Kit	1 Each	
Floor Drain Plug	1 Each	
Yellow Paint Markers	2 Each	
Knife	2 Each	
Rubber Aprons	2 Each	
Vinegar	5 Gals	
Incident Commander Vest	1 Each	
Drain Blacker Pads 16" x 16"	2 Each	
Bio Hazard Kit	1 Each	
Sani Cloth Wipes for SCBAs	1 Each	

NWST Signature: \_\_\_\_\_

.

Date: \_\_\_\_\_

Description of Item	Quantity	On Hand Quantity
Pink Absorbent Socks (acid/base)	15 Each	· · · · · · · · · · · · · · · · · · ·
White Absorbent Socks (oil)	15 Each	
Blue Absorbent Socks (general use)	15 Each	
White Paper Absorbent Pads (oil)	50 Each	
Gray Absorbent Pads (general use)	50 Each	
Plastic Suits Large	2 Each	
Plastic Suits X-Large	2 Each	
Plastic Suits XX-Large	2 Each	
Level <sup>*</sup> "A" Suits (tyke)	2 Each	·
Rubber Shoe Covers X-Large	3 Pair	
Rubber Shoe Covers Large	3 Pair	
Silver Shield Gloves (maximum protect)	1 Pack	
Yellow Rubber Gloves (general use)	6 Pair	e
Blue Rubber Gloves (general use)	6 Pair	
Green Rubber Gloves (acid/bases)	6 Pair	
Cotton Liners	30 Each	
Safety Goggles	2 Pair	
Hard Hat Face Shields	2 Each	
Yellow Ribbon (warm zone)	1 Roll	
Red Ribbon (hot zone)	1 Roll	
Red Ribbon (danger do not enter)	1 Roll	
Duct Tape	2 Rolls	
Acid Neutralizer	2 Boxes	
Caustic Neutralizer	2 Boxes	
Solvent Absorbent	2 Boxes	
4" x 4" Corrosive Stickers	10 Each	

# WAREHOUSE AREA SPILL RESPONSE KIT INVENTORY

4" x 4" Flammable Stickers	10 Each	
pH Paper	2 Packs	
Large Clear Plastic Bags	4 Each	
Spill Response Book	1 Each	
DOT Emergency Response Book	1 Each	
1/2" Ratchet & 15/16" Socket	1 Each	
15/16" Combination Wrench	1 Each	
Combination Bung Hole Wrench	1 Each	
Drum Patch Kit	1 Each	
Floor Drain Plug	1 Each	
Yellow Paint Markers	2 Each	
Knife	2 Each	
Rubber Aprons	2 Each	
Vinegar	5 Gals	
Incident Commander Vest	1 Each	
Drain Blocker Pads 16" x 16"	2 Each	
Bio Hazard Kit	1 Each	
Sani Cloth Wipes for SCBAs	1 Each	

# WAREHOUSE AREA SPILL RESPONSE KIT INVENTORY

NWST Signature:

Date: \_\_\_\_\_

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# WATERFRONT INTAKE AREA SPILL RESPONSE KIT INVENTORY

Description of Item	Quantity	On Hand Qty.
Oil Booms 10' x 5"	160 Ft.	
Absorbent Roll 36" x 150'	1 Roll	
Absorbent Pillows 18" x 18"	12 Each	
1⁄2" Inch Rope	500 Ft.	
Yellow Rubber Gloves	12 Each	
Large Clear Plastic Bags	10 Each	· · · · · · · · · · · · · · · · · · ·
Drain Blocker Pads 32" x 48"	2 Each	
Drain Blocker Pads 16" x 16"	3 Each	
Red Ribbon (danger do not enter)	1 Roll	
Drum Patch Kit	1 Each	
Knife	2 Each	
Incident Commander Vest	1 Each	
Spill Response Book	1 Each	
D.O.T. Emergency Response Book	1 Each	
Bio Hazard Kit	1 Each	
•		

NWST Signature: \_\_\_\_\_

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Date: \_\_\_\_\_

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# SPILL RESPONSE KIT SUPPLY LIST

# NOTE

CAT ID numbers for supplies listed on Enclosure 8 for the Spill Response Kits are provided for the convenience for reordering supplies, but are subject to change without notification from Stores. Supplies may be obtained from an off-site vendor as needed.

Description of Item	CAT. ID #
Pink Absorbent Socks (acid/base)	01402402
White Absorbent Socks (oil)	01053702
Blue Absorbent Socks (general use)	01402401
White Paper Absorbent Pads (oil)	01012306
Gray Absorbent Pads (general use)	01440106
Plastic Suits Large	01400933
Plastic Suits X-Large	01400927
Plastic Suits XX-large	01400878
Level "A" Suits (tyvek)	CAT I.D. No. has changed or not in stock.
Rubber Shoe Covers X-Large	01440108
Rubber Shoe Covers Large	01440107
Silver Shield Gloves (maximum protect)	01410392
Yellow Rubber Gloves (general use)	CAT 1.D. No. has changed or not in stock.
Blue Rubber Gloves (general use)	01400311
Green Rubber Gloves (acid/bases)	CAT I.D. No. has changed or not in stock.
Cotton Liners	01400319
Safety Goggles	01071387
Hard Hat Face Shields	01268357
Yellow Ribbon (warm zone)	01410396
Red Ribbon (hot zone)	01410399
Red Ribbon (danger do not enter)	01410397
Duct Tape	01037350
Acid Neutralizer	01400855
Caustic Neutralizer	01400854

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# SPILL RESPONSE KIT SUPPLY LIST

# NOTE

CAT ID numbers for supplies listed on Enclosure 8 for the Spill Response Kits are provided for the convenience for reordering supplies, but are subject to change without notification from Stores. Supplies may be obtained from an off-site vendor as needed.

Solvent Absorbent	01400853
pH Paper	01400877
Large Clear Plastic Bags	CAT I.D. No. has changed or not in stock.
8" Tie Wraps	01026932
1/2" Ratchet	01100602
15/16" Deepwell Socket	01083658
15/16" Combination Wrench	01083807
Yellow Paint Markers	CAT I.D. No: has changed or not in stock.
Knife	01038703
New Seals for Spill Kit	66280327
Rubber Aprons	01400031
Oil Boom for Waterfront 10' x 5"	01012305
Vinegar	01120017
Absorbent Roll 36" x 150'	01012308
Absorbent Pillows 8" x 18"	01398953
1/2" Rope	01850013
Drain Blocker Pads	01398954
Sani Cloth Wipes for SCBAS	01071006
Bio Hazard Kit	CAT I.D. No. has changed or not in stock.
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· · ·	

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# ASBESTOS SUPPLY STATION INVENTORY

# NOTE

The quantities of supplies listed on this Enclosure are the minimum required. Quantities of supplies greater than the amount listed are considered satisfactory. CAT I.D. provided is for the convenience of reordering supplies, but is subject to change without notification from Stores. Supplies may be obtained from an off-site vendor as needed.

Minimum Required Amount of Supplies	CAT I.D Number	119' EL, Hot Machine Shop, East Wall, Inside Cabinet	119' EL, Hallway Between Cold Machine Shop and I&C Shop
20 Asbestos Stickers	01037386	· · · ·	
6 Scotch Bright Pads	00434353		
1 Box Latex Gloves	CAT I.D. No. has changed or not in stock.		
4 Bottles Encapsulate	CAT I.D. No. has changed or not in stock.		
2 Rolls Duct Tape	01037350		
1 Roll Safety Barricade Tape	01700723	·	
3 Putty Knives	01038654		
20 6 Mil Poly Bags	01090055		

Check ( $\sqrt{}$ ) all that apply:

- [] Sat and Complete
- [] Un-Sat Condition
- [] Corrective Actions Taken

[] Comments

Provide Details:

 $\sum_{i=1}^{m_{i}} \sum_{i=1}^{m_{i}} \sum_{i=1}^{m_{$ 

NWST Signature:	Da	ate:
HWC Signature:	Da	te:
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HAZARDOUS WASTE STORAGE AREA INSPECTION FORM				
Date Inspection Performed:	Time:	·		
Inspected By (Print Name):				
Number/Types of containers:		· · ·		
YES	CONDITION			
1. Are any cor	ntainers open?	na n		
2. Are any cor	ntainers rusted?			
3. Are any cor	ntainer heads bulging?			
4. Are any cor	ntainers leaking?			
If any questions are marked YES, descri	be action taken to resolve discrep	ancies and date corrected.		
YES NO CONTAINER 1. Completed	MARKING Hazardous Waste Label on Drum?			
If question is marked no, describe action	n taken to resolve discrepancies a	ind date corrected.		
YES NO STORAGE A 1. Is area free	REA of structural deterioration?			
2. Have conta	iners been stored less than 120 day	/s?		
3. Is adequate aisle space present between drums to allow				
unobstructe	d movement for emergency response	se?		
4. Is area clea	an (free of trash, debris, liquid on top	o of drums, etc.)		
If any question is marked no, describe a	ction taken to resolve discrepanc	ies and date corrected.		
		······································		
	VESDONSEEOUIDMENT			
1 Is unused a	absorbent material on-site?			
2 Are communication devices in working order?				
3 Is fire extinguisher readily accessible?				
4. Is eve wast	h station in good working order?			
If any question is marked no, describ	be action taken to resolve discrep	ancies and date corrected.		
Check (√) all that apply:				
[]] Sat and Complete				
[] JUN-Sal Condition				
[] Corrective Actions Taken				
Provide Details:				
		· · · · · · · · · · · · · · · · · · ·		
NWST Signature:	Date:			
HWC Signature:	Date:	· · · · · · · · · · · · · · · · · · ·		
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# SUMMARY OF CHANGES PRR 00311681

Section / Step	Changes	
Revision	Revision 17 to revision 18.	
PRR 00311681	PRR 00311681 resolved the conflict between SP-909 that stated that ballasts	
	not containing PCB's into DOT approved container for shipment to a vendor, or	
Step 3.5.1 and	with approval of the HWC, place non-PCB ballasts into a dumpster for disposal.	
Section 4.3	Step 3.5.1 and Section 4.3 of SP-909 now states that Fluorescent ballasts	
	labeled "No PCBs" or those manufactured and dated after July 1, 1998 may be	
	recycled or disposed of as solid waste.	
Table of	Re-titled the Instruction Section and added instruction sections to include	
Contents	Universal Waste, Ballast, and Capacitor Wastes.	
3.3.4	Re-defined the two (2) different types of corrective actions to clarify the criteria	
	that would prevent the procedure from being accepted as satisfactory verses	
	unsatisfactory.	
3.3.5	Clarified CR3 Hazardous Waste Satellite Accumulation Buildings.	
3.3.6	Added and defined Hazardous / Mixed Waste Satellite Accumulation Container.	
	Deleted the term deficient condition from revision 17 to eliminate confusion in	
	reference to procedure acceptance criteria.	
3.3.8	Re-defined the term Hazardous Waste Storage Building	
3.3.11	Added and defined Mixed Waste.	
3.3.13	Re-defined the term Satisfactory (Sat).	
3.3.16	Re-defined the term Spill Kit.	
3.3.18	Re-defined the term Un-satisfactory.	
3.4.1	Re-formatted responsibilities for Nuclear Waste System Technicians.	
3.4.2	Re-formatted responsibilities for the Hazardous Waste Coordinator.	
3.5.1	Added and defined Polychlorinated biphenyls (PCB's).	
3.5.2	Added information in reference to PCB classifications.	
3.5.3	Added information in reference to electrical equipment including PCB	
	Capacitors that have some levels or concentrations of PCB.	
3.5.4	Added information in reference to components or equipment that is not clearly	
	identified with PCB's.	
3.5.5	Added information in reference to PCB contaminated items when removed from	
	service and required disposal time frame.	
3.5.8	Added information in reference to transferring 55 gallons of hazardous or mixed	
	waste off-site or to a designated locations.	
3.5.10	Re-defined the term "Time Limit for Surveillance Procedure Acceptance".	
3.5.16 through	Added information in reference to fluorescent PCB and non-PCB Ballasts, PCB	
3.5.20	and non-PCB Capacitors and equipment.	
3.5.23 through	Added information in reference to the various universal waste types and	
3.5.30	associated removal service dates.	
3.6.1	Added information in reference to how instructional sections may be completed.	
3.6.7	Added information in reference to criteria to N/A steps.	
3.6.8	Added information in reference to criteria for place keeping using circle-and-	
	slash method.	
4.1 through 4.7	Added notes in each of the instructional sections to include criteria for N/A steps	
	if needed.	

SP-909

# SUMMARY OF CHANGES PRR 00311681

Section / Step	Changes			
4.1.2	Clarified notes above step 4.1.2. Added a note above step 4.1.2 for using initials			
	as a place keeping method.			
4.1.3 through	Added place keeping steps to reduce human error while performing the			
4.1.18	procedure.			
4.2	Added a new instruction / inspection section titled "Universal Waste Inspections"			
	with place keeping steps that include instructions for Nickel-Cadmium Batteries			
	inspections, Lithium Battery inspections, Mercury Battery inspections, Lead-Acid			
ļ	Battery inspections, Lead-Calcium Battery inspections, Gel-Cell Battery			
	inspections, Fluorescent Lamp inspections, High Intensity Discharge (HID) Lamp			
	inspections, Neon Lamp inspections, Mercury Lamp inspections, Mercury			
	Containing Device inspections,			
4.3	Added a new instruction / inspection section titled "Ballast Inspection" with place			
	keeping steps that include instructions / inspections for Non-Leaking PCB Ballast			
	inspections, Leaking PCB Ballast inspections, Non-Leaking Non-PCB Capacitor			
	inspections, Leaking PCB Capacitor inspections, and PCB Capacitor			
· · · · · · · · · · · · · · · · · · ·	Inspections.			
4.4	Added a new instruction / inspection section titled "Capacitor Inspection" with			
	place keeping steps that include instructions / inspections for Non-Leaking Non-			
	Capacitor inspections, Leaking PCB Capacitor inspections, and PCB			
4.5	Revised the section to clarify Chemical Collection / Inspections, Also included			
4.5	nlace keeping stops to reduce human error			
16	Place Reeping steps to reduce number enor.			
4.0	keeping steps to reduce human error			
465	Revised note above Step 4.5.5 to extend administrative inspection periods from			
1.0.0	one (1) week to one (1) month for Spill Response Kit Inspections and provides			
	discretionary inspections as needed to inspect and replace spill response			
	supplies.			
4.7	Revised the section to clarify Asbestos Supply Station Inspections. Also included			
	place keeping steps to reduce human error.			
4.8	Revised the section to clarify Inspection requirements for Paint Drying Areas.			
	Also included place keeping steps to reduce human error.			
4.9	Revised the section to clarify Inspection requirements for the Hazardous Waste			
	Storage Building Container Inspection.			
Enclosure 1	Revised and reformatted Enclosure 1 to include information in reference to			
	Hazardous / Mixed Waste Type, Location, Volume, and Date that will provide the			
	Hazardous Waste Coordinator with the necessary hazardous waste			
	accumulation data to determine waste inventory.			
Enclosure 2	Revised and reformatted Enclosure 2 to include information in reference to			
	Universal Waste types and accumulation start dates, Ballast Waste types and			
	accumulation start dates, Capacitor Waste types and accumulation start dates,			
	Chemical Collection / Inspection, Spill Response Kit Inspection, Asbestos Supply			
	Kit Inspection, and Paint Drying Area Inspection.			

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# Non-Radiological Waste

# NRW-2

- 1. CRS WWTP, Figure 1
- 2. ECST Waste Stream
- 3. Attachment C Waste Water Flow, Crystal River Energy complex, Renewal of IWW Permit FLA016969
- 4. LSST Waste Stream
- 5. SDT-1 Waste Stream
- 6. Drawing CRI-M307-D, FPC Sewage Treatment Project, Sewage Plant Block Diagram
- 7. Wastewater Permit Application Form 2A For Domestic Wastewater Facilities





Note: Numerous scenarios of valve alignments can alter the flow paths indicated by this flow diagram. Examples are: tanks can be put on recirc, pumped back to another tank for reprocessing, pumped to another system, etc.



# **LSST Waste Stream**



Note: Numerous scenarios of valve alignments can alter the flow paths indicated by this flow diagram. Examples are: tanks can be put on recirc, pumped back to another tank for reprocessing, pumped to another system, etc.

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# **SDT-1 Waste Stream**



Note: Numerous scenarios of valve alignments can alter the flow paths indicated by this flow diagram. Examples are: tanks can be put on recirc, pumped back to another tank for reprocessing, pumped to another system, etc. SDT-1 can be discharged to the settling ponds.



1.2

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# WASTEWATER PERMIT APPLICATION FORM 2A

# FOR DOMESTIC WASTEWATER FACILITIES

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# WASTEWATER PERMIT APPLICATION FORM 2A

# APPLICATION FOR A DOMESTIC WASTEWATER FACILITY PERMIT

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#### FORM 2A

Application for a Domestic Wastewater Facility Permit

2A-1

**INSTRUCTIONS FOR FORM 2A** 

# APPLICATION FOR A DOMESTIC WASTEWATER FACILITY PERMIT

## GENERAL INSTRUCTIONS

- 1. Application for a domestic wastewater treatment facility permit, reuse or disposal system permit, limited wet weather discharge permit, residuals/septage management facility permit, or any combination thereof shall be made using this form and DEP Form 62-620.910(1). The appropriate number of copies of this form and DEP Form 62-620.910(1), with supporting documentation, and a check for the appropriate application fee made payable to the Department of Environmental Protection shall be submitted with this application as required by Rule 62-620.310, F.A.C.
- 2. Unless otherwise specified in the detailed instructions, each applicable item must be completed in full in order to avoid delay in processing. To indicate that each item has been considered, enter "NA" for not applicable, where a particular item does not fit the circumstances or characteristics of your facility.
- 3. All information must be typed or printed in ink.
- 4. Dates must be entered in MM/DD/YY format.
- 5. Some items in this form require narrative explanation. For this purpose, attach a separate sheet entitled "Additional Information." Where a separate sheet is used, identify the name of the applicant, the activity, and the section and item number of the form to which it refers. All other documents required by this application must be similarly identified.

# SECTION 1. APPLICANT AND FACILITY DESCRIPTION

Application Type - Indicate whether this application is for construction of new facilities, for substantial modification of existing facilities, or for renewal of an existing facility permit. As defined in Rule 62-620.200, F.A.C., substantial modification means a modification to the facility which is reasonably expected to lead to a substantially different environmental impact or which involves a substantially different type of wastewater or residuals treatment, reuse, or disposal system. A substantial modification includes changes in the characteristics of the effluent, reclaimed water, or residuals, changes to the location of the discharge, or changes in the permitted capacity of the treatment, reuse, or disposal system.

Application for minor modification of existing facilities shall be made on DEP Form 62-620.910(9). A minor modification means a modification to the facility which is not expected to lead to a substantially different environmental impact or which will not involve a substantially different type of wastewater or residuals treatment, reuse, or disposal system. A minor modification does not substantially change the characteristics of the effluent, reclaimed water, or residuals nor does it change the permitted capacity of the treatment, reuse, or disposal system. It includes construction to replace a unit operation or process structure. It also includes construction to unit operation or mechanical equipment which is not associated with routine facility maintenance.

2. Facility Type - Indicate whether this application is for a wastewater treatment facility, a reuse or disposal system, a limited wet weather discharge as defined in Rule 62-610.860, F.A.C., a residuals/septage management facility or

some combination of the above. (i.e., If the application is for permit renewal of both treatment and disposal facilities, mark an "X" by the word "Treatment" and mark an "X" by the words "Reuse or Disposal". If the application is for construction of treatment facilities only, mark an "X" by the word "Treatment" only.)

- 3. *Treatment Facility Information* Enter the requested information for the treatment facility which produces the effluent, reclaimed water, or residuals. Provide the name of the facility as it is officially or legally referred to in order to distinguish it from similar entities, if any, in the same geographical area. Do not use colloquial names as a substitute for the official name. Enter the facility's DEP identification number if the application is for an existing facility (i.e., either for permit renewal or modification). If the application is for a new facility, enter "NA" for the facility's DEP identification number. Enter the address where the facility is located as well as the mailing address of the facility. Enter the ownership status of the permittee.
- 4. *Applicant or Authorized Representative* Enter the legal name of the applicant or authorized representative. The applicant or authorized representative is the person, agency, firm, or other entity which owns or is responsible for the wastewater facilities. Enter the name of the applicant as it is officially or legally referred to. Do not use colloquial names as a substitute for the official name. Next, enter the complete mailing address and telephone number of the applicant or authorized representative. This often will not be the same address as is used to designate the location of the wastewater facilities. When identifying whether the applicant is the owner or operator of the facility, please note that the operator of the facility is the legal entity that controls the facility's operation, rather than the plant or site manager.
- 5. *Project Name and Description* For a new facility or a modification to an existing facility, provide the name and a general description of the project. The description should include the reason the project is needed and its relationship to existing facilities.
- 6. *Municipalities or Areas Served* Enter the names of the municipalities or areas served by this facility and, for each, enter its ownership (municipal, private, etc.), and the best estimate of the actual population served at the time of this application. If there is another sewer authority discharging into this facility, give the name of that authority and the actual population it serves. Do not include the names of the municipalities or areas served by that sewer authority.
- 7. Reclaimed Water Reuse and Effluent Disposal Enter the number of disposal points for each discharge to surface waters, the number of different types of reuse or land application systems used by the treatment facility, and the number of different underground injection well facilities used by the treatment facility. Reuse or land application systems are considered different types if they are permitted under different parts of Chapter 62-610, F.A.C. (i.e., slow rate restricted public access, rapid-rate, public access reuse system, etc.) Underground injection well systems are considered different facilities if they have different physical locations or distinct DEP identification numbers.

For each method of reuse or disposal listed, provide the total design capacity and the basis of the design flow (e.g., annual average daily flow, maximum monthly average daily flow, three-month average daily flow). Intermittent discharges, such as seasonal or periodic discharge points from lagoons, holding ponds, etc., should be included in the flows provided in this item. Additional intermittent discharge information should be provided in Section 3.A., Item 9. A separate Section 3.A., 3.B., or 3.C. must be completed for each reuse or disposal system identified.

#### 8. Flows to Another Wastewater Facility –

- a. If your facility discharges treated or untreated wastewater to another treatment facility (including a municipal waste transport or collection system), provide the information requested in Item 8. If your facility sends wastewater to more than one treatment facility, provide the following information for each treatment facility on additional sheet(s). Attach the additional sheet(s) to your application form.
- b. Describe how the wastewater is transported to the other treatment facility. Also provide the name and mailing address of the company that transports your facility's wastewater to this treatment facility as well as the name, phone number, and title of the contact person at the transportation company.

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- c. Provide the name and mailing address of each treatment facility that receives wastewater from your facility as well as the name, phone number, and title of the contact person at the treatment facility that receives your facility's wastewater.
- d. Provide the facility identification number for the treatment facility that receives wastewater from your facility.
- e. Indicate the average daily flow, in million gallons per day, that is sent from your facility to the other treatment facility. If the exact flow to the other facility is not known, provide best estimates.
- 9. Residuals Use or Disposal Enter the average amount of residuals generated by the facility. This amount should be zero for Residuals Management Facilities that are not also wastewater treatment facilities. Indicate whether the facility receives residuals from other facilities for further treatment and disposal. If yes, complete Section 7 of this form. For each method of residuals use or disposal listed, enter the number of sites or number of receiving facilities and the average amount of residuals used or disposed of per year. The total amount of residuals used or disposed of should equal the total amount of residuals generated and received. If the method of use is land application, an Agricultural Use Plan or Dedicated Site Plan should be attached for each site. If the residuals are landfilled, incinerated, or transported to another treatment facility, the name, DEP identification number, and address of the receiving facility should be listed. Identify the treatment processes used by the receiving facility.

#### 10. Permits and Applications -

- a. If applicable, provide the expiration date of the current National Pollutant Discharge Elimination System permit.
- b. If applicable, provide the expiration date of the current DEP permit for this facility.
- c. Provide the permit numbers for all existing environmental permits from Federal, State, and local agencies related to the facility or the proposed project.
- d. For all currently effective orders and notices issued by Federal, State, and local agencies, provide the name of the issuing agency and the effective date of the order or notice.

## SECTION 2. TREATMENT FACILITY DESCRIPTION

This section includes specific information about the treatment facilities. Complete a separate Section 2 for each current or proposed method of reuse or disposal identified in Section 1, Item 7 for which different levels of treatment are provided. The 4-digit serial numbers which are established in Sections 3. A.1., B.1., and C.1. and which correspond to the treatment facility description should be entered at the top of each page of this section.



- 1. *Flow*
  - a. Enter the current design capacity, the proposed incremental design capacity, and the proposed total design capacity in million gallons per day.
  - b. Enter the basis for the current design capacity, the proposed incremental design capacity, and the proposed total design capacity (e.g., annual average daily flow, maximum monthly average daily flow, three-month average daily flow) for the treatment facilities.
  - c. Enter the annual average daily flow rate, in million gallons per day, that your facility actually treated this year and each of the past two years for days that your facility actually discharges. Each year's data must be based on a 12-month time period, with the 12<sup>th</sup> month of "this year" occurring no more than three months prior to this application submittal.
  - d. Enter the maximum daily flow rate, in million gallons per day, that your facility received this year and each of the past two years. Each year's data must be based on a 12-month time period, with the 12<sup>th</sup> month of "this year" occurring no more than three months prior to this application submittal.
- 2. Design Treatment Levels At a minimum, enter the range of pH and the 5-day CBOD and the TSS effluent concentrations and percent removals for which the plant is designed. Also provide the basis for the effluent concentrations (i.e., annual average, monthly average, and weekly average as defined in Chapter 62-620, F.A.C.). Design data for additional parameters may be required based on additional treatment requirements established in accordance with Department rules for reclaimed water or effluent disposal.
- 3. **Disinfection Level Provided** Indicate the level of disinfection provided as specified in Rule 62-600.440, F.A.C. For the high-level alternative, see Rules 62-600.440(5)(g) and (h), F.A.C. Also, if the facility disinfects by chlorination and the discharge is to surface waters, indicate whether dechlorination is provided.
- 4. Residuals Treatment
  - a. Indicate which class criteria the residuals meet after treatment. For example, if the residuals will be distributed and marketed, Class AA should be checked and the residuals should meet the criteria in Rule 62-640.850, F.A.C.
  - b. Describe treatment processes used at your facility to reduce pathogens in sewage sludge. Give the Class A or B pathogen reduction method alternative number, if known.
  - c. Check any vector attraction reduction options that are used at your facility.
  - d. Describe any treatment processes used at your facility to reduce vector attraction properties of sewage sludge.
  - e. If this is an existing facility, complete the table in Section 2, Item 4.e of the form or attach the information separately. If the residuals will meet different class criteria, provide the information for each class on separate pages.
- 5. *Reliability Class* Indicate the class of reliability provided by the treatment facility. Reliability shall be provided in accordance with Rule 62-600.400, F.A.C, as described in the EPA's 1974 publication entitled Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability, MCD-05. If other equivalent reliability is provided, the equivalent reliability features should be described in the preliminary design report or on a separate sheet entitled "Additional Information".



2AI-6

#### SECTION 3. REUSE OR EFFLUENT DISPOSAL SYSTEM DESCRIPTION

This section includes specific information required for the reuse or effluent disposal system. Complete a separate and appropriate Section 3.A., 3.B., or 3.C. for each current or proposed method of reuse or effluent disposal identified in Section 1, Item 7. Separate descriptions of each reuse or effluent disposal system are required even if the discharge or reuse system originates at the same treatment facility.

#### SECTION 3. A. DISCHARGES TO SURFACE WATERS (including wetlands)

- Discharge Serial Number and Name Assign a 4-digit number beginning with D001 for each point of discharge identified in Section 1, Item 7. Discharge serial numbers must be consecutive for each additional discharge described; hence, the second serial number would be D002, the third D003, etc. Enter this number at the top of each page of Section 3. A.
- 2. **Discharge Location** Provide the name of the county, the name of city or town (if applicable), and the name of the street where the point of discharge is located. If the discharge is not located on a named street, provide a description of the point of discharge. State the precise location where the effluent from the discharge reaches the waterway. If the discharge is to a dry waterway, give the point where the discharge enters the waterway.
- 3. *Design Capacity of the Outfall* For the outfall identified in Item 1 of this section, provide the current design capacity, the proposed incremental design capacity, and the proposed total design capacity in million gallons per day (mgd) to three decimal places.
- 4. Basis of Design Flow Enter the basis for the current design capacity, the proposed incremental design capacity, and the proposed total design capacity (e.g., annual average daily flow, maximum monthly average daily flow, three-month average daily flow) for the outfall.
- 5. Basis for Effluent Limitations Indicate how and when the effluent limitations were established for this discharge. Technology Based Effluent Limitation (TBEL) means a minimum wastewater treatment requirement, established by the Department, based on treatment technology. The minimum treatment requirements may be set at levels more stringent than that which is necessary to meet water quality standards of the receiving waterbody. TBELs for domestic wastewater treatment facilities are established in Chapter 62-600, Parts II and III. Water Quality Based Effluent Limitation (WQBEL) means an effluent limitation, which may be more stringent than a TBEL, that has been determined necessary by the Department to ensure that water quality standards in a receiving body of water will not be violated. WQBELs are established in accordance with the provisions of Chapter 62-650, F.A.C.

#### 6. Description of Receiving Waters –

- a. Provide the name of the waterbody as designated on a USGS map of the area. If the discharge is to an unnamed tributary, state and provide the name of the first body of water fed by that tributary which is named on the map (e.g., unnamed ditch to Vaughan Creek; unnamed ditch to Serpent River, where Serpent River is the first waterbody that is named on the map and is reached by the discharge).
- b. Indicate whether the receiving waters are fresh or marine/brackish.
- c. Indicate the class of the receiving waterbody as defined in Chapter 62-302, F.A.C., and whether the receiving waterbody is an Outstanding Florida Water (OFW) or an Outstanding National Resource Water (ONRW). If yes, name the OFW or ONRW and locate on a USGS map.
- d. If known, provide the name of the watershed in which the receiving water is located. If known, also provide the 14-digit watershed code assigned to this watershed by the U.S. Soil Conservation Service.

- e. If known, provide the name of the State Management/River Basin into which this outfall discharges. If known, also provide the 8-digit hydrologic cataloging unit code assigned by the U.S. Geological Survey.
- f. If known and if the water body is a river or stream, provide the acute and chronic critical low flow in cubic feet per second (cfs). If you are unsure of these numbers, the U.S. Geological Survey may be able to give them to you or you may be able to get these numbers from prior studies.
- g. Give the total hardness of the receiving stream at critical low flow, in milligrams per liter of CaCO<sub>3</sub>, if applicable.
- 7. *Outfall Information* If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete this item. If no, enter "NA". The discharge depth below water surface and the receiving water bottom depth below water surface should be provided for mean flow conditions.
- 8. Surface Water Improvement and Management (SWIM) Answer Items a. d. pertaining to any applicable SWIM plans for the waterbody to which the facility discharges.
- 9. Additional Information Required for Intermittent or Periodic Discharges For each seasonal or periodic discharge identified in Section 1, Item 7, provide the frequency of the discharge. If the discharge is intermittent, from a holding pond, lagoon, etc., give the actual or approximate number. Also, provide the average duration and average volume of the discharge per incidence, and identify the months during the year when the discharge normally occurs. If the seasonal discharge is a limited wet weather discharge permitted in accordance with Rule 62-610.860, F.A.C., complete Item 10 of this section.
- 10. Additional Information Required for Limited Wet Weather Discharges Permitted in Accordance with Rule 62-610.860, F.A.C. Information requirements in support of a limited wet weather discharge are contained in Rule 62-610.860, F.A.C. If all conditions specified in Rule 62-610.860, F.A.C., are met, a Water Quality Based Effluent Limitation (WQBEL) will not be needed for this discharge. For limited wet weather discharges permitted in accordance with Rule 62-610.860, F.A.C., a simulation of operation of the reuse, storage, and limited wet weather discharge system for an average rainfall year shall be included in the preliminary design report in addition to the information required by Rule 62-610.860(2), F.A.C. Also, a description of the gauging method and the facilities that will be used to measure stream flow in the receiving waterbody upstream of the point of discharge should be included in the report. The gaging station should be located on a USGS map.
- 11. Additional Information Required for Wetland Discharges If the discharge is to a wetland, complete this item. Chapter 62-611, F.A.C., contains regulations for discharge of domestic wastewater to wetlands.
- 12. *Effluent Testing Information* Applicants must provide data from a minimum of three samples taken within four and one-half years prior to the date of the permit application. Values must be representative of the seasonal variation in the discharge from each outfall or represent best engineering estimates for proposed treatment or disposal systems. Existing data may be used, if available, in lieu of sampling done solely for the purpose of this application. The Department may require additional samples, as appropriate, on a case-by-case basis. All existing data that is collected within four and one-half years of the application must be included in the pollutant data summary. If, however, the applicant samples for a specific pollutant on a monthly or more frequent basis, it is only necessary, for such pollutant, to summarize all data collected within one year of the application. For facilities that have not been in operation for one year, data reported should represent the existing period of record with a note to that effect.

Sampling schedules, locations, and methodology shall be as specified in Rule 62-601.500, F.A.C. Sampling and testing methods shall be in accordance with Rule 62-601.400, F.A.C. Applicants should use methods that enable pollutants to be detected at levels adequate to meet water quality standards. Where no approved method can detect a pollutant at the water quality-based standards level, the most sensitive approved method should be used. If the applicant believes that an alternative method should be used (e.g., due to matrix interference), the applicant should obtain prior approval from the Department. If an alternative method is specified in the existing permit, the applicant should use that method unless otherwise directed by the Department. Where no approved analytical

method exists, an applicant may use a suitable method but must provide a description of the method. For the purposes of the application, "suitable method" means a method that is sufficiently sensitive to measure as close to the water quality-based standard as possible.

Indicate the method used for each pollutant in the "Analytical Method" column of the pollutant tables. If a method has not been approved for a pollutant for which you are providing data, you may use a suitable method to measure the concentration of the pollutant in the discharge, and provide a detailed description of the method used or a reference to the published method. The description must include the sample holding time, preservation techniques, and the quality control measures used. In such cases, indicate the method used and attach to the application a narrative description of the method used.

The applicant should provide the method detection limit (MDL) and practical quantification limit (PQL). All analytical results must be reported using the actual numeric values determined by the analysis. In other words, even where analytical results are below the detection or quantitation level of the method used, the actual data should be reported, rather than reporting "non-detect" ("ND") or "zero" ("0"). Because the endpoint of the method has also been reported along with the test results, the Department will be able to determine if the data are in the "non-detect" or "below quantitation" range. For any dilutions made and any problems encountered in the analysis, the applicant should attach an explanation and any supporting documentation with the application. For GC/MS, report all results found to be present by spectral confirmation (i.e., quantitation limits or detection limits should not be used as a reporting threshold for GC/MS).

Total recoverable metals are measured from unfiltered samples using EPA methods specified in 40 CFR Part 136.3. A digestion procedure is used to solubilize suspended materials and destroy possible organic metal complexes. The method measures dissolved metals plus those metals recovered from suspended particles by the method digestion.

#### 13. Additional Application Information for Applicants with a Design Flow Greater Than or Equal to 0.1 mgd

a. Effluent Testing Data. Applicants that discharge to waters of the US must provide effluent testing data for the listed parameters. Provide the indicated effluent testing for each outfall through which effluent is discharged. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

Facilities that do not use chlorine for disinfection, do not use chlorine elsewhere in the treatment process, and have no reasonable potential to discharge chlorine in their effluent may delete chlorine from the table.

- b. *Inflow and Infiltration.* Estimate the average daily flow rate of inflow and infiltration in gallons per day and steps the facility is taking to minimize inflow and infiltration.
- c. Operation/Maintenance Performed by Contractor(s). If a contractor carries out any operational or maintenance aspects associated with wastewater treatment or effluent quality at this facility, provide the name, mailing address, and telephone number of each such contractor. Also provide a description of the responsibilities of the contractor. Attach additional pages if necessary.
- 14. Expanded Effluent Testing Data: 1.0 mgd and Pretreatment Treatment Works If the treatment works has a design flow greater than or equal to 1.0 mgd or it has (or is required to have) a pretreatment program, or is otherwise required to provide the data, then provide effluent testing data for the listed pollutants. Provide the indicated effluent testing information and any other information required for each outfall through which effluent is discharged. All information reported must be based on data collected through analyses conducted using 40 CFR Part 136 methods. In addition, these data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. Indicate in the blank rows provided below any data you may have on pollutants not specifically

listed in this form. At a minimum, effluent testing data must be based on at least three pollutant scans and must be no more than four and one-half years old.

# SECTION 3. B. REUSE AND LAND APPLICATION SYSTEMS

- 1. *Reuse or Land Application System Serial Number and Name* Assign a 4-digit number beginning with R001 for each type of reuse or land application system identified in Section 1, Item 7. Reuse or land application system serial numbers must be consecutive for each additional reuse or land application system described; hence, the second reuse or land application system serial number would be R002, the third R003, etc. Enter this number at the top of each page of Section 3. B.
- 2. *Reuse or Land Application System Location* Provide the name of the county, the name of city or town (if applicable), and the name of the street where the reuse or land application system is located. If the reuse or land application system is not located on a named street, provide a description of the location of the reuse or land application system. Provide the latitude and longitude for the centroid of the reuse or land application site.
- 3. **Design Capacity of the Reuse or Land Application System** For the reuse or land application system identified in Item 1 of this section, provide the current design capacity, the proposed incremental design capacity, and the proposed total design capacity in million gallons per day (mgd) to three decimal places.
- 4. Basis of Design Flow Enter the basis for the current design capacity, the proposed incremental design capacity, and the proposed total design capacity (e.g., annual average daily flow, maximum monthly average daily flow, three-month average daily flow) for the reuse or land application system.
- 5. *Application Areas and Rates* For each reuse or land application site used by the treatment facility, provide the area irrigated, the average application rate, and the site capacity. List major users (greater than or equal to 0.1 mgd), such as golf courses, separately. Locate all areas or sites receiving reclaimed water along with the overall reuse service area on the USGS map provided under Section 8., Item 1.c.

#### SECTION 3.C. GROUND WATER DISPOSAL BY UNDERGROUND INJECTION

If the proposed project includes ground water disposal by underground injection, application for construction or operation of the injection well shall be made on DEP Form 62-528.900(1). Application for treatment facilities for the injection well shall be made on this form.

- 1. Underground Injection Well Facility Serial Number and Name Assign a 4-digit serial number beginning with U001 for each underground injection well facility identified in Section 1, Item 7. Underground injection well facility serial numbers must be consecutive for each additional underground injection well facility described; hence, the second underground injection well facility serial number would be U002, the third U003, etc. Enter this number at the top of each page of Section 3. C.
- 2. Underground Injection Well Facility Location Provide the name of the county, the name of city or town (if applicable), and the name of the street where the underground injection well facilities are located. If the underground injection well facilities are not located on a named street, provide a description of the location of the facilities. State the precise location of the underground injection well facilities.
- 3. Underground Injection Well Facility DEP Identification Number or Permit Application Number Enter the DEP identification number for each underground injection well facility identified in Section 1, Item 7. If a DEP identification number has not been assigned, enter the permit application number for the underground injection well facilities.

- 4. *Design Capacity of the Underground Injection Well Facility* For the underground injection well facilities identified in Item 1 of this section, provide the current design capacity, the proposed incremental design capacity, and the proposed total design capacity in million gallons per day (mgd) to three decimal places.
- 5. *Basis of Design Flow* Enter the basis for the current design capacity, the proposed incremental design capacity, and the proposed total design capacity (e.g., annual average daily flow, maximum monthly average daily flow, three-month average daily flow) for the injection well facilities.

## SECTION 4. SCHEDULED IMPROVEMENTS AND SCHEDULES OF IMPLEMENTATION

Provide the information requested for any scheduled improvements to the wastewater facilities, whether uncompleted or proposed and whether developed by the applicant (i.e., self-imposed capital improvements program) or imposed by local, Federal, or State agencies or by court action. Include only those improvements that will affect the wastewater treatment, effluent quality, or design capacity of your treatment works (such improvements may include regionalization of treatment works). If the wastewater facilities have more than one implementation schedule, either because of different levels of authority imposing different schedules (Item 1.b) or staged construction of separate operational units (Item 1.c), submit a separate Section 4 for each one.

#### 1. Improvements Required

- a. Discharge Serial Numbers, Reclaimed Water Reuse and Land Application System Serial Numbers, and Underground Injection Well Facility Serial Numbers Affected List the discharge serial numbers, reuse or land application system serial numbers, and underground injection well facility serial numbers assigned in Section 3 that are covered by this implementation schedule.
- b. *Authority Imposing Requirement* Check the appropriate item indicating the authority imposing the implementation schedule.
- 2. Implementation Schedule and Actual Completion Dates Indicate, as accurately as possible, scheduled and actual completion dates. For improvements imposed by local, Federal, or State agencies or by court action, provide the dates imposed by the compliance schedule and any actual dates of completion, as applicable. For self-imposed capital improvement programs, provide, at a minimum, the planned and actual completion dates for completion of final plans and specifications, begin construction, begin reuse or disposal, and operational level attained. A description of the implementation dates follows.
  - a. *Preliminary Plans Complete* The date the preliminary engineering report is to be completed.
  - b. *Final Plans and Specifications Complete* The date the detailed plans and specifications are to be completed.
  - c. *Financing Complete* The date all financing arrangements are to be completed.
  - d. *Site Acquired* The date the land to be used for the treatment works is to be acquired.
  - e. Begin Construction The date construction is scheduled to begin.
  - f. End Construction The date construction is scheduled to be completed.
  - g. Begin Reuse or Disposal The date the treatment facility or reuse or disposal system is scheduled to be placed into operation.
  - h. *Operational Level Attained* The date the effluent or reclaimed water level is scheduled to comply with the final reclaimed water or effluent limitations.

#### SECTION 5. INDUSTRIAL WASTEWATER CONTRIBUTIONS

Domestic wastewater treatment facilities that meet any of the criteria in a. through c. below must develop a pretreatment program in accordance with Chapter 62-625, F.A.C.:

- a. Any facility owned or operated by a public utility, as defined in Rule 62-625.200, F.A.C., (or combination of facilities operated by the same utility) with a total design flow greater than 5 million gallons per day and receiving pollutants from industrial users which pass through or interfere with the operation of the facility or are otherwise subject to pretreatment standards;
- b. Any facility owned or operated by a public utility with a design flow of 5 million gallons per day or less, if the Department finds that the nature or volume of the industrial influent causes or contributes to treatment process upsets, violations of wastewater effluent limitations, contamination of domestic wastewater residuals, or other circumstances requiring a pretreatment program in order to prevent interference with the facility or pass through; and
- c. Any facility providing reclaimed water to public access areas in accordance with Chapter 62-610, F.A.C, unless the facility provides an affirmative demonstration that there are no significant industrial users discharging into the facility.

If a facility identified as needing a pretreatment program does not have an approved pretreatment program, the Department shall include a compliance schedule in their permit for the development of a program meeting the requirements of Chapter 62-625, F.A.C.

Each domestic wastewater treatment facility is required to complete a separate Section 5 for each significant industrial user as defined in Rule 62-625.200, F.A.C., discharging wastewater into the domestic wastewater facility. It is the responsibility of the applicant to obtain the required information on any significant industrial user of the facility. Actual data should be provided if available. If actual data is not available, Section 5 should be marked "interim" and a best estimate should be provided with a statement indicating the amount of time required to provide the actual information. Filing the permit application should not be delayed beyond the filing deadline for completion of Section 5. However, any missing information is to be submitted when it becomes available. If certain of the requested information does not apply, it should be marked "NA".

- 1. Significant Industrial User Information Give the name and the address that designates the location of the facility.
- 2. Industrial Processes Affecting of Contributing to the SIU's Discharge Describe the actual process(es) (rather than simply listing them) at the SIU that affect or contribute to the SIU's discharge. For example, in describing a metal finishing operation, include such information as how the product is cleaned prior to finishing, what type of plating baths are in operation (e.g., nickel, chromium), how paint is applied, and how the product is polished. Attach additional sheets if necessary.
- 3. *Principal Product(s) and Raw Material(s)* List principal products that the SIU generates and the raw materials used to manufacture the products.
- 4. *Flow Rate* "Process wastewater" means any water that, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. Indicate the average daily volume, in gallons per day, of process wastewater and non-process wastewater that the SIU discharges into the collection system. Specify whether the discharges are continuous or intermittent.
- 5. *Pretreatment Standards* Indicated whether the SIU is subject to local limits or categorical pretreatment standards. "Local limits" are enforceable local requirements developed by treatment facilities to address Federal

standards as well as state and local regulations. "Categorical pretreatment standards" are national technologybased standards developed by EPA, setting industry-specific effluent limits. These standards are implemented by 62-625.410, F.A.C. If the treatment facility is subject to categorical pretreatment standards, indicate the category and subcategory.

- 6. **Problems at the Treatment Facility Attributed to Waste Discharged by the SIU** Provide information concerning any problems the treatment facility has experienced that are attributable to discharges from the SIUs. Problems may include upsets or interference at the plant, corrosion in the collection system, or other similar events in the past three years.
- 7. *RCRA Waste* Indicate whether the treatment facility currently receives or has received RCRA waste by truck, rail, or dedicated pipe in the past three years.
- 8. Waste Transport Indicate the method by which RCRA waste is received at the treatment facility.
- 9. *Waste Description* Provide the EPA hazardous waste number, which are located in 40 CFR Part 261, Subparts C and D, and the amount (in volume or mass) received.
- 10. *Remediation Waste* Indicate whether this treatment works currently receives waste from a CERCLA (Superfund) site or plans to accept waste from a CERCLA site in the next five years. If it does, provide the information requested in 13 through 15 once for each site.
- 11. *Waste Origin* Provide information about the CERCLA site that is discharging waste to the treatment works. Information must include a description of the type of facility and an EPA identification number if one exists.
- 12. *Pollutants* Provide a list of the pollutants that are or will be discharged by the CERCLA site and the volume and concentration of such pollutants.
- 13. *Waste Treatment* Provide information concerning the treatment used (if any) by the CERCLA site to treat the waste prior to discharging it to the treatment works. The information should include a description of the treatment technology, information on the frequency of the discharge (continuous or intermittent) and any data concerning removal efficiency.

# SECTION 6. ADDITIONAL INFORMATION REQUIRED PERMIT RENEWALS

Complete this section if the permit application is to renew an existing domestic wastewater facility permit. Attach separate sheets entitled "Additional Information" as indicated.

# SECTION 7. ADDITIONAL INFORMATION REQUIRED FOR RESIDUALS/SEPTAGE MANAGEMENT FACILITIES

If the facility accepts residuals from one or more wastewater treatment facilities for further treatment or disposal, this section should be completed. This section should also be completed for septage management facilities treating more than 10,000 gallons per day monthly average daily flow of septage. Residuals/septage use or disposal information should be provided in Section 1, Item 9. Residual/septage treatment information should be provided in Section 2, Item 4. All other applicable sections of this form should also be completed.

A separate Item 3 of this section must be completed for each wastewater treatment facility which transports residuals to this residuals/septage management facility.

### SECTION 8. DOCUMENTATION SUBMITTED

Indicate whether the following documentation is attached to this application.

- 1. General Application Requirements A process flow diagram, site plan, and location map are required with this application. All maps and drawings should be on paper or other material suitable for reproduction. If possible, all sheets should be approximately letter size with margins suitable for filing and binding. As few sheets as necessary should be used to clearly support the application. All sheets should include a title which includes the applicant's name, facility location, date of drawing, and designation of the number of sheets of each diagram type as "Page \_\_\_\_\_ of \_\_\_".
  - a. *Process Flow Diagram* The process flow diagram, a line drawing of the wastewater flow through the treatment facility, should identify each treatment unit, including all bypass piping and all backup power sources or redundancy in the system (including the residuals treatment processes), and show the current average design flows to each unit. The title is to be headed by the statement "Process Flow Diagram."
  - b. *Site Plan* The site plan should show the current status (i.e., operational, not operational, abandoned, etc.) and the location of all operation and unit processes. The title is to be headed by the statement "Site Plan."
  - c. Location Map The location map should be an 8 1/2" x 11" copy of a USGS map extending one mile beyond the facilities boundaries showing the treatment facility location, the reuse or disposal system location, the land application system site(s), and the receiving waterbody location, as applicable. The location of each discharge structure and reuse or land application site, including any and all outfall devices, dispersive devices, and nonstructural points of reuse or disposal should be shown. For discharges to surface waters, the structure must be identified using the 4-digit serial number specified in Section 3.A.1. The location of each reuse and land application system must be identified using the 4-digit serial number specified in Section 3.B.1. The location of each underground injection well facility must be identified using the 4-digit serial number specified in Section 3.C.1. On all maps of rivers, the direction of the current is to be indicated by an arrow. In tidal waters, the directions of the ebb and flow tides are to be shown. The map should show those wells, springs, sinkholes, other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant in the map area. The title is to be headed by the statement "Location Map". Be sure to include the name and date of the USGS map provided.
  - d. *Agricultural Use Plan or Dedicated Site Plan* If the method of residuals use or disposal is by land application, attach as applicable, an up-to-date Agricultural Use Plan or Dedicated Site Plan with the application as required by Chapter 62-640, F.A.C.
  - e. *Capacity Analysis Report* Applications for modifications to existing facilities and applications for permit renewal shall include a capacity analysis report if required by Rule 62-600.405, F.A.C.
  - f. *Results of Whole Effluent Biological Toxicity Testing* For facilities discharging to surface waters, applications for modifications to existing facilities and applications for permit renewal shall include the results of whole effluent biological toxicity testing as required by the DEP Guide to Permitting Wastewater Facilities or Activities Under Chapter 62-620, F.A.C.
  - g. *Reuse Feasibility Study* In accordance with Section 403.064, Florida Statutes, if the wastewater treatment facility is located in an area that has been designated as a water resource caution area by the Water Management District, a reuse feasibility study must be submitted with this application.
  - h. Binding Agreements and Documentation of Controls on Individual Users of Reclaimed Water In accordance with the DEP Guide to Permitting Wastewater Facilities or Activities Under Chapter 62-620, F.A.C., for projects involving the discharge of reclaimed water or effluent onto property not owned or under the direct control of the permittee, the application shall include a binding agreement, generally for the term of the useful life of any treatment, reuse, or disposal facilities, to ensure adequate operation and maintenance of

facilities. For reuse projects permitted under Part III of Chapter 62-610, F.A.C., the permittee shall submit documentation of controls on individual users of reclaimed water through detailed agreements or by local ordinances as set forth in Rule 62-610.491, F.A.C.

#### 2. Additional Application Requirements for New Facilities and Modifications to Existing Facilities

- a. Preliminary Design Report For all projects involving construction of new facilities or modifications to existing facilities, a preliminary design report must be submitted in support of this application pursuant to the DEP Guide to Permitting Wastewater Facilities or Activities Under Chapter 62-620, F.A.C. The preliminary design report must address each applicable section of Rule 62-610.310, F.A.C., for reuse and land application systems, and Rule 62-640.880, F.A.C., for residuals management facilities. The preliminary design report shall be signed and sealed by the engineer of record.
- b. Documentation of Compliance with Antidegradation Requirements If the proposed project includes a new discharge to surface waters or an expansion of an existing discharge to surface waters, attach documentation supporting that the proposed new or expanded discharge meets the antidegradation requirements contained in Rule 62-4.242, F.A.C.
- c. *Public Service Commission (PSC) Certification Number and Copy of Certificate or Order Number and Copy of Order* In accordance with the DEP Guide to Permitting Wastewater Facilities or Activities Under Chapter 62-620, F.A.C., new domestic wastewater treatment plants serving an area located in a county regulated by the PSC must obtain, before permit issuance, either a certificate of authorization or an order of exemption. Attach a copy of the certification number and a copy of the certificate or the order number and a copy of the order.
- d. Letter from the Management and Storage of Surface Waters (MSSW) Permitting Agency To comply with the requirements of Rule 62-610.830, F.A.C., if the project is to be permitted under Part III of Chapter 62-610, F.A.C., if golf course lakes are used for storage, and if these lakes also serve as part of the stormwater management system, provide a concurrence letter from the Management and Storage of Surface Waters (MSSW) permitting agency stating that the lakes have sufficient capacity for both stormwater management and storage of reclaimed water.
- e. *Request for Approval of Monitoring Plans for Discharge of Domestic Wastewater to Wetlands* If the discharge is to a wetlands, attach to this application a completed DEP Form 62-620.910(16) in accordance with Rule 62-611.600, F.A.C.
- f. Concurrent Application for Ground Water Disposal by Underground Injection If the discharge is ground water disposal by underground injection, concurrent application using DEP Form 62-528.900(1) is required.
- g. *Application for Monitoring Plan Approval* If the facility is required to monitor groundwater in accordance with Chapter 62-522.600, F.A.C., a complete DEP Form 62-522.900(1), Application for Monitoring Plan Approval, shall be submitted with this application.
- 3. Additional Application Requirements for Permit Renewals
  - a. *Operation and Maintenance Performance Report* An operation and maintenance performance report shall be submitted with the application pursuant to Rule 62-600.735, F.A.C.
  - b. Reclaimed Water or Effluent Analysis Report In accordance with Rule 62-601.300, F.A.C., wastewater treatment facilities with a permitted capacity of 100,000 gpd or greater that discharge to ground waters via reuse or land application systems shall complete and submit DEP Form 62-620.910(15), Reclaimed Water or Effluent Analysis Report, with any application to renew a permit.

- c. *Technical Evaluation of Need to Revise Local Pretreatment Limits* For all domestic wastewater facilities with an approved pretreatment program, the applicant shall submit a copy of the latest program approval letter with the application and a written technical evaluation of the need to revise local limits in accordance with Chapter 62-625, F.A.C.
- d. *Results of Mechanical Integrity Tests* For underground injection facilities, attach the results of mechanical integrity tests as referenced in Rule 62-528.300, F.A.C.

# SECTION 9. CERTIFICATIONS

As indicated, complete the appropriate certifications for new facilities, modifications to existing facilities, and permit renewals. This application and all attachments shall be signed in accordance with Rule 62-620.305, F.A.C. Also, this application and all attachments shall be signed and sealed by a professional engineer registered in Florida in accordance with Rule 62-620.310, F.A.C.

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# WASTEWATER APPLICATION FORM 2A FOR A DOMESTIC WASTEWATER FACILITY PERMIT

Instructions for selected items are included in the "INSTRUCTIONS FOR FORM 2A". Refer to these instructions before filling out each item.

# SECTION 1. APPLICANT AND FACILITY DESCRIPTION

1.	Application Type	<ul> <li>New</li> <li>Substantial Mo</li> <li>Permit Renewa</li> </ul>	odification al	
2.	Facility Type	Wastewater Tr Reuse or Dispo Limited Wet W Residuals/Sept	eatment osal Veather Discharge age Management	
3.	Treatment Facility Information			
	a. Name	Progress Energy Florida, Inc., Cr	ystal River Units	1,2,3 WWTP
b. Facility Identification Number		FLA118753		
	c. Location			
	Number and Street	15760 W. Power Line Street		
	City/State/Zip Code	Crystal River. FL 34428-6708		
	Telephone	(352) 464-4484		
	Latitude	28°	57'	23"N
	Longitude	<u> </u>	41'	<u>58''W</u>
	Dates Coordinates Determined	May 28, 2008		
	Method Used to Obtain Coordinates Google Earth			

d. Ownership Type

Municipal
 County
 State
 Private

e. Contact

	Name	Douglas W. Yowell	
	Title	Sr. Environmental Specialist	
	Telephone	(727) 820-5228	
	f. Facility Mailing Address		
	Number and Street	15760 West Power Line Street	
	City/State/Zip Code	Crystal River, FL 34428-6708	
	g. Year Facility Began Operation	1973	
4.	Applicant or Authorized Representative		
	Legal Name	Florida Power Corp. d/b/a Progress Energy Florida, Inc.	
	Number and Street	15760 West Power Line Street	
	City/State/Zip Code	Crystal River, FL 34428-6708	
	Telephone		
	Contact Person	Douglas W. Yowell	
	Title	Sr. Environmental Specialist	
	Telephone Number	_(727) 820-5228	
	Is the applicant the owner or operator (or both) of the facility? 🛛 Owner 🔲 Operator		
	Indicate whether correspondence regarding the	is facility should be directed to the facility or the applicant. Facility X Applicant	
5.	Project Name and Description		
Pro	ogress Energy Florida, Inc., Crystal River Units	1, 2, 3 Domestic WWTP	

# 6. Municipalities or Areas Served

Name of Municipality or Area	Ownership	Population Served
Progress Energy Florida, Inc., Crystal River Units 1, 2, 3	Progress Energy FL.	940 to 3015 during outages
	Total Population Served	940 to 3015 during outages

#### 7. Reclaimed Water Reuse and Effluent Disposal

Method of Reuse or Disposal	Number of Reuse or Disposal Points	Total Design Capacity (mgd)	Basis of Design Flow
Surface Waters - Excluding Ocean Outfalls and Wetlands (Rule 62-600.510, F.A.C.)			
Ocean Outfalls (Rule 62-600.520, F.A.C.)			
Wetlands (Rule 62-600.620, F.A.C.)			
Reuse of Reclaimed Water and Land Application (Rule 62-600.530, F.A.C.)	1	0.030 mgd	TMADF .
Ground Water Disposal by Underground Injection (Rule 62-600.540, F.A.C.)			
Other (Describe)			•
Total	1	0.030	TMADF

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#### 8. Flows to Another Wastewater Facility

a. Does the facility discharge or transport treated or untreated wastewater to another treatment facility?

b. If yes, describe the mean(s) by which the wastewater from the treatment facility is discharged or transported to the other treatment facility (e.g., collection/transmission system, reclaimed water distribution system)? N/A

If transport is by a party	other than the applicant, provide the following:	
Transporter name:		
Mailing Address:		
Contact person:		
Title:	••••••	·····
Telephone number:		
c. For each treatment fa	cility that receives this discharge, provide the following:	
Name:		
Mailing Address:		
Contact person:		
Title:	· · · · · · · · · · · · · · · · · · ·	

Telephone number:

- d. Facility Identification Number of Facility Which Receives the Flow
- e. Average Daily Flow Rate to the Receiving Facility

#### **Residuals Use or Disposal** 9.

- a. Amount of Residuals Generated by the Facility
- b. Does this facility receive residuals from another facility for further treatment and disposal?
- c. Method of Residuals Use or Disposal

Method	Number of Sites or Number of Receiving Facilities	Dry Tons Used or Disposed per Year
and Application Chapter 62-640, F.A.C.)		
Distribution and Marketing Chapter 62-640, F.A.C.)		
Landfill Disposal (Chapter 62-701, F.A.C.)		
ncineration (Chapter 62-200 Series, F.A.C.)		
Fransport to Another Treatment	2	1.13987
Other (Describe)		
	Total	1.13978

d. If residuals are transported to another facility for landfill disposal, incineration, or treatment, provide the facility name, Facility identification number and address.

#### Name

American Pipe & Tank, Inc. FLA 010776 FLA356697 Facility Identification Number 4310 SE 73rd. St. Number and Street 412 Cypress Rd. Ocala, FL 34480 Ocala, FL 34480 City/State/Zip Code Marion County Telephone (352) 236-4281 Treatment Processes Used by Receiving Facility Lime Stabilization

DEP Form 62-620.910(2) Effective 6/1/01

N/A mgd

dry tons/year

🗌 Yes 🖾 No

1.13987

#### 10. Permits and Applications

a. Expiration Date of Current NPDES Permit

May 8, 2010

b. Expiration Date of Current DEP Permit

April 28, 2009 (domestic wastewater permit)

c. Permit Number of Any Existing Environmental Permits

NPDES	FL0000159	PSD	
UIC		Other	IWW Permit - FLA016960
RCRA		Other	

d. Orders and Notices

Type or Order or Notice	Issuing Agency	Date of Order or Notice
Notice or Violation	none pertaining to domestic ww permit	
Consent Order	none pertaining to domestic ww permit	
Administrative Order	none pertaining to domestic ww permit	
Other (Describe.)	none pertaining to domestic ww permit	

2A-5

# SECTION 2. TREATMENT FACILITY DESCRIPTION

#### 1. Flow

a. Design Capacity

Current Design Capacity Proposed Incremental Design Capacity Proposed Total Design Capacity

b. Basis of Design Flow

0.030	mgd
+	mgd
=	mgd

Annual Average Daily Flow
 Maximum Monthly Average Daily Flow
 Three-Month Average Daily Flow
 Other. If other, specify.

	Two Years Ago	Last Year	This Year	
c. Annual Average Daily Flow Rate	0.008	0.010	0.009	mgd
d. Maximum Daily Flow Rate	0.019	0.025	0.023	mgd

# 2. Design Treatment Levels

Parameter	Effluent Concentration	Units	Basis	Percent Removal
pН	6.0 - 8.5	Standard Units		
CBOD <sub>5</sub>	20 /30 / 60 *	mg/L	Permit Limits	> 90%
TSS	20 / 30 / 60 *	mg/L	Permit Limits	
Fecal Coliform	200 mo. avg.	# / 100 mL	Permit Limit	
Nitrate (as N)	12.0 (max.)	mg/L	Permit Limit	
TRC	> 0.5	mg/L	Permit Limit	

#### 3. Disinfection Level Provided

Low-level

Intermediate

High-level

High-level Alternative

If the facility disinfects by chlorination and the discharge is to surface waters, is dechlorination provided?

🗌 Yes 🗌 No


### 4. Residuals Treatment

a.	Class of Residuals	Class AA (Rule 62-640.850, F.A.C.) Class A (Rule 62-640.600, F.A.C.) Class B (Rule 62-640.600, F.A.C.) Other

If other, describe Residuals transported off-site for treatment and disposal

b. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce pathogens in sewage sludge:

·····

N/A				

c. Which vector attraction reduction option is met for the sewage sludge at your facility?

	Option 1 (Minimum 38 percent reduction in volatile solids)
	Option 2 (Anaerobic process, with bench-scale demonstration)
	Option 3 (Aerobic process, with bench-scale demonstration)
	Option 4 (Specific oxygen uptake rate for aerobically digested sludge)
	Option 5 (Aerobic processes plus raised temperature)
	Option 6 (Raise pH to 12 and retain at 11.5)
	Option 7 (75 percent solids with no unstabilized solids)
	Option 8 (90 percent solids with unstabilized solids)
	Option 9 (Injection below land surface)
	Option 10 (Incorporation into soil within 6 hours)
	Option 11 (Covering active sewage sludge unit daily)
$\boxtimes$	None or unknown

d. Describe, on this form or another sheet of paper, any treatment processes used at your facility to reduce vector attraction properties of sewage sludge:

N/A



## e. Parameter Concentrations

POLLUTANT	CONC.	UNITS
Total Nitrogen	11	% dry weight
Total Phosphorus	2.2	% dry weight
Total Potassium	0.79	% dry weight
Arsenic	< 5.1	mg/kg dry weight
Cadmium	-10	mg/kg dry weight
Chromium	120	mg/kg dry weight
Copper	1100	mg/kg dry weight
Lead	120	mg/kg dry weight
Mercury	1.9	mg/kg dry weight
Molybdenum	53	mg/kg dry weight
Nickel	98	mg/kg dry weight
Selenium	10	mg/kg dry weight
Zinc	3300	mg/kg dry weight
pН	6.06	standard units
Total Solids	0.77	%
Other Parameters		

Date of Sample

July 11, 2007

5. Reliability Class

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	Class I
	Class II
$\boxtimes$	Class III
	Other Equivalent Reliability



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# SECTION 3. A. DISCHARGES TO SURFACE WATERS (including wetlands)

## 1. Discharge Serial Number and Name

Discharge Serial Number		Not applicable - No discharge to surface water				
2.	Discharge Location					
	County Street or Description City or Town (if applicable) Zip Code Latitude Longitude Dates Coordinates Determined Method Used to Obtain Coordinates	o ' "N o ' "W				
3.	Design Capacity of the Outfall					
	Current Design Capacity Proposed Incremental Design Capacity Proposed Total Design Capacity	mgd + mgd = mgd				
4.	Basis of Design Flow	<ul> <li>Annual Average Daily Flow</li> <li>Maximum Monthly Average Daily Flow</li> <li>Three-Month Average Daily Flow</li> <li>Other</li> </ul>				
	If other, specify					
5.	Basis for Effluent Limitations	TBEL TEvel I WQBEL Level II WQBEL Other				
	If other, specify					
	Date Effluent Limitations Established					
6.	Description of Receiving Waters					
	a. Name of Receiving Water					
	b. Type of Receiving Waterbody	<ul> <li>Fresh</li> <li>Brackish or Marine</li> </ul>				
	c. Classification of Receiving Waterbody	Class I Class II Class III Class IV Class V				

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	Is the receiving waterbody contiguous to, or identified as, an Outstanding Florida Water (OFW) or an Outstanding National Resource Water?	
	If yes, name and locate on a USGS man	
	Does this facility discharge to a receiving water that is eith eventually flow through) Indian Country?	er in Indian Country or that is upstream from (and $$ No
	d. Name of Watershed (if known)	
	United States Soil Conservation Service 14-digit Watershed Code (if known)	
	e. Name of State Management/River Basin (if known)	
	United States Geological Survey 8-digit Hydrologic Cataloging Unit Code (if known)	
	f. Critical low flow of receiving stream (if applicable)	
	acute cfs chronic	cfs
	g. Total hardness of receiving stream at critical low flow (if a	pplicable) mg/l of CaCO <sub>3</sub>
7.	Outfall Information	
	Description of Outfall and Diffuser	
	Construction Materials	
	Length From Shore Diameter	feet inches
	Discharge Depth Below Water Surface	feet
	Receiving Water Bottom Depth Below Water Surface Is the outfall equipped with a diffuser?	feet No
8.	Surface Water Improvement and Management (SWIM)	
	a. Will the discharge affect any SWIM plan waterbodies?	🗌 Yes 🛛 No
	b. If yes, name the waterbody	
	c. Has the SWIM plan been approved by a water management district and the Department?	Yes No
	d. If yes, attach documentation that the proposed discharge is consistent with the SWIM plan.	

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# 9. Additional Information Required for Intermittent or Periodic Discharges

Frequency		Times	s Per `	Year		
Duration		Days				
Volume		Thous	sand C	Gallons Per	Incid	ent
Occurrence						

Jan	May	Sep
Feb	Jun	Oct
Mar	Jul	Nov
Apr	Aug	Dec

# 10. Additional Information Required for Limited Wet Weather Discharges Permitted in Accordance with Rule 62-610.860, F.A.C.

a. Downstream Waterbody

Name of nearest downstream lake, estuary, reservoir, OFW, or Class I water. Show location on a USGS map.

Classification of Downstream Waterbody

N/A - No discharge to surface water
Class IV
Class V

Distance Downstream

Average Flow Velocity During Anticipated Periods of Discharge

Travel Time During Anticipated Periods of Discharge

b. Rainfall Information

Rainfall Gauging Station Location

Period of Record Analyzed: Beginning Year Ending Year Number of Years Average Annual Rainfall

miles

\_\_\_\_

feet per second

hours

inches per year



	c.	Simulation of Operation of the Reuse, Storage, and Limited Wet Weather Discharge for an Average Rainfall Year	
		Year Simulated	
		Annual Rainfall During Average Year	 inches
		Number of Days Limited Wet Weather Discharge is Used During Average Rainfall Year (N)	 days
		Percent of the Days of the Year that the Limited Wet Weather Discharge will Occur During Average Rainfall Year (P)	 %
		<u>Note:</u> P = [ ( N ) / ( 365 ) ] x 100%. P cannot exceed 25% or be less than 1%.	
	d.	Reclaimed Water Quality (maximum monthly average)	
		CBOD <sub>5</sub> TKN (as Nitrogen)	 mg/L mg/L
	e.	Minimum Acceptable Stream Dilution Factor (SDF)	
		<u>Note:</u> SDF = P(0.085 x CBOD <sub>5</sub> + 0.272 x TKN - 0.484) The values for CBOD <sub>5</sub> and TKN should be in terms of maximum monthly average limitations as provided in 14.d. above. The value of P should be as calculated in 14.c. above.	
	f.	Adjusted Stream Dilution Factor	
		Note: If the travel time shown in 14.a., above, is less than 24 hours, provide the adjusted minimum acceptable stream dilution factor. Adjusted SDF = SDF x (24 hours)/(travel time in hours)	
11.	A	dditional Information Required for Wetland Discharges	
	a.	Is the wetland a jurisdictional wetland (i.e. within the landward extent of waters as defined in Rule 62-301.400. F.A.C., or	

🗌 Yes 🛛 No

-

isolated and not owned entirely by one

person, or owned entirely by the State)?

b.	Will the wetland be used as a treatment wetland or receiving wetland?	<ul> <li>Treatment</li> <li>Receiving</li> </ul>
	If the wetland is to be used as a treatment wetland, attach documentation showing ownership or the applicant's legal interest in the treatment wetland.	• •
c.	If the wetland is to be used for treatment, identify the type.	<ul> <li>Man-made</li> <li>Hydrologically Altered</li> <li>Unaltered</li> </ul>
d.	Is the wetland herbaceous or woody?	Herbaceous Woody
e.	Identify the classification of surface waters within the wetland.	Class I Class II Class III Class IV Class V

f. Are the waters within the wetland part of an OFW?

# 12. Effluent Testing Information.

PARAMETER	MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE				
	Value	Units	Value	Units	Number of Samples		
pH (Minimum)	N/A	s.u.	-	-	-		
pH (Maximum)	N/A	s.u.	-	-	-		
Flow Rate	N/A						
Temperature (Winter)	N/A						
Temperature (Summer)	N/A						
* For pH_please report a m	inimum and ma	aximum daily value.					

Yes No

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAG	E DAILY DI	ANALYTICAL METHOD	MDL/ PQL	
	Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NO	DNCONVENTIO	ONAL COMPO	UNDS.			•	
CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND (CBOD)	N/A						
TOTAL SUSPENDED SOLDS (TSS)	N/A						
FECAL COLIFORM	N/A						



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#### 13. Additional Application Information for Applicants with a Design Flow Greater Than or Equal to 0.1 mgd

#### a. Effluent Testing Data

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE	DAILY DIS	ANALYTICAL METHOD	MDL/ PQL	
	Conc.	Units	Conc.	Units	Number		
					of		
					Samples		
CONVENTIONAL AND NO	NCONVENTIO	ONAL COMPO	UNDS.				
AMMONIA (as N)	N/A						
CHLORINE (TOTAL	N/A						
DISSOLVED OXYGEN	N/A						
TOTAL KJELDAHL NITROGEN (TKN)	N/A						
NITRATE PLUS NITRITE	N/A						
NITROGEN	N/A						
OIL and GREASE	N/A						
PHOSPHORUS (Total)	N/A						
TOTAL DISSOLVED SOLIDS (TDS)	N/A						
OTHER PARAMETERS	N/A						

b. Inflow and Infiltration

Estimate the average number of gallons per day that flow into the treatment works from inflow and/or infiltration N/A gpd

Briefly explain any steps underway or planned to minimize inflow and infiltration.

N/A

c. Operation/Maintenance Performed by Contractor(s).

Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor?  $\Box$  Yes  $\boxtimes$  No

If yes, list the name, address, telephone number, and status of each contractor and describe the contractor's responsibilities (attach additional pages if necessary).

Name:	
Mailing Address:	
Telephone Number:	
Responsibilities of Contrator:	

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POLLUTANT	M	AXIMU DISCH	IM DAH IARGE	LY	AV	ERAGE	RAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/ MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of		
									Samples		
METALS (TOTAL RECO	VERABL	E), CYANI	DE, PHEN	NOLS, AN	D HARDN	ESS.		r		r	r
	N/A										<b> </b>
ARSENIC	N/A			1							
BERYLLIUM	N/A		ļ								
	N/A		<b> </b>								
CHROMIUM	N/A		ļ								
	IN/A		<u> </u>	ļ							
LEAD	N/A										ļ
MERCURY	N/A			I	ļ						ļ
	N/A					ļ					ļ
SELENIUM	N/A										
SILVER	N/A										
THALLIUM	N/A										
ZINC	N/A										
CYANIDE	N/A										
TOTAL PHENOLIC COMPOUNDS	N/A										Í
HARDNESS (AS CaCO 3 )	N/A	1		<u> </u>							
Use this space (or a sep	arate shee	et) to provi I	ide inform	ation on of	ther metals	s requeste 	d by the p	ermit write	er	r	-
		2016					I				1
ACROLEIN	N/A	103.		1		T					
ACRYLONITRILE	N/A		-								
BENZENE	N/A										
BROMOFORM	N/A										
CARBON	N/A										
TETRACHLORIDE CLOROBENZENE	N/A										
CHLORODIBROMO-	N/A									(	
CHLOROETHANE	N/A	1	-	1							
2-CHLORO-	N/A		1				1				
	N/A					<b> </b>		<b> </b>			
DICHLOROBROMO-	N/A	1									
	N/A										
	N/A		1								
TRANS-1,2- DICHLORO- ETHYLENE	N/A										
1,1-DICHLORO- ETHYLENE	N/A		<u> </u>				1				
1,2-	N/A										
1,3-DICHLORO-	N/A		1		1						
FTHYLENE	N/A		+	+		·	·				<u> </u>
METHYL BROMIDE	N/A	1									

# 14. Expanded Effluent Testing Data: 1.0 mgd and Pretreatment Treatment Works.



METHYL CHLORIDE

METHYLENE CHLORIDE N/A

N/A

										· · · · ·	· · · · · · · · · · · · · · · · · · ·
1,1,2,2- TETRACHLORO-	N/A										
ETHANE TETRACHLORO-	N/A										
	N/A										
111-	N/A										
TRICHLOROETHANE											
1,1,2- TRICHLOROETHANE	N/A										
TRICHLOR-	N/A										
VINYL CHLORIDE	N/A										
Use this space (or a sep	arate shee	et) to provi	de informa	ation on ot	her volatile	e organic (	compound	ls request	ed by the perm I	it writer.	
	COMPOUR										
P-CHLORO-M-	N/A										
	N/A										
24-	N/A										
DICHLOROPHENOL											
2,4- DIMETHYLPHENOL	N/A										
4,6-DINITRO-O- CRESOL	N/A										
2,4-DINITROPHENOL	N/A										
2-NITROPHENOL	N/A						-				
4-NITROPHENOL	N/A										
PENTACHLORO- PHENOI	N/A										
PHENOL	N/A										
2,4,6- TRICHLOROPHENOL	N/A										
Use this space (or a sep	arate shee	et) to provi	de informa	ation on ot	her acid-e	xtractable	compoun	ds reques	ted by the perr	nit writer.	l
1		1	1								
1		{									
BASE-NEUTRAL COM	POUNDS.	I	I	l							
BASE-NEUTRAL COM ACENAPHTHENE	POUNDS. N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE	POUNDS. N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE	POUNDS. N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZIDINE BENZO(A)	POUNDS. N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZIDINE BENZO(A)- ANTHRACENE	POUNDS. N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZIDINE BENZO(A)- ANTHRACENE BENZO(A)PYRENE	POUNDS. N/A N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE	POUNDS. N/A N/A N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZD(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE	POUNDS. N/A N/A N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(K)- ELUOPANTHENE	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- BENZO(A)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2-	POUNDS. N/A N/A N/A N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZIDINE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE	POUNDS. N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZD(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE BIS (2- CHLOROETHYL)- ETHEP	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZD(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)-	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE BIS (2- CHLOROETHYL)- ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-ETHYLHEXYL)	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZD(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-ETHYLHEXYL) PHTHALATE 4-BROMOPHENYL PHENYL ETHER	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-THYLHEXYL) PHTHALATE 4-BROMOPHENYL PHTHALATE	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2-ETHYLHEXYL) PHTHALATE 4-BROMOPHENYL PHTHALATE BUTYL BENZYL PHTHALATE 2-CHLORO- NAPHTHAI ENE	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PHTHALATE 2-CHLORO- NAPHTHALENE 4-CHLORO- NAPHTHALENE	POUNDS.           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHENE ACENAPHTHYLENE BENZO(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2-CHLOROISO- PROPYL) ETHER BIS (2-CHLOROISO- PROPYL) ETHER BUTYL BENZYL PHTHALATE 2-CHLORO- NAPHTHALENE 4-CHLORPHENYL PHENYL ETHER CHRYSENE	POUNDS.           N/A           N/A										
BASE-NEUTRAL COM ACENAPHTHENE ACENAPHTHYLENE ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)- ANTHRACENE BENZO(A)PYRENE 3,4 BENZO- FLUORANTHENE BENZO(GHI)- PERYLENE BENZO(K)- FLUORANTHENE BIS (2- CHLOROETHOXY) METHANE BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROETHYL)- ETHER BIS (2- CHLOROFHENYL PHTHALATE 2-CHLORO- NAPHTHALENE 4-CHLORPHENYL PHENYL ETHER CHRYSENE DI-N-BUTYL	POUNDS.           N/A           N/A										

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DI-N-OCTYL PHTHALATE	N/A										
DIBENZO(A,H)	N/A										
1,2- DICHI OROBENZENE	N/A										
	N/A										
1,4-	N/A										
3,3- DICHLOROBENZIDIN E	N/A										
DIETHYL PHTHALATE	N/A										
DIMETHYL PHTHALATE	N/A										
2,4- DINITROTOLUENE	N/A										
2,6- DINITROTOLUENE	N/A										
1,2-DIPHENYL- HYDRAZINE	N/A										
FLUORANTHENE	N/A										
FLUORENE	N/A										
HEXACHLORO- BENZENE	N/A										
HEXACHLORO- BUTADIENE	N/A										
HEXACHLORO- CYCLO-PENTADIENE	N/A										
HEXACHLORO- ETHANE	N/A										
INDENO(1,2,3- CD)PYRENE	N/A										
ISOPHORONE	N/A										
NAPHTHALENE	N/A		1								
NITROBENZENE	N/A										
N-NITROSODI-N- PROPYLAMINE	N/A										
N-NITROSODI- METHYLAMINE	N/A										
N-NITROSODI- PHENYLAMINE	N/A										
PHENANTHRENE	N/A ,										
PYRENE	N/A				1						
1,2,4-TRICHLORO- BENZENE	N/A										
Use this space (or a sep	arate shee	t) to provi	de informa	ation on of	her base-	neutral co	npounds i	requested	by the permit v	writer.	
										[	
Use this space (or a sep	arate shee	t) to provi	de informa	ation on of	her pollut	ants (e.g.,	pesticides	) requeste	ed by the permi	t writer.	
							I		l		

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# SECTION 3. B. REUSE AND LAND APPLICATION SYSTEMS

#### 1. Reuse or Land Application System Serial Number and Name

 Reuse or Land Application System Serial Number
 R-001

### 2. Reuse or Land Application System Location

Citrus County Crystal River City or Town (if applicable) 15760 W. Power Line St. Street or Description Latitude 28° 57' 23"N **8**2° 41' 58"W Longitude May 29, 2008 Dates Coordinates Determined

Google Earth

Method Used to Obtain Coordinates

## 3. Design Capacity of the Reuse or Land Application System

Current Design Capacity	0.030	mgd
Proposed Incremental Design Capacity	+ 0	mgd
Proposed Total Design Capacity	= 0.030	mgd

4. Basis of Design Flow

	Annual Average Daily Flow
	Maximum Monthly Average Daily Flow
$\boxtimes$	Three-Month Average Daily Flow
$\Box$	Other

If other, specify

5.	Is land application continuous or intermittent?	🗌 Continuous 🛛 Intermittent	
6.	Underdrains and Perimeter Ditches		
	a. Is the reuse or land application system underdrained?	🗌 Yes 🖾 No	
	b. Are perimeter ditches used?	🗌 Yes 🖾 No	
	If yes, will they be excavated to a depth which will intersect the seasonal high ground water table or the ground water mound during any portion of the year?	Yes No	

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#### 7. Type of Reuse or Land Application System

Slow-rate land application system/restricted public access (Chapter 62-610, F.A.C., Part II)

Slow-rate land application system/public access areas, residential irrigation, and edible crop irrigation (Chapter 62-610, F.A.C., Part III)

Rapid-rate land application system (Chapter 62-610, F.A.C., Part IV)

- Absorption field system (Chapter 62-610, F.A.C., Part V)
- Overland flow system (Chapter 62-610, F.A.C., Part VI)
- Other land application system with additional levels of preapplication treatment (Rule 62-610.660, F.A.C.)
- Other land application system with lower levels of preapplication treatment (Rule 62-610.670, F.A.C.)

### 8. Application Areas and Rates

Site/Use Type/Major User	Area (acres)	Rate (inches/week)	Capacity (mgd)
CR 1,2,3 - two-cell IWW perc/evap pond system	2	3.9	0.030
Total			

#### 9. Additional Information Required for Reuse Systems Permitted Under Part III of Chapter 62-610, F.A.C.

a. Areas Irrigated	Residential lawns
	Golf courses
	Cemeteries
	Parks, playgrounds
	Landscape areas
	Highway medians, rights-of-way
	Edible crops
с.	Others
If other, specify N/A	
b. Other Uses of Reclaimed Water	Toilet flushing
	Fire protection
	Construction dust control
	Aesthetic purposes (decorative ponds.
	fountains, etc.)
	Others
If other encodify N/A	

It other, specify. N/A

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c. How many hours per day, seven days per week, is or will an operator be on-site at the wastewater treatment facility?

If the treatment facility is or will be staffed by an operator less than 24 hrs/day, describe the additional levels of reliability included within the treatment or reuse systems (See Rule 62-610.462, F.A.C.) N/A hours per day

d. For permit renewals, list the dates on which the operating protocols (as described in Rule 62-610.463, F.A.C.) were submitted to the Department and the date of the Department's approvals during the last five years.

Date Submitted	Date Approved
N/A	

e. For each site where edible crops are or will be irrigated with reclaimed water, describe the crops grown; the type of application system used; provisions for crop washing and for processing, if any; and provisions for control of public access, if any: (See Rule 62-610.475, F.A.C.)

N/A	

# SECTION 3. C. GROUND WATER DISPOSAL BY UNDERGROUND INJECTION

# 1. Underground Injection Well Facility Serial Number and Name

	Underground Injection Well Facility Serial Number	N/A - No underground injection
2.	Underground Injection Well Facility Location	
	County City or Town (if applicable) Street or Description	
	Latitude	• ' "N
	Longitude Dates Coordinates Determined Method Used to Obtain Coordinates	
3.	Underground Injection Well Facility DEP Identification Number or Permit Application Number	N/A
4.	Design Capacity of the Underground Injection Well Faci	lity
	Current Design Capacity Proposed Incremental Design Capacity Proposed Total Design Capacity	mgd + mgd = mgd
5.	Basis of Design Flow	<ul> <li>Annual Average Daily Flow</li> <li>Maximum Monthly Average Daily Flow</li> <li>Three-Month Average Daily Flow</li> <li>Other</li> </ul>
	If other, specify. N/A	
6.	Is injection continuous or intermittent?	ntinuous 🗌 Intermittent

.

# SECTION 4. SCHEDULED IMPROVEMENTS AND SCHEDULES OF IMPLEMENTATION

### 1. Improvements Required

- a. Discharge Serial Numbers, Reclaimed Water Reuse or Land Application System Serial Numbers, and Underground Injection Well Facility Serial Numbers Affected
- b. Authority Imposing Requirement

Local	
State	
Federal	

Developed by Applicant

Other

N/A

If other, specify.

## 2. Implementation Schedule and Actual Completion Dates

Implementation Steps	Schedule	Actual Completion
a. Preliminary Plans Complete		
b. Final Plans and Specifications Complete		
c. Financing Complete		
d. Site Acquired		
e. Begin Construction		
f. End Construction		
g. Begin Reuse or Disposal		
h. Operational Level Attained		

### 3. Have appropriate permits/clearances concerning other Federal/State requirements been obtained?

### Yes No

If so, describe briefly:

# SECTION 5. INDUSTRIAL WASTEWATER CONTRIBUTIONS

1.	Does the treatment works have, or is it subject to, an approved pretreatment program?	🗌 Yes [	🛛 No
----	---	---------	------

2. Provide the number of each of the following types of industrial users that discharge to the treatment works.

a. Number of non-categorical SIUs.
b. Number of CIUs.

#### 3. Significant Industrial User Information

Name	
Number and Street	
City/State/Zip Code	
County	

## 4. Industrial processes Affecting or Contributing to the SIU's Discharge

5. I	Principal	Product(s)	and Raw	Material(s)
------	-----------	------------	---------	-------------

	Principal product(s): Raw material(s):	
6.	Flow Rate	
	a. Process wastewater f	low rate.
	gpd	Intermittent Continuous
	b. Non-process wastew	ater flow rate.
	gpd	Intermittent Continuous
7.	Pretreatment Standar	ds. Indicate whether the SIU is subject to the following:
	a. Local limits	TYes No

b. Categorical pretreatment standards 🛛 🗌 Yes 🗌 No

If subject to categorical pretreatment standards, which category and subcategory?

8.	Problems at the Treatment Works Attributed to Waste Discharged by the SIU. Has the SIU caused or
	contributed to any problems (e.g. upsets, interference) at the treatment works in the past three years?

🗌 Yes 🖾 No

If yes, describe each episode.

•	D. RCRA Waste. Does the treatment works receive or has it in by truck, rail, or dedicated pipe?	in the past three years received RCRA haza	rdous waste
	$\Box$ Yes $\boxtimes$ No If no, go to question 12.		
0.	0. Waste Transport. Method by which RCRA waste is received	ived (check all that apply):	
	Truck Rail Dedicated Pipe		
۱.	1. Waste Description. Give EPA hazardous waste number and	and amount (volume or mass, specify units).	
	EPA Hazardous Waste Number Amount	nt <u>Units</u>	
2.	2. Remediation Waste. Does the treatment works currently (or remedial activities?	(or has it been modified that it will) receive	waste from
	Yes (complete 13. through 15.)	No	
	Provide a list of sites and the requested information (13 15	15.) for each current and future site.	
3.	<ol> <li>Waste Origin. Describe the site and type of facility at which originates (or is expected to originate in the next five years).</li> </ol>	ich the CERCLA/RCRA/or other remedial v ).	vaste
١.	volume and concentration, if known. (Attach additional shee	leets if necessary).	data on

## 15. Treatment.

-	-	-

a. Is this waste treated (or will it be treated) prior to entering the treatment works?

🗌 Yes 🗌 No

If yes, describe the treatment (provide information about the removal efficiency):

N/A

b. Is the discharge (or will the discharge be) continuous or intermittent?

Continuous Intermittent

If intermittent, describe discharge schedule.

N/A



# SECTION 6. ADDITIONAL INFORMATION REQUIRED FOR PERMIT RENEWALS

1.	Have there been any modifications to the treatment facilities or reuse or disposal system, since the issuance of the current permit? If yes, describe on a separate sheet and attach.	🗌 Yes 🔀 No
2.	For limited wet weather discharges, have any modifications been made to the operation, frequency of discharge, or stream hydrology since the original limited wet weather discharge permit or the most recent permit. If yes, describe on a separate sheet and attach.	🗌 Yes 🗌 No 🕅 NA
3.	Have there been any violations during the last six months? If yes, describe on a separate sheet and attach.	Yes 🗌 No
4.	Have there been any treatment facility interferences due to the discharge of industrial wastewater to the treatment facility during the last six months? If yes, describe on a separate sheet and attach.	🗌 Yes 🔀 No
5.	Is there any enforcement action pending against these treatment, reuse, or disposal facilities? If yes, describe on a separate sheet and attach.	🗌 Yes 🔀 No
6.	Have all previous permit conditions, including pretreatment requirements, monitoring requirements, and operator attendance been complied with? If no, describe on a separate sheet and attach.	Xes 🗌 No

7. For permit renewals involving a limited wet weather discharge permitted under Rule 62-610.860, F.A.C., list the number of days during each of the last five years that the limited wet weather discharge was used. Also, list the total annual rainfall for each year.

Year	Number of Days Used	P (%)	Annual Rainfall (inches)
1.			
2.			
3.			
4.			
5.			
Total/Average			

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.

8. For permit renewals involving a limited wet weather discharge permitted under Rule 62-610.860, F.A.C., provide the number of days during each of the last five years that the actual dilution ratio, as defined in Rule 62-610.860, F.A.C., was less than the minimum SDF and the number of months in which the monthly average CBOD<sub>5</sub> or TKN in the limited wet weather discharge exceeded the permit limitations.

	Number of Days the Dilution	Number of Months the	Limits Were Exceeded
Year	Ratio Was Less Than SDF	CBOD <sub>5</sub>	TKN
1.			
2.			
3.			
4.			
5.			

# SECTION 7. ADDITIONAL INFORMATION REQUIRED FOR RESIDUALS/SEPTAGE MANAGEMENT FACILITIES

1. Location of Residuals Treatment Processes

N/A

(Describe in relation to the wastewater treatment processes.)

#### 2. Type and Amount of Waste Treated at this Facility

Туре		Amount (dry tons/day)	Amount (gallons/day)
Residuals		or	
Septage		5.4 -	
Food Establishment Sludge			
Portable Toilet Waste			
Holding Tank Waste			
Boat or Marina Waste			
Other (Describe.)		or	
Total		or	
Is the total amount estimated or actual?	Estimated Actual	1	
3. Information on Treatment Facilities Transportin	g Residuals		
a. DEP Permit Number			

b. Facility Name
 Number and Street
 City/State/Zip Code
 County
 Telephone

c. Facility Type

d. Amount of Residuals Received From This Facility

Is this amount	estimate or actual?

Estimated Actual

Type I Type II Type III

\_\_\_\_\_ dry tons/day or \_\_\_\_\_ gpd

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#### f. Parameter Concentrations

POLLUTANT	CONC.	UNITS
Total Nitrogen		% dry weight
Total Phosphorus		% dry weight
Total Potassium		% dry weight
Arsenic		mg/kg dry weight
Cadmium		mg/kg dry weight
Chromium		mg/kg dry weight
Copper		mg/kg dry weight
Lead		mg/kg dry weight
Mercury		mg/kg dry weight
Molybdenum		mg/kg dry weight
Nickel		mg/kg dry weight
Selenium		mg/kg dry weight
Zinc		mg/kg dry weight
pH		standard units
Total Solids		• %
Other Parameters		

Date of Sample

4. Describe the manifest system used for tracking residuals during transport from the facilities.

\_\_\_\_\_

\_\_\_\_

# **SECTION 8. DOCUMENTATION SUBMITTED**

	Atta	ched
1. General Application Requirements	Yes	No
a. Process Flow Diagram	x	
b. Site Plan	x	
c. Location Map	x	
d. Agricultural Use Plan or Dedicated Site Plan	-	x
e. Capacity Analysis Report	x	
f. Results of Whole Effluent Biological Toxicity Testing		x
g. Reuse Feasibility Study		x
h. Binding Agreements and Documentation of Controls on Individual Users of Reclaimed Water		x

2.	Additional Application Requirements for New Facilities and Modifications to Existing Facilities	Yes	No
a	Preliminary Design Report		x
b	. Documentation of Compliance with Antidegradation Requirements		x
с	Public Service Commission Certification Number and Copy of Certificate or Order Number and Copy of Order		x
d	. Letter from the Management and Storage of Surface Waters Permitting Agency		x
e	. Request for Approval of Monitoring Plans for Discharge of Domestic Wastewater to Wetlands		x
f	Concurrent Application for Ground Water Disposal by Underground Injection		x
g	. Application for Monitoring Plan Approval		x

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3. Additional Application Requirements for Permit Renewals	Yes	No
a. Operation and Maintenance Performance Report	x	
b. Reclaimed Water or Effluent Analysis Report		x
c. Technical Evaluation of Need to Revise Local Pretreatment Limits		x
d. Results of Mechanical Integrity Testing		x

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## **SECTION 9. CERTIFICATIONS**

#### 1. Certifications for Construction of New Facilities or Modifications to Existing Facilities

#### a. Applicant or Authorized Representative

I certify that the statements made in this application for a permit and all attachments are true, correct, and complete to the best of my knowledge and belief. I agree to retain the design engineer, or another professional engineer registered in Florida, to conduct on-site observation of construction, to prepare a notification of completion of construction, and to review record drawings for adequacy as referenced in Rule 62-620.630, F.A.C. Further, I agree to provide an appropriate operation and maintenance manual for the facilities pursuant to Rule 62-620.630, F.A.C., and to retain a professional engineer registered in Florida to examine (or to prepare or revise, if necessary) the manual. For projects regulated by Chapter 62-610, F.A.C., I agree to provide the additional operation requirements of that Chapter.

(Signature of Applicant or Authorized Representative <sup>1</sup> )	Date
Name (please type)	Company Name
Title	Company Street Address or P O Box
Telephone No. (including area code)	City, State, Zip Code
Telephone No. (including area code)	City, State, Zip Code

I certify that the engineering features of this domestic wastewater project have been (designed) (examined) by me and found to conform to engineering principles applicable to such projects. In my professional judgment, this facility, when properly constructed, operated, and maintained, will comply with all applicable statutes of the State of Florida and rules of the Department.

Name (please type):

Florida Registration Number:

Telephone No. (including area code)

Company Name:

Company Street Address or P O Box

City/State/Zip Code:

(Seal, Signature, Date, Registration No.)

#### c. Professional Engineer Registered in Florida

I certify that this firm or individual has been retained by the applicant to prepare a notification of completion of construction, to prepare operation and maintenance manuals, and to review record drawings for adequacy as referenced in Rules 62-620.630, 62-600.717, and 62-600.720, F.A.C.

 Name (please type):
 Company Name:

 Florida Registration Number:
 Company Street Address or P O Box

 Telephone No. (including area code)
 City/State/Zip Code:

 (Seal, Signature, Date, Registration No.)

#### 2. Certifications for Permit Renewals

#### a. Applicant or Authorized Representative

I certify that the statements made in this application for a permit and all attachments are true, correct and complete to the best of my knowledge and belief. I agree to operate and maintain these wastewater facilities in such a manner as to comply with the provisions of Chapter 403, F.S., Chapter 62-600, F.A.C., and all other applicable rules of the Department. Further, an appropriate operation and maintenance manual which has been examined by a professional engineer as certified below is available and located at

<u>Crystal River Units 1, 2 & 3</u> and can be submitted upon request as part of the permit procedure. A copy of the record drawings or other plans (as applicable) showing modifications to existing acilities, as referenced in Rule 62-600.717, F.A.C., is available at the same location. I also understand that a permit if granted by the Department, is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C., and I will notify the Department in accordance with this rule upon sale or legal transfer of the permitted facilities. In the event of abandonment or inactivation of the facilities, I will notify the Department and ensure that public health and safety are protected as required by Rule 62-620.610, F.A.C.

(Signature of Applicant or	Date
Authorized Representative <sup>2</sup> )	
Larry Hatcher	Progress Energy Florida, Inc.
Name (please type)	Company Name
Plant Manager, Crystal River Fossil Plants	P.O. Box 14042, PEF 903
Title	Company Street Address or P O Box
(352) 563-4484	St. Petersburg, FL 33733-4042
Telephone No. (including area code)	City, State, Zip Code

<sup>2</sup> If signed by the authorized representative, attach a letter of authorization.

### b. Professional Engineer

I certify that the engineering features of these domestic wastewater facilities have been examined by me and found to conform to engineering principles applicable to such projects. I certify that the operation and maintenance manual for these wastewater facilities has been prepared or examined by me or by individual(s) under my direct supervision and that there is reasonable assurance, in my professional judgement, that the facilities, when properly operated and maintained in accordance with this manual, will comply with all applicable statutes of the State of Florida and rules of the Department.

Name (please type):

Company Name:

Florida Registration Number:

Company Street Address or P O Box

Telephone No. (including area code)

City/State/Zip Code:

(Seal, Signature, Date, Registration No.)

Non-Radiological Waste

# NRW-3

# 1. CH-400, Nuclear Chemistry Master Scheduling Program



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# 1.0 **PURPOSE**

This procedure defines the parameters to be monitored and the sampling frequencies, for the Crystal River 3 Chemistry/Radiochemistry Program during all modes of operation. [NOCS 000605, 009710, 030100, 030101, 040240, 062194, 062196, 062667, 100309, 100380, 100497]

This procedure also serves as the primary reference against which the computerized Chemistry Data Management system is checked for accuracy.

# 2.0 **REFERENCES**

# 2.1 **Developmental References**

- 2.1.1 Water Chemistry Manual for 177 FA Plants, BAW-1385, Rev. 6 (December 1992)
- 2.1.2 PWR Primary Water Chemistry Guidelines, EPRI 1014986 Final Report
- 2.1.3 PWR Secondary Water Chemistry Guidelines, EPRI 1008224 Final Report
- 2.1.4 Closed Cooling Water Chemistry Guidelines, EPRI 1007820
- 2.1.5 Final Safety Analysis Report, Sections 1.7, 3.2, 4.1, 4.2, 4.3, 5.2, 11.2, 11.5, 11.6, 12.2, 12.6, 12.7, 12.8, Tables 4-10 & 4-11
- 2.1.6 Crystal River Unit #3 Offsite Dose Calculation Manual (ODCM)
- 2.1.7 Improved Technical Specifications
- 2.1.8 Department of Environmental Protection Waste Water Permit No. FL0000159
- 2.1.9 Fire Protection Plan (FPP), 6.2.b
- 2.1.10 American National Standards Institute (ANSI)
- 2.1.11 Compressed Gas Association (CGA)-7.1, 1989
- 2.1.12 Westinghouse Instruction Book, Vendor Manual 81, Volume one
- 2.1.13 IOC, CR95-017, "Increase in Feedwater Cation Conductivity Limit"
- 2.1.14 IOC, CR04-010, "Secondary Chemistry Monitoring during Reduced Staff Hurricane or Violent Weather Coverage "
- 2.1.15 Instrument Society of America, ISA-S7.3
- 2.1.16 Design Basis Document
- 2.1.17 Enhanced Design Basis Document

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- 2.1.18 INPO Report O & MR 423 EH Fluid Chemistry Guidelines
- 2.1.19 SOER 93-01, Diagnosis and Mitigation of Reactor Coolant Leakage Including Steam Generator Tube Ruptures.
- 2.1.20 EC ED 65055 RM-A6(P) setpoint change.
- 2.1.21 EC 65263 Elevated Constant RCS pH for Cycle 16 (and beyond)
- 2.1.22 AREVA Elevated Lithium Evaluation for Crystal River Unit 3 document 51-9041769-000
- 2.1.23 AREVA PWR Fuel Reactor Coolant Chemistry Supplemental Guidelines document 51-9076054-000

# 3.0 **PERSONNEL INDOCTRINATION**

## 3.1 **Description**

- 3.1.1 The parameters listed in this procedure should be monitored within or equal to the frequencies and acceptance criteria as described on Enclosure 1 (Scheduling Table), where applicable.
- 3.1.2 Background information necessary to perform this procedure is acquired through the Nuclear Chemistry Technician training program.

## 3.2 **Definition**

- 3.2.1 **Admin Frequency** Frequency of parameter value recording and/or parameter measurement that is not an industry guideline, but is based on plant-specific considerations, historical or potential rates of change, and engineering judgment.
- 3.2.2 **Amerzine** Trade name for catalyzed hydrazine. Amerzine in this procedure denotes any brand of catalyzed hydrazine approved for use at CR-3.
- 3.2.3 ANSI American Nuclear Standards Institute
- 3.2.4 **ASTM** American Society for Testing and Materials
- 3.2.5 **BOC** Beginning of Core Life
- 3.2.6 **CD** Condensate system (system containing water from the condenser hotwell to the entrance of the deaerator)
- 3.2.7 **CDM** Chemistry Data Management Computer Database

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3.2.8 **CDM Limit Type** – Documentation within CDM of the basis for a measurement limit. CDM limit types are listed below:

Limit Type	Description
ANSI	American National Standards Institute
ASTM	American Society for Testing & Materials
CP-138	Compliance Procedure-Secondary Chemistry
CP-142	Compliance Procedure-Primary Chemistry
CP-160	Compliance Procedure-Intermediates and Support Systems Chemistry
FPP	Fire Protection Program
ODCM	Offsite Dose Calculation Manual
TS	Technical Specification
WEST	Westinghouse

- 3.2.9 **CDT-1** Condensate storage tank
- 3.2.10 **CI** Chloride
- 3.2.11 **COLR** Core Operating Limits Report
- 3.2.12 **Cond** Condensate (water from the condenser hotwell to the entrance to the deaerator)
- 3.2.13 **Conductivity Values** µmhos/cm and µS/cm are numerically equivalent
- 3.2.14 **Control Parameter** Parameters (critical variables) that have demonstrated relationship to material degradation or reduction in component performance. Control parameters are assigned limits and required responses for out of guidelines conditions. A procedure or technical specification reference is listed in the reference column for control parameters.
- 3.2.15 **Continuous Monitoring** An in-line monitor is aligned to the sample point at all times to monitor the specified parameter, except when the monitor is temporarily aligned to other sample points to perform procedurally or supervision required measurements, or for monitor maintenance/calibration.
- 3.2.16 **Cool Down** Plant reducing temperature from Mode 1 down to Mode 5.
- 3.2.17 **Cu** Copper
- 3.2.18 **Diagnostic Parameter** Parameters that are important to monitor to gauge program effectiveness or identify programmatic problems. Diagnostic parameters do not have assigned limits. However, diagnostic parameters may have expected ranges listed in the limit columns, with the word "Diagnostic" listed in the reference column.

Diagnostic parameters for the Crystal River-3 Chemistry Program are listed in this procedure.

3.2.19 **EFPD** – Effective Full Power Days

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3.2.20	EFT-2 - Emergency feedwater tank
3.2.21	EPRI PRI – EPRI "PWR Primary Water Chemistry Guidelines"
3.2.22	EPRI SEC - EPRI "PWR Secondary Water Chemistry Guidelines"
3.2.23	F - Fluoride
3.2.24	FAC - Flow Accelerated Corrosion
3.2.25	Fe – Iron
3.2.26	FPP- Fire Protection Plan
3.2.27	Frequency notations: C Continuously, based on chart recorder print frequency
	30-min       Every 30 minutes         H       Hourly         2H       2 Hours         4H       4 Hours         6H       6 Hours         S       Shiftly = every 12 hours         D       Daily         W       Weekly         W       Week         2X/w       2x/week         3X/w       3X/week         2X/M       2X/Month         M       Monthly         Q       Quarterly         SA       Semi-annually         A       Yearly         R       18 months         24M       2 years         14D       Every 14 days         28D       Every 28 days         84D       Every 168 days         AR       As Requested
3.2.28	<b>FW</b> - Feedwater (water from the outlet of the deaerator to the steam generator feedwater nozzles).
3.2.29	Heat Up - Plant increasing temperature from Mode 5 up to Mode 1.
3.2.30	Ka – Cation Conductivity
3.2.31	Ks – Specific Conductivity

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#### 3.2.32 **LL** – Lower limit (LLD) <sup>(39)</sup>

- 3.2.33 MIC Microbiologically Influenced Corrosion
- 3.2.34 **MSD** Moisture Separator Drains
- 3.2.35 N<sub>2</sub> Nitrogen
- 3.2.36 **Na** Sodium
- 3.2.37 N<sub>2</sub>H<sub>4</sub> Hydrazine
- 3.2.38 **O**<sub>2</sub> Oxygen
- 3.2.39 **ODCM** Offsite Dose Calculation Manual
- 3.2.40 Operational Modes

CDM %RATED **AVERAGE** SCHEDULING REACTIVITY THERMAL COOLANT OPERATION POWER<sup>(a)</sup> MODE MODE CONDITION, Keff **TEMPERATURE** 1 1. Power Operation ≥0.99 >5% NA 2 ≤5% NA 2. Startup ≥0.99 ≥280°F < 0.99 NA 3 3. Hot Standby 4 4. Hot Shutdown  $280^{\circ}F > T_{avg} > 200^{\circ}F$ < 0.99 NA 5. Cold Shutdown<sup>(b)</sup> 5 ≤200°F < 0.99 NA 6 6. Refueling<sup>(c)</sup> NA NA NA

- a. Excluding decay heat.
- b. All reactor vessel head closure bolts fully tensioned.
- c. One or more reactor vessel head closure bolts less than fully tensioned.
- 3.2.41 **Out of Guidelines Result** A measurement result that is outside the upper or lower limit of Enclosure 1 for a parameter.
- 3.2.42 **pH Calc** RCS pH corrected to 300°C.
- 3.2.43 S/D shutdown, reducing power to turbine trip (i.e., 100% to 15% power).
- 3.2.44 S/U startup, increasing power from latching turbine to 100% power.
- 3.2.45 **S** Sulfur
- 3.2.46 SG Steam Generator
- 3.2.47 **SiO**<sub>2</sub> Silica
- 3.2.48 **SO**<sub>4</sub> Sulfate

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- 3.2.49 **Trending -** Evaluation of data to determine if the value of a parameter is heading outside of a normally observed range or control band, so that appropriate corrective actions may be taken to maintain it within the desired range.
- 3.2.50 UL Upper limit
- 3.2.51 **WEST** Westinghouse

#### 3.3 **Responsibilities**

- 3.3.1 The Environmental & Chemistry (E&C) Superintendent is responsible for the content of this procedure, shall act as the interpretation contact regarding intent, and has final authority regarding this procedure.
- 3.3.2 E&C Section personnel are responsible for implementation of this procedure.
- 3.3.3 Nuclear Chemistry Technicians are responsible to perform:
  - Initial review and assessment of a chemistry analysis as the analysis is completed
  - Comparison of analysis results to recently generated data
  - Re-check of questionable result
  - Notification of trends, questionable data, abnormalities to the E&C Supervisor, Analyst, and/or CRS/SSO
  - Input of Chemistry data into CDM and documentation on logsheets
  - Initiation of corrective action(s)
- 3.4 Limits and Precautions

None

#### 3.5 **Prerequisites**

- 3.5.1 Completion of all applicable Nuclear Chemistry Technician Task Performance Manual criteria is a requirement prior to performing tasks.
- 3.6 Records

None

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#### 4.0 INSTRUCTIONS

#### NOTE

Enclosure 1 specifies the minimum measurements and the minimum frequency of performance for each measurement. Performing measurements more frequently than, or in addition to those specified in Enclosure 1 are permitted as requested by E&C Supervision.

#### 4.1 **Monitoring and Analysis Frequencies**

- 4.1.1 PERFORM measurements at the frequency specified in Enclosure 1, or at a shorter frequency as requested by E&C Supervision. For flexibility in scheduling, a 25% float may be applied to the listed frequency, as in Tech Spec surveillances.
- 4.1.2 Temporary Changes in Diagnostic Parameter Sampling Frequencies
  - Diagnostic parameter sampling may be temporarily decreased (including temporary suspension of performing the sampling) by E&C Supervision.
  - DOCUMENT the temporary change in diagnostic parameter sampling frequency in autolog, the data logsheet, shift turnover sheet, or a Short Term Instruction (STI), as appropriate.
- **Temporary Changes in Control Parameter Sampling Frequencies** 4.1.3
  - In the event of an emergency which limits the availability of E&C personnel or materiel, with the approval of the E&C Superintendent, control parameter sampling may be temporarily decreased (including temporary suspension of performing the sampling) as follows:
    - Secondary water chemistry control parameters sampling and monitoring (FW, CD, and HD systems, CDT-1, and EFT-2), may be relaxed during an emergency to the frequencies specified in Enclosure 3 (reference NCR 136268 for the technical justification for the relaxed monitoring frequencies).
    - Closed cooling water chemistry control parameters sampling in the SW. SC, DC, CI, IAP-3B, IAP-3C, DJHE-15, secondary sampling chilled water, Control Complex chilled water, Appendix R chilled water, and the Nuclear Administration Building chilled water systems, may be deferred until the emergency is over. The deferred sampling and analyses in these systems should be performed within two (2) weeks after the emergency is over.

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The below step does not apply to control parameters for which Improved Technical Specifications or the Off-Site Dose Calculation Manual specify an analysis frequency.

- Control parameters sampling and monitoring for all other systems not specifically listed above may be relaxed via a Nuclear Condition Report (NCR). The NCR must, however, state both (1) the rationale for the reduced or suspended sampling for each control parameter, and (2) an alternate method for ensuring that the control parameter does not exceed any CH-400 limits during the time period that the analysis frequency is reduced or suspended.
- DOCUMENT the temporary change in control parameter sampling frequency and the concurrence of the E&C Superintendent in autolog, the data logsheet, shift turnover sheet, or a Short Term Instruction (STI), as appropriate. Ensure a Nuclear Condition Report (NCR) is generated as part of the documentation.
- 4.1.4 Monitoring and Sampling Frequencies during Operational Conditions Not Specifically Addressed by this Procedure
  - Neither this procedure nor the industry guidelines upon which this procedure is based, addresses or contemplates every operational scenario that may be encountered (ref. PRR 137027). For example, during the September 2004 plant trip due to loss of offsite power during Hurricane Frances, the steam generators were fed for several days by emergency feedwater; the steam generators were steamed to the atmosphere via the atmospheric dump valves; and short and long cycle cleanup (which is normally performed in Mode 5) were performed in Mode 3. During operational conditions that are not specifically addressed by this procedure, E&C Supervision and management will provide direction for chemistry control based on the principles of both this procedure and the appropriate governing compliance procedure, i.e., CP-138, CP-142, or CP-160.
  - DOCUMENT the monitoring and sampling frequencies to be required during the atypical operational condition in autolog, the data logsheet, shift turnover sheet, or a Short Term Instruction (STI), as appropriate. Ensure a Nuclear Condition Report (NCR) is generated as part of the documentation.

#### 4.2 Data Recording

- 4.2.1 Recording Data that is within Specification
  - 4.2.1.1 RECORD the measurement or analysis result on the appropriate data sheet and in CDM as soon as practical in order for limits to be checked and for comparison of newly obtained results to previous data.

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- 4.2.1.2 DO NOT RECORD on the appropriate log sheet, or in CDM data that is known or proven to be incorrect.
- 4.2.1.3 DELETE incorrect data that has been entered into CDM.

#### 4.2.2 Recording Out of Specification Data or Unexpected Data

#### NOTE

Abnormal values include an unexpected change, or a value unchanged when a change is expected.

- 4.2.2.1 RECORD on the appropriate data sheet and in CDM what follow-up action has been taken for abnormal or out-of-specification measurements or analysis results.
- 4.2.2.2 RECORD on the appropriate data sheet and in CDM the relevant procedure and procedure section which define the limit for the out of specification parameter and describes the recommended corrective actions (i.e., Compliance Procedures CP-138, CP142, and CP-160).

#### 4.3 Documenting Measurements or Analyses that were Not Performed

- 4.3.1 RECORD in CDM and on the appropriate log sheet, the sample time and reason why the scheduled measurement or analysis could not be performed (e.g., BAST OOS).
- 4.3.2 PERFORM the measurement or analysis as soon as reasonable after system is returned to service or after discovery that the analysis was missed. Some conditions require immediate sampling or monitoring after the system is returned to service. Other conditions will allow sampling at the next scheduled sampling or monitoring time [NCR 55316].
- 4.3.3 RECORD in CDM and on the appropriate log sheet an explanation for samples that cannot be collected or analyses that cannot be completed within the allowable time frame. Examples of explanations are: system tagged out, valve not functional, analytical instrument OOS, etc. Ensure a NCR is generated which includes an explanation of the delay.

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Abnormal values include an unexpected change, or a value unchanged when a change is expected.

#### 4.4 Response to an Out of Specification or Abnormal Measurement or Analysis Result

- 4.4.1 NOTIFY E&C Supervision of the out of specification or abnormal result.
- 4.4.2 COLLECT another sample.
- 4.4.3 RE-ANALYZE the sample to verify the result.
- 4.4.4 NOTIFY E&C Supervision of the re-analysis result.

# NOTE Analytical results that are outside the acceptance criteria may require additional tests to be performed.

- 4.4.5 SAVE all samples and resamples that are outside the acceptance criteria until approved by E&C supervision.
- 4.4.6 PRESERVE samples and resamples to be saved in accordance with CP-163.
- 4.4.7 LABEL saved samples with the following information:
  - Date and time the sample was collected,
  - Sample location, and
  - the word "SAVE".
- 4.4.8 PERFORM responses and corrective actions for the out of specification parameter that are described in the compliance procedure in referenced in Enclosure 1 for that parameter.
- 4.4.9 CONTACT E&C Supervision for responses and corrective actions for the out of specification parameters that do not have a compliance procedure reference in Enclosure 1.
- 4.4.10 DOCUMENT and EVALUATE in accordance with the Plant Corrective Action Program out of specification parameters which do not have a compliance procedure reference in Enclosure 1.

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#### 4.4.11 DOCUMENT the out of specification condition as follows:

- Ensure a NCR is generated to document the condition.
- Red circle the OOS parameter on the applicable logsheet.
- RECORD an analysis specific comment on the appropriate log sheet and in CDM for all out of specification results.
- RECORD on the appropriate log sheet and in CDM what corrective actions or follow up actions have been initiated, for example, NCR #, system on feed and bleed, increase parameter monitoring or analysis frequency, etc.
- 4.4.12 DOCUMENT follow-up or corrective actions for abnormal or out of specification chemistry parameters by both of the following means:
  - SCHEDULE INCREASE sample measurement frequency of out of specification parameter.
  - SHIFT TURNOVER SHEET RECORD actions that cannot be completed by the end of the current shift.

#### 4.5 Chemistry Control Program Impact Review for CH-400 Revisions

#### NOTE

Revisions to CH-400 revisions can impact the Chemistry Data Management System (CDM), various chemistry compliance procedures, and chemistry optimization plans.

• COMPLETE Enclosure 4, CH-400 Revision Matrix, when this procedure is being revised in order to identify potential impacts on other chemistry control documents, and to coordinate revisions of the impacted documents to a common issue date with the CH-400 revision.

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Measurement	Units	Freq	Schedule	LL <sup>(39)</sup>	UL	Reference
EFF Chemistry Group						
AHFL-1A/AHFL-1B/AHFL-4A/AHFL-4B						
Required Modes At All Times						
Gamma	μCi/cc	AR				Admin
AHFL-2A/AHFL-2B/AHFL-2C/AHFL-2D						
Required Modes At All Times						
Gamma   μCi/cc   AR   Admin						
	Ma	ain Steam L	.ine A/B (CE-1	3, CE-14)		
		Required	Node 1, >15%	Power		
ResinGam	μCι/cc				1.000E-5	NOCS 30100
	Waste Gas I Re	Decay Tank equired Mod	c <b>A/B/C</b> (CE-11 les At All Times	2, CE-113, C s [009710]	<b>Ŀ-114</b> )	
%H2 Gas	% vol	С			4.0	ODCM 2.18
%O2 Gas	% vol	С			2.0	ODCM 2.18
XeEquiv	Curies	W			39,000	ODCM 2.17
		RW	P Seal Water			
	Re	quired Mod	es At All Times	s [030100]		
LIQGamma	μCi/g	M				Diagnostic
Liquid Release: Settling Pond						
		Required	Modes At All 7	Times		
Σ Ci/ECL		Each			≤ 1.0	
		Fach				
N2H4	ppm	Permit			2.4	
На				2.0	12.5	
	Cila	Each				Diagnostic
п-э	μC//g	Permit				Diagnostic
Gamma Emitters	uCi/a	Each				Diagnostic
	polig	Permit		1 0005 7		0001105
G Alpha	μCi/g	M	······	<u>&lt;1.000E-7</u>		ODCM 2.5
Sr-89 and Sr-90	μCi/g	Q		<u>&lt;5.000E-8</u>		ODCM 2.5
Fe-55         μCi/g         Q $\leq$ 1.000E-6         ODCM 2.5						
Miscellaneous waste Storage Lank (WD1-4)						
$\frac{p\pi}{sn Cond^{(28)}}$	uS/cm				· · ·	Diagnostic
		AR				Diagnostic
	hong Versenheiden heter	NUS Dem	in Influent (NI	JS Inf)		
pH <sup>(28)</sup>		AR		<u></u>		Diagnostic
Sp Cond	uS/cm	AR				Diagnostic
LIQGamma	uCi/a	AR				Diagnostic
TOTALIZR	GALLONS	AR				Diagnostic
L		I			· · · · · · · · · · · · · · · · · · ·	. <u> </u>

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NUS Demins: (WDT-15, WDT-16, WDT-17, WDT-18, WDT-19, WDT-20)									
рН		AR				Diagnostic			
Sp Cond	μS/cm	AR				Diagnostic			
LIQGamma	μCi/g	AR				Diagnostic			
	RM-A1 Reactor Building Purge Exhaust Duct Monitor (RM-A1)								
· .		Required	Modes At All	Times					
		[N	IOCS 100309]			· · ·			
A1 TFlow	scfm	D		3.25	5.25	CH-280			
A1 Vacuum	in. Hg	D							
A1 IFlow	scfm	D		0.80	1.0	CH-280			
	com	0		-25%	+25%				
	cpin	<u> </u>		setpoint	setpoint				
A1P Warn	com	0		-25%	+25%				
	00111	<u>x</u>		setpoint	setpoint				
A1I Hi	com	Q		-25%	+25%				
	opin			setpoint	setpoint				
A1I Warn	com	Q	:	-25%	+25%				
				setpoint	setpoint				
Particulate channel calibration		R		1		Diagnostic			
lodine channel calibration		R				Diagnostic			
Gas channel calibration	μCi/cc	R		1.000E-6		TS 3.3.15/ ODCM 2.2			
Mid range gas channel calibration		R				ODCM 2.2			
High range gas channel calibration		R				ODCM 2.2			
RM-A2 Auxiliary Building and Fuel Handling Area Duct Monitor (RM-A2)									
Required Modes At All Times									
		[N	OCS 100309						
A2 TFlow	scfm	D		4.24	6.24	CH-280			
A2 Vacuum	in. Hg	D				Diagnostic			
A2 IFlow	scfm	D		0.80	1.0	CH-280			
	com			-25%	+25%				
	срп	Q .		setpoint	setpoint				
	com			-25%	+25%				
				setpoint	setpoint				
A21 Hi	cpm	0		-25%	+25%				
				setpoint	setpoint				
A2I Warn	cpm	Q		-25%	+25%				
	•••••			setpoint	setpoint				
Calibration		Q				Diagnostic			

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Measurement	Units	Freq	Schedule	LL <sup>(39)</sup>	UL	Reference
lodine channel calibration		R				Diagnostic
Gas channel calibration	μCi/cc	R		≤1.000E-6		ODCM 2.2
Mid range gas channel calibration		R				ODCM 2.2
High range gas channel calibration		R				ODCM 2.2
	RM-A3 Auxi	liary Build	ing Exhaust [	<b>Duct Monitor</b>	(RM-A3)	
	Requ	ired Modes	At All Times [	NOCS 10030	9]	
A3 TFlow	scfm	W		2.0	6.0	CH-280
A3 Vacuum	in. Hg	W		2.0	15.0	
Particulate filter replacement		w				Diagnostic
Charcoal filter replacement		w				Diagnostic
A3G Hi	cpm	Q		-25% setpoint	+25% setpoint	
A3G Warn	cpm	Q		-25% setpoint	+25% setpoint	
Gas channel calibration		24M				
RM-A4 Fuel Handling and Spent Fuel Handling Area Exhaust Monitor (RM-A4) Required Modes At All Times [NOCS 100309]						
A4 TFlow	scfm	W		2.0	6.0	CH-280
A4 Vacuum	in. Hg	W		2.0	15.0	
Particulate filter replacement		W				Diagnostic
Charcoal filter replacement		w				Diagnostic
A4G Hi	cpm	Q		-25% setpoint	+25% setpoint	
A4G Warn	cpm	Q		-25% setpoint	+25% setpoint	
Gas channel calibration		24M				Diagnostic

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	RM-A5 Co Requ	ntrol Com	plex Return D s At All Times	uct Monito	r (RM-A5) 309]			
Measurement	Units	Freq	Schedule	LL <sup>(39)</sup>	UL	Reference		
A5 TFlow	scfm	W		2.20	4.2	CH-280		
A5 Vacuum	in. Hg	W		2.0	15.0			
A5 IFlow	scfm	W		0.80	1.0	CH-280		
Particulate filter replacement		W				Diagnostic		
Charcoal filter replacement		W				Diagnostic		
A5PI Hi	cpm	Q		-25% setpoint	+25% setpoint			
A5PIWarn	cpm	Q		-25% setpoint	+25% setpoint			
A5G Hi	cpm	Q		-25% setpoint	+25% setpoint			
A5G Warn	cpm	Q		-25% setpoint	+25% setpoint			
Particulate/iodine channel calibration		R						
Gas channel calibration		R			· · ·	Diagnostic		
	RM-A6 Reactor Building Air Monitor (RM-A6) Required Modes At All Times [NOCS 100309]							
A6 TFlow	scfm	D		2.30	4.30	CH-280		
A6Vacuum	in. Hg	D		2.0	15.0			
A6 IFlow	scfm	D		0.80	1.0	CH-280		
Particulate filter replacement		W				Diagnostic		
Charcoal filter replacement		W				Diagnostic		
A6PI Hi	cpm	Q		-25% setpoint	+25% setpoint			
A6PIWarn	cpm	Q		-25% setpoint	+25% setpoint			
A6G Hi	cpm	Q		-25% setpoint	+25% setpoint			
A6G Warn	cpm	Q		-25% setpoint	+25% setpoint			
Particulate channel calibration		R				TS 3.4.14		
Gas channel calibration		R				TS 3.4.14		

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Measurement	Units	Frq	Schedule	LL <sup>(39)</sup>	UL	Reference			
	RM-A	7 Nuclear S	ample Room	Monitor (R	M-A7)				
Required Modes At All Times [NOCS 100309]									
A7 TFlow	scfm	W		2.0	6.0	CH-280			
A7 Vacuum	in. Hg	W		2.0	15.0				
Particulate filter replacement		W				Diagnostic			
Charcoal filter replacement		w				Diagnostic			
A7G Hi	cpm	Q		-25% setpoint	+25% setpoint				
A7G Warn	срт	Q		-25% setpoint	+25% setpoint				
Gas channel calibration		24M				Diagnostic			
	RM-A8 Auxiliary Building Exhaust Monitor (RM-A8) Required Modes At All Times [NOCS 100309]								
A8 TFlow	scfm	W		2.0	6.0	CH-280			
A8 Vacuum	in. Hg	W		2.0	15.0				
Particulate filter replacement		W				Diagnostic			
Charcoal filter replacement		W				Diagnostic			
A8G Hi	cpm	Q		-25% setpoint	+25% setpoint				
A8G Warn	cpm	Q		-25% setpoint	+25% setpoint				
Gas channel calibration		24M				Diagnostic			
	RM-A11 Waste Gas Decay Tank Release Monitor (RM-A11) Required Modes At All Times [NOCS 100309]								
Gas channel calibration		R				ODCM 2.2			

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Measurement	Units	Freq	Schedule	LL <sup>(39)</sup>	UL	Reference			
· · ·	RM-A	12 Conden	ser Offgas M	onitor (RM-	A12)	1			
	Ť	Required M	odes 1-4 [NOC	CS 100309]					
A12TFlow	scfh	W		25.0	35.0	CH-280			
A12 Vacuum	in. Hg	W		25.0	30.0				
	com	0		-25%	+25%				
	сри	y.		setpoint	setpoint				
A 12 Marn	com	0		-25%	+25%				
ATZ WAIT	cpin	Q		setpoint	setpoint				
Gas channel calibration		R				ODCM 2.2			
GasGamma	μCi/cc	W				Diagnostic			
A12 Slope		R				Diagnostic			
BkgCRate		М				Diagnostic			
Source ck		М				Diagnostic			
	RM-	L1 Primary	y Letdown Mo	onitor (RM-L	_1)				
	F	Required M	odes 1-4 [NOC	CS 100309]					
1411	0.0.00	Q		-25%	+25%				
	срп			setpoint	setpoint				
	onm	Q	-25%	+25%					
	срп			setpoint	setpoint				
Channel calibration		24M				Diagnostic			
	RM-L	2 Primary I	Plant Dischar	ge Line Mo	nitor				
	(F	RM-L2) Rec	quired Modes	At All Times					
Channel calibration		R				ODCM 2.1			
	RM-L3 I	Nuclear Se	rvices Closed	d Cooling M	lonitor				
	(RM-L3) F	Required M	odes At All Tir	nes [NOCS	100309]				
134	com			-25%	+25%				
	Срп	<u> </u>		setpoint	setpoint				
13 Marn	com			-25%	+25%				
	срп			setpoint	setpoint				
Channel calibration		R				ODCM 2.1			
	RM-L5 A-Decay Heat Closed Cooling Water Monitor (RM-L5) Required Modes At All Times (NOCS 100309)								
1.5.1.				-25%	+25%				
	cpm			setpoint	setpoint				

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Measurement	Units	Freq	Schedule	LL <sup>(39)</sup>	UL	Reference		
1.5 Morp	onm	0		-25%	+25%			
	cpin	Y		setpoint	setpoint			
Channel calibration		R				ODCM 2.1		
	RM-L6 B-	Decay Heat Clo	osed Cooling	Water Mon	itor (RM-L6	6)		
	É. F	Required Modes	At All Times	[NOCS 1003	309]			
	anm	0		-25%	+25%			
	сріп	Q,		setpoint	setpoint			
	0.0.00	0		-25%	+25%			
Lo vvani	срп	Q		setpoint	setpoint			
Channel calibration		R				ODCM 2.1		
RM-L7 Secondary Plant Discharge Line Monitor (RM-L7)								
		Require	d Modes At Al	I Times				
Channel calibration		R				ODCM 2.1		
		Units 1 & 2	Sewage Treat	tment Plant				
		Require	d Modes At Al	l Times				
		Prior to Each				Diagnostic		
LIQGamma	μCi/cc	Shipment				PC99-1742		
	llnite	1 & 2 Sowago	Troatmont P	ant Liquid	Effluent			
	Unite	Require	d Modes At Al	I Times	Lindent			
	0.1	Prior to Each				Diagnostic		
I ritium	μCi/cc	Shipment				American Nuclear Insurers (ANI)		
	1		L	L	1	· · ·		

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Measurement	Units	Freq	Schedule	LL	UL	Reference			
			INT GROU	Ρ					
Admin Bldg Chilled Water System (Admin Bldg)									
Required Modes At All Times									
рН		Q		8.50	11.0	CP-160			
Sp Cond	μS/cm	Q				Diagnostic			
NITRITE	ppm	Q		500	1500	CP-160			
TTA	ppm	Q		5.0 (25.0 if pH = 10.5 – 11.0)	100	CP-160			
Fe	ppb	Q				Diagnostic			
Cu	ppb	Q				Diagnostic			
Ammonia	ppb	Q				Diagnostic			
AB		Q			0	CP-160			
	Appe	ndix R Chi	lled Water Sy	stem (APP	R Chiller)				
(Normal C	Cooling C	onfiguratio	on TB Switch	gear Room	Coolers AH	HE-10A/B)			
	Requi	red Modes	At All Times, F	low Diagran	n 302-769				
pH		M		8.50	11.0	CP-160			
Sp Cond	μS/cm	М				Diagnostic			
NITRITE	ppm	М		500	1500	CP-160			
Fe	ppb	М				Diagnostic			
Cu	ppb	М				Diagnostic			
ТТА	ppm	М		5.0 (25.0 if pH = 10.5 – 11.0)	100	CP-160			
Ammonia	ppb	М				Diagnostic			
AB		М			0	CP-160			
	Contro Requi	ol Complex	<b>Chilled Wate</b> At All Times, I	e <b>r System</b> (( Flow Diagran	CC Chiller) n 302-756				
рН		М		8.50	11.0	CP-160			
Sp Cond	μS/cm	М				Diagnostic			
NITRITE	ppm	М		500	1500	CP-160			
Fe	ppb	М				Diagnostic			
Cu	ppb	М				Diagnostic			
ТТА	ppm	М		5.0 (25.0 if pH = 10.5 - 11.0)	100	CP-160			
Ammonia	ppb	М				Diagnostic			
AB		M			0	CP-160			

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Measurement	Units	Freq	Schedule	LL	UL	Reference				
	Append	dix R Chille	d Water Syst	tem (APP R	Dedicated)					
(Appendix R Dedicated Loads AHHE-43 through 57)										
	Required Modes At All Times, Flow Diagram 302-769									
рН		24M		8.50	11.0	CP-160				
Sp Cond	μS/cm	24M				Diagnostic				
NITRITE	ppm	24M		500	1500	CP-160				
Fe	ppb	24M				Diagnostic				
Cu	ppb	24M				Diagnostic				
ТТА	ppm	24M		5.0 (25.0 if pH = 10.5 – 11.0)	100	CP-160				
Ammonia	ppb	24M				Diagnostic				
AB		24M			0	CP-160				
EGDG	-A, EGDC	G-B Cooling	<b>g Water</b> (DJ-A	, DJHE-7/9;	(DJ-B, DJHE	E-8/10))				
	Requi	red Modes	At All Times, F	-low Diagran	n 302-283					
pН		<sup>(31)</sup> , 28D		8.00	10.5	CP-160				
Sp Cond	μS/cm	AR				Diagnostic				
Eth Gly	%	<sup>(31)</sup> , 28D		20.0	25.0	CP-160				
NITRITE	ppm	<sup>(31)</sup> , 28D		500	1500	CP-160				
Cu	ppb	<sup>(31)</sup> , 28D				Diagnostic				
Fe	ppb	Q				Diagnostic				
MoO4	ppm	<sup>(31)</sup> , 28D		160	1000	CP-160				
TTA	ppm	<sup>(31)</sup> , 28D		100	3000	CP-160				
	EC Required	GDG-C Coc Modes At	oling Water (E All Times, Flo	)J-C, DJHE- w Diagram 3	17/18) 02-781, 782					
рН		<sup>(31)</sup> , Q		8.00	10.5	CP-160				
Sp Cond	μS/cm	AR				Diagnostic				
Eth Gly	%	<sup>(31)</sup> , Q		20.0	25.0	CP-160				
NITRITE	ppm	<sup>(31)</sup> ,Q		500	1500	CP-160				
Cu	ppb	<sup>(31)</sup> , Q				Diagnostic				
Fe	ppb	Q				Diagnostic				
MoO4	ppm	<sup>(31)</sup> , Q		160	1000	CP-160				
TTA	ppm	<sup>(31)</sup> , Q		100	3000	CP-160				

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Measurement	Units	Freq	Schedule	LL	UL	Reference			
EFP-3 Cooling Water (DJHE-15)									
· · · · · · ·	Required /	ALL Modes	AT ALL TIME	S, Flow Diag	gram 302-77	7			
рН		Q	;	8.00	10.5	CP-160			
Sp Cond	μS/cm	AR				Diagnostic			
Eth Gly	%	Q		33.0	68.0	CP-160			
Fe	ppb	Q				Diagnostic			
Cu	ppb	Q				Diagnostic			
MoO4	ppm	Q		160	1000	CP-160			
NITRITE	ppm	Q		500	1500	CP-160			
TTA	ppm	Q		100	3000	CP-160			
	Ş	Secondary	Sampling Ch	iller Water (	(SS)				
	Requi	red Modes	At All Times, F	low Diagran	n 302-181				
рН		Q		8.50	11.0	CP-160			
Sp Cond	μS/cm	Q				Diagnostic			
NITRITE	ppm	Q		500	1500	CP-160			
Fe	ppb	Q				Diagnostic			
Cu	ppb	Q				Diagnostic			
ТТА	ppm	Q		5.0 (25.0 if pH = 10.5 – 11.0)	100	CP-160			
Ammonia	ppb	Q				Diagnostic			
AB		Q			0	CP-160			

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Measurement	Units	Freq	Schedule	LL	UL	Reference
	R	equired Mo	des 1-5, Flow	Diagram 302	2-601	
Filt Fe	ppb	М			50.0	CP-160
:	Inc	lustrial Co	oler Closed C	Cycle Coolin	ig (CI)	
	Requi	ed Modes	At All Times, F	low Diagran	n 302-762	
рН		W		9.00		CP-160
Sp Cond	μS/cm	W				Diagnostic
Diss O2	ppb	М			100	CP-160
N2H4 Hi	ppm	W		10.0	20.0	CP-160
Morph	ppm	М		2.0	6.0	CP-160
Ammonia	ppm	М			5.0	CP-160
Fe	ppb	М			500 <sup>(62)</sup>	CP-160
Cu	ppb	М			100	CP-160
CI	ppb	М			150	CP-160
F	ppb	М			150	CP-160
Sulfate	ppb	М			150	CP-160
Acetate	ppb	Per STI				Diagnostic
Formate	ppb	Per STI				Diagnostic
Total S	ppb	Q			50.0	CP-160
LIQGamma	μCi/g	М			1.000E-5	NOCS 30100

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Measurement	Units	Freq	Schedule	LL	UL	Reference
· · · · ,	Indu	strial Coole	er Tower Sur	nps (CIHE-1	CIHE-9)	
	Requi	red Modes	At All Times,	Flow Diagram	n 302-762	
рН		W		-		Diagnostic
Sp Cond	μS/cm	W			3000 <sup>(53)</sup>	-
Са	ppm	W				Diagnostic
Alkalin	ppm	W				Diagnostic
LIQGamma	μCi/g	М			1.000E-5	NOCS 30100
	Decay He	at Closed	Cycle Coolin	g Train A/B	(DC-A, DC-E	3)
	Requi	red Modes	At All Times,	Flow Diagram	m 302-631	
рН		Q		9.00		CP-160
Sp Cond	μS/cm	Q				Diagnostic
N2H4 Hi	ppm	Q		10.0	20.0	CP-160
Morph	ppm	Q		2.0	6.0	CP-160
Ammonia	ppm	Q			5.0	CP-160
F	ppb	Q			150	CP-160
CI	ppb	Q			150	CP-160
Sulfate		Q			150	CP-160
Diss O2	ppb	Q			100	CP-160
Fe	ppb	Q			500 <sup>(62)</sup>	CP-160
LIQGamma	μCi/g	Q			1.000E-5	NOCS 30100
Acetate	ppb	Per STI				Diagnostic
Formate	ppb	Per STI				Diagnostic
Total S	ppb	Q			50.0	CP-160
Cu	ppb	Q			100	CP-160
	Seco	ondary Ser	vices Closed	l Cycle Cool	ling (SC)	
	Requi	red Modes	At All Times,	Flow Diagram	m 302-221	
pН		W		9.00		CP-160
Sp Cond	uS/cm	W				Diagnostic
N2H4 Hi	ppm	W		10.0	20.0	CP-160
Morph	ppm	M		2.0	6.0	CP-160
Ammonia	ppm	M			5.0	CP-160
F	ppb	M			150	CP-160
CI	ppb	M			150	CP-160
Diss O2	ppb	M			100	CP-160
Fe	ppb	W			500 <sup>(62)</sup>	CP-160
Total S	ppb	Q			50.0	CP-160
Cu	ppb	M			100	CP-160

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Measurement	Units	Freq	Schedule	LL	UL	Reference
, ,	Seco	ondary Ser	vices Close	d Cycle Cool	ing (SC)	
	Requi	ed Modes	At All Times,	Flow Diagram	n 302-221	
Acetate		Per STI				Diagnostic
Formate		Per STI				Diagnostic
Sulfate	ppb	М			150	CP-160
Liq Gamma	uCi/g	М			1.000E-5	NOCS 30100
% H2 Gas	%	AR				Diagnostic
	Nu	clear Servi	ces Closed	Cycle Coolir	ig (SW)	
	Requi	red Modes	At All Times,	Flow Diagram	n 302-601	
рН		W		9.00		CP-160
Sp Cond	μS/cm	W				Diagnostic
N2H4 Hi	ppm	W		10.0	20.0	CP-160
Cu	ppb	М			100	CP-160
Morph	ppm	М		2.0	6.0	CP-160
Ammonia	ppm	M			5.0	CP-160
F	ppb	М			150	CP-160
CI	ppb	М			150	CP-160
Sulfate	dqq	M			150	CP-160
Diss O2	ppb	М			100	CP-160
Fe	ppb	М			500 <sup>(62)</sup>	CP-160
Acetate		Per STI				Diagnostic
Formate		Per STI				Diagnostic
Total S	ppb	Q			50.0	CP-160
Liq Gamma	μCi/g	М			1.000E-5	NOCS 30100
4	Domestic	Water St	orage Tank (	DOT-1) (Prin	hary Lab Sink)	
	Requi	red Modes	At All Times,	Flow Diagra	n 302-211	
LIQ	Cila	N.4	[			NOCS 20100
Gamma	μονα				5.000E-7	1003 30100
Са	ppm	W				Diagnostic
pH		W				Diagnostic
Sp Cond	μS/cm	W				Diagnostic
Alkalin	ppm	W				Diagnostic
CI	ppb	Q				Diagnostic
Total S	ppb	Q				Diagnostic
Sulfate	ppb	Q				Diagnostic
Fe	ppb	Q				Diagnostic
Phosphate	ppb	Q				Diagnostic
Silica	ppb	Q				Diagnostic

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Aux. Bldg. Demin Water Tank (DWT-1)						
Required Modes At All Times, Flow Diagram 302-182						
LIQ Gamma	μCi/g	М			1.000E-5 <sup>(54)</sup>	NOCS 30100
	F	ire Servic	e Water Sys	tem (FST-1A	V1B)	
	Require	d Modes	At All Times,	Flow Diagra	m 302-231	· · · ·
LIQ Gamma	μCi/g	Q			1.000E-5 <sup>(54)</sup>	NOCS 30100
Alkalinity	mg/l	A				Diagnostic
Langdex		Α				Diagnostic
Temp	Degrees C	А				Diagnostic
Measurement	Units	Freq	Schedule	LL	UL	Reference
	F	ire Servic	e Water Sys	tem (FST-1A	V1B)	
	Require	ed Modes	At All Times,	Flow Diagra	m 302-231	
AB		A				Diagnostic
Cat Cond	uS	А				Diagnostic
CI	ppb	А				Diagnostic
Redox Potential	mv	А				Diagnostic
Sulfate	ppb	А				Diagnostic
Sp Cond	uS	А				Diagnostic
TDS	mg/l	А				Diagnostic
Total Hardness	mg/l	А				Diagnostic
рН		А				Diagnostic
Nuclear Services Area Sump (NS Sump) Required Modes At All Times, Flow Diagram 302-601						
LIQGamma	μCi/g	М			1.000E-5 <sup>(54)</sup>	NOCS 30100

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#### NOTE

The results of Pre and Post Offload Diesel Fuel receipt analyses are entered into CDM to allow for trending only. The fuel receipt process administered by M&CS QC receiving determines if Diesel Fuel meets CR-3 acceptance criteria per the limits specified by fuel specification NCP-G-0001. See CDM for fuel receipt data.

Diesel Fuel Storage Tank A/B (DFT-1A, DFT-1A OFFSITE, DFT-1B, DFT-1B OFFSITE)						
	Required	I Modes	At All Times	, Flow Diag	ram 302-281	
Viscos Saybolt OR	SUS	Q		32.6	40.1	SP-746
Viscos Kinematic	mm²/s	Q		1.9	4.1	SP-746
Wat&Sed	%	Q			0.05	SP-746
					7.0	SP-746
Partics	mg/L	Q			10.0	TS Bases/TS 3.8.3.3/5.6.2.14
Cu Strip		Q			# 2	SP-746
Oxidation	mg/100 g	Q			Trend Only	SP-746
AB <sup>(67)</sup>		Q			0	SP-746
BWat&Sed	%	Q			Trend Only Warning Flag > 1.0 % vol.	SP-746
Lubricity	microns	А			520	SP-746
API Gravity		Q		30.0	38.0	SP-746
OR Specific Gravity		Q		0.835	0.876	SP-746

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Measurement	Units	Freq	Schedule	LL	UL	Reference			
EFP-3 Fuel Storage Tank (DFT-4, DFT-4 OFFSITE)									
Required Modes At All Times, Flow Diagram 302-776									
Viscos Saybolt OR	SUS	Q		32.6	40.1	SP-746			
Viscos Kinematic	mm²/s	Q		1.9	4.1	SP-746			
Wat&Sed	%	Q			0.05	SP-746			
					7.0	SP-746			
Partics	mg/L	Q		·	10.0	TS Bases/TS 3.7.19.3/5.6.2.14			
Cu Strip		Q			#2	SP-746			
Oxidation	mg/100g	Q			Trend Only	SP-746			
AB <sup>(67)</sup>		Q			0	SP-746			
Lubricity	microns	Α			520	SP-746			
API Gravity		Q		30.0	38.0	SP-746			
Specific Gravity		Q		0.835	0.876	SP-746			

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Measurement	Units	Freq	Schedule	LL	UL Reference			
Alternate AC Diesel Fuel Tank (DFT-5, DFT-5 OFFSITE)								
	<u> </u>	Rec	uired Modes	At All Times		· · · · · · · · · · · · · · · · · · ·		
Viscos Saybolt OR	SUS	Q		32.6	40.1	CH-431		
Viscos Kinematic	mm²/s	Q		1.9	4.1	CH-431		
Wat&Sed	%	Q			0.05	CH-431		
Partics	mg/L	Q			7.0	CH-431 <sup>(63)</sup>		
					10	CH-431		
Cu Strip		Q			#2	CH-431		
Oxidation	_mg/100g	Q			Trend Only	CH-431		
AB <sup>(67)</sup>		Q			0	CH-431		
Lubricity	microns	A			520	CH-431		
API Gravity		Q		30.0	38.0	CH-431		
OR Specific Gravity		Q		0.835	0.876	CH-431		
Diesel Fire Pu	mp Fuel Ta	nk A/B Rec	(FST-2A, FST juired Modes	-2A OFFSITE At All Times	, FST-2B, FST-2B	OFFSITE)		
Viscos Saybolt OR Viscos	SUS	Q		32.6	40.1	CH-431		
Kinematic	mm²/s	Q		1.9	4.1	CH-431		
Wat&Sed	%	Q			0.05	CH-431		
Partics	ma/l	0			7.0	CH-431 <sup>(63)</sup>		
Fartics	nig/L	Q			10.0	CH-431		
Cu Strip		Q			. #2	CH-431		
Oxidation	mg/100g	Q			Trend Only	CH-431		
AB <sup>(67)</sup>		Q			0	CH-431		
Lubricity	microns	А			520	CH-431		
BWat&Sed	%	Q			Trend Only Warning Flag > 1.0 % vol.	CH-431		
API Gravity		Q		30.0	38.0	CH-431		
Specific Gravity		Q		0.835	0.876	CH-431		

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Measurement	Units	Freq	Schedule	LL	UL	Reference		
TSC Diesel Generator Fuel Tank (MET-1, MET-1 OFFSITE)								
-		Requ	ired Modes A	At All Times				
Viscos Saybolt OR	SUS	SA		32.6	40.1	CH-431		
Viscos Kinematic	mm²/s	SA		1.9	4.1	CH-431		
Wat&Sed	%	SA			0.05	CH-431		
Dertico		<b>6</b> 4			7.0	CH-431 <sup>(63)</sup>		
Partics	mg/L	SA SA			10.0	CH-431		
Cu Strip		SA			#2	CH-431		
Oxidation	mg/100g	SA			Trend Only	CH-431		
AB <sup>(67)</sup>		SA			0	CH-431		
Lubricity	microns	А			520	CH-431		
BWat&Sed	%	SA			Trend Only Warning Flag > 1.0 % vol.	CH-431		
API Gravity OR Specific Gravity		SA		30.0	38.0	CH-431		

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Measurement	Units	Freq	Schedule	LL	UL	Reference			
Trisodium Phosphate Baskets (TSP Baskets)									
Valuma	<b>ft</b> 3	$4^3$ Defuel 246 254 TO 267.1							
volume		Reluei		240	254				
Density	lb/ft <sup>3</sup>	Refuel		53.0		TS 3.6.7.2			
рН		Refuel		7.00		TS 3.6.7.3			
	Ne	w Trisoc Requi	lium Phosp red Modes A	h <mark>ate</mark> (TSP t All Times	New)				
Density	lb/ft <sup>3</sup>	Each Batch		53.0		TS 3.6.7.2			
рН		Each Batch		7.00		TS 3.6.7.3			
S Requ	Secondary Sample Room Demineralized Water (SSR DW) Required Modes at all Times: Flow Diagram 302-182INOCS 0402401								
Liq Gamma	μCi/g	M			1.000E-5	NOCS 30100			
Requ	Instrumen ired Modes	t Air Clo at all Tin	sed Cycle C nes, Flow Dia	<b>ooling</b> (IA agram 302-	P-3B, IAP-30 271[NOCS (	C) 040240]			
Sp Cond	μS/cm	Q				Diagnostic			
pН		Q		8.00	11.0	CP-160			
Fe	ppb	Q				Diagnostic			
Cu	ppb	Q				Diagnostic			
MoO4	ppm	Q		160	1000	CP-160			
NITRITE	ppm	Q		500	1500	CP-160			
TTA	ppm	Q		100	3000	CP-160			
Ethy Gly	%	Q		30.0	60.0	CP-160			

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Measurement	Units	Freq	Schedule	LL		Reference		
	Instrume	nt Air Ev	aporative Co	olers (IAHE	-6B / IAHE-	6C)		
Required Modes at all Times, Flow Diagram 302-271[NOCS 040240]								
рН		D		6.50 <sup>(55)</sup>	9.00 <sup>(55)</sup>			
Alkalin	ppm	W	•		300 <sup>(56)</sup>			
Phosphate	ppm	AR						
Phosphonate	ppm	W		0.50 <sup>(56)</sup>	5.0 <sup>(56)</sup>			
AB		W			0 (57)			
Sp Cond	μS/cm	D			1200 <sup>(69)</sup>			
Са	ppm	W				Diagnostic		
		· · · ·	Instrumen	t Air				
	Requi	red Mode	es at all Times,	Flow Diagra	am 302-271			
Indiv. IAP Disch. (IAP 3A,B,C, IAP-4)		AR				ISA-S7.3-1975 (R1981)		
IA Remote Points		SA			Note 1	ISA-S7.3-1975 (R1981)		
IA Header 95'TB		SA			Note 1	ISA-S7.3-1975 (R1981)		
Berm IA Header		SA			Note 1	ISA-S7.3-1975 (R1981)		

(1) Instrument air samples shall be analyzed for particle size. The maximum particle size, in accordance with ISA-S7.3-1975 (R1981) is 3 micron.

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Measurement	Units	Freq	Schedule	LL	UL	Reference	
PRI Chemistry Group							
			Flow Diagra	m 302-672			
		RC Le	etdown or N	IUD Inf (CE	E-119)		
	Rec	uired Mc	des 1 - 4 <sup>(71)</sup>	, Flow Diag	ram 302-661		
В	ppm	D			Per Cycle Core Design <sup>(64)</sup>	Reactivity Control FSAR Table 4-10	
F	ppb	3x/W			20.0 (150 <sup>(71)</sup> )	CP-142	
CI	ppb	3x/W				CP-142	
SO4	ppb	3x/W			20.0 (150 <sup>(71)</sup> )	CP-142	
Li <sup>(51)</sup>	ppm	D		0.20	5.50 (6.00)	CP-142	
pH Calc <sup>(3)</sup>		D		6.90	< 7.8	CP-142	
H2 Meter <sup>(15)</sup>	cc/kg	D		25.0 (15.0) <sup>(71)</sup>	50.0	CP-142	
H2 Theor	cc/kg	W				Diagnostic	
Pri H2 (strip gas) <sup>(15)</sup>	cc/kg	W		25.0	50.0	CP-142	
Pri N2 (strip gas)	cc/kg	W				Diagnostic	
Tot Gas (strip gas)	cc/kg W 100 Diagnostic						
Diss O2 <sup>(14)</sup>	ppb	3x/W			5.0(100.0 <sup>(71)</sup> )	CP-142	
Silica	ppb	W			1500 <sup>(64)</sup> (3000 <sup>(71)</sup> )	CP-142	

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Measurement	Units	Freq	Schedule	LL	UL	Reference			
RC Letdown or MUD Inf (CE-119)									
Required Modes 1 - 4 <sup>(71)</sup> , Flow Diagram 302-661									
Total Zinc (1)(64)	ppb	(S)D*			10.0	CP-142			
Total Nickel <sup>(1)</sup>	ppb	3x/W			6.0	CP-142			
Total Iron (1)	ppb	W				Diagnostic			
Sp Cond	μS/cm	D				Diagnostic			
Sp Cond Calc	uS/cm	D				Diagnostic			
Ammonia	ppb	W				Diagnostic			
Total Suspended Solids/Filterable Iron <sup>(1)</sup>	ppb	w			350 <sup>(71)</sup>	Diagnostic			
Na	ppb	Q				Diagnostic			
AI	ppb	Q			80.0 <sup>(65) (72)</sup>	Diagnostic			
Са	ppb	Q			40.0 <sup>(65) (72)</sup>	Diagnostic			
Mg	ppb	Q			40.0 <sup>(65) (72)</sup>	Diagnostic			
DEI-131	μCi/g	W			.05	CP-142			
DEI-131	μCi/g	W			1.000E+0	TS 3.4.15.2,			
LIQGamma	μCi/g	W <sup>(73)</sup>			2.000E+0	CP-142			
Liq Rcnt	μCi/g	W				Diagnostic			
CRUD Act <sup>(1)</sup>	μCi/g	W			1.000E-1	CP-142			
CRUD Rcnt	μCi/g	W				Diagnostic			

\* 1/Shift until stable program target range is achieved (6 consecutive samples), daily thereafter.

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Measurement	Units	Freq	Schedule	LL	UL	Reference	
RC Letdown or MUD Inf (CE-119)							
Required Modes 1 - 4 <sup>(71)</sup> , Flow Diagram 302-661							
Filtrate Gamma <sup>(1)</sup>	μCi/g	W				Diagnostic	
Filtrate Gamma Rcnt	μCi/g	W				Diagnostic	
Co-58 <sup>(70)</sup>	μCi/g	W				Diagnostic	
Co-60 <sup>(70)</sup>	μCi/g	W				Diagnostic	
I-131/133		W				Diagnostic	
I-133/135		W				Diagnostic	
Cs-Ratio		W				Diagnostic	
U-238	μCi/g					Diagnostic	
NP-239i	μCig	W				Diagnostic	
GSpecAct	μCi/g	w			100/Ebar 1.000E+1	TS 3.4.15.1	
FBAR	MeV/nt	SA			1.0002.1	TS 3 4 15 3	
GasGamma		W			1.000E+1	CP-142	
Xe-Ratio		W			>1.0	Diagnostic	
Kr-88/Xe-133		W		<0.2		Diagnostic	
H-3	uCi/a	W				Diagnostic	
B-10	%	M <sup>(60)</sup>				Diagnostic	
G Alpha	μCi/g	Q				Diagnostic	
Sr-89	μCi/g	Q				Diagnostic	
Sr-90	μCi/g	Q				Diagnostic	
Fe-55	μCi/g	Q				Diagnostic	
	MU&P	Demin A	A/B Effluent	(CE-12	1A, CE-121B)		
	Requ	ired Mo	des 1-6, Flov	v Diagra	m 302-661		
F	ppb	W		•	20.0	CP-142	
CI	ppb				20.0	CP-142	
SO4	ppb	<u></u>			20.0	CP-142	
LIQGamma	μCi/g	W			2.000E+0	CP-142	
DF-Gamma	μCi/g	W				Diagnostic	
CompCrud		M				Diagnostic	
DF Na-24		W				Diagnostic	
DF Cr-51		W				Diagnostic	
DF Mn-54		W				Diagnostic	
DF Co-58		W				Diagnostic	
DF Co-60		W				Diagnostic	
DF I-131		W			_	Diagnostic	
DF Cs-134		W				Diagnostic	
DF Cs-137		W				Diagnostic	

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Measurement	Units	Freq	Schedule	LL	UL	Reference	
	RC	S. Deca	v Heat Coo	ler Outlet	(CE-131)		
Required when RCS Temperature < 250°F Modes 5-6. No Mode, Flow Diagram 302-641							
В	ppm	D			Per COLR	TS 3.9.1.1	
LIQGamma	μCi/g	D			2.000E+0	CP-142	
F	ppb	3x/W			150.0	CP-142	
CI	ppb	3x/W			150.0	CP-142	
SO4	ppb	3x/W			150.0	CP-142	
Silica	ppb	W				CP-142	
AI	ppb	W				Diagnostic	
Са	ppb	W				Diagnostic	
Mg	ppb	W				Diagnostic	
Sp Cond	μS/cm	D				Diagnostic	
Turb	NTU	W				Diagnostic	
CRUD Act	μCi/g	W				Diagnostic	
G Alpha	μCi/g	Q				Diagnostic	
Sr-89	μCi/g	Q				Diagnostic	
Sr-90	μCi/g	Q				Diagnostic	
B-10	%	(59)				Diagnostic	
		Pressu	rizer Water	Space (CE	-125)		
	Reo	uired M	odes 1-4, Fl	ow Diagran	n 302-651		
B	ppm	VV NA		RC-100	<u>RC+100</u>	CP-142	
	<u>dqq</u>	Makouu	Tank Gae	Space (CE		CP-142	
a Carl State of State	Reo	uired M	odes 1-4. Fl	ow Diagran	n 302-692		
Xe-Equiv	μCi/cc	W	1002.00.000		122	CP-142	
%H2 Gas (46) (49)	% vol	AR		80.0	100	CP-142	
%O2 Gas (47) (49)	% vol	AR			2.0	CP-142	
%N2 Gas (40) (49)	<u>% vol</u>	AR				Diagnostic	
i dan	Ren	Makeup	Iank Wate	r Space (C ow Diagran	E-122) n 302-661		
Filt Fe	ppb	<u> </u>		<u> </u>	50.0	Diagnostic	

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Measurement	Units	Freq	Schedule	LL	UL	Reference
		Reactor	Coolant Bl	eed Tank	A, B, C	
		(WD	T-3A, WDT-	3B, WDT-	3C)	004
R	lequired N	lodes At A	All Limes, No	ote 30, Flo	w Diagram 302-	681
В	ppm					CP-142
F	ppb	V			50.0	CP-142
CI	ppb				50.0	CP-142
SO4	ppb	W			50.0	CP-142
Diss O2 <sup>(14)</sup>	ppb	W			100.0	CP-142
Sp Cond	μS/cm	W				Diagnostic
Silica	ppb	AR(66)			1500.0	CP-142
AI	ppb	AR <sup>(66)</sup>			50.0	CP-142
Са	ppb	AR <sup>(66)</sup>			50.0	CP-142
Mg	ppb	AR <sup>(66)</sup>			50.0	CP-142
	Borio	Acid Sto	orage Tank	3A/B (CA)	T-5A, CAT-5B)	
	R	equired M	odes 1-4, Fl	ow Diagra	im 302-671	
В	ppm	28D		11720	13866	CP-142
CI	ppb	28D			150.0	CP-142
F	ppb	28D			150.0	CP-142
SO4	ppb	28D			150.0	CP-142
AI	ppb	84D			55.0	CP-142
Са	ppb	84D			55.0	CP-142
Mg	ppb	84D			55.0	CP-142
Silica	ppb	84D			1500.0	CP-142
Iron	ppb	168D			••••••••••••••	Diagnostic
LIQGamma	μCi/g	168D				Diagnostic
		Borated	Water Stor	age Tank	(DHT-1)	
	R	equired M	lodes 1-4, Fl	ow Diagra	im 302-621	
В	ppm	28D		2365	2932	CP-142
В	ppm	28D		2270	3000	TS 3.5.4.3
F	dqq	28D			150.0	CP-142
CI	daa	28D			150.0	CP-142
SO4	dad	28D			150.0	CP-142
Silica	dqq	28D				Diagnostic
Turb	NTU	28D			0.2 (6)	Diagnostic
Na	ddd	168D				Diagnostic
AI	ppb	168D				Diagnostic
Са	ppb	168D				Diagnostic
Ma	pph	168D				Diagnostic
LIQGamma		168D	h			Diagnostic
B-10	<u>~~~~</u>	(60)				Diagnostic
	1 /0		1			



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### ENCLOSURE 1 (Page 26 of 41)

Measurement	Units	Freq	Schedule	LL	UL	Reference			
		S	pent Fuel Poc	Is (SFP)					
	Requir	Required Modes At All Times, Flow Diagram 302-621							
В	ppm	W		1987		TS 3.7.14, CP-142			
F	ppb	М			150.0	CP-142			
CI	ppb	М			150.0	CP-142			
SO4	ppb	М			150.0	CP-142			
pН		М				Diagnostic			
Turb	NTU	М			0.2 (7)	Diagnostic			
Silica	ppb	М				Diagnostic			
LIQGamma	μCi/g	W				Diagnostic			
CompCrud		М				Diagnostic			
Al	ppb	М				Diagnostic			
Са	ppb	М				Diagnostic			
Mg	ppb	М				Diagnostic			
H-3	μCi/g	SA				Diagnostic			
G Alpha	μCi/g	SA				Diagnostic			
B-10	%	(59,60)				Diagnostic			
	Spe	ent Fuel C	Coolant Demir	n Effluent (	SFDM-1)				
	Requi	red Modes	s At All Times,	Flow Diagra	am 302-621				
F	ppb	М			100.0 <sup>(5)</sup>	Diagnostic			
CI	ppb	М			100.0 <sup>(5)</sup>	Diagnostic			
SO4	ppb	М			100.0 <sup>(5)</sup>	Diagnostic			
LIQGamma	μCi/g	М				Diagnostic			
DF-Gamma		М				Diagnostic			

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## ENCLOSURE 1 (Page 27 of 41)

Measurement	Units	Freq	Schedule	LL	UL	Reference	
Core Flood Tanks A/B (CE-132A/B)							
Required Modes 1-3, Flow Diagram 302-702							
В	ppm	28D		2334	3429	CP-142	
В	ppm	28D		2270	3500	TS 3.5.1.4	
F	ppb	168D <sup>(8)</sup>				Diagnostic	
CI	ppb	168D <sup>(8)</sup>				Diagnostic	
SO4	ppb	168D <sup>(8)</sup>				Diagnostic	
Sp Cond	μS/cm	168D <sup>(8)</sup>				Diagnostic	
Silica	ppb	168D <sup>(8)</sup>				Diagnostic	
LIQGamma	μCi/g	168D <sup>(8)</sup>				Diagnostic	
		Fuel	Transfer C	anal (FTC)			
	Requ	ired Mode (	5, SP-702D,	Flow Diagr	am 302-621	and the second	
В	ppm	1X/72 hrs			Per COLR	TS 3.9.1.1	
B-10	%	(59)				Diagnostic	
Demineralized Water (AB DW Header Down Stream DWT-1)							
			античез, т.е. Т		1 000 5		
	μ <b>ι</b> /g	VV		Lange Course States	1.000E-5		
Primary to Secondary Leakrate (68)							
		Jan Barta Kartan	Required M	lode 1			
LR- CE-5 H3	GPD	W			5.0	CP-152	
LR-A12 Xe-133	GPD	W					
LR-A12 Xe-135	GPD	W					
LR - A12 CPM	GPD	W					

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Measurement (2)	Units	Freq (1)		Measurement (2)	Units	Freq (1)		
RCS Shutdown Monitoring Reactor Subcritical to FTC Floodup Refueling Outage or Mode 5								
Midcycle Outage Reference CH-442								
В	ppm	<b>4</b> H		Reactor Power	%	4H		
Li	ppm	4H		Reactor T-Ave	°F	4H		
Ammonia	ppm	4H	2	Letdown Flow	gpm	4H		
pH Calc		4H		MUT Pressure	psi	4H		
pH neutral		<b>4</b> H		LOOP Pressure	psi	4H		
H2 Meter	cc/kg	4H		PZR Temp	°F	AR		
Diss O2	ppb	4H		TC A LOOP	°F	AR		
H2O2	ppm	4H		TC B LOOP	°F	AR		
Fe	ppb	4H		DH Cooler Outlet Temp	°F	AR		
Fe Filtrate (non filterable)	ppb	4H		MUT H2	%	4H		
Ni	ppb	4H		MUT O2	%	4H		
Ni Filtrate (non filterable)	ppb	4H		MUT N2	%	4H		
Zn	ppb	4H		Demin Train Effluent DF		S		
Zn Filtrate (non filterable)	ppb	4H		MUDM-1B Effluent Liq Gamma	μCi/g	AR		
Filterable Fe	ppm	4H	<u> 2017년</u> 1917년 - 1917년 1917년 - 1917년	WDDM-2A Effluent Liq Gamma	μCi/g	AR		
Co-58/Ni ratio		4H		WDDM-2B Effluent Liq Gamma	μCi/g	AR		
LIQGamma	μCi/g	4H						
Filtrate Gamma (non filterable)	μCi/g	4H						
CRUD Act (filterable)	μCi/g	4H						

- The frequencies specified are minimum required. Analyses are required only as applicable to shutdown phase. Sample frequencies can be increased or decreased per Environmental and Chemistry Supervisor direction. i.e. lithium, ammonia, pH Calc, pH neutral may be discontinued once acid reducing conditions are established.
- 2) These analyses are in addition to regularly scheduled analysis.

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Measurement (2)	Units	Freq (1)	ľ	Measurement (2)	Units	Freq (1)		
RCS Startup Monitoring from Refueling Outage or Mode 5 Midcycle Outage								
Reference CH-444								
В	ppm	AR	]	Reactor Power	%	4H		
Li	ppm	4H		Reactor T-Ave	°F	4H		
Ammonia	ppm	4H		Letdown Flow	gpm	4H		
pH Calc		4H		MUT Pressure	psi	4H		
Specific Conductivity	μS/cm	4H		LOOP Pressure	psi	4H		
H2 Meter	cc/kg	4H		PZR Temp	°F	AR		
Diss O2	ppb	4H		PZR Diss O2	ppb	AR		
Hydrazine	ppm	4H		MUT H2	%	4H		
Fe	ppb	4H		MUT O2	%	4H		
Fe Filtrate (non filterable)	ppb	4H	•	MUT N2	%	4H		
Ni	ppb	<b>4</b> H		MU Demin Effluent DF	μCi/g	S		
Ni Filtrate (non filterable)	ppb	4H		MUDM-1B Effluent Liq Gamma	μCi/g	AR		
Zn	ppb	4H	100 A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A.A					
Zn Filtrate (non filterable)	ppb	4H						
Filterable Fe	ppm	4H						
LIQGamma	μCi/g	<b>4</b> H						
Filtrate Gamma (non filterable)	μCi/g	4H						
CRUD Act (filterable)	μCi/g	4H						

CH-444 specifies when additional analysis are required to support plant conditions.
 Sample frequencies can be increased or decreased per Environmental and

2) Sample frequencies can be increased or decreased per Environmental and Chemistry Supervisor direction.

3) These analyses are in addition to regularly scheduled analysis.
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Measurement	Units	Freq	Schedule	LL	UL	Reference
		S	EC Chemistry	/ Group		
· · · · · · · · · · · · · · · · · · ·		F	Flow Diagram 3	802-181		· · · · · · · · · · · · · · · · · · ·
		Conde	sate Storage	Tank (CD	T-1)	
	Requi		At All Times, i	low Diagr	am 302-101	Diamantin
Cat Cond	μS/cm	<u> </u>				
Sp Cond	μS/cm	Q				Diagnostic
рН		Q				Diagnostic
SO4	ppb	Q			100	CP-138
Na	ppb	Q			100	CP-138
CI	ppb	Q			100	CP-138
LIQGamma	μCi/g	Q			1.000E-5	NOCS 30100
	Con	densate	Pump A/B Dis	charge (C	E-2, CE-3)	
Cat Cand	r C/arra		VIODE I, FIOW	Diagram 3	10.0	
	μS/cm				10.0	CP-130
Na	ррр	<u> </u>			1.0	CP-138
Diss O2	ppb	D				Diagnostic
Total Fe (CE-2 preferred)	ppb	W	Required only if sample line aligned to NWT sampler			Diagnostic
Filter Color		W				Diagnostic
DEI-131 <sup>(50)</sup>	uCi/a	М			4.500E-4	TS 3.7.16.1
	Con	densate	Pump A/B Dis	charge (C	E-2, CE-3)	
Required in	h Short Cy	cle and L	ong Cycle Clea	anup, Mod	e 5, Flow Dia	agram 302-031
Cat Cond	μS/cm	2H	Short Cycle			Diagnostic
Cat Cond	μS/cm	6H	Long Cycle			Diagnostic
Diss O2	ppb	Н	Short Cycle		100	CP-138
Diss O2	ppb	2H	Long Cycle			Diagnostic
Filt Fe	ppb	2H	Short Cycle			Diagnostic
Filt Fe	ppb	4H	Long Cycle			Diagnostic
Na	ppb	4H	Short Cycle			Diagnostic
Na	ppb	4H	Long Cycle			Diagnostic

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Measurement	Units	Freq	Schedule	LL	UL	Reference		
	Co	ndensate Pump	A/B Disch	arge (CE	-2, CE-3)			
	Require	ed Modes 2-4 an	d 5 Down, l	Flow Diag	ram 302-031			
Diss O2	ppb	Not required in Mode 5 down. 2H in Modes 3 – 4. 6H in Mode 2				Diagnostic		
Cat Cond	μS/cm	S			10.0	CP-138		
Na	ppb	D			1.0	CP-138		
DEI – 131	μCi/g	D			4.500E-4	TS 3.7.16.1		
	Conde	ensate Deminera	alizers Con	nmon Eff	uent (CE-5)			
		<b>Required Mode</b>	1, Flow Dia	igram 302	2-101			
Cat Cond	μS/cm	D			d Ka < 0.25 μS/cm	CP-138		
H-3	μCi/g	W			5.000E-4	NOCS 30100		
R	Conde equired in	nsate Deminera Short Cycle Cle	alizers Con anup, Mode	nmon Effl e 5, Flow I	l <b>uent</b> (CE-5) Diagram 302-0	31		
Cat Cond	μS/cm	2H				Diagnostic		
Filt Fe	ppb	2H			100	CP-138		
Sp Cond	μS/cm	2H				Diagnostic		
Morph	ppm	6H		45.0	·····	CP-138		
N2H4 Lo	ppb	2H		1000	2000	CP-138		
Diss O <sub>2</sub>	ppb	Н				Diagnostic		
Na	ppb	4H			1.0	CP-138		
Condensate Demineralizers Common Effluent (CE-5) Required in Long Cycle Cleanup, Modes 2-5, Flow Diagram 302-031								
Cat Cond	μS/cm	6H in Mode 5 S in Modes 2 – 4			∆ka < 0.25 μS/cm	CP-138		

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Measurement	Units	Freq	Schedule	LL	UL	Reference
		De	eaerator Outle	et (CE-6)		
	Requ	uired in Mod	de 1 > 15%, , l	-low Diagra	am 302-031	
Diss O2	ppb	D			3.0	CP-138.
Total Sample Line Flow Rate	L/min	M (D when 15 - 50%		2.0		CH-545
			aerator Outle	L		
Re	nuired in M	Indes 2-5		eanun Flo	w Diagram 30	)2₋031
	nnh					Diagnostic
0133 02	ppb		Hostor Drain			
		Required I	Mode 1 Flow I	ə (∪∟-7) Diagram 3(	12-111	
Cat Cand	u S/om			Jiagjani Ju	JZ-111	Diagnostic
	μο/οπ					Diagnostic during
Na	ppb	Н				power reductions of 10% or more until 12 hours after steady state operation is resumed.
		"A"/ "I	3" Main Stear	<b>n</b> (CE-13,	14)	
		Required I	Mode 1, Flow I	Diagram 30	02-011	
Na (using sample point with the larger flow rate is preferred)	ppb	Н			1.0	CP-138. Control parameter only during power reductions of 10% or more until 12 hours after steady state operation is resumed.

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Measurement	Units	Freq	Schedule	LL	UL	Reference
		OTSG-A/B Fee	edwater (CE	-9, CE-10)		
the contraction of the		Required Mode 1> 15%	Power, Flov	v Diagram 302-	181	
Cat Cond	μS/cm	D				Diagnostic
Sp Cond (CE-9 preferred)	μS/cm	D				Diagnostic
Pb (in Total Fe filter)	ppb	AR				Diagnostic
Diss O2	ppb	D				Diagnostic
Na (CE-9 preferred)	ppb	D			1.0	CP-138
CI (CE-9 preferred)	ppb	D (Not required at ≥ 85% power. CE-100 Cl is control parameter).			3.0	CP-138
N2H4 Lo (CE-9 preferred)	ppb	D		8X CD DISS O2 (80 ppb min.) <sup>(61)</sup>		CP-138
Ammonia (CE-9 preferred)	ppb	W				Diagnostic
SO4 (CE-9 preferred)	ppb	D			1.0	CP-138
Morph (CE-9 preferred)	ppm	D		45.0		CP-138
Acetate (CE-9 preferred)	ppb	W				Diagnostic
Formate (CE-9 preferred)	ppb	W				Diagnostic
Filter Color <sup>(22)</sup> (CE-9 preferred)		W				Diagnostic
Silica (CE-9 preferred)	ppb	W (Perform daily when plant activities increase risk of higher FW SiO2)			10.0	CP-138
Total Fe <sup>(22)</sup> (CE-9 preferred)	ррb	w			5.0	CP-138
Total Cu <sup>(22)</sup> (CE-9 preferred)	ppb	W			1.0	FSAR control parameter; value required for INPO CEI.
Total Sample Line Flow Rate (CE-9 & CE- 10)	L/min	D when 15 50% power, otherwise not required.		2.6		CH-545



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	OTSG-A/B Feedwater (CE-9, CE-10) Required in Long Cycle Cleanup, Mode 5, Elow Diagram 302-031							
N2H4 Lo (CE-9 preferred)	ppb	2H (Perform S after 6 consecutive measurements are 1000 – 2000 ppb)		1000	2000	CP-138		
Sp Cond (CE-9 preferred)	μS/cm	6H (Perform S when Morph is performed S).				Diagnostic		
Morph (CE-9 preferred)	ppm	6H (Perform S after 3 consecutive measurements are > 45 ppm)		45.0		CP-138		
Cat Cond (CE-9 preferred)	μS/cm	2H (Perform S when CI and SO4 are performed S)				Diagnostic		
SO4 (CE-9 preferred)	ppb	4H (Perform S after 3 consecutive measurements are < 1 ppb)			1.0	CP-138		
Diss O2	ppb	2H (Perform S after 6 consecutive measurements are < 100 ppb)			100	CP-138		
Filt Fe	ppb	2H (Perform S after 6 consecutive measurements are < 100 ppb)			100	CP-138		
Na (CE-9 preferred)	ppb	4H (Perform S after 3 consecutive measurements are < 1 ppb)			1.0	CP-138		
CI (CE-9 preferred)	ppb	4H (Perform S after 3 consecutive measurements are < 3 ppb)			3.0	CP-138		

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Measurement	Units	Freq	Schedule	LL	UL	Reference		
	Requ	OTSG-A/B F	eedwater (C	E-9, CE-10) Elow Diagram	302-031			
Required Mode 4, and Mode 5 Down, 1 low Diagram 502-051								
NOTE: CE-5 or 6 may be used to monitor FW parameters if flow is too low at CE-9 and CE-10, or if EW flow configuration results in non-representative samples at CE-9 and CE-10								
Cat								
Cond(CE-9 preferred)	μS/cm	S			2.5	CP-138		
Sp Cond (CE-9 preferred)	μS/cm	6Н				Diagnostic		
Diss O2	ppb	2H			100	CP-138		
N2H4 Lo (CE-9 preferred)	ppb	2H		8xCD O2, 8xFW O2, or 80 ppb, whichever is largest		CP-138		
CI (CE-9 preferred)	ppb	S (Perform only during Mode 4 heatup.)				Diagnostic		
SO4 (CE-9 preferred)	ppb	S (Perform only during Mode 4 heatup.)				Diagnostic		
Morph (CE-9 preferred)	ppm	6H (Perform only during Mode 4 heatup.)		45.0		CP-138		
Na (CE-9 preferred)	ppb	S (Perform only during Mode 4 heatup.)				Diagnostic		
Silica (CE-9 preferred)	ppb	S (1X12 hrs When Vac Maintained)				Diagnostic		
Filt Fe	ppb	6H (Perform only during Mode 4 heatup.)			100	CP-138		
рН		12H (Perform only during Mode 4 heatup.)				Diagnostic		

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OTSG-A/B Feedwater (CE-9, CE-10) Required in Mode 3 Flow Diagram 302-031								
NOTE: CE-5 and 6 may be used to monitor FW parameters if flow is too low at CE-9 and CE-10,								
or if FW f	low config	juration results in nor	<u>i-repres</u>	entative samples at	t CE-9 and	d CE-10.		
N2H4 Lo (CE-9 preferred)	ppb	2H (Perform 6H when DO2 frequency is 6H)		8xCD O2, 8xFW O2, or 80 ppb, whichever is largest		CP-138		
CI (CE-9 preferred)	ppb	S			3.0	CP-138		
Morph (CE-9 preferred)	ppm	S		45.0		CP-138		
Cat Cond (CE-9 preferred)	μS/cm	S			2.5	CP-138		
Sp Cond (CE-9 preferred)	μS/cm	S				Diagnostic		
Silica (CE-9 preferred)	ppb	S			10.0	CP-138		
SO4 (CE-9 preferred)	ppb	S			1.0	CP-138		
Na (CE-9 preferred)	ppb	S			1.0	CP-138		
рН		12H				Diagnostic		
Diss O2	ppb	2H (perform every 6H after 3 consecutive measurements are < 10 ppb)			10.0	CP-138		
Filt Fe	ppb	S			10.0	CP-138		
	Requir	OTSG-A/B Feedwa ed in Modes 1-2 <15%	a <b>ter</b> (CE Power Fl	-9, CE-10) ow Diagram 302-03	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			
Na (CE-9 preferred)	ppb	12H			1.0	CP-138		
N2H4 Lo (CE-9 preferred)	ppb	6Н		8xCD O2, 8xFW O2, or 80 ppb, whichever is largest		CP-138		
pH		12H				Diagnostic		
CI (CE-9 preferred)	ppb	12H			3.0	CP-138		
Cat Cond (CE-9 preferred)	μS/cm	12H			2.5	CP-138		
Silica (CE-9 preferred)	ppb	12H			10.0	CP-138		
SO4 (CE-9 preferred)	ppb	12H			1.0	CP-138		

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Measurement	Units	Freq	Schedule	LL	UL	Reference
Diss O2	ppb	6H			5.0	CP-138
Filt Fe	ppb	12H			10.0	CP-138
Sp Cond (CE-9 preferred)	μS/cm	12H				Diagnostic
Morph (CE-9 preferred)	ppm	12H		45.0		CP-138
	•	Auxiliary St	eam (CE-15)	· · ·		
Rec	juired when	receiving steam from	n Units 1&2, Fl	ow Diagram	302-031	
Cat Cond	μS/cm	12H			1.0	CP-138
		LP Heater Dra	ins (CE-16/20)	)* • • • •		· · · ·
		Required Mode 1, Fl	ow Diagram 30	)2-111		
Na	ppb	Per Chemistry STI				Diagnostic
Cat Cond	μS/cm	D				Diagnostic
	Mo	sture-Separator Re Required Mode 1, Fl	heater Drains ow Diagram 30	(CE-100) )2-111		
Ammonia	ppb	W				Diagnostic
Cat Cond	μS/cm	D				Diagnostic
Sp Cond	μS/cm	D				Diagnostic
N2H4 Lo	dqq	W				Diagnostic
Na (required at <u>&gt;</u> 85% power)	ppb	D			14.8 (applies only to >85% power)	CP-138, diagnostic during S/Ds and S/Us.
CI (required at <u>&gt;</u> 85% power)	ppb	D			44.0 (applies only to >85% power)	CP-138
SO4	ppb	W				Diagnostic
Silica	ppb	W				Diagnostic
Ace + For	ppb	W			2250	CP-138
Acetate	ppb	W				Diagnostic
Formate	ppb	W				Diagnostic
Morph	ppm	W				Diagnostic
F	ppb	W				Diagnostic

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Measurement	Units	Freq	Schedule	LL	UL	Reference
		Demin	Water Panel	(DWPL-1)	· · ·	
	Required I	Modes A	t All Times, F	low Diagram 3	02-162	
Diss O2 <sup>(40)</sup>	ppb	D			10.0	CP-160
Sp Cond <sup>(40)</sup>	μS/cm	D			0.080	CP-160
Na <sup>(40)</sup>	ppb	D			0.50	CP-160
TOC <sup>40)</sup>	ppb	D			25.0	CP-160
Silica (40)	ppb	D			5.0	CP-160
Cat Cond	μS/cm	D			0.25	CP-160
AI	ppb	Q			5.0	CP-160
Са	ppb	Q			1.0	CP-160
Mg	ppb	Q			1.0	CP-160
Ca + Mg	ppb	Q			2.0	CP-160
Emergency Feedwater Tank (EFT-2)						
	Required Mo	des 1-6	and No Mode	e, Flow Diagra	m 302-082	
pH		M <sup>(52)</sup>		9.50		CP-138
Cat Cond	μS/cm	M <sup>(52)</sup>				Diagnostic
Sp Cond	μS/cm	M <sup>(52)</sup>				Diagnostic
Diss O2	ppb	M <sup>(52)</sup>			100	CP-138
				3xO <sub>2</sub> or		
N2H4 Lo	daa	M <sup>(52)</sup>		75 ppm,		CP-138
(catalyzed)	PP~			whichever		
		• •(52)			400	0.0.100
Na	ppb	M(02)			100	CP-138
CI	ppb	M <sup>(52)</sup>		<b> </b>	100	CP-138
SO4	ppb	M <sup>(52)</sup>			100	CP-138
LIQGamma	μCi/g	M <sup>(52)</sup>			1.000E-5	NOCS 30100

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	Rec	OTSG-A/B Shellside Drains (Cl juired Mode 1-4, <15% Power, Flow	E-11, CE- v Diagram	12) າ 302-01	1	
<ul> <li>NOTES:</li> <li>(1) All diageduring head the UL for the UL for the UL for the stead</li> <li>(2) If shells via the control the stead</li> <li>(3) Perform and in More with the stead</li> <li>(4) Al, K, Can diagnoss steam go</li> <li>(5) The stead full rangeduction of the</li></ul>	nostics and neat up in M or 3 consec- ide drain si common bl m generato analyses a Modes 3 – 4 team generato s at water I a, Mg, and stic analyse generator p m generato ge. The sar	d CP-138 required analyses may b Nodes 3 – 1 < 15% power if all con- cutive measurements and SG leve ample is unavailable during Mode owdown line may be sampled to r or being blown down. At time frequencies specified belo when steam generator levels are rator levels are being raised and levels specified below in parenthe SiO <sub>2</sub> significantly influence steam as should be performed when pos H(t). [NCR 57094] or bulk water should be sampled wo or water level is maintained at low mple data should be logged under	e reduce trol para els are be s 3 or 4, nonitor ti w during being m owered in ses. n generat sible in o via the loo level lim sample	d to one meters sing ma steam g he bulk Modes aintaine Modes or pH(t) order to wer tub its, i.e., point C	ce every have be intained generato water c 2 – 1 < ed at low 3 – 4, p accurat esheet o < 40 in E-11BD	y 6 hours en less than at low level or blowdown hemistry of 15% power, y level limits. berform ore, these ely estimate drains when ches on the or CE-12BD
Cat Cond	μS/cm	H regardless of SG water level.				Diagnostic
Sp Cond	μS/cm	4H (required at max. SG water level)				Diagnostic
SO4	ppb	2H (required at max. and min. SG water levels)			100	CP-138
Na	ppb	2H (required at max. and min. SG water levels)			100	CP-138
рН		4H (required at max. SG water level)				Diagnostic
CI	ppb	2H (required at max. and min. SG water levels)			100	CP-138
Silica	ppb	4H (required at max. and min. SG water levels)				Diagnostic
N2H4 Lo	ppb	4H (required at max. SG water level)				Diagnostic
Total S	ppb	4H (required at max. SG water level)				Diagnostic

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•	Re	<b>(CONTINUED)</b> OTSG-A/B Shellside Drains (C quired Mode 1-4, <15% Power, Flov	E-11, CE-12) v Diagram 302-011	
Са	ppb	4H (required at max. SG water level)		Diagnostic
Mg	ppb	4H (required at max. SG water level)		Diagnostic
к	ppb	4H (required at max. SG water level)		Diagnostic
AI	ppb	4H (required at max. SG water level)		Diagnostic
F	ppb	4H (required at max. SG water level)		Diagnostic
Sample line flow rate	L/min	Required every time a grab sample is obtained during cool down only.		Diagnostic [NCR 114662]

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Measurement	Units	Freq	Schedule	LL	UL	Reference
		OTSG-A/B V	Vet Layup			
		(OTSG-A, (	DTSG-B)			202 402
Required in viet Layup w	nen steam	generator re	circulation is a		Flow Diagra	am 302-192
				9.50	100 <sup>(58)</sup>	CP-130
	ppo				100 1	CP-130
	aqq				1000 /	CP-138
	ррр			75.0		CP-138
N2H4 HI (catalyzed)	ppm			75.0	500	CP-138
SO4	ppb	D			1000(00)	CP-138
Silica	ppb					Diagnostic
Morph	ppm	D		100		CP-138
Acetate	ppb	Per STI				Diagnostic
Formate	ppb	Per STI				Diagnostic
Ammonia	ppb	W				Diagnostic
Cat Cond	μS/cm	Per STI				Diagnostic
Sp Cond	μS/cm	W				Diagnostic
N2 Cover	psig	S		>0.0		CP-138
Са	ppb	Per STI				Diagnostic
Mg	ppb	Per STI				Diagnostic
К	ppb	Per STI				Diagnostic
AI	ppb	Per STI				Diagnostic
Total S	ppb	Per STI				Diagnostic
Hot Reheat Steam to LP Turbine (CE-101)						
As Re	quested by	STI, Flows	Diagram 302	-011, 302	-181	
		المراجع المراجع معادية المحمد المراجع ال				
NOTE: (1) Analyses are	performed	as directed	by Short terr	n Instruc	tion.	
(2) If condenser I	eak is sus	pectea, ther lished to aid	1 CE-101 sam	piing sno bo look (i	DUID DE DIS	continued
Cat Cond		Per STI		ije ican (i	CI. FOAN 3	Diagnostic
	pro/Ulli					Diagnostic
	ppp					Diagnostic
01 504	ppb ppb	Por STI				Diagnostic
SU4	hhn -	Der STI				Diagnostic
SIIICa	aqq	PerSII				Diagnostic

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### <u>NOTES</u>

- 1. MUD Influent sample point is preferred location for obtaining the most representative sample for these parameters.
- 3. RCS pH Calc
  - Current RCS pH control program is at a constant pH of 7.2
  - RCS pH Calc must be  $\geq$  6.9 prior to reactor critical on startup
  - pH Calc may be reduced to < 6.9 but <u>></u> 6.5 up to 8 hours prior to scheduled plant shutdown.
- 5. To ensure SF Pool limits are not exceeded, these parameters should not exceed 100 ppb.
- 6. Prior to filling fuel transfer canal for refueling operations, BWST turbidity should be <0.05 NTU.
- 7. During refueling operations SF Pool turbidity should be maintained <0.2 NTU.
- 8. Coordinate CF sample frequency with first post refueling monthly sample.
- RCS gammas to include at minimum Co-58, Co-60, Mn-54, Cr-51, Fe-59, Cs-134, Cs-137, Cs-136, Cs-138, I-131, I-132, I-133, I-134, I-135. Phase separated samples for fission gas monitoring should include Kr-85m, Kr-87, Kr-88, Xe-131m, Xe-133, Xe-133m, Xe-135, Xe-138. Not all isotopes may be present in sufficient quantity to identify.
- 14. Dissolved Oxygen
  - RCS dissolved oxygen limit does not apply when RCS temperature (Tave) <250°F.</li>
  - Pressurizer dissolved oxygen limit applies whenever Pressurizer temperature is >250°F. Pressurizer dissolved oxygen must be < 100 ppb prior to the Pressurizer temperature exceeding 250°F.
  - RCBT dissolved oxygen limit does not apply when RCS temperature (Tave) <250°F.
- 15. RCS Hydrogen
  - Hydrogen levels may be reduced to 15 cc/kg 24 hours prior to shutdown.
  - Hydrogen levels shall be ≥15 cc/kg but may be < 25 cc/kg for up to 24 hours after reaching reactor critical (Mode 2).
  - The PASS RC Letdown sample point and PASS H2L measure type may be used as an alternate dissolved hydrogen-monitoring instrument.
- 16. This lower limit applies only during a shutdown when plant is held in Mode 3 conditions.
- 19. Perform MinerOil if Viscosity is below LL.
- 22. Required only if sample line is aligned to NWT sampler.
- 28. Use NUS influent if MWST is not available.
- 29. Required between 12 and 24 hours after flooding the Refuel Canal and at least once per 7 days thereafter while the Refueling Canal is flooded. Also required pre-batch release for RM-A1, and monthly during RM-A2 release.
- 30. Scheduled frequencies are only for RCS make-up designated tanks.

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- 31. Diesel Cooling System for EGDG-1A/1B/1C are sampled while EGDG-1A/1B/1C has run electrically loaded for at least 1 hour or within 4 hours after shutdown from at least a 1 hour electrically loaded run.
- 39. Lower Limit (LL) is equal to Lower Limit of Detection for the radiation monitor activity and isotopic analysis performed.
- 40. These measurements are taken directly from the in-line instrumentation, if not available, alternate chemistry methods are to be used.
- 45. <u>IF</u> limits are exceeded <u>THEN</u> have Vendor perform a System Health Analysis and Metals Analysis.
- 46. <u>IF MUT sample is NOT available</u>, THEN MONITOR RCS H2 to determine if MUT H2 concentration has changed.
- 47. <u>IF MUT sample is NOT available,</u> <u>THEN MONITOR RCS DISS O2 to determine if Oxygen has increased in the MUT.</u>
- 48. <u>IF MUT sample is NOT</u> available, <u>THEN MONITOR RCS Ammonia to determine if Nitrogen has increased in the MUT.</u>
- 49. <u>IF MUT is not being sampled for dose considerations,</u> <u>THEN</u> STI must be written to describe the reason for normal sampling not to be performed and compensatory actions to be taken including MUT pressure. If an increase in DISS O2, Ammonia, and or a decrease in H2 are seen, a sample from the MUT should be taken.
- 50. Sample may be collected from either condensate train. Only one sample is required.
- 51. RCS Li Control
  - The 6.0 ppm lithium limit applies only during the first 4 EFPDs at beginning of fuel cycle (BOC). The 5.5 ppm limit applies after the first 4 EFPDs at BOC. AREVA evaluation and approval per AREVA Technical Evaluation 51-9041769-000 included in EC 65263.
  - Lithium should be controlled within the target band following a plant startup no later than upon achieving xenon equilibrium.
  - In response to a power transient, lithium should be within control band within 24 hours after reaching xenon equilibrium.
- 52. The limit for N2H4 Lo is 3X O2, or 75.0 ppm, whichever is larger. Sampling is required following significant demin water make-up to the tank, as determined by Supervision.
- 53. Return to normal within 7 day. Feed and bleed until  $\leq$  2500  $\mu$ S/cm.
- 54. Return to normal as soon as possible. Determine the source of contamination.
- 55. Return to normal as soon as possible. Verify calibration on pH meter. Recalibrate pH meter as needed. Adjust stroke on acid addition pump as needed to return pH to proper level.
- 56. Return to normal as soon as possible. Adjust anti-scalant feed to system.

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- 57. Return to normal as soon as possible. Add biocide. Monitor results to assess the biocide effectiveness. If the preferred treatment is ineffective, use alternate biocides.
- 58. < 100 ppb before heating up above  $200^{\circ}$  F.
- 59. Prior to Fuel Movement.
- 60. Prior to Start-up.
- 61. May be reduced to the higher of 20 ppb or 8 times the CE-6 dissolved oxygen concentration in order to reduce the feedwater sodium concentration. The hydrazine concentration should be returned to normal value after the feedwater sodium concentration is reduced to the desired value.
- 62. Filterable iron analysis may be performed as directed by chemistry supervision to supplement the total iron analysis when rapid real time monitoring of corrosion product concentrations is necessary. If the filterable iron is measured and found to exceed 500 ppb, the total iron should be assumed to be out of specification since the total iron is the sum of filterable and non-filterable or dissolved iron.
- 63. Diesel Fuel Action level exceedence response: notify E&C Supervisor, notify System Engineering, initiate Work Request for tank filtration.
- 64. The following rules apply to the operation of the Zinc Injection System
  - Zinc injection may not be initiated until Silica is ≤ 1500 ppb
  - Zinc injection shall be terminated when Silica is > 1500 ppb
  - The system shall be secured two weeks prior to a planned shutdown or end of cycle coastdown
  - Zinc injection may not be initiated until RCS boron concentration is < 1500 ppm
  - Zinc injection shall be terminated when RCS boron concentration is  $\geq$  1500 ppm
  - Following a plant shutdown, increase Zinc monitoring to once per shift, if feasible (this is a Corporate request to gather data on Zinc residual return and cleanup time for Fleet use)
  - Prior to a plant startup, ensure that Zinc concentration has returned to an acceptable level
- 65. Analyze prior to 250° F in Mode 4 UP. Upper Limits <u>a</u>re Calcium 40 ppb, Aluminum 80 p<sup>p</sup>b, and Magnesium 40 ppb.
- 66. AR frequency for RCBT's is first sample that qualifies RCBT for RCS makeup.
- 67. On-site analysis.
- 68. Leak GPD based on Ce-5 sample. Xe133-LR and Xe135-LR based on samples obtained at RM-A12. LkRate use RMA12 based on RM-A12 countrate.

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- 69. Verify tower is blowing down at maximum rate allowed by tower operating procedure. Return to within specification as soon as possible.
- 70. Co-58 and Co-60 data included from Liquid gamma, Liquid gamma recount, CRUD gamma, CRUD gamma recount, Filtrate gamma, and Filtrate gamma recount. Record highest value from each respective original count and recount set. If less than MDA then record MDA value.
- 71. All the listed parameters are required in Modes 1-4. Limits for applicable parameters in Modes 3&4 are indicated in parenthesis.
- 72. These limits apply if RCS silica is > 1500 ppb in Modes 1&2
- 73. Increase frequency to 3X/W during zinc transients per E&C Supervision

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### **Emergency Pre-planned Reduced Secondary Sampling / Analyses**

#### Background:

Due to reduced Chemistry staffing that may be necessary due to emergencies, (for example hurricanes, tropical storms, strikes, etc.) sampling may reduced to monitoring only at Chemistry Supervision discretion for the parameters listed below at the frequencies stated.

### Instructions:

- 1. The reduced chemistry sampling described in this attachment may only be performed when specifically directed to do so by Chemistry Supervision because of reduced staffing due to emergencies or violent weather. The direction to Chemistry personnel to perform chemistry monitoring in accordance with this attachment should be documented in the Chemistry Turnover Sheet and in Autolog.
- 2. The reduced chemistry sampling described in this attachment will be stopped and the normal CH-400 chemistry monitoring resumed only when specifically directed to do so by Chemistry Supervision because the need has ended for reduced staffing. The direction to Chemistry personnel to resume chemistry monitoring in accordance with CH-400 should be documented in the Chemistry Turnover Sheet and in Autolog.
- 3. This attachment applies ONLY to secondary water chemistry **sampling frequencies** and supercedes the normal CH-400 secondary water chemistry sampling requirements only for the time period specified by Chemistry Supervision.
- 4. The **limits of CH-400 and CP-138 still apply** for the parameters that are being monitored by this attachment.
- NOTE: During power reductions, Na from HP turbine wash is expected in the HP/IP heater drains which are routed to the deaerator, and in the moisture separator drains which are routed to the condenser, causing a brief elevation in feedwater and condensate Na concentrations. The increases in Na concentration should not be confused with a condenser cooling water leak. If sea water is leaking into the condenser, then a significant increase in cation conductivity at CE-2, -3, -26, -19, and/or -29 would occur in conjunction with an increase in condensate Na (CE-2 or CE-3). An increase in feedwater Na would not be expected at the same time and magnitude as the condensate Na increase because of the condensate polisher cation resin removing the Na from the condenser leak.
- NOTE: During power reductions, generally there is no preference as to the order in which condensate demineralizers are removed from service. Two (2) demineralizers should be left in service during plant cool down and Modes 3 4. The spare condensate demineralizer vessel should not be placed into service unless absolutely necessary.

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- 1. During Mode 1 operation, ensure:
  - Na monitor SS-112-CE is aligned to CE-10,
  - Na monitor SS-152-CE is aligned to CE-3,
  - The N2H4 monitor is aligned to CE-9, and
  - The dissolved oxygen analyzer patch panel point is aligned to CE-6.
- 2. During Mode 1 operation, record daily the values for the following parameters:
  - CE-10 Na from SS-112-CE,
  - CE-3 Na from SS-152-CE,
  - CE-26 cation conductivity,
  - CE-19 cation conductivity,
  - CE-29 cation conductivity,
  - CE-5 cation conductivity,
  - CE-9 cation conductivity,
  - CE-10 cation conductivity,
  - CE-9 N2H4,
  - CE-6 dissolved oxygen, and
  - CE-9 morpholine (performed by grab sample).
- 3. During Modes 1 < 15% power, 2, 3, and 4, record every 12 hours the values for the following parameters (see also Step 9 below):
  - CE-10 Na from SS-112-CE,
  - CE-26 cation conductivity,
  - CE-19 cation conductivity,
  - CE-29 cation conductivity,
  - CE-5 cation conductivity,
  - CE-9 cation conductivity,
  - CE-10 cation conductivity,
  - CE-9 N2H4,
  - CE-6 dissolved oxygen, and
  - CE-9 morpholine (performed by grab sample).

NOTE: Blowing down the steam generators on an alternating basis during Modes 2 – 4 is necessary to prevent impurities from concentrating to corrosive levels in the steam generators.

4. During Modes 2, 3, and 4, as soon as possible request Operations to start blowing down each steam generator on an alternating basis approximately every 2 hours.

- 5. Align Na monitor SS-152-CE to CE-11 as soon as shellside drain sample line flow is established by Operations.
  - NOTE: There is no preference as to which steam generator is blown down first, only that each steam generator be blown down on an alternating basis every 2 hours or until the Na concentration is < 100 ppb.
- 6. As soon as Operations begins to blow down the first steam generator, perform Section 4.1 of CH542B and Section 4.3 of CH-543B so that the in-line monitor will be monitoring the Na concentration in the lower tubesheet drains of the steam generator being blown down at any given time. The intent is that CE-11BD Na and CE-12BD Na be monitored continuously at CE-11.
- 7. It is not necessary to record the Na monitor data into CDM every 2 hours if manpower is not available, however, the Na concentration should be checked within 30 60 minutes after blowdown is swapped to ensure that the Na concentration is decreasing to below 100 ppb. Operations may have to be requested to increase the blowdown flow rate, or raise and lower the steam generator water level in order to reduce the Na concentration.
- 8. During power ascension, the condensate demineralizers may be placed back into service in any order, but the spare demineralizer should not be placed into service unless absolutely necessary.

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## CH-400 Revision Matrix

Proposed CH-400 Issue Date \_\_\_\_\_

1. Does this revision impact:	Yes	No	Init
CP-138			
CP-142			<del>م </del>
CP-160			
CP-163			
Primary Water Chemistry Optimization Plan			
Secondary Water Chemistry Optimization Plan			
Closed Cooling Water Optimization Plan			
If any CP's or Optimization plans are impacted, ensure appropriate revisions are scheduled to be completed and all revision issue dates match.			
2. Does this revision require CDM Schedule Changes?			
CDM Schedule Changes Complete: Date			
<ol> <li>Does this revision require CDM Analyses Changes?</li> <li>CDM Schedule Changes Complete:</li> <li>Date</li> </ol>			
4. CDM Validation of Changes Complete:Date	;		
5. Does this revision require CH-400A, CH-400B, CH-400C, or CH-400D Logsheet Changes?			
Logsneet Changes Complete: Date	è		

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## Revision Summary (PRR# 332504)

SECTION	CHANGE
Page 35	Added phosphonate as a control parameter for IAHE-6B/C to be performed weekly with a control band of $0.5 - 5.0$ ppm per PRR 332504
Page 35	Changed phosphate for IAHE-6B/C to a diagnostic parameter with no limits to be performed as required per PRR 332504.

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## NRW-5

# 1. 2008 Tier II Chemical Inventory Reports



Larry E. Hatcher Manager, Crystal River Fossil Plant & Fuel Operations

February 26, 2009

State Emergency Response Commission 2555 Shumard Oak Boulevard Tallahassee, FL 32399-2100

Subject: 2008 Tier II Chemical Inventory Reports

Dear Sir or Madam,

Enclosed are the annual Tier II reports for the Florida Power Corporation dba Progress Energy Florida, Inc. Crystal River Energy Complex for those materials stored on-site above the following thresholds:

- Extremely hazardous substances in excess of 500 pounds, or the threshold planning quantity, whichever is less;
- MSDS hazardous chemicals in excess of 10,000 pounds.

The Material Safety Data Sheets (MSDS) for the listed chemicals are available at your request.

Check number 181426 has been submitted to the SERC by Progress Energy in the amount of \$2,000 along with the consolidated Annual Registration Form to cover the company's annual registration and registration fees.

Omitted from the enclosed Tier II lists are ammunition and special devices necessary for the security of the Crystal River Nuclear Plant. The information on these types of materials and quantities is considered "Safeguards Information" under Title 10, Section 73.21 of the Code of Federal Regulations. Should a response be required by your department to an area containing materials described herein, your personnel would be under the escort of Security Officers who are knowledgeable of the storage locations.

Also, we are requesting that the enclosed maps only be distributed to organizations with a "Need to Know" of exact locations of our storage areas.

Please feel free to contact Ms. Cynthia Wilkinson of my staff at (352) 563-4396 if you require any additional information.

Sincerely,

Larry E. Hatel

Larry E. Hatcher Manager, Crystal River Fossil Plant & Fuel Operations

Enclosures

xc: Withlacoochee Regional Planning Council Citrus County Emergency Management Crystal River Fire Station Citrus County Fire Rescue Division

Progress Energy Florida, Inc. Crystal River Steam Plant 15760 W. Powerline Street Crystal River, FL 34428 bc: Bob Stafford – PEF903 Sheilagh Garrity– PA3A File Point: 12564-F

#### CERTIFIED MAIL: 7008 0150 0002 9283 4791

S:\Crystal River\Environ Health & Safety\Environmental\EPCRA\Tier II-312 Reporting\2008\2008 Tier II Submittal Cover Letter.doc

Addresses for Recipients:

Withlacoochee Regional Planning Council 1241 SW 10<sup>th</sup> Street Ocala, FL 34471-2798

### CERTIFIED MAIL: 7008 0150 0002 9283 4807

Captain Joe Eckstein Citrus County Emergency Management 3425 West Southern Street Lecanto, FL 34461

### CERTIFIED MAIL: 7008 0150 0002 9283 4814

Crystal River Fire Station 650 Northwest 3<sup>rd</sup> Avenue Crystal River, FL 34428

#### CERTIFIED MAIL: 7008 0150 0002 9283 4821

Citrus County Fire Rescue Division 3600 W. Sovereign Path, Suite 291 Lecanto, Fl. 34461

CERTIFIED MAIL: 7008 0150 0002 9283 4838

TIER TWO	REPORTING	YEAR JAN. 1 TO DE	<b>C. 31</b> , 2008	Florida	S•E•R•	C Page 1	ofpages
EMERGENCY	Facility Identification Name Crystal River Energy	Complex		Øwner/Øpe Name	erator Name	<del>gy Florida _</del> Phone	e ( <u>352</u> ) <u>563-2943</u>
AND HAZARDOUS	Street 15760 W. Power Line Street	et ,		Mail Addres	ss 15760 W.	Power Line St., Cry	stal River, FL 34428
CHEMICAL	City Crystal River Count	y <u>Citrus</u> State I	EZip_34428	Emergency	Contact		
INVENTORY Specific	SIC Code 4911 Dun &	Brad Number 0 0-6	92-3700	Name Nick	Maltese	Title _	Supv. Safety, Env Lab
Information				Phone ( <u>352</u>	2) <u>464-7511</u>	24 Hr. Phone	( <u>352</u> ) <u>464-7511</u>
by Chemical	F.E.I # 5	9-0247-77	ס	Phone (352	<u>av Wiikinsc</u> ) 563-4396	24 Hr. Phone	( 352 ) 464-7739
					0		
		Physical	Inventor	v.		Storage Cod	es and Locations
	an a	Hazards	lin.		enp.	Storage Locations -	Description; not addres
	TIG-34-6 Trade	(check all that apply)	Pounds		<u>চ</u> নেনে	F3 (CR Units 1&2 AS	<u></u>
hem Name		Sudden Belease	Maximum Daily	Amount	ÂTĂ	E4, F4 (CR Unit 3 AS	T)
	No. 2 Fuel Oil	of Pressure		Anount	B14	E4, F4 (CR Unit 3 US	T)
heck all		Reactivity	Average Daily	Amount	B14	G4 (So. Coal Yard)	
HS Name	ure Mix Solid Liquid Gas EHS	Immediate (acute)	365	]		A4, A5, C5 (CR 4&5	three ASTs)
		Delayed (chronic)	Days on S	Site		C4 (Clean Air Projec	()
AS 076	6 4 - 4 1 - 7 Trade Secret	Fire	7,200		A24	B5 (East Side of CR	4&5 - single AST)
hem. Name	Ammonia (Anhydrous)	Sudden Release	Maximum Daily	Amount			
Check all			0 3				
that apply:	∠ L L L L L L L L L L L L L L L L L L L		Average Daily	Amount			
HS Name	Ammonia (Anhydrous)	Delayed (chronic)	Davs on S	ite			
						E2 (Ardolito Silo)	<del></del>
AS LIEICIG hem Name	Ash - Fly/Bottom		1,269,298, Maximum Daily		RIA	F2 (Boral Silo)	
		of Pressure		Anount	RIA	B5 (CR Units 4&5 Fly	& Bottom Ash Silos)
Check all		Reactivity	Average Daily	Amount	R14	A7, B7, C7 (Site Ash	Landfili)
Hat apply. Pui HS Name	re Mix Solid Liquid Gas EHS	Immediate (acute)	365		R14	E3 (CR 1&2 Bottom A	sh Silo)
	······································	Delayed (chronic)	Days on S	ite		·····	
ntification (Rea	ad and sign after completing all s	ections)		nginesen, sin ista Gebruitzen		Optional /	vitachments
ertify under penalty of la inquiry of those individ	aw that I have personally examined and a luals responsible for obtaining the inform	am familiar with the information s ation. I believe that the submitte	submitted in pages one thro d information is true, accura	ugh <u>8</u> and the	hat based on		
Aail address of representative	who prepared Tier Two Form (optional): cynthia	wilkinson@pgnmail.co	m			I have attached a	site plan
arn E Ustaka	r Manager Cristel Disco	^	· · · · ·			coordinate abbrev	viations
ne and official litle of owner/op	erator OR owner/operator's authorized representative	Signalure JE	Hatch		Z/26/09	I have attached a	description of
		- U				aikes and other s	areguard measures

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TIER TWO	REPORTING	YEAR JAN. 1 TO DE	C. 31, 2008	Florida	S•E•R	•C Page 2	of	pages
	Facility Identification Name Crystal River Energy (	Complex		Owner/Op Name Pro	erator Nam ogress Ene	e rgy Florida Phone	( <u>352</u> ) <u>563-2</u>	943
HAZARDOUS	Street 15760 W. Power Line Stree	t	•	Mail Addres	s 15760 W	. Power Line St., Crys	stal River, FL	pages 3-2943 FL 34428 ty, Env Lab -7511 >pecialist -7739 atlons no? address 
CHEMICAL	City <u>Crystal River</u> County	Citrus State F	L Zip 34428	Emergency	/,Contact			pages -2943 FL 34428 y, Env Lab -7511 pecialist -7739 Nigns mol: address 
Specific	SIC Code 4 9 1 1 Dun &	Brad Number 0 0-6	92-3700	Name Nick	Maltese	Title	Supv. Safety,	Env Lab
Information by Chemical	F.E.I. # 5	9-0247-770	5	Name <u>Cvn</u> Phone (352	dv Wilkins ) 563-439	onTitle 6 24 Hr. Phone	<u>Sr. Env. Spe</u> (352) 464-7	<u>ecialist</u> 739
Cher	nical Description	Physical and Health Hazards	Inventor In Pounds		Container Container Type Pressure Temperature	Storage:Code (NonKoc Storage Locations - I	s and Locath Infidential) Description, no	sin <b>s</b> . Staddress
CAS 100	4 3 - 3 5 - 3 Trade Secret	Fire	10,288	Constitution and the second	J14	E4, F4 (CR Unit 3)	<u> </u>	
Chem. Name		Sudden Release	Maximum Daily	Amount				
Check all				A man a com t				
that apply:	re Mix Solid Liquid Gas EHS		Average Dally	Amount				
EHS Name		Delayed (chronic)	Days on S	ite				
	5-62-0 Trade	Fire	102.907	,	C14	F3 (CR Units 1&2 Silc	)	
Chem. Name	Calcium Hydroxide	Sudden Release	Maximum Daily	Amount		B5 (CR Units 4&5 Sild	o)	
Check all					HHH			
that apply: LY.	re Mix Solid Liquid Gas EHS		Average Daily A	Amount				
EHS Name		Delayed (chronic)	Days on Si	ite				
$CAS \square \square$	4-38-9 Trade	Fire	15 325			E3 (CR Units 1s&2)		
Chem. Name	Carbon Dioxide	Sudden Release	Maximum Daily	Amount	A 2 4	B5 (CR Units 4&5)		
		of Pressure	04			E4, F4 (CR Unit 3)		
that apply:	e Mix Solid Liquid Gas EHS		Average Daily A	Amount				
EHS Name	······	Delayed (chronic)	Days on Si	te		····	· · · · · · · · · · · · · · · · · · ·	
Certification (Rea	d and sign after completing all se w that I have personally examined and a	ctions) m familiar with the information si	ubmitted in pages one throu	igh <sup>8</sup> and th	nat based on	Optional A	ttachments	
my inquiry of those Individu	uals responsible for obtaining the informa	tion, I believe that the submitted	I information is true, accurat	e, and complete.		I have attached a	site plan	
		wiikiiison@pgnmaii.cor	1)			have attached a coordinate abbrev	list of site iations	
Larry E. Hatcher	*, Manager, Crystal River rator OR owner/operator's authorized representative	<u>Signature</u>	htl_	2	Date signed	I have attached a dikes and other sa	description of	sures

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TIER TWO	REPORTING	YEAR JAN. 1 TO DE	<b>C. 31</b> , 2008	Florida	a S•E•R	•C Page <u>3</u>	of _8	pages
EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY Specific Information by Chemical	*Facility/Identification         Name       Crystal River Energy (         Street       15760 W. Power Line Street         City       Crystal River         Code       4 9 1 1 Dun &         F.E.I. # 5	Complex           t	FLZip_ <u>34428</u> 9 [2] - [3] [7] [0] 0]	OWner/Op Name Pr Mail Addre Emiengenc Name Nicl Phone (35 Name Cyn Phone (35	erator/Nam ogress Ene ss 15760 W. & Contact & Maltese 2 ) 464-7511 dv Wilkinso 2 ) 563-4396	rgy Florida Phone Power Line St., Crys Title St., Crys 24 Hr. Phone Title 24 Hr. Phone 24 Hr. Phone	(352) 563 stal River, F Supv. Safety (352) 464- Sr. Env. S (352) 464-	pages     2943     L 34428     7, Env Lab     7511     pecialist     7739     floins     not address     ment Bid)  )  )
Cibe CAS [] [] [7] [7] Chem. Name	mical Description 8 2-50-5 Trade Secret	Physical and Health Hazards (checklailthat apply) Fire Sudden Release	MAVENTOR Jin Pounds 450 Maximum Daily	y Z Amount		Storage Code (Nom-Co Storage Locations - 1 B4 (CR Units 4&5 - W	s:and:Loca inflidential) Description: 'ater Manage	flons not-addres ment Bld)
Check all [ that apply: P EHS Name	Chlorine	of Pressure Reactivity Immediate (acute) Delayed (chronic)	02 Average Daily <u>365</u> Days on S	Amount ] Site				
CAS	0 2 -0 1 -2 Trade Secret Hydrazine	<ul> <li>Fire</li> <li>Sudden Release of Pressure</li> <li>Reactivity</li> <li>Immediate (acute)</li> <li>Delayed (chronic)</li> </ul>	33,905 Maximum Daily 04 Average Daily <u>365</u> Days on S	Amount Amount Site	E14 014 014 R14 E14	A6 (Site Flam, Chem, E3 (CR Unit 1 Chem, E3 (CR Unit 2 Chem, F4 (CR Unit #3) F4 (CR Unit #3) E5 (CR Unit #3 Wareh	Warehouse) Feed Station Feed Station	)
CAS 13	3 3 - 7 4 - 0 Trade Secret Hydrogen	<ul> <li>Fire</li> <li>Sudden Release of Pressure</li> <li>Reactivity</li> <li>Immediate (acute)</li> <li>Delayed (chronic)</li> </ul>	12,674 Maximum Daily [0]4 Average Daily 365 Days on S	Amount Amount ite		E4, F4 (CR Unit 3) E4, F4 (CR Unit 3) E3 (CR Units 1&2) B4 (CR Units 4&5)		
Sentification (Re certify under penalty of I ny Inquiry of those individ E-Meil address of representative Larry E. Hatche	ad and sign after completing all s aw that I have personally examined and a duals responsible for obtaining the inform who prepared Tier Two Form (optional): cynthia er, Manager, Crystal River	m familiar with the information s ation, I believe that the submitte .wilkinson@pgnmail.co	submitted in pages one thro d information is true, accura m	ugh <u>8</u> and ite, and complete	that based on	Optional A	ittachments site plan list of site riations	
ame and official lills of owner/op	perator OR owner/operator's authorized representative	Signature.		<u></u>	Date signed	LI have attached a dikes and other sa	description of afeguard me	of asures

TIER TWO	REPORTING	YEAR JAN. 1 TO DE	EC.31, 2008	Floric	la S∙E∙R	•C Page <u>4</u>	of _8 pages
EMERGENCY	Name Crystal River Energy	Complex		NameP	rogress Ene	rgy Florida Phone ( 3	<u>52</u> ) <u>563-2943</u>
HAZARDOUS	Street 15760 W. Power Line Stre	et		Mail Addre	ess 15760 W	. Power Line St., Crystal	River, FL 34428
	City Crystal River Count	y <u>Citrus</u> State	FL Zip 34428	Emergen	ey Contact		
Specific Information	SIC Code 4911 Dun &	Brad Number 0 0-6	92-3700	Name <u>Nic</u> Phone ( 3	ck Maltese 52)464-751		v. Safety, Env Lal 52 ) 464-7511
by Chemical	F.E.I. # 5	9-0247-77	0	Name <u>Cv</u> Phone (35	ndv Wilkins 52)563-439	on Title Sr 6 24 Hr. Phone ( 3	<u>, Env. Specialist</u> 52 ) 464-7739
Che	mical Description	Physical and Health Hazards (date all that apply)	Inventor In Pounds		Contained. Contained. Type: Pressure Temperature	Storage:Codesta (Non-Confl Storage Locations - Des	nd(Locations dential) cription( notraddre:
CAS 74	39-92-1 Trade	G Fire	220.548	3	R14	A6 (Flam Chem Warehou	ISC)
Chem, Name		Sudden Release	Maximum Dailv	Amount	R14	E3 (CR Units 1&2 Batter	(Rooms)
Lead (I	n lead acid batteries)	of Pressure	05	ر میں ا	R14	E4, F4 (CR Unit #3 Batter	ry Rooms)
that apply:			Averag <u>e Daily</u>	Amount		B4 (CR Units 4&5 Batter	y Rooms)
EHS Name	ure Mix Solid Liquid Gas EHS	Delayed (chronic)	<u>365</u> Days on S	ite	R14	D4 (Electrical Switch Yar	rd)
	1 0 -9 1 -8 Trade	V Fire	15.394	<u> </u>	EIA	E4, F4 (CR Unit #3)	······································
Chem. Name	Morpholine	Sudden Release of Pressure	Maximum Daily	Amount		E4, F4 (CR Unit #3)	
Check all			Average Daily	Amount			
that apply:	ure Mix Solid Liquid Gas EHS	Immediate (acute)	365	anount			
EHS Name		Delayed (chronic)	Days on S	ite			
	2 7 3 7 9 <sup>Trade</sup>	Fire	80.247			E4, F3, F4 (CR Unit #3)	
Chem. Name	Nitrogen	Sudden Release	Maximum Daily	Amount		E4, F3, F4 (CR Unit #3)	
		of Pressure	04		L24	B4 (CR Units 4&5)	
Check all that apply:		Reactivity	Average Daily A	Amount		E3 (CR Units 1&2)	·····
EHS Name	re Mix Solid Liquid Gas EHS	Immediate (acute) □ Delayed (chronic)	<u>365</u> Davs on Si	te			
Sertification (Re	ad and sign after completing all s	l   ections)				Ontional Atta	hments
certify under penalty of I	aw that I have personally examined and i	am familiar with the information s	submitted in pages one through	igh <u>8</u> , and	that based on		
ny inquiry of those individ	suals responsible for obtaining the inform	ation, I believe that the submitte	d information is true, accurat	e, and complet	te.	I have attached a site	plan
-weil doniess of representative	who prepared ther two Porm (optional): Cynthia	.wiikinson@pgnmail.co		<u> </u>		I have attached a list	of site
Larry E. Hatche	r, Manager, Crystal River	Lange F	the fel	4	2/26/09		
ame and official lille of owner/or	perator OR owner/operator's authorized representative	Signature	- Deduct -		Date signed	dikes and other safeg	cription of uard measures
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TIER TWO	REPORTING	YEAR JAN. 1 TO DE	<b>C. 31</b> , 2008	Florida	S•E•R	C Page 5	of _8	_ pages	
EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY Specific Information by Chemical	Facility identification         Name       Crystal River Energy Complex         Street       15760 W. Power Line Street         City       Crystal River         County       Citrus         Stace       FL         Zip 34428         SIC Code       9         Total River       0         F.E.I. #       5         O       7         County       2         County       0         Citrus       5         Sic Code       9         Citrus       7         Code       9         Citrus       7         Citrus       7         Code       7         Citrus       7         Code       7         Citrus       7			Name Pro Mail Address Emergency Name Nick Phone (352 Name Cyne Phone (352	Winer/OperatorsName         Name       Progress Energy Florida         Mail Address 15760 W. Power Line St., Crystal River, FL 34428         Imergency/contact,         Name       Nick Maltese         Phone (352) 464-7511       24 Hr. Phone (352) 464-7511         Name       Cyndy Wilkinson         Phone (352) 563-4396       24 Hr. Phone (352) 464-7739				
Cher	vical Mascription	Physical and Health Hazards	inventor lin Bounds	X	Curtanee Hype Pressure Temperature	Storage Code: (Non-Co Storage Locations - D	and Local fidential) escription, r	tions not <i>adares</i> s	
CAS 6 8 4 7 Chem. Name Check all that apply: Pu EHS Name	7     6     9     6     -     0     Trade Secret       Slag. Coal       7	☐ Fire ☐ Sudden Release of Pressure ☐ Reactivity ☐ Immediate (acute) ☑ Delayed (chronic)	2,123,054, Maximum Daily 11 Average Daily <u>365</u> Days on S	000 Amount Amount		G3 (South Coal Yard) C6 (North Coal Yard) E3 (CR Units 1&2 Coa B4 (CR Units 4&5 Coa	l Silos) Il Silos)		
CAS 763 Chem, Name Check all that apply: Pu EHS Name	1-90-5       Trade Secret         Sodium Bisulfite	<ul> <li>☐ Fire</li> <li>☐ Sudden Release of Pressure</li> <li>☐ Reactivity</li> <li>☑ Immediate (acute)</li> <li>☑ Delayed (chronic)</li> </ul>	28,559 Maximum Daily 0 4 Average Daily 365 Days on S	Amount Amount ite		B3 (CR Units 4&5, Coo Treatment Buildinig)	bling Tower <sup>1</sup>	Water	
CAS 764 Chem. Name Check all that apply: Pure EHS Name	7-15-6       Trade Secret         Sodium Bromide	<ul> <li>□ Fire</li> <li>□ Sudden Release of Pressure</li> <li>□ Reactivity</li> <li>☑ Immediate (acute)</li> <li>□ Delayed (chronic)</li> </ul>	23,944 Maximum Daily 04 Average Daily A <u>365</u> Days on Si	Amount Amount ite		A6 (Flam Chem Wareh B3 (CR Units 4&5 Coo Treatment Building)	ouse) ling Tower V	Vater	
Certification (Rea I certify under penalty of la my inquiry of those individi E-Mail address of representative v Larry E. Hatchel Name and official title of owner/ope	Id and sign after completing all se w that I have personally examined and a uals responsible for obtaining the informative operated Tier Two Form (optional): cynthia, r, Manager, Crystal River rator OR owner/operator's authorized representative	ictions) m familiar with the information su tion, I believe that the submitted wilkinson@pgnmail.con 	ubmitted in pages one throu information is true, accura n	ugh and ti te, and complete	hat based on	Optional A I have attached a s I have attached a I coordinate abbrevi I have attached a d dikes and other sa	tachments ite plan ist of site ations description c feguard mea	of	

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TIER TWO	REPORTING	YEAR JAN. 1 TO DE	C. 31, 2008	Florida	S•E•R	•C Page <u>6</u>	of	_ pages		
EMERGENCY	Facility Identification: Name Crystal River Energy Complex				Owher/Operator Name Name Progress Energy Florida Phone ( <u>352</u> ) <u>563-2943</u>					
ANU HAZARDOUS	Street 15760 W. Power Line Street				Mail Address 15760 W. Power Line St., Crystal River, FL 34428					
	City Crystal River County	Citrus State F	L Zip 34428	Emengency Contact						
Specific Information	SIC Code 4911 Dun & Brad Number 00-692-3700				Name Nick Maltese Title Supv. Safety, Env Lab Phone (352) 464-7511 24 Hr. Phone (352) 464-7511 Name Cyndy Wilkinson Title Sr. Env Specialist					
by chemical	F.E.I. # 5	9-0247-770	<u>ן</u>	Phone (352	) 563-439	6 24 Hr. Phor	ne(352)464-7	′739		
Cher	nical Description	Physical and Health Hazards	inventor in Pounds		Containol Lyner Piessue Temperature	Storage Co (Nohiv Storage Locations	les and Locat Sonfidential) Description, m	lons ot <i>addr</i> ess		
CAS 13 Chem. Name	10-73-2     Trade Secret	Fire Sudden Release of Pressure	149,488 Maximum Daily	5 Amount	A 1 4 A 1 4 A 1 4	F3 (CR Units 1&2 - B4 (CR Units 4&5 V B4 (CR Unit 4 & 5)	Water Treatmen Vater Treatmen	it Bidg.) t Bidg.)		
Check all that apply: Pure Mix Solid Liquid Gas EHS EHS Name		Reactivity Immediate (acute)	Average Daily Amount		014 M14 E14	A6 (Flammable Ch B4, F3, E4 (Site Ch A6 (Flammable Ch	emical Warehou emistry Laborat emical Warehou	ise) (ories)		
CAS 7681-52-9 Trade Chem. Name Sodium Hypochlorite Check all Pure Mix Solid Liouid Gas EHS EHS Name		<ul> <li>Delayed (chronic)</li> <li>Fire</li> <li>Sudden Release of Pressure</li> <li>Reactivity</li> <li>Immediate (acute)</li> <li>Delayed (chronic)</li> </ul>	Days on Site 10,430 Maximum Daily Amount 0 4 Average Daily Amount 365 Days on Site			F3 (CR Units 1&2 - B3 (CR 4&5 Coolin Treatment Building	Water Treatmen 9 Tower Water )	<u>it Bldg.)</u>		
CAS	AS Check all Check all Pure Mix Solld Liquid Gas EHS		Maximum Daily Average Daily Days on S	Amount Amount ite						
Centification (Rea I certify under penalty of la my inquiry of those individi E-Mail address of representative y	to and sign after completing all se w that I have personally examined and a uals responsible for obtaining the informa who prepared Tier Two Form (optional): Cynthia.	ctions) n familiar with the information s tion, I believe that the submitted wilkinson@pgnmail.cor	ubmitted in pages one throu d information is true, accura N	ugh <u>8</u> and t te, and complete	hat based on	Optional	Attachments a site plan a list of site			
Larry E. Hatchel	r, Manager, Crystal River arator OR owner/operator's authorized representative		tatel.	2	12604 Date signed	I have attached dikes and other	a description o safeguard mea	f isures		

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TIER TWO	REPORTING	YEAR JAN, 1 TO DE	C. 31, 2008	Florida	S•E•R	•C Page <u>7</u>	of	pages		
EMERGENCY	Facility Identification Name Crystal River Energy Complex				Owner/Operator Name Name Progress Energy Florida Phone (352) 563-2943					
AND HAZARDOUS	Street 15760 W. Power Line Street				Mail Address 15760 W. Power Line St., Crystal River, FL 34428					
CHEMICAL	City Crystal River County	Citrus State	L Zip 34428	Emergency.Contact						
INVENTORY Specific	SIC Code 4911 Dun &	SIC Code 4911 Dun & Brad Number 00-692-3700				Name Nick Maltese Title Supv. Safety, Env Lab				
Information				Phone (35)	Phone ( <u>352</u> ) <u>464-7511</u> 24 Hr. Phone ( <u>352</u> ) <u>464-7511</u>					
by Chemical	F.E.I. # 5	9-0247-77	0	Phone (352	Phone (352 ) 563-4396 24 Hr. Phone ( 352 ) 464-7739					
		Physical and Health	inventor		iaue	Storage Co (Non-1	les and Loca	itions		
		Hazards			Conta Lype Press	Storage Ldcations	Description	not address		
			51 220	M.S. Minister and Lower 1	AIA	C5 (Gasoline AST)	Min a carta interior alia.	<u>لان مى زىمىرىمىشى خ</u>		
	Contraction Secret		Maximum Daily	Amount	A 1 4	C4, B5 (Clean Air P	roject)			
	nleaded Gasoline	of Pressure	04							
Check all		Reactivity	Average Daily	Amount				<u> </u>		
Pure Mix Solid Liquid Gas EHS		Immediate (acute) 365					······			
	······································	Delayed (chronic)	Days on S	Site						
CAS	6 4 - 9 3 - 9 Trade	Fire	107,355	5	A14	F3 (CR Units 1&2 W	ater Treatmer	nt Bldg.)		
Chem. Name Sulfuric Acid		Sudden Release	Maximum <u>Daily</u>	Amount		B4 (CR Units 4&5 -	So. Side of ea	ch unit)		
Chack all			04			B5 (CR Units 4&5 +	tr Trt Bldg )	ant Bldg.)		
Check all that apply: Pure Mix Solld Liquid Gas EHS EHS Name Sulfuric Acid		Immediate (acute)     Average Daily A       Immediate (acute)     365       Immediate (chronic)     Days on Si		Amount 014 M14		F4 (CR Unit 3) F3, F4, B4 (All Units Chemistry Labs)				
AS LITE	6 4 - 9 3 - 9 Secret	Fire	82,149		R14	A6 (Flammable Che	mical Wareho Rooms)	use)		
Chem. Name Sulfuric Acid		Judden Release of Pressure	Maximum Daily	Amount	RIA	E4, F4 (CR Unit #3 E	Battery Rooms	 s)		
		V Reactivity Average Daily (		mount R14		B4 (CR Units 4&5 B	attery Rooms)			
that apply: L. IX. L. IX. L. IX. Pure Mix Solid Liquid Gas EHS		Immediate (acute)				C4, C5 (Site Support Bldg./Fleet Services)				
HS Name	Sulfuric Acid	Delayed (chronic)	Days on Si	ite	R14	D4 (Electrical Switc	h Yard)			
ertification (Re	ad and sign after completing all s	Ctvons)				Optional	Attachments			
certify under penalty of I	aw that I have personally examined and a	m familiar with the information s	ubmitted in pages one throu	ugn and i	hat based on	an an the second of the second	an a	潮波的2000年1月1日 (13) 		
y inquiry or mose maintaines responsible for obtaining the information, I believe that the submitted information is true, accurate -Mail address of representative who prepared Tier Two Form (optional): cynthia wilkins on Anginanmail com						I have attached a site plan				
						L have attached coordinate abbr	a list of site eviations			
arry E. Hatcher, Manager, Crystal River					126109	L have attached	a description	of		
me and afficial title of owner/or	nerstor OR owner/operator's authorized representative	Signature A			0		a geoonpron	<u> </u>		

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TIER TWO	REPORTING	YEAR JAN. 1 TO DE	EC. 31, 2008	Florida	a S•E•R	•C Page <u>*</u>	of _8	_ pages
EMERGENCY AND HAZARDOUS CHEMICAL INVENTORY Specific Information by Chemical	Facility/Identification Name Crystal River Energy C Street 15760 W. Power Line Stree City Crystal River County SIC Code 4 9 1 1 Dun & F.E.I. # 5	Complex t CitrusState Brad Number 0 0 - 6	FL Zip 34428 9 2 - 3 7 0 0 0	Owner/Op Name Pr Mail Addre Emenganc Name Nicl Phone (35 Name Cym Phone (35)	erator/Nam ogress Ene ss 15760 W yContact k Maltese 2) 464-751 dv Wilkinso 2) 563-4390	e rgy Florida Phone Power Line St., Cry Title Title 24 Hr. Phone Title 24 Hr. Phone Title 24 Hr. Phone	( <u>352</u> ) <u>563-</u> stal River, F Supv. Safety ( <u>352 ) 464-</u> Sr. Env. Sp ( 352 ) 464-	2943 L 34428 , Env Lab 7511 Decialist 7739
Che CAS [647]	mical Description 42-54-7 Trade Secret	Physical u and Health Hazards (checkrallithanapply) Fire	Inventon In Pounds 724,703	Amount	Linguages Linguages	Storage Code INon*C Storage Locations E3 (CR 1&2) E4, F4 (CR Unit #3)	s and Locat ntidential) Secontion : r	lons ot/acdres
Check all [ that apply: P EHS Name	bon Base Oil (Lube Oil)	Reactivity Delayed (chronic)	Average Daily 05 Average Daily 365 Days on S	Amount ) ite		B4 (CR Units 4&5) A6 (Site Flam Chem B4, E3, E4, F4 (Temp C4 (Used oil storage	Warehouse) Staging at al site support	l units) whse)
CAS 6 4 7 Chem. Name A for Hvdroca Check all 1 that apply: Pu EHS Name	4       2       -5       4       -7       Frade Secret         dditional storage locations         arbon Base OII (Lube Oil)	<ul> <li>Fire</li> <li>Sudden Release of Pressure</li> <li>Reactivity</li> <li>Immediate (acute)</li> <li>Delayed (chronic)</li> </ul>	Maximum Daily Average Daily Days on S	Amount Amount ite		B5,C4 (CR 4&5 Clean E4, F4 (CR Unit #3) E4, F4 (CR Unit #3)	Air Project)	
CAS 7 4 4 Chem. Name Check all that apply: Put EHS Name	10-37-1       Trade Secret         Argon, compressed gas	<ul> <li>□ Fire</li> <li>☑ Sudden Release of Pressure</li> <li>□ Reactivity</li> <li>☑ Immediate (acute)</li> <li>☑ Delayed (chronic)</li> </ul>	25,785 Maximum Daily 04 Average Daily A <u>365</u> Days on Si	Amount Amount te		A4, B5 (Clean Air Pro B4 (CR Units 4&5) E3 (CR 1&2)	lect)	
Sertification (Rea certify under penalty of la ny inquiry of those individ E-Mail address of representative Larry E. Hatche lame and official little of owner/op	ad and sign after completing allise aw that I have personally examined and ar fuals responsible for obtaining the informa who prepared Tier Two Form (optional): cynthia. r, Manager, Crystal River erator OR owner/operator's authorized representative	ctions) n familiar with the information s tion, I believe that the submitted wilkinson@pgnmail.com 	ubmitted in pages one throu d information is true, accurat m Hatel	igh <u>8</u> and t ie, and complete	hal based on 	<ul> <li>Optional A</li> <li>I have attached a</li> <li>I have attached a coordinate abbrev</li> <li>I have attached a dikes and other sa</li> </ul>	ttachiments site plan list of site lations description o feguard mea	f



Non-Radiological Waste

## NRW-8

# 1. CR3 Pollution Prevention (P2) Accomplishments

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### CR3 Pollution Prevention (P2) Accomplishments (5/2008)

- Identified waste concerns beginning in 2005-removed wastes from site in 2006/2007
  - Waste had not been removed from site. Approximately \$30,000 of waste was removed during 2006 and 2007. The Environmental Specialist inherited waste in Jan 2006 due to the early retirement program until a Hazardous Waste Coordinator was hired and identified in February 2007.
  - Warehouse stock, tool room stock, and expired chemicals were identified as a major contributor to waste
    - Identified monthly shelf life listing will go to Environmental Specialist to review and contact vendors for possible shelf life extensions beginning May 2008.
       Several extensions have been received for chemicals eliminating waste
    - Evaluate maintaining batteries with float charge to eliminate the 6 month shelf life
  - Minimize chemicals ordered on restricted use permits began 1/2006 reducing waste quantities
  - Minimize container sizes in Warehouse began as CAT ID were renewed or created beginning 1/2006 reducing waste quantities
  - CAT IDs were assigned for each new chemical minimizing health, minimizing MSDS retrieval issues, and environmental reporting issues beginning early 2006.
- Obtained Upper Management Support
  - o Environmental Specialist drafting letter for Site Communication for PGM
  - Progress Energy Corporate Strategic Sourcing is in agreement with the CR3 chosen green products
  - Change management requirements in review
- Reviewed ME-197
  - o Identified changes may be made to this document to eliminate waste
  - Identified Progress Energy Procurement Engineering & Dedication is in charge of ME 197 and changes may be made to this document relatively quickly to reduce waste
- Model Work Orders

- Identified this will be a huge gain once these can be modified. This will take time to
  make formal changes. However, marking a box in the software that states De-select will
  eliminate ordering this product so this can be used from one of the tool rooms when it is
  stocked in these locations instead of ordering more chemical. This will minimize a large
  amount of waste due to expiration dates on these materials. Awareness of what
  marking this box means will minimize waste without changes to the model work order.
- Control in the cold tool room has been increased by adding a door and wall minimizing access.
   This allows chemicals to be stored in one area with access for all employees using the chemicals before dates expire to ensure minimizing waste.
- Placing a cabinet outside the hot tool room cage increases control of items minimizing health and storage concerns.
- Obtaining Planners Buy-in and making procedural changes will make huge gains in the automated system —discussions have begun but no procedures have been changed until change management is ensured and completed.
- Awareness of the CR3 Staff/contractors
  - o Air, water, land, waste slogan
  - What does she do slogan
  - Who do you call slogan
  - Set-up displays of attention getting chemicals or spills with various pictures and training documents
  - Monthly chemical control, pollution prevention, various CR3 Sections meeting attended by the Environmental Specialist, and environmental training to different groups including contractors, NPC, Warehouse, NFS, maintenance, monthly safety meetings, and during outages to major contractors to ensure training of over 550 employees so they understand sustainability
  - During the CR3 R-15, over 340 individuals were trained on environmental, chemical control, waste minimization, and pollution prevention
- The need for process waste assessments have been identified
  - A summer intern has been chosen to work on pollution prevention and process waste assessments during the summer of 2008. This person is Brandon Barr, an Environmental Engineering Major at UF in Gainesville, FL. Batteries and used oils have been identified as the first process waste assessments.
- Janitorial products (15) for substitution to less hazardous chemicals have been identified. The initial test has been completed. Chemicals currently used and quantities identified for CR3. A meeting is being established for the pollution prevention team to review followed by the janitorial staff evaluation on site.
- Once we are all in agreement with satisfactory results, we will contact Corporate with our products and prices. These products have been submitted to Sustainable Earth (proposed company for less hazardous chemicals) for cost comparison. Once this information is received Corporate has agreed to present this information to the current vendor for comparisons. The cost of Sustainable Earth chemicals are very reasonable priced since they are also the manufacturer. Therefore, this will be a cost savings, as well as, minimize waste. Once this is final, PE Corporate plans to use these chemicals for blanket purchase to ensure we incorporate sustainability Progress Energy wide in the chemical purchasing arena for all facilities and power plants. One this has been implemented, additional items will be evaluated for substitution or minimization in the pollution prevention program. This will eliminate the quantities of different chemicals and several chemicals will have various uses.
- Proactive Management has been implemented at CR3 since Jan 2006. Instead of reacting to concerns, we now plan ahead and train 550 staff members in the basics of environmental, chemical control, and pollution prevention. This includes understanding the chemical processes and the CR3 internal processes. During 2006, an additional 4120 pounds of potential hazardous waste was identified from CR3 planned functions. Due to waste minimization and pollution prevention, only 2161 pounds of hazardous waste were created. This eliminated 1959 pounds of hazardous waste in 2007 due to implementation of pollution prevention activities beginning in 2006. Minimal quantities, purchases, expiration dates, awareness of the staff, management buy-in, and corporate buy-in are all part of the proactive management initiated here at CR3 which leads to pollution prevention.
  - 1959 pounds of hazardous waste eliminated due to P2
  - o 7 less hazardous products substituted for hazardous products in 2007
  - o 16 planned (to date, in final review) substitutions for more hazardous products in 2008
  - Reviewed processes and minimized quantity purchased prior to requisition in 2007 for 73 chemicals
    - 27 for R-15
    - 73 during entire 2007
  - Minimizing container sizes to eliminate waste since 2006
    - Minimized container size for 73 restricted use chemicals

- Ensured minimum container size for 12 Warehouse stock chemicals with catalogue IDs
- Total of 85 different chemical container sizes minimized
- o Shelf Life Extensions
  - 6 chemical shelf life extended to eliminate waste (coatings, paints, adhesives, water chemistry chemicals)
- Denied approval of 4 chemical requests when less hazardous chemicals are available due to health hazards, hazardous waste creation, or environmental concerns (ozone depletion chemicals, benzene, methylene chloride, methyl ethyl ketone)

# **Radiation Protection**

# RP-1

1. CR-3 Off-Site Dose Calculation Manual

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# CRYSTAL RIVER UNIT #3

# OFF-SITE DOSE CALCULATION MANUAL

# PNSC & PGM approval documented in PNSC meeting 2009-18 on 8-11-09

Hughes, LeeAPPROVED BY:Lee Hughes(sicI am approving this document.SuperintendentEnvi2009.08.12 14:48:10-04'00'

Lee Hughes <u>(signature on file)</u> Superintendent Environmental & Chemistry

DATE: <u>08/11/2009</u>

REVISION: 32

APPROVED BY: Interpretation Contact

Rudy Pinner <u>(signature on file)</u> Sr. Science and Lab Services Specialist

Pinner, Rudolph W. Lam approving this document.-2009.08.12 13:25:29 -04'00'/

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#### INTRODUCTION

The Off-site Dose Calculation Manual (ODCM) is provided to support implementation of the Crystal River Unit 3 radiological effluent controls. The ODCM is divided into two parts. Part I contains the specifications for liquid and gaseous radiological effluents and the radiological environmental monitoring program which were relocated from the Technical Specifications in accordance with the provisions of Generic Letter 89-01 issued by the NRC in January, 1989. Part II of the ODCM contains the calculational methods to be used in determining the dose to members of the public resulting from routine radioactive effluents released from Crystal River Unit 3. Part II also contains the methodology used to determine effluent monitor alarm/trip setpoints which assure that releases of radioactive materials remain within specified concentrations.

The ODCM shall become effective after acceptance by the Plant Nuclear Safety Committee and approval by the Plant General Manager in accordance with Technical Specification Section 5.6.2.3. Changes to the ODCM shall be documented and records of reviews performed shall be retained. This documentation shall contain sufficient information to support the change (including analyses or evaluations), and a determination that the change will maintain the level of radioactive effluent control required by the regulations listed in Technical Specification and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

Changes shall be submitted to the NRC in the form of a complete and legible copy of the entire ODCM as part of, or concurrent with, the Radioactive Effluent Release Report for the period of the report in which any change to the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (e.g. month/year) the change was implemented.

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PART I

# SPECIFICATIONS

#### 1.0 DEFINITIONS

## 1.1 CHANNEL CALIBRATION

Refer to Technical Specifications.

#### 1.2 CHANNEL CHECK

Refer to Technical Specifications.

#### 1.3 CHANNEL FUNCTIONAL TEST

Refer to Technical Specifications.

## 1.4 **DEGASSING**

DEGASSING, for purposes of hydrogen and oxygen control, means venting of the make-up or reactor coolant systems to the WASTE GAS SYSTEM.

DEGASSING, for purposes of controlling the inventory of radioactive material, means venting of the pressurizer to the WASTE GAS SYSTEM.

DEGASSING does not include sampling.

1.5 FREQUENCY

#### NOTATION

## FREQUENCY

S	At least once per 12 hours.
5	
D	At least once per 24 hours.
W	At least once per 7 days.
М	At least once per 31 days.
Q	At least once per 92 days.
SA	At least once per 6 months.
R	At least once per 18 months.
S/U	Prior to each reactor startup.
Р	Completed prior to each release.
N.A.	Not applicable.

NOTE: Surveillance frequencies are met if the surveillance is performed within 1.25 times the interval specified, as measured from the previous performance or as measured from the time a specified condition of the frequency is met. This is consistent with the convention of ITS 3.0.2.

## 1.6 LIQUID RADWASTE TREATMENT SYSTEM

The LIQUID RADWASTE TREATMENT SYSTEM shall be any available equipment (e.g., filters, evaporators) capable of reducing the quantity of radioactive material, in liquid effluents, prior to discharge.

#### 1.7 MEMBER OF THE PUBLIC

MEMBER OF THE PUBLIC means an individual in a controlled or unrestricted area. However, an individual is not a member of the public during any period in which the individual receives an occupational dose.

## 1.8 <u>MODE</u>

Refer to Technical Specifications.

## 1.9 OFFSITE DOSE CALCULATION MANUAL (ODCM)

The OFFSITE DOSE CALCULATION MANUAL contains the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM also contains the Radioactive Effluent Controls and Radiological Environmental Monitoring Program and descriptions of the information that should be included in the Annual Radiological Environmental Operating and Radioactive Effluent Release Reports.

#### 1.10 OPERABLE - OPERABILITY

Refer to Technical Specifications.

#### 1.11 SITE BOUNDARY

The SITE BOUNDARY shall be that line beyond which the land is not owned, leased, or otherwise controlled by the licensee.

#### 1.12 <u>SOURCE CHECK</u>

A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.

### 1.13 UNPLANNED RELEASE

An UNPLANNED RELEASE is an unintended discharge of liquid or airborne radioactivity to the environment. The Auxiliary Building ventilation system is designed to handle leakage from various plant components. Leakage of this sort is not considered unplanned unless the magnitude of the leak is significant (i.e. reportable). Minor equipment failures which cause an increase in plant releases are not unplanned as it is expected that minor failures will occur from time-to-time. Human error which results in a release of radioactivity to the environment is considered unplanned.

Examples:

Releasing the wrong waste tank. Plant leakage which exceeds reporting limits such as those of 10 CFR 50.72 and 10 CFR 50.73.

#### 1.14 UNRESTRICTED AREA

An UNRESTRICTED AREA shall be any area at or beyond the site boundary, access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the site boundary used for residential quarters or industrial, commercial, institutional, and/or recreational purposes.

#### 1.15 VENTILATION EXHAUST TREATMENT SYSTEM

A VENTILATION EXHAUST TREATMENT SYSTEM is any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to release to the environment (such a system is not considered to have any effect on noble gas effluents). Engineered Safety Feature (ESF) atmospheric cleanup systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.

#### 1.16 WASTE GAS SYSTEM

A WASTE GAS SYSTEM is any equipment (e.g., tanks, vessels, piping) capable of collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

#### 1.17 <u>PURGE – PURGING</u>

PURGE or PURGING is the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.

#### 2.0 SPECIFICATIONS

## RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

2.1 The radioactive liquid effluent monitoring instrumentation channels shown in Table 2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of specification 2.5 are not exceeded.

**<u>APPLICABILITY</u>**: As shown on Table 2-1

#### ACTION:

- a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required above, without delay suspend the release of radioactive liquid effluents monitored by the affected channel, or change the setpoint so that it is acceptably conservative, or declare the channel inoperable.
- b. With one or more radioactive liquid effluent monitoring instrumentation channels inoperable, take the ACTION shown in Table 2-1. For the instrumentation covered by items 1 and 2 of the table, exert best efforts to return the inoperable instrument(s) to OPERABLE status within 30 days. If the affected instrument(s) cannot be returned to OPERABLE status within 30 days, provide information on the reasons for inoperability and lack of timely corrective action in the next Radioactive Effluent Release Report.

## SURVEILLANCE REQUIREMENTS

2.1.1 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 2-2.

# <u>TABLE 2-1</u>

# RADIOACTIVE LIQUID EFFLUENT AND PROCESS MONITORING INSTRUMENTATION

		INSTRUMENT	MINIMUM CHANNELS <u>OPERABLE</u>	APPLICABLE MODES	<u>ACTIONS</u>
1.	GROS AUTO	SS RADIOACTIVITY MONITORS PROVIDING ALARM AND DMATIC TERMINATION OF RELEASE			
	a.	Auxiliary Building Liquid Radwaste Effluent Line (RM-L2)	1	ALL MODES	21
	b.	Secondary Drain Tank Liquid Effluent Line (RM-L7)	1	ALL MODES	22
2.	FLOV	N RATE MEASUREMENT DEVICES			
	a.	Auxiliary Building Liquid Radwaste Effluent Line	1	ALL MODES	23
	b.	Secondary Drain Tank Liquid Effluent Line	1	ALL MODES	23
3.	PROC	CESS MONITORS			
	a.	Nuclear Services Closed Cooling Water Monitor (RM-L3)	1_	*	24
	b.	Decay Heat Closed Cooling Water Monitors (RM-L5 and RM-L6)	1	זע	24

\* During system operation

OFF-SITE DOSE CALCULATION MANUAL

\_\_\_\_\_

#### TABLE 2-1 (Continued) TABLE NOTATION

- ACTION 21 With less than the required number of OPERABLE channels, effluent releases via this pathway may continue, provided that prior to initiating a release:
  - a. At least two independent samples are analyzed in accordance with Specification 2.5.1, and
  - b. Two qualified persons independently verify the release rate calculations, and
  - c. Two qualified persons independently verify the discharge valve lineup.

Otherwise, suspend releases of radioactive materials via this pathway.

- ACTION 22 With less than the required number of OPERABLE channels, effluent releases via this pathway may continue, provided that grab samples are collected and analyzed for gross radioactivity, at least once per 12 hours.
- ACTION 23 With less than the required number of OPERABLE channels, effluent releases via this pathway may continue, provided that the flow rate is estimated at least once per 4 hours during actual releases.
- ACTION 24 With no channels OPERABLE, plant operation may continue provided grab samples are collected and analyzed at least once per 24 hours.

# TABLE 2-2

## RADIOACTIVE LIQUID EFFLUENT AND PROCESS MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

		INSTRUMENT	CHANNEL <u>CHECK</u>	SOURCE <u>CHECK</u>	CHANNEL <u>CALIBRATION</u>	CHANNEL FUNCTIONAL <u>TEST</u>	MODES IN WHICH SURVEILLANCE <u>REQUIRED</u>
1.	GROSS AUTOM	RADIOACTIVITY MONITORS PROVIDING ALARM AND ATIC TERMINATION OF RELEASE					
	a. Ar L'	uxiliary Building Liquid Radwaste Effluent ine (RM-L2)	D*	Р	R (1)	Q	· N.A.
	b.S E	econdary Drain Tank Liquid ffluent Line (RM-L7)	D*	Ρ	R (1)	Q	N.A.
2.	FLOW	RATE MEASUREMENT DEVICES				•	
	a. Ai E	uxiliary Building Liquid Radwaste ffluent Line	D (2)	N.A.	R	Ν.Α.	N.A.
	b. So E <sup>.</sup>	econdary Drain Tank Liquid ffluent Line	D (2)	N.A.	R	N.A.	Ν.Α.
3.	PROCE	SS MONITORS					
	a. Ni Wi	uclear Services Closed Cooling ater Monitor (RM-L3)	D	N.A.	R	Q	ALL MODES
	b. De Wa	ecay Heat Closed Cooling ater Monitors (RM-L5 and RM-L6)	D	N.A.	R	Q	ALL MODES

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#### TABLE 2-2 (Continued) TABLE NOTATION

\* During periods of release.

- (1) CHANNEL CALIBRATION shall be performed using:
  - a. One or more standards traceable to the National Bureau of Standards, or
  - Standards obtained from suppliers that participate in measurement assurance activities with the National Bureau of Standards, or
  - c. Standards related to previous calibrations performed using (a) or (b) above.
- (2) CHANNEL CHECK shall consist of verifying indication of flow during periods of release. A CHANNEL CHECK shall be performed at least once per day on any day that continuous, periodic or batch releases are made.

#### RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

2.2 The radioactive gaseous effluent monitoring instrumentation channels shown in Table 2-3 shall be OPERABLE with the effluent release isolation alarm/trip setpoints set to ensure that the limits of Specification 2.7 are not exceeded.

APPLICABILITY: As shown in Table 2-3

## ACTION:

- a. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required above, without delay suspend the release of radioactive gaseous effluents monitored by the affected channel where applicable, or change the setpoint so that it is acceptably conservative, or declare the channel inoperable.
- b. With one or more radioactive gaseous effluent monitoring instrumentation channels inoperable, take the ACTION shown in Table 2-3. For the instruments covered by items 1, 2, and 3 of the table, exert best efforts to return the inoperable instrument(s) to OPERABLE status within 30 days. If the affected instruments cannot be returned to OPERABLE status within 30 days, provide information on reasons for inoperability and lack of timely corrective action in the next Radioactive Effluent Release Report.

### SURVEILLANCE REQUIREMENTS

2.2.1 Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations during the MODES and frequencies shown in Table 2-4.

## <u>TABLE 2-3</u>

#### RADIOACTIVE GASEOUS EFFLUENT AND PROCESS MONITORING INSTRUMENTATION

		MINIMUM CHANNELS <u>OPERABLE</u>	APPLICABLE MODES	ACTION
1.	Waste Gas Decay Tank Monitor (RM-A11) a. Noble Gas Activity Monitor* b. Effluent System Flow Rate Monitor	1 1	ALL MODES ALL MODES	24 26
2.	Reactor Building Purge Exhaust Duct Monitor (RM-A1)			
	a. Noble Gas Activity Munitor	1	**	27
	i. Mid Bango#	1	**	27
	iji Hich Bange#	1	**	29
	h Indine Sampler	1	nic ste	25
	c Particulate Sampler	1	* *	25
	d Effluent System Flow Rate Monitor	1	<b>3</b> ¢ 3¢	26
	e. Sampler Flow Rate Monitor	1	* *	26
3.	Auxiliary Building and Fuel Handling Area Exhaust Duct Monitor (RM-A2) a. Noble Gas Activity Monitor			
	i. Operating Range *	1	ALL MODES	28
	ii. Mid Range #	1	1, 2, 3 & 4	29
	iii. High Range #	1 .	1, 2, 3 & 4	29
	b. Iodine Sampler	1	ALL MODES	25
	c. Particulate Sampler	1	ALL MODES	25
	d. Effluent System Flow Rate Monitor	1	ALL MODES	26
	e. Sampler Flow Rate Monitor	1	ALL MODES	26
4.	Condenser Vacuum Pump Exhaust - Gaseous Activity Monitor (RM-A12)	1	1, 2, 3, 4	30

\* Provides control room alarm and automatic termination of release.

\*\* During periods of reactor building purge, except during fuel movement. During fuel movement surveillance requirements for RM-A1 (operating range) are specified by ITS 3.3.15. Automatic isolation function is not required if moving fuel that has not been recently irradiated. (See ITS B 3.3.15 and B 3.9.3 for discussion). Fuel movement includes preparation for and demobilization from AI-504, Shutdown Condition 3. Automatic isolation function is also not required in 'no mode' plant status.

# There is no isolation setpoint or release termination function for this monitor. Alarm setpoints are determined by the appropriate system procedures.

#### TABLE 2-3 (Continued) TABLE NOTATION

- ACTION 24 With less than the required number of OPERABLE channels, the contents of the Waste Gas Decay Tank may be released to the environment, provided that prior to initiating a release:
  - 1. The Auxiliary Building & Fuel Handling Area Exhaust Duct Monitor (RM-A2) is OPERABLE with its setpoints set to ensure that the limits of Specification 2.7 are not exceeded. The setpoint shall be determined in accordance with the OFFSITE DOSE CALCULATION MANUAL, or
  - 2. a. At least two independent samples of the tank's contents are analyzed in accordance with Table 2-6 and
    - b. Two qualified persons independently verify the release rate calculations, and
    - c. Two qualified persons independently verify the discharge valve lineup.

Otherwise, suspend releases of radioactive effluents via this pathway.

#### ACTION 25 RM-A1

With the affected sampler inoperable, operation of the RB purge may continue for 1 hour with no auxiliary sampling, provided that RB airborne levels are steady state or declining. If indicators of RB atmospheric activity, such as RM-A6, RCS leakage, or general area air samples, show an increase in RB activity while the sampler is inoperable, then immediately restore the affected sampler, or implement auxiliary sampling, or shut down the purge.

With the affected sampler inoperable, operation of the RB purge may continue for more than 1 hour provided that samples (reference Tables 2-6) are continuously taken (except for filter changes) with auxiliary sampling equipment.

Auxiliary sampling equipment includes general area RB air samples or RMA-15. Other sampling regimes are acceptable provided results are representative of plant effluents.

Note: Coordination of sampling during core alterations or fuel movement is required in order to comply with Technical Specifications.

#### TABLE 2-3 (Continued) TABLE NOTATION

ACTION 25 RM-A2 (Continued)

> With the affected channel inoperable, effluent releases may continue for 1 hour with no auxiliary sampling, provided that AB airborne levels are steady state or declining. If indicators of AB atmospheric activity, such as RM-A3, RM-A4, and RM-A8 show an increase in activity then restore the affected sampler, or implement auxiliary sampling, or shut down the release.

With the affected sampler inoperable, effluent releases may continue for more than 1 hour provided that samples (reference Table 2-6) are continuously taken (except for filter changes) with auxiliary sampling equipment.

Auxiliary sampling equipment includes 1) RM-A4 and RM-A8 used together 2) general area AB air samples, or 3) RMA-15. Other sampling regimes are acceptable provided results are representative of plant effluents.

- ACTION 26 With the number of OPERABLE channels less than required, effluent releases via this pathway may continue, provided flow rate is estimated at least once per 4 hours.
- ACTION 27 With the noble gas monitor (operating range) inoperable, operation of the RB purge may continue for 1 hour, provided that RB airborne levels are steady state or declining. If indicators of RB atmospheric activity such as RM-A6, RCS leakage, or general area air samples show an increase in RB activity while the monitor is inoperable, then immediately restore the noble gas monitor or shut down the purge.
  - Note: Coordination of sampling during core alterations or fuel movement is required in order to comply with Technical Specifications.
- ACTION 28 With the number of OPERABLE channels less than required, releases via this pathway may continue, provided grab samples are collected at least once per 12 hours and analyzed within 24 hours, and either the requirements of ACTION 24 Part 2 are met or Radiation Monitor RM-A11 is OPERABLE prior to releasing the contents of the Waste Gas Decay Tanks.

\* Gas grabs may be taken from RM-A4 and RM-A8.

#### TABLE 2-3 (Continued) TABLE NOTATION

- ACTION 29 With the number of OPERABLE channels less than required by the Minimum Channels OPERABLE requirements,
  - 1) Either restore the inoperable Channel(s) to OPERABLE status within 7 days of the event, or
  - 2) Prepare and submit a Special Report to the Commission pursuant to Specification 2.14 within the next 30 days outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.
  - NOTE: Action Statement 2.2a not applicable.
- ACTION 30 With no channels OPERABLE, plant operation may continue provided grab samples are collected and analyzed for noble gases at least once per 24 hours.
  - NOTE: The absence of a conversion factor to relate cpm to gpd primary to secondary leakage does not make RM-A12 inoperable; RM-A12 can still be used as an indicator of changes in noble gas concentrations in the condenser off gas. CP-152, Primary to Secondary Leakage Operating Guideline, specifies the actions to take when a leak rate conversion factor is not available for use with RM-A12.

# TABLE 2-4

# RADIOACTIVE CASEOUS EFFLUENT AND PROCESS MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	INSTRUMENT	CHANNEL <u>CHECK</u>	SOURCE <u>CHECK</u>	CHANNEL <u>CALIBRATION</u>	CHANNEL FUNCTIONAL <u>TEST</u>	MODES IN WHICH SURVEILLANCE <u>REQUIRED</u>
1.	WASTE GAS DECAY TANK MONITOR (RM-A11) a. Noble Gas Activity Monitor b. Effluent System Flow Rate Monitor	P P	Р N.A.	R(1) R	Q Q	ALL MODES ALL MODES
2.	<pre>REACTOR BUILDING PURGE EXHAUST DUCT MONITOR (RM-A1) a. Noble Gas Activity Monitor I. Operating Range ii. Mid Range ii. High Range b. Iodine Sampler c. Particulate Sampler d. Effluent System Flow Rate Monitor e. Sampler Flow Rate Monitor</pre>	D W W D D	P M N.A. N.A. N.A. N.A.	R(1) R(1) N.A. N.A. R R	Q Q Q. N.A. N.A. Q Q	# # # # #
3.	<ul> <li>AUXILIARY BUILDING &amp; FUEL HANDLING AREA EXHAUST DUCT MONITOR (RM-A2)</li> <li>a. Noble Gas Activity Monitor <ol> <li>Operating Range</li> <li>Mid Range</li> <li>High Range</li> </ol> </li> <li>b. Iodine Sampler</li> <li>c. Particulate Sampler</li> <li>d. Effluent System Flow Rate Monitor</li> <li>e. Sampler Flow Rate Monitor</li> </ul>	D W W D D	N.A. M N.A. N.A. N.A. N.A.	R(1) R(1) R(1) N.A. N.A. R R	Q Q Q N.A. N.A. Q Q	ALL MODES 1, 2, 3, 4 1, 2, 3, 4 ALL MODES ALL MODES ALL MODES ALL MODES
4.	Condenser Vacuum Pump Exhaust - Gaseous Activity Monitor (RM-A12)	D	N.A.	R	Q	1, 2, 3, 4

#### TABLE 2-4 (Continued)

# During periods of Reactor Building Purge, except during fuel movement. During fuel movement surveillance requirements for RM-A1 (operating range) are specified by ITS 3.3.15. Automatic isolation function is not required if moving fuel that has not been recently irradiated. (See ITS B 3.3.15 and B 3.9.3 for discussion). Fuel movement includes preparation for and demobilization from AI-504, Shutdown Condition 3.

(1) CHANNEL CALIBRATION shall be performed using:

- a. One or more standards traceable to the National Bureau of Standards, or
- b. Standards obtained from suppliers that participate in measurement assurance activities with the National Bureau of Standards, or
- c. Standards related to previous calibrations using (a) or (b) above.

1

#### LIQUID RADWASTE TREATMENT SYSTEM

- 2.3 The LIQUID RADWASTE TREATMENT SYSTEM shall be used, as required, to reduce radioactive materials in liquid wastes prior to their discharge, when projected monthly doses due to liquid effluents discharged to UNRESTRICTED AREAS would exceed the following values:
  - a. 0.06 mrem whole body;
  - b. 0.2 mrem to any organ

**APPLICABILITY:** At all times.

- <u>ACTION</u>: a. When radioactive liquid waste, in excess of the above limits, is discharged without prior treatment, prepare and submit to the Commission within 30 days, a Special Report pursuant to Specification 2.14, which includes the following information:
  - 1. Identification of inoperable equipment and the reasons for inoperability.
  - 2. Actions taken to restore the inoperable equipment to OPERABLE status.
  - 3. Actions taken to prevent recurrence.

## SURVEILLANCE REQUIREMENTS

2.3.1 Doses due to liquid releases shall be projected at least once per 31 days.

#### WASTE GAS SYSTEM

- 2.4 The WASTE GAS SYSTEM shall be used, as required, to reduce the radioactivity of materials in gaseous waste prior to discharge, when projected monthly air doses due to releases of gaseous effluents from the site to areas at or beyond the SITE BOUNDARY would exceed:
  - 1) 0.2 mrad gamma;
  - 2) 0.4 mrad beta; and

The VENTILATION EXHAUST TREATMENT SYSTEM shall be used, as required, to reduce the quantity of radioactive materials in gaseous waste prior to discharge, when projected monthly air doses due to release of gaseous effluents from the site to areas at or beyond the SITE BOUNDARY would exceed:

1) 0.3 mrem to any organ

APPLICABILITY: At all times.

#### ACTION:

- a. When the WASTE GAS SYSTEM and/or VENTILATION EXHAUST TREATMENT SYSTEM are not used and gaseous waste in excess of the above limits is discharged without prior treatment, prepare and submit to the Commission, within 30 days a Special Report, pursuant to Specification 2.14, which includes:
  - Identification of the inoperable equipment and the reason(s) for inoperability.
  - 2) Actions taken to restore the inoperable equipment to OPERABLE status.
  - 3) Actions taken to prevent recurrence.

#### SURVEILLANCE REQUIREMENTS

2.4.1 Doses due to gaseous releases from the site shall be projected at least once per 31 days.

#### LIQUID EFFLUENTS CONCENTRATION

2.5 The concentration of radioactive material released to UNRESTRICTED AREAS shall be less than or equal to 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For Xe-133, the concentration shall be  $\leq 1 \times 10^{-3}$  microcuries/ml. For all other dissolved or entrained noble gases, the concentration shall be less than or equal to  $2\times10^{-4}$  microcuries/ml total activity.

APPLICABILITY: At all times.

#### ACTION:

a. With the concentration of radioactive materials released to UNRESTRICTED AREAS exceeding the above limits, without delay restore the concentration of radioactive materials being released to UNRESTRICTED AREAS to within the above limits. If the concentration of radioactive materials being released in excess of the above limit is related to a plant-operating characteristic, appropriate corrective measures (e.g., power reduction, plant shutdown) shall be taken to restore the concentration of radioactive materials being released to UNRESTRICTED AREAS to within the above limits.

#### SURVEILLANCE REQUIREMENTS

- 2.5.1 Radioactive liquid wastes shall be sampled and analyzed in accordance with the sampling and analysis program of Table 2-5.
- 2.5.2 The results of the radioactivity analyses shall be used to assure the concentrations of radioactive material released from the site are maintained within the limits of Specification 2.5.

# <u>TABLE 2-5</u>

		r=			
Liquid Release Type		Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (µCi/m1) <sup>a</sup>
Α.	Batch Waste Release Tanks <sup>d</sup>	P Each Batch	P Each Batch	Principal Gamma Emitters <sup>f</sup>	5×10 <sup>-7</sup>
1.	Evaporator Condensate Storage Tanks (2)			I-131	1×10 <sup>-6</sup>
2.	Laundry & Shower Sump Tanks (2)	P One Batch/M	М	Dissolved and Entrained Gases (Gamma Emitters	1×10 <sup>-5</sup>
3.	Secondary Drain Tank	P Each Batch	M Composite <sup>b</sup>	H-3	1x10 <sup>-5</sup>
				Gross Alpha	1x10 <sup>-7</sup>
		P Each Batch	Q Composite <sup>b</sup>	Sr-89, Sr-90	5x10-8
				Fe-55	1×10-6
В.	Continuous Releases <sup>e</sup>	Continuous <sup>c</sup>	W Composite <sup>C</sup>	Principal Gamma Emitters <sup>f</sup>	5x10 <sup>-7</sup>
1.	Condensate System			I-131	1x10-6
		M Grab Sample	М	Dissolved and Entrained Gases (Gamma Emitters)	1×10 <sup>-5</sup>
		Continuous <sup>C</sup>	M Composite <sup>C</sup>	H-3	1x10 <sup>-5</sup>
				Gross Alpha	1×10 <sup>-7</sup>
		Continuous <sup>C</sup>	Q Composite <sup>C</sup>	Sr-89, SR-90	5x10-8
				Fe-55	1×10-6

# RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

OFF-SITE DOSE CALCULATION MANUAL

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#### TABLE 2-5 (Continued)

#### TABLE NOTATION

a. The LLD\* is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

LLD = 
$$4.66s_{1}/(2.22x10^{6}EVYe^{-\lambda\Delta t})$$

Where:

LLD is the lower limit of detection as defined above (as microcurie per unit mass or volume),

s is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency (as counts per disintegration),

V is the sample size (in units of mass or volume),

2.22x10<sup>6</sup> is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield (when applicable),

 $\lambda$  is the radioactive decay constant for the particular radionuclide, and

 $\Delta t$  is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, not environmental samples).

Typical values of E, V, Y, and  $\Delta t$  shall be used in the calculation.

\* The LLD is defined as an <u>a priori</u> (before the fact) limit representing the capability of a measurement system and not as an <u>a posteriori</u> (after the fact) limit for a particular measurement.

#### TABLE 2-5 (Continued)

#### TABLE NOTATION

- b. A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen which is representative of the liquids released.
- c. To be representative of the quantities and concentrations of radioactive materials in liquid effluents, samples shall be collected continuously in proportion to the rate of flow of the effluent stream. Prior to analyses, all samples taken for the composite shall be thoroughly mixed in order for the composite sample to be representative of the effluent release.
- d. A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analyses, each batch shall be isolated, and then thoroughly mixed to assure representative sampling.
- e. A continuous release is the discharge of liquid wastes of a nondiscrete volume; e.g., from a volume or system that has an input flow during the continuous release.
- f. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144. This list does not mean that only these nuclides are to be detected and reported. Other peaks, which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses shall be reported as "less than" the nuclide's LLD, and shall not be reported as being present at the LLD level for that nuclide. The "less than" values shall not be used in the required dose calculations.

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#### LIQUID EFFLUENTS - DOSE

- 2.6 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released to UNRESTRICTED AREAS shall be limited as follows:
  - a. During any calendar quarter to less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ.
  - b. During any calendar year to less than or equal to 3 mrem to the total body and to less than or equal to 10 mrem to any organ.

**APPLICABILITY**: At all times.

#### ACTION:

- a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission, within 30 days, a Special Report pursuant to Specification 2.14, which includes:
  - 1. Identification of the cause for exceeding the limit(s);
  - 2. Corrective action taken to reduce the release of radioactive materials in liquid effluents during the remainder of the current calendar quarter an during the remainder of the current calendar year so that the dose or dose commitment to a MEMBER OF THE PUBLIC from this source is less than or equal to 3 mrem total body and less than or equal to 10 mrem to any organ during the calendar year.

#### SURVEILLANCE REQUIREMENTS

2.6.1 DOSE CALCULATIONS. Cumulative dose contributions from liquid effluents shall be determined at least once per 31 days.
#### GASEOUS EFFLUENTS - DOSE RATE

- 2.7 The dose rate at or beyond the SITE BOUNDARY, due to radioactive materials released in gaseous effluents, shall be limited as follows:
  - a. Noble gases: less than or equal to 500 mrem/year total body and less than or equal to 3000 mrem/year to the skin.
  - b. I-131, I-133, Tritium, and radioactive particulates with halflives of greater than 8 days: less than or equal to 1500 mrem/year to any organ.

**<u>APPLICABILITY</u>**: At all times

#### ACTION:

a. With dose rate (s) exceeding the above limits, without delay decrease the dose rate to within the above limit(s). If the dose rate at or beyond the SITE BOUNDARY due to radioactive materials in gaseous effluents in excess of the above limits is related to a plant-operating characteristic, appropriate corrective measures (e.g., power reduction, plant shutdown) shall be taken to decrease the dose rate to within the above limits.

#### SURVEILLANCE REQUIREMENTS

- 2.7.1 The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits.
- 2.7.2 The dose rate due to radioactive materials specified above, other than noble gases, in gaseous effluents shall be determined to be within the above limits by obtaining representative samples and performing analyses in accordance with Table 2-6.



## TABLE 2-6

## RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type		Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (µCi/ml) <sup>a</sup>
A. Waste Gas Decay Tank		P Each Tank Grab Sample	P Each Tank	Principal Gamma Emitters <sup>f</sup>	1×10-4
Β.	Reactor Building Purge Exhaust Duct Monitor (RM-A1)	P Each Purge <sup>C</sup> Grab Sample	P Each Purge	Principal Gamma Emittersb,f	1×10 <sup>-4</sup>
				Н-3	1×10-6
с.	Auxiliary Building and Fuel Handling Area Exhaust Duct Monitor (RM-A2)	M <sup>C</sup> Grab Sample	M	Principal Gamma Emittersb,f	1×10 <sup>-4</sup>
				Н-3	1×10-6
D.	All Release Types as Listed in A, B, C above	Continuous <sup>e</sup>	<sub>W</sub> d Charcoal Sample	I-131	1X10-12
		Continuous <sup>e</sup>	<sub>W</sub> d Particulate Sample	Principal Gamma Emitters <sup>f</sup> (I-131, Others)	1x10-11
		Continuous <sup>e</sup>	M Composite Particulate Sample	Gross Alpha	1x10-11
		Continuous <sup>e</sup>	Q Composite Particulate Sample	Sr-89, Sr-90	1x10-11
		Continuous <sup>e</sup>	Noble Gas Monitor	Noble Gases Gross Beta & Gamma	1×10-6

#### TABLE 2-6 (Continued)

#### TABLE NOTATION

a. The LLD\* is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

LLD = 
$$4.66s_b/(2.22 \times 10^6 \text{EVYe}^{-\lambda\Delta t})$$

Where:

LLD is the lower limit of detection as defined above (as microcurie per unit mass or volume),

 $s_{b}$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency (as counts per disintegration),

V is the sample size (in units of mass or volume),

2.22x10<sup>6</sup> is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield (when applicable),

 $\lambda$  is the radioactive decay constant for the particular radionuclide, and

 $\Delta t$  is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, not environmental samples).

Typical values of E, V, Y, and  $\Delta t$  shall be used in the calculation.

\* The LLD is defined as an <u>a priori</u> (before the fact) limit representing the capability of a measurement system and not as an <u>a posteriori</u> (after the fact) limit for a particular measurement.

#### TABLE 2-6 (Continued)

#### TABLE NOTATION

b. Analyses shall be performed when there is a sustained increase in the noble gas monitor count rate. As sustained increase is one in which the count rate stays above the monitor warning sepoint for at least one hour. Sampling shall be done within 2 hours of warning alarm actuation.

If the associated noble gas monitor (RM-A1 or RM-A2) is out of service during a release, then analyses shall be performed between 2 and 6 hours following shutdown, startup, or a change in power level exceeding 15% rated thermal power within one hour.

- c. Tritium grab samples shall be taken between 12 and 24 hours after flooding the refueling canal and at least once per 7 days thereafter while the refueling canal is flooded.
- d. Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing (or after removal from sampler). Sampling and analyses shall be performed at least once per 24 hours for at least 7 days following each shutdown, startup or change in power level exceeding 15% of RATED THERMAL POWER within one hour, unless the Iodine Monitoring Channels in Radiation Monitors RM-A1 and RM-A2 show that the Radionuclide concentration in the Auxiliary Building and Fuel Handling Area or the Reactor Building Purge Exhaust Ducts will lead to a release which is less than the 10 CFR 20, Appendix B, Table II, Column I limits, at or beyond the SITE BOUNDARY.
- e. The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with the Specifications 2.7, 2.8, and 2.9.
- f. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks, which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses shall be reported as "less than" the nuclide's LLD and shall not be reported as being present at the LLD level for that nuclide. The "less than" values shall not be used in the required dose calculations.

- 2.8 The air dose at or beyond the SITE BOUNDARY, due to radioactive noble gases released in gaseous effluents shall be limited to:
  - a. During any calendar quarter: less than or equal to 5 mrad gamma and less than or equal to 10 mrad beta radiation, and
  - b. During any calendar year: less than or equal to 10 mrad gamma and less than or equal to 20 mrad beta radiation.

**APPLICABILITY:** At all times.

#### ACTION:

- a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission, within 30 days, a Special Report, pursuant to Specification 2.14, which includes:
  - 1) Identification of the cause for exceeding the limit(s).
  - 2) Corrective action taken to reduce the release of radioactive noble gases in gases effluents during the remainder of the current calendar quarter and during the remainder of the current calendar year so that the average dose during the calendar year is less than or equal to 10 mrad gamma and 20 mrad beta radiation.

#### SURVEILLANCE REQUIREMENTS

2.8.1 DOSE CALCULATIONS: Cumulative dose contributions for the current calendar quarter and current calendar year shall be determined at least once per 31 days.

#### DOSE - I-131, I-133, TRITIUM, AND RADIOACTIVE PARTICULATES

- 2.9 The dose to a MEMBER OF THE PUBLIC from I-131, I-133, Tritium, and radioactive particulates with half-lives greater than 8 days in gaseous effluents released from the site to areas at or beyond the SITE BOUNDARY shall be limited as follows:
  - a. During any calendar quarter: less than or equal to 7.5 mrem to any organ, and
  - b. During any calendar year: less than or equal to 15 mrem to any organ.

**<u>APPLICABILITY</u>**: At all times.

#### ACTION:

- a. With the calculated dose from the release of I-131, I-133, Tritium, and radioactive particulates with greater than 8 day half-lives, in gaseous effluents, exceeding any of the above limits, prepare and submit to the Commission, within 30 days, a Special Report, pursuant to Specification 2.14, which includes:
  - 1) Identification of the cause for exceeding the limits(s);
  - 2) Corrective action to reduce those releases during the remainder of the current calendar quarter and the remainder of the current calendar year so that the average dose to any organ is less than or equal to 15 mrem.

#### SURVEILLANCE REQUIREMENTS

2.9.1 DOSE CALCULATIONS: Cumulative dose calculations for the current calendar quarter and current calendar year shall be determined at least once per 31 days.

2.10 The calendar year dose or dose commitment to any MEMBER OF THE PUBLIC, due to releases of radioactivity and radiation, from uranium fuel cycle sources shall be limited to less than or equal to 25 mrems to the total body or any organ (except the thyroid, which shall be limited to less than or equal to 75 mrems).

#### **<u>APPLICABILITY</u>**: At all times.

#### ACTION:

a. With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specification 2.6a, 2.6b, 2.8a, 2.8b, 2.9a, or 2.9b, calculations should be made, which include direct radiation contributions from the reactor, to determine whether the above limits of Specification 2.10 have been exceeded. If such is the case, prepare and submit to the Commission within 30 days, pursuant to Specification 2.14, a Special Report that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits and includes the schedule for achieving conformance with the above limits. This Special Report, as defined in 10 CFR Part 20.2203, shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentrations of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the above limits, and if the release condition resulting in violation of 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report is considered a timely request, and a variance is granted until staff action on the request is complete.

#### SURVEILLANCE REQUIREMENTS

2.10.1 <u>DOSE CALCULATIONS</u> - Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Specifications 2.6.1, 2.8.1, and 2.9.1.

#### RADIOLOGICAL ENVIRONMENTAL MONITORING

2.11 The radiological environmental monitoring program shall be conducted as specified in Table 2-7.

**<u>APPLICABILITY</u>**: At all times.

#### ACTION:

- a. With the radiological environmental monitoring program not being conducted as specified in Table 2-7, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.
- b. With the level of radioactivity, resulting from plant effluents, in an environmental sampling medium exceeding the reporting levels of Table 2-8 when averaged over any calendar quarter, prepare and submit to the Commission, within 30 days of obtaining analytical results from the affected sampling period, a Special Report pursuant to Specification 2.14, which identifies the cause(s) for exceeding the limit(s) and defines corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of Specifications 2.7, 2.8, and 2.9. When more than one of the radionuclides in Table 2-8 are detected in the radionuclides in Table 2-8 are detected in the sampling medium, this report shall be submitted if:

 $\frac{\text{concentration (1)}}{\text{limit level (1)}} + \frac{\text{concentration (2)}}{\text{limit level (2)}} + \dots \ge 1.0$ 

When radionuclides other than those in Table 2-8 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to a MEMBER OF THE PUBLIC is greater than or equal to the calendar year limits of Specifications 2.7, 2.8, and 2.9. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

c. With milk or fresh leafy vegetation samples unavailable from one or more of the sample locations required by Table 2-7, identify the cause of the unavailability of samples and identify locations for obtaining replacement samples in the next Annual Radiological Environmental Operating Report. The locations from which samples were unavailable may then be deleted from those required by Table 2-7, provided the locations from which the replacement samples were obtained are added to the environmental monitoring program as replacement locations.

SURVEILLANCE REQUIREMENTS

2.11.1 The radiological environmental monitoring samples shall be collected pursuant to Table 2-7 from the locations given in the table and Figures 5.1, 5.2, and 5.3 and shall be analyzed pursuant to the requirements of Tables 2-7 and 2-9.

## <u>TABLE 2-7</u>

## OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling/ Collection Frequency	Type/Frequency of Analysis
1.AIRBORNE Radioiodine and particulates	One sample each: CO7, C18, C40, C41, C46 and Control Location C47	Continuous sampler/ Weekly collection	<ul> <li>Radioiodine canister:</li> <li>a) I-131 analysis weekly</li> <li>Particulate sampler:</li> <li>a) Gross β at ≥ 24 hours/following weekly filter change.</li> <li>b) Composite gamma special analysis (by location)/ quarterly. (Gamma Spectral Analysis shall also be performed on individual samples if gross beta activity of any sample is greater than 1.0 pCi/m³ and which is also greater than ten times the control</li> </ul>
2.DIRECT RADIATION	<ol> <li>Site Boundary: C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C41, C70, C27, C71, C72, C73</li> </ol>	Continuous placement/Quarterly collection	Gamma exposure rate/quarterly
	2) Five Miles: C18, C03, C04, C74, C75, C76, C08, C77, C09, C78, C14G, C01, C79		
	3) Control Location: C47		: :

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### TABLE 2-7 (Continued)

## OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

	Exposure Pathway and/or Sample	Number of Samples and Locations	Sampling/ Collection Frequency	Type/Frequency of Analysis
3.	WATERBORNE Seawater	One sample each: C14H, C14G Control	Grab sample/Monthly	Gamma spectral analysis/monthly
		Location CI3		Tritium analysis on each sample or on a quarterly composite of monthly samples
	Ground water	One sample: C40 (Control Location)	Grab sample/semiannual	Gamma spectral and Tritium analysis/each sample
	Site Ground Water	One sample each: CR3-2, CR3-4, CR3-5, CR3-6S, CR3-6D, CR3-7 CR3-8, CR3-9, CR3-10	Grab sample/quarterly	Gamma spectral and Tritium analysis/each sample
	Drinking water	One sample each: CO7, C10, C18 (All Control Locations)	Grab sample/quarterly	Gamma spectral and Tritium analysis/each sample
	Shoreline Sediment	One sample each: C14H, C14M, C14G Control Location CO9	Semiannual sample	Gamma spectral analysis/each sample
4.	INGESTION Fish & Invertebrates	One sample each: C29, Control Location C30	Quarterly: Oysters and carnivorous fish	Gamma spectral analysis on edible portions/each sample
	Food Products	One sample each: C48a*, C48b*, Control Location C47	Monthly (when available): Sample compressed of three (3) types of broad leaf vegetation from each location	Gamma spectral and I-131 analysis/each sample
		One sample: C19	Annual during harvest: Citrus	Gamma spectral analysis/each sample
		Une sample: CU4	Annual during harvest: Watermelon	Gamma spectral analysis/each sample

 $\ast$  Stations C48a and C48b are located near the site boundary for gaseous effluents in the two sectors which yield the highest historical annual average D/Q values.

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m³)	Fish (pCi/Kg, wet)	Milk (pCi/l)	Food Products (pCi/Kg, wet)
H-3	20,000 <sup>(a)</sup>				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-Nb-95)	400				
I-131	2 <sup>(c)</sup>	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140 <sup>(b)</sup>	200			300	

#### REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

TABLE 2-8

(a) For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used.

(b) An equilibrium mixture of the parent and daughter isotope which contains the reporting value of the parent isotope.

(c) For drinking water samples only.

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m³)	Fish (pCi/Kg, wet)	Milk (pCi/l)	Food Products (pCi/Kg, wet)	Sediment (pCi/Kg, dry)
gross beta		0.01				
3 <sub>H</sub>	2000 <sup>b</sup>					
54 <sub>Mn</sub>	15		130			
59 <sub>Fe</sub>	30		260			
58 <sub>Co</sub>	15		130			
60 <sub>Co</sub>	15		130			
65 <sub>Zn</sub>	30		260			
95 <sub>Zr-Nb</sub>	15 <sup>C</sup>					
131 <sub>I</sub>	1 <sup>f</sup>	0.079		1	60	
134 <sub>Cs</sub>	15	0.05 <sup>e</sup>	130	15	60	150
137 <sub>Cs</sub>	18	0.06 <sup>e</sup>	150	18	80	180
140 <sub>Ba-La</sub>	15 <sup>c</sup>			15c		

## MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD) a,d

<u>TABLE 2-9</u>

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#### TABLE 2-9 (Continued)

#### TABLE NOTATION

a. The LLD\* is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

LLD = 
$$4.66 s_{1}/(2.22 EVY e^{-\lambda \Delta t})$$

#### Where:

LLD is the lower limit of detection as defined above (as picocurie per unit mass or volume),

s is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency (as counts per disintegration),

V is the sample size (in units of mass or volume),

2.22 is the number of disintegrations per minute per picocurie,

Y is the fractional radiochemical yield (when applicable),

 $\lambda$  is the radioactive decay constant for the particular radionuclide, and

 $\Delta t$  is the elapsed time between environmental collection, or end of the sample collection period, and time of counting.

Typical values of E, V, Y, and  $\Delta t$  shall be used in the calculation.

\* The LLD is defined as an <u>a priori</u> (before the fact) limit representing the capability of the measurement system and not as an <u>a posteriori</u> (after the fact) limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLD's will be achieved under routine conditions. Occasionally, background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLD's unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Operating Report.

#### TABLE 2-9 (Continued)

#### TABLE NOTATION

- b. LLD for drinking water. If no drinking water pathway exists, a value of 3000 pCi/l may be used.
- c. The specified LLD is for an equilibrium mixture of parent and daughter nuclides which contain 15 pCi/l of the parent nuclide.
- d. Other peaks which are measurable and identifiable, together with the radionuclides in Table 2.9, shall be identified and reported.
- e. Cs-134, and Cs-137 LLD's apply only to the quarterly composite gamma spectral analysis, not to analyses of single particulate filters.
- f. LLD for drinking water. If no drinking water pathway exists, the LLD of gamma isotopic analysis may be used.
- g. LLD for I-131 applies to a single weekly filter.

#### LAND USE CENSUS

2.12 A land use census shall be conducted and shall identify the location of the nearest milk animal, the nearest residence and the nearest garden\* of greater than 500 square feet producing fresh leafy vegetables in each of the land based meteorological sectors within a distance of five miles.

APPLICABILITY: At all times.

#### ACTION:

- a. With a land use census identifying a location(s) that yields a calculated dose or dose commitment greater than the values currently being calculated by Specification 2.9.1, identify the new location in the next Annual Radiological Environmental Operating Report.
- b. With a land use census identifying a location(s) which yields a calculated dose or dose commitment (via the same exposure pathway) which is at least 20% greater than at a location from which samples are currently being obtained in accordance with Specification 2.11, this location shall be added to the radiological environmental monitoring program within 30 days. The new sampling location shall replace the present sampling location, which has the lower calculated dose or dose commitment (via the same exposure pathway), after June 30 following this land use census. Identification of the new location and revisions of the appropriate figures shall be submitted with the next Radioactive Effluent Release Report.
- \* Broad leaf vegetation sampling may be performed at the site boundary in the direction sector with the highest D/Q in lieu of the garden census.

#### SURVEILLANCE REQUIREMENTS

2.12.1 The land use census shall be conducted at least once per 12 months during the growing season by a door-to-door survey, aerial survey, or by consulting local agriculture authorities, using that information which will provide adequate results.

#### INTERLABORATORY COMPARISON PROGRAM

2.13 Analyses shall be performed on radioactive materials supplied as part of an Interlaboratory Comparison Program which has been approved by the Commission. A summary of the results obtained from this program shall be included in the Annual Radiological Environmental Operating Report.

APPLICABILITY: At all times.

#### ACTION:

a. With analyses not being performed as required above, report the corrective actions taken to prevent a recurrence to the Commission in the Annual Radiological Environmental Operating Report.

#### SURVEILLANCE REQUIREMENTS

2.13.1 No surveillance requirements other than those required by the Interlaboratory Comparison Program.

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#### ADMINISTRATIVE CONTROLS

#### 2.14 SPECIAL REPORTS

Special reports shall be submitted to the Nuclear Regulatory Commission within the time period specified for each report. These reports shall be submitted covering the activities identified below. A separate Licensee Event Report, when required by 10 CFR 50.73 (a), need not be submitted if the Special Report meets the requirements of 10 CFR 50.73 (b) in addition to the requirements of the applicable referenced Specification.

- A. Dose due to radioactive materials in liquid effluents in excess of specified limits, Specification 2.6.
- B. Dose due to noble gas in gaseous effluents in excess of specified limits, Specification 2.8.
- C. Total calculated dose due to release of radioactive effluents exceeding twice the limits of Specifications 2.6a, 2.6b, 2.8a, 2.8b, 2.9a, or 2.9b (required by Specification 2.10).
- D. Dose due to I-131, I-133, Tritium, and radioactive particulates with greater than eight day half-lives, in gaseous effluents in excess of specified limits, Specification 2.9.
- E. Failure to process liquid radwaste, in excess of limits, prior to release, Specification 2.3.
- F. Failure to process gaseous radwaste, in excess of limits, prior to release, Specification 2.4.
- G. Measured levels of radioactivity in environmental sampling medium in excess of the reporting levels of Table 2-8, when averaged over any quarterly sampling period, Specification 2.11.
- H. Inoperable Mid or High Range Noble Gas Effluent Monitoring Instrumentation, Specification 2.2.
- I. Meteorological monitoring channel inoperable for more than 7 days, Specification 2.15.
- J. WGDT explosive gas monitoring instrumentation inoperable for more than 30 days, Specification 2.16.

#### METEOROLOGICAL INSTRUMENTATION

2.15 The meteorological monitoring instrumentation channels shown in Table 2-10 shall be OPERABLE.

**APPLICABILITY:** At all times.

#### ACTION:

a. With one or more required meteorological monitoring channels inoperable for more than 7 days, prepare and submit a Special Report to the Commission pursuant to Specification 2.14 within the next 10 days outlining the cause of the malfunction and the plans for restoring the channel(s) to OPERABLE status.

#### SURVEILLANCE REQUIREMENTS

2.15.1 Each of the above meteorological monitoring instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown in Table 2-11.

## TABLE 2-10

#### METEOROLOGICAL MONITORING INSTRUMENTATION

INS	TRUME	MINIMUM NT LOCATION	OPERABLE
1.	WIND	SPEED	
		Nominal Elev. 33'	1
2.	WIND	DIRECTION	
		Nominal Elev. 33'	1
3.	STABI	LITY CLASS (DELTA-T OR SIGMA-THETA)	
		Nominal Elev. *	1

\* 33' for sigma-theta. 175'-33' for delta-T.

NOTE: Back up meteorological tower instruments may be used to meet the minimum operability requirement of ODCM specification 2.15.

INS	TRUMENT		CHANNEL <u>CHECK</u>	CHANNEL CALIBRATION
1.	WIND SPEED Nominal Ele	ev. 33'	D	SA
2.	WIND DIRECTION Nominal Ele	ev. 33'	D	SA
3.	STABILITY CLASS Nominal Ele	(DELTA-T	OR SIGMA-THETA) D	· SA

# TABLE 2-11 METEOROLOGICAL MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

 $\star$  33' for sigma-theta. 175' - 33' for delta - T

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#### WASTE GAS DECAY TANK - EXPLOSIVE GAS MONITORING INSTRUMENTATION

2.16 The Waste Gas Decay Tanks shall have one hydrogen and one oxygen monitoring channel OPERABLE.

APPLICABILITY: During WASTE GAS SYSTEM operation.

#### ACTION:

- a. With the number of OPERABLE channels less than required above, operation of this system may continue, provided grab samples are collected and analyzed:
  - (1) at least once per 4 hours during DEGASSING operations
  - (2) at least once per 24 hours during other operations
- b. If the affected channel(s) cannot be returned to OPERABLE status within 30 days, submit a special report to the Commission pursuant to Specification 2.14 within 30 days describing the reasons for inoperability and a schedule for corrective action.

#### SURVEILLANCE REQUIREMENTS

2.16.1 The Waste Gas Decay Tank explosive gas monitoring instrumentation shall be demonstrated operable by performing the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION at the frequencies shown in Table 2-12.

## TABLE 2-12

#### WASTE GAS SYSTEM EXPLOSIVE GAS MONITORING INSTRUMENTATION

#### SURVEILLANCE REQUIREMENTS

INS	<u>TRUMENT</u>	CHANNEL <u>CHECK</u>	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL <u>TEST</u>
1.	Hydrogen Monitors	D	Q*	M
2.	Oxygen Monitors	D	Q*	М

\* The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

#### Hydrogen Monitors

a. 1 volume percent hydrogen, balance nitrogen.b. 4 volume percent hydrogen, balance nitrogen.

#### Oxygen Monitors

- c. 1 volume percent oxygen, balance nitrogen.
- d. 4 volume percent oxygen, balance nitrogen.

#### WASTE GAS DECAY TANKS

2.17 The quantity of radioactivity contained in each Waste Gas Decay Tank shall be limited to less than or equal to 39000 curies (considered as Xe 133).

APPLICABILITY: At all times.

#### ACTION:

a. With the quantity of radioactivity in any Waste Gas Decay Tank exceeding the above limit, immediately suspend all additions of radioactive material to that tank, and within 48 hours reduce the tank contents to within its limit.

#### SURVEILLANCE\_REQUIREMENTS

2.17.1 The quantity of radioactive material contained in each Waste Gas Decay Tank shall be determined\* to be within the limit at least once per 7 days whenever radioactive materials are being added to the tank, and at least once per 24 hours during primary coolant system DEGASSING operations.

\* Determining that each waste gas decay is in compliance with the limit may be done by a method other than direct sampling of the tank provided it is in accordance with an approved procedure.

#### WASTE GAS DECAY TANK - EXPLOSIVE GAS MIXTURE

2.18 The concentration of oxygen in any Waste Gas Decay Tank shall be limited to less than or equal to 2% by volume whenever the concentration of hydrogen in that Waste Gas Decay Tank is greater than or equal to 4% by volume.

NOTE: Whenever the concentration of hydrogen in the bulk of the waste gas header, including the cover gas of the reactor coolant bleed tanks, is greater than 4%, or the oxygen concentration is greater than 2%, then consideration should be given to purging the waste gas header with nitrogen.

APPLICABILITY: At all times.

#### ACTION:

Whenever the concentration of hydrogen in any Waste Gas Decay Tank is greater than or equal to 4% by volume, and:

- a. The concentration of oxygen in that Waste Gas Decay Tank is greater than 2% by volume, but less than 4% by volume, without delay begin to reduce the oxygen concentration to within its limit.
- b. The concentration of oxygen in that Waste Gas Decay Tank is greater than or equal to 4% by volume, immediately suspend additions of waste gas to that Waste Gas Decay Tank and without delay begin to reduce the oxygen concentration to within its limit.

#### SURVEILLANCE REQUIREMENTS

2.18.1 The concentrations of hydrogen and oxygen in the in-service Waste Gas Decay Tank shall be continuously monitored with the hydrogen and oxygen monitors required OPERABLE by Specification 2.16 or by sampling in accordance with Specification 2.16 action a.

#### 3.0 SPECIFICATION BASES

#### 3.1 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION BASIS

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the OFFSITE DOSE CALCULATION MANUAL (ODCM) to ensure that the alarm/trip will occur prior to exceeding the 10 times limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR Part 50.

#### 3.2 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION BASIS

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments are calculated in accordance with the procedures in the OFFSITE DOSE CALCULATION MANUAL (ODCM) to ensure that the alarm/trip will occur prior to exceeding a Site Boundary dose rate of 500 mrem/year to the total body. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

#### 3.3 LIQUID RADWASTE TREATMENT SYSTEM BASIS

The requirement that these systems be used when specified provides assurance that the releases of radioactive materials in liquid effluents will be kept "as low as reasonably achievable" (ALARA). This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the liquid radwaste treatment system were specified as a suitable fraction of the dose design objectives set forth in Section II.A of Appendix I, 10 CFR Part 50, for liquid effluents.

#### 3.4 WASTE GAS SYSTEM BASIS

The requirement that these systems be used when specified provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonable achievable" (ALARA). This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

#### 3.5 LIQUID EFFLUENTS CONCENTRATION BASIS

This specification is provided to ensure that the concentration of radioactive materials released in liquid waste effluents to UNRESTRICTED AREAS will be less than 10 times the effluent concentration limits (ECLs) specified in 10 CFR Part 20. This limitation provides additional assurance that the levels of radioactive materials in bodies of water in UNRESTRICTED AREAS will result in exposures within the Section II.A design objectives of Appendix I, 10 CFR 50, to a MEMBER OF THE PUBIC. The concentration limit for Xe-133 was determined by calculating that amount of the isotope, which if present in water, would give a dose rate of 500 mrem/yr at the surface. Typically, over 90% of the noble gas released in liquid effluents at CR-3 is Xe-133. The concentration limit for all other dissolved or entrained noble gases is based upon the assumption that Xe-135 is the controlling radioisotope and its MPC in air (submersion) was converted to an equivalent concentration in water using the methods described in International Commission on Radiological Protection (ICRP) Publication 2.

#### 3.6 LIQUID EFFLUENTS DOSE BASIS

This specification is provided to implement the requirements of Sections II.A. Ill-A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth in Section II.A of Appendix I. The ACTION statement provides the required operating flexibility and at that same time implements the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents will be kept "as low as is reasonably achievable" (ALARA). The dose calculations in the OFFSITE DOSE CALCULATION MANUAL (ODCM) implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the OFFSITE DOSE CALCULATIONAL MANUAL (ODCM) for calculating the doses due to the actual release rates of radioactive materials in liquid effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977.

#### 3.7 GASEOUS EFFLUENTS DOSE RATE BASIS

This specification is provided to ensure that the dose at any time at and beyond the SITE BOUNDARY from gaseous effluents will be within the annual dose limits of 10 CFR Part 20, §§ 20.1 - 20.602. The annual dose limits are the doses associated with the concentrations of 10 CFR Part 20, §§ 20.1 - 20.602, Appendix B, Table II, Column 1. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a MEMBER OF THE PUBLIC, either within or outside the SITE BOUNDARY to annual average concentrations exceeding the limits specified in Appendix B, Table II of 10 CFR Part 20 (10 CFR Part 20.106(b)(1)). For a MEMBER OF THE PUBLIC who may at time be within the SITE BOUNDARY, the occupancy of the MEMBER OF THE PUBLIC will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the SITE BOUNDARY. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above to a MEMBER OF THE PUBLIC at or beyond the SITE BOUNDARY to less than or equal to 500 mrem/year to the total body or to less than or equal to 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to a child via the inhalation pathway to less than or equal to 1500 mrem/year.

#### GASEOUS EFFLUENTS DOSE NOBLE GASES BASIS

This Specification is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth in Section II.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents will be kept "as low as reasonably achievable" (ALARA). The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate The dose pathways is unlikely to be substantially underestimated. calculations established for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculational of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors," Revision 1, July 1977. The equations provided for determining the air doses at and beyond the SITE BOUNDARY are based upon the historical average atmospheric conditions.

#### 3.9 GASEOUS EFFLUENTS DOSE I-131, I-133, TRITIUM, AND RADIOACTIVE PARTICULATE BASIS

This specification is provided to implement the requirements of Sections II.C. III.A. and IV.A of Appendix I, 10 CFR Part 50. The Limiting Conditions for Operation are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the quides set forth in Section IV.A of Appendix I to assure that the releases of radioactive materials in gaseous effluent will be kept "as low as is reasonably achievable" (ALARA). The calculational methods specified in the Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The methods for calculating the dose due to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, Revision 1, July 1977. These equations also provide for 'determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for I-131, I-133,

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3.8

Tritium, and radioactive particulates with half-life less than eight days are dependent on the existing radionuclide pathways to man, in areas at and beyond the SITE BOUNDARY. The pathways which were examined in the development of these calculations were: 1) Individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leaf vegetation with subsequent consumption by man, 3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man, and 4) deposition on the ground with subsequent exposure of man.

#### 3.10 TOTAL DOSE BASIS

This specification is provided to meet the dose limitations of 40 CFR Part 190 that have now been incorporated into 10 CFR Part 20 by 46 FR 18525. The specification requires the preparation and submittal of a Special Report whenever the calculated doses from plant radioactive effluents exceed twice the design objective doses of Appendix I. For sites containing up to 4 reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR Part 190 if the individual reactors remain within the reporting requirement level. The Special Report will describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR Part 190 limits. For the purposes of the Special Report, it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible, with the exception that dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 8 km must be considered. If the dose to any MEMBER OF THE PUBLIC is estimated to : exceed the requirements of 40 CFR Part 190, the Special Report with a request for a variance (provided the release conditions resulting in violation of 40 CFR Part 190 have not already been corrected), in accordance with the provisions of 40 CFR part 190.11 and 10 CFR Part 20.405c, is considered to be a timely request and fulfills the requirements of 40 CFR Part 190 until NRC staff action is completed. The variance only relates to the limits of 40 CFR Part 190 and does not apply in any way to the other requirements for dose limitation of 10 CFR Part 20, as addressed in Specifications 2.5 thru 2.9. An individual is not considered a MEMBER OF THE PUBLIC during any

period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

#### 3.11 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM BASIS

The radiological monitoring program required by this specification provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures of MEMBER OF THE PUBLIC resulting from the station operation. This monitoring program thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. Program changes may be initiated based on operational experience.

The LLD's required by Table 2-9 are considered optimum for routine environmental measurements in industrial laboratories. The LLD's for drinking water meet the requirements of 40 CFR 141.

#### 3.12 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM LAND USE CENSUS BASIS

This specification is provided to ensure that changes in the use of areas at or beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census. Adequate information gained from door-todoor or aerial surveys or through consultation with local agricultural authorities shall be used. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 500 square feet provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumption were used: 1) that 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and 2) a vegetation yield of 2 kg/square meter.

#### 3.13 RADIOLOGICAL ENVIRONMENTAL MONITORING INTERLABORATORY COMPARISON PROGRAM BASIS

The requirement for participation in an Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are reasonably valid.

#### 3.14 EXPLOSIVE GAS MIXTURE

This specification is provided to ensure that the concentration of potentially explosive gas mixtures contained in the Waste Gas Decay Tanks is maintained below the flammability limits of hydrogen and oxygen. Maintaining the concentration of hydrogen and oxygen below their flammability limits provides assurance that the releases of radioactive materials will be controlled in conformance with the requirements of General Design Criterion 60 of Appendix A to 10 CFR Part 50.

#### 3.15 WASTE GAS DECAY TANKS

Restricting the quantity of radioactivity contained in each waste gas decay tank provides assurance that in the event of a simultaneous uncontrolled release of all the tanks' contents, the resulting total body exposure to an individual at the nearest exclusion area boundary will not exceed 0.5 rem. This is consistent with Branch Technical Position ETSB 11-5.

#### 3.16 WASTE GAS DECAY TANK - EXPLOSIVE GAS MONITORING INSTRUMENTATION

The OPERABILITY of the Waste Gas Decay Tank explosive gas monitoring instrumentation or the sampling and analysis program required by this specification provides for the monitoring (and controlling) of potentially explosive gas mixtures in the Waste Gas Decay Tanks.

#### 3.17 METEOROLOGICAL INSTRUMENTATION

The OPERABILITY of the meteorological instrumentation ensures the sufficient meteorological data is available for estimating potential radiation doses to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the needs for initiating protective measures to protect the health and safety of the public.

BASES

PART II

## METHODOLOGIES

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## SECTION 1.0

RADIOACTIVE EFFLUENT

## MONITOR SETPOINTS SPECIFICATIONS

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#### TABLE I - RADIOACTIVE EFFLUENT MONITOR SETPOINTS

-	RELEASE	TYPE CONT.	SETPOINT SPECIFICATION	NUCLIDE	ANAL.	SETPOINT CALCULATION	SETPOINT ADJUSTMENT
MONITOR	BATCH			TYPE **	FREQ.		
RM-A1 (Noble Gas)	x		1.1-1	1.2-1	Ρ	1.3-1	1.4-1
RM-A1 (Noble Gas)		х	1.1-1	1.2-1	W	1.3-1	1.4-2
RM-A2 (Noble Gas)	X*	х	1.1-1	1.2-2	W/P*	1.3-1	1.4-3
RM-A11 (Noble Gas)	Х		1.1-1	1.2-3	Ρ	1.3-1	1.4-4
RM-L2 (Gamma)	x		1.1-2	1.2-4	Ρ	1.3-2	1.4-5
RM-L7 (Gamma)	Х	x	1.1-2	1.2-5	W	1.3-2	1.4-6 & 1.4-7
RM-A1 & RM-A2 (Iodine Channels)	N/A	N/A	1.1-3	NA	NA	1.3-3	NA

\*This monitor is used in conjunction with (or instead of) RM-A11 to monitor the release of the waste gas decay tanks. Nuclide analysis and setpoint calculation must be performed for this monitor prior to waste gas decay tank release. At all other times, it is a continuous source monitor and the setpoint is determined weekly.

\*\*For composited samples the results from the most recently completed analysis are used.

#### GASEOUS EFFLUENT MONITORS SETPOINT SPECIFICATION 1.1-1 (Monitors RM-A1, RM-A2 and RM-A11)

The dose <u>rate</u> at or beyond the SITE BOUNDARY, due to radioactive materials released in gaseous effluents, is limited as follows:

Noble Gases -500 mrem/year (total body)<br/>3000 mrem/year (skin)I-131, I-133, Tritium<br/>and Radioactive1500 mrem/year (any organ via<br/>the inhalation pathway.)greater than 8<br/>day half-lives400 mrem/year (any organ via<br/>the inhalation pathway.)

The radioactive gaseous effluent monitors (RM-A1, RM-A2 and RM-A11) shall have their alarm/trip setpoints set to ensure that the above total body, noble gas dose rate limit is not exceeded.

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#### LIQUID EFFLUENT MONITORS SETPOINT SPECIFICATION 1.1-2 (Monitors RM-L2, RM-L7)

The concentration of radioactive materials in liquid effluents, released to UNRESTRICTED AREAS, is limited to 10 times the effluent concentrations specified by 10 CFR 20, for radionuclides other than noble gases. For all dissolved or entrained noble gases, except Xe-133, the concentration limit is  $2E-4 \ \mu \text{Ci/ml}$ . For Xe-133 the concentration limit is  $1E-3 \ \mu \text{Ci/ml}$ .

The radioactive liquid effluent monitors (RM-L2 and RM-L7) shall have their alarm/trip setpoints set to ensure that the above gamma emitting concentration limits are not exceeded.
#### GASEOUS EFFLUENT MONITORS SETPOINT SPECIFICATION 1.1-3 (Iodine Channels in RM-A1 and RM-A2)

Sampling and analyses of the Reactor Building Purge Exhaust, and the Auxiliary Building and Fuel Handling Area Exhaust for radioiodine and other gamma emitters, shall be performed at least once per 24 hours for at least 7 days when the Radioiodine concentration in the Auxiliary Building and Fuel Handling Area or the Reactor Building Purge Exhaust Ducts will lead to a release which is greater than or equal to the 10 CFR 20, Appendix B, Table II, Column I limits, at or beyond the SITE BOUNDARY.

The iodine monitoring channels in radiation monitors RM-A1 and RM-A2 shall have their alarm setpoints set to alarm when the above radioiodine concentration limits are exceeded.

#### NUCLIDE ANALYSIS 1.2-1 REACTOR BUILDING PURGE EXHAUST

NUCI	LIDE	SAMPLE SOURCE	LLD <sup>(b)</sup> (uCi/cc)	
Α.	Principal Gamma	Emitters <sup>(a)</sup>		
	Mn-54 Fe-59 Co-58 Co-60 Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Pre-release grab sample for Batch Type release. Weekly Particulate Filter Analysis for continuous(c) type release.	1x10 <sup>-4</sup> /1x10 <sup>-11</sup>	
	Kr-87 Kr-88 Xe-133 Xe-133m Xe-135 Xe-138	Pre-release grab sample for Batch type release. Noble Gas monitor during batch and continuous releases Grab sample within 2-6 hr. following startup, shutdown or ≥ 15% RTP change in 1 hr.	1×10 <sup>-4</sup>	
Β.	Iodine 131	Pre-release grab sample for Batch type release. Weekly charcoal filter and once per 24 hr for 7 days following startup shutdown or ≥ 15% RTP change in 1 hr if I-131 concentration at site boundary > 10 CFR 20 limit.	NA/1 × 10 <sup>-12</sup>	
c.	Tritium	Pre-release Grab Sample and within 12-24 hr following flooding of refueling canal and once per 7 days while canal is flooded.	1x10 <sup>-6</sup>	
D.	Gross Alpha	Monthly Particulate Filter Composite	1x10 <sup>-11</sup>	
E.	Sr-89	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	
F.	Sr-90	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	

- (a) Other identified Gamma Emitters not listed in this table shall be included in dose and setpoint calculations.
- (b) The first value refers to the LLD for pre-release grab sample; the second value refers to the LLD for weekly Particulate Filter Analysis.
- (c) Reactor Building Purge is considered continuous after a minimum of one Reactor Building volume has been released on a continuous basis (i.e., first volume is a batch type).

#### NUCLIDE ANALYSIS 1.2-2 AUXILIARY BUILDING AND FUEL HANDLING AREA EXHAUST

NUCLIDE		SAMPLE SOURCE	LLD <sup>(b)</sup> (uCi/ml)	
Α.	Principal Gamma	Emitters <sup>(a)</sup>		
	Mn-54 Fe-59 Co-58 Co-60	Weekly Particulate Filter Analysis.		
	Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144		1x10 <sup>-4</sup> /1x10 <sup>-11</sup>	
	Kr-87 Kr-88 Xe-133 Xe-133m Xe-135 Xe-138	Monthly Grab Sample and Continuous Noble Gas monitor. Grab sample within 2-6 hr following startup, shutdown or ≥ 15% RTP change in 1 hr.	1×10-4	
В.	Iodine 131	Weekly Charcoal Filter analysis and once per 24 hr for 7 days following startup shutdown or ≥ 15% RTP change in 1 hr if I-131 concentration at site boundary > 10 CFR 20 limit.	1x10 <sup>-12</sup>	
c.	Tritium	Monthly Grab Sample and within 12-24 hr following flooding of refueling canal and once per 7 days while canal is flooded.	1x10 <sup>-6</sup>	
D.	Gross Alpha	Monthly Particulate Filter Composite	1×10 <sup>-11</sup>	
Ε.	Sr-89	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	
F.	Sr-90	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	

- (a) Other identified Gamma Emitters not listed in this table shall be included in dose and setpoint calculations.
- (b) The first value refers to the LLD for pre-release grab sample; the second value refers to the LLD for weekly Particulate Filter Analysis.

#### NUCLIDE ANALYSIS 1.2-3 WASTE GAS DECAY TANKS

NUC	LIDE	SAMPLE SOURCE	LLD <sup>(b)</sup> (uCi/ml)
Α.	Principal Gamma	Emitters (a)	
	Mn-54 Fe-59 Co-58 Co-60		
	Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Pre-release Grab sample and Weekly Particulate Filter Sample from RM-A2	1x10 <sup>-4</sup> /1x10 <sup>-11</sup>
	Kr-87 Kr-88 Xe-133 Xe-133m Xe-135 Xe-138	Pre-release Grab sample.	1×10-4
B.	Iodine 131	Weekly Charcoal Filter from RM-A2.	1×10 <sup>-12</sup>

- (a) Other identified Gamma Emitters not listed in this table shall be included in dose and setpoint calculations.
- (b) The first value refers to the LLD for pre-release grab sample; the second value refers to the LLD for weekly Particulate Filter Analysis.

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		NUCLIDE	ANALYS	SIS 1.2-4	Ļ			
EVAPORATOR	CONDENSATE	STORAGE	TANKS,	LAUNDRY	AND	SHOWER	SUMP	TANKS,
		SECOND	ARY DRA	IN TANK				

NUCLIDE		SAMPLE SOURCE	LLD(uCi/ml)		
Α.	Principal Gamma	Emitters <sup>(a)</sup>			
	Mn-54 Fe-59 Co-58 Co-60 Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Pre-release Grab Sample	5x10 <sup>-7</sup>		
в.	Iodine 131	Pre-Release Grab Sample	1×10 <sup>-6</sup>		
c.	Dissolved and Entrained Noble Gases	Monthly Grab Sample	1×10 <sup>-5</sup>		
D.	Tritium	Monthly Composite	1×10 <sup>-5</sup>		
E.	Gross Alpha	Monthly Composite	1×10 <sup>-7</sup>		
F.	Sr-89	Quarterly Composite	5×10 <sup>-8</sup>		
G.	Sr-90	Quarterly Composite	5×10 <sup>-8</sup>		
Н.	Fe-55	Quarterly Composite	1×10 <sup>-6</sup>		

(a) Other identified Gamma Emitters not listed in this table shall be included in dose and setpoint calculations.

#### NUCLIDE ANALYSIS 1.2-5 SECONDARY DRAIN TANK AND/OR PLANT CONDENSATE

NUC	LIDE	SAMPLE SOURCE	LLD(uCi/ml)		
Α.	Principal Gamma	Emitters (a)			
	Mn-54 Fe-59 Co-58 Co-60 Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Weekly Composite	5×10 <sup>-7</sup>		
Β.	Iodine 131	Weekly Composite	1×10 <sup>-6</sup>		
c.	Dissolved and Entrained Noble Gases	Monthly Grab Sample	1×10 <sup>-5</sup>		
D.	Tritium	Monthly Composite	1×10 <sup>-5</sup>		
E.	Gross Alpha	Monthly Composite	1×10 <sup>-7</sup>		
F.	Sr-89	Quarterly Composite	5×10 <sup>-8</sup>		
G.	Sr-90	Quarterly Composite	5×10 <sup>-8</sup>		
Н.	Fe-55	Quarterly Composite	1×10 <sup>-6</sup>		

(a) Other identified Gamma Emitters not listed in this table shall be included in dose and setpoint calculations.

#### PRE-RELEASE CALCULATION 1.3-1 GASEOUS RADWASTE RELEASE

#### I. <u>INTRODUCTION</u>

Prior to initiating a release of gaseous radwaste, it must be determined that the concentration of radionuclides to be released, and the flow rates at which they are released will not cause the dose rate limitations of Specification 1.1-1 to be exceeded.

#### II. INFORMATION REQUIRED

Results of appropriate Nuclide Analysis from Section 1.2

#### III. CALCULATIONS

Noble Gas Gamma Emissions

Dose Rate (Total Body) =  $\Sigma$  (X/Q)K<sub>1</sub>Q<sub>1</sub> mrem/yr. (1.1)

Noble Gas Beta Emissions

Dose Rate (Skin) =  $\Sigma$  (X/Q)Q<sub>i</sub>(L<sub>i</sub> + 1.1M<sub>i</sub>) mrem/yr. (1.2)

Iodine 131, Iodine 133, Tritium, Radioactive Particulates

Dose Rate  $(I,T,P) = \Sigma (X/Q)P_1Q_1$  mrem/yr. (1.3)

where:

- $K_i$  = The total body dose factor due to gamma emissions for each identified noble gas radionuclide, in mrem/yr per  $\mu Ci/m^3$ . (See Table 4.4-1).
- L<sub>i</sub> = The skin dose factor due to beta emissions for each identified noble gas radionuclide, in mrem/yr per µCi/m<sup>3</sup>. (See Table 4.4-1).
- M<sub>i</sub> = The air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/yr per μCi/m<sup>3</sup> (unit conversion constant of 1.1 mrem/mrad converts air dose to skin dose). (See Table 4.4-1).
- $P_i$  = The dose parameter for radionuclides other than noble gases for the inhalation pathway, in mrem/yr per  $\mu Ci/m^3$ . (See Table 4.4-3).
- Q<sub>i</sub> = The release rate of radionuclides, i, in gaseous effluent from individual release sources, in µCi/sec (per unit, unless otherwise specified). Q<sub>i</sub> = Effluent stream nuclide concentration x flow rate.

Flow Rates (Variable - based on setpoint needs, nominal or maximum values listed below.)

- 1) Reactor Building Purge Exhaust Duct =  $50,000 \text{ cfm} = 2.4 \times 10^7 \text{ cc/sec}$
- 2) Auxiliary Building and Fuel Handling Area Exhaust Duct= 156,000 cfm = 7.4 x 10<sup>7</sup> cc/sec
- 3) Waste Gas Decay Tank Release Line = 50 cfm max =  $2.4 \times 10^4$  cc/sec
- $(X/Q) = 2.5 \times 10^{-6} \text{ sec/m}^3$ . For all vent releases. The highest calculated annual average relative concentration for any area at or beyond the unrestricted area boundary.

In order for a gaseous release to be within the limits of specification 1.1-1, the Projected Dose Rate Ratio (PDRR) must not exceed 1. The PDRR for each limit is calculated as follows:

$PDRR_{_{TB}}$	= PDR <sub>TB</sub> / 500	(1.4)
PDRR	= PDR <sub>sk</sub> / 3000	(1.5)
	= PDR <sub>org</sub> / 1500	(1.6)

 $PDR_{-}$  = Projected Dose Rate to the TOTAL BODY due to noble gas emissions.

- $PDR_{v}$  = Projected Dose Rate to the SKIN due to noble gas emissions.
- $PDR_{orc}$  = Projected Dose Rate to any organ due to inhalation of iodine, tritium and particulates with half-lives greater than 8 days.
  - 500 = The allowable total body dose rate due to noble gas gamma emissions in mrem/yr.
  - 3000 = The allowable skin dose rate due to noble gas beta emissions in mrem/yr.

1500 = The allowable organ dose rate in mrem/yr.

Equations 1.1, 1.2, and 1.3 are solved for each release type and release point currently releasing or awaiting release. If relationships 1.4, 1.5, and 1.6 are satisfied, the release can be made under the assumed flow rates. If one or more of the relationships 1.4, 1.5 and 1.6 are not satisfied, action must be taken to reduce the the radionuclide release rate prior to initiating a release (or to reduce the radionuclide release rate already in progress).

The following actions are available to reduce the release rates at the three release points.

#### 1) Waste Gas Decay Tanks

- a) Release Valve may be throttled
- b) Tank contents may be diluted
- c) Release may be delayed for longer decay time.
- 2) Reactor Building Purge Exhaust Duct
  - a) Dilution flow may be opened to reduce purge rate while maintaining the same flow rate.

#### 3) Auxiliary Building and Fuel Handling Area Exhaust

- a) Reduce inlet air supply to areas in Auxiliary Building to reduce radioactivity source rate to vent. b) Identify and isolate the sources of radioactive releases into the
- Auxiliary Building.

#### **Effluent Monitor LLD Determination**

The relationship given below may be used to calculate a monitor LLD.

LLD =  $(4.66\sqrt{B})/Slope$ 

= Average monitor background count rate in cpm. В

Slope = Slope of monitor calibration curve in  $cpm/\mu Ci/ml$ .

#### PRE-RELEASE CALCULATION 1.3-2 LIQUID RADWASTE RELEASE

#### I. INTRODUCTION

Prior to initiating a release of liquid radwaste, it must be determined that the concentration of radionuclides to be released and the flow rates at which they will be released will not lead to a release concentration greater than the limits of specification 1.1-2 at the point of discharge.

#### INFORMATION REQUIRED II.

Results of appropriate Nuclide Analysis from Section 1.2

#### III. CALCULATIONS

Discharge

Concentration	= 0.1	$\left[\sum \frac{C_{i}}{ECL_{i}} + \frac{C_{G}}{2E-5} + \frac{C_{XE-133}}{1E-4} + \frac{C_{a}}{ECL_{a}} + \frac{C_{T}}{ECL_{T}} + \frac{C_{s}}{ECL_{s}} + \frac{C_{Fe}}{ECL_{Fe}}\right] \div \left[\frac{D+E}{E}\right]$
where:		
Сл	=	The concentration of isotope i, in the gamma spectrum excluding dissolved or entrained noble gases.
Cg	=	Total dissolved or entrained noble gas concentration, excluding Xe-133.
CXE - 133	=	XE-133 concentration.
Ст	-	Tritium Concentration from most recent analysis.
Ca	=	Gross alpha concentration from most recent analysis.
Cs	=	Sr-89, 90 concentration from most recent analysis.
CFe	=	Fe-55 concentration from most recent analysis.
Е	=	Effluent Stream Flow Rate
D	=	Dilution Stream Flow Rate (Nuclear Services and Decay Heat seawater flow only)
ECL	=	10CFR20 Appendix B, effluent concentration limit.
	If D disc grea assu Chan dilu	ischarge Concentration is less than or equal to 1, the harge may be initiated. If Discharge Concentration is ter than 1, then release parameters must be changed to re that Discharge Concentration is not greater than 1. ges include reducing tank concentration by decay or tion, reducing the waste stream release rate, or increasing

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dilution water flow rate.

#### PRE-RELEASE CALCULATION 1.3-3 GASEOUS EFFLUENT IODINE MONITORS

#### I. INTRODUCTION

In order to determine the setpoints for these monitors, the following assumptions are used.

- A. The release rate through the Auxiliary Building and Fuel Handling Area exhaust duct is  $7.4 \times 10^7$  cc/sec. (156,000 cfm).
- B. The release rate through the Reactor Building Purge Exhaust Duct is 2.4 x  $10^7$  cc/sec (50,000 cfm).
- C. A limitless supply of uniformly concentrated I-131 is available to supply the Exhaust Ducts.
- D. The iodine filter has been installed for 8 hours and operating at a constant flow rate of 472 cc/sec (1 cfm). Therefore, total flow through the filter has been  $1.36 \times 10^{7}$  cc.

#### II. <u>CALCULATIONS</u>

The limiting concentration of Iodine in the vent which would result in a concentration equal to the 10 CFR 20 limit at the site boundary is calculated as follows:

$$C_V = C_I / [(X/Q)FK]$$

where:

F

- $C_V$  = The Concentration of Radioiodine in the vent in  $\mu$ Ci/cc.
- $C_I$  = The 10 CFR 20 effluent concentration limit for Iodine 131, 2 x 10<sup>-10</sup> µCi/cc.
  - = The duct flow rate: 2.4 x 10<sup>7</sup> cc/sec for the Reactor Building Purge Exhaust Duct and 7.4 x 10<sup>7</sup> cc/sec for the Auxiliary Building and Fuel Handling Area Exhaust Duct.
- K = Unit conversion constant,  $1 \times 10^{-6} \text{ m}^3/\text{cc}$
- X/Q = The highest calculated annual average concentration for any area at or beyond the unrestricted area boundary, 2.5 x 10<sup>-6</sup> sec/m<sup>3</sup>.

Solving eqn. 1.7 for the Reactor Building Purge exhaust vent yields:

 $C_{V(RB)} = 3.33 \times 10^{-6} \mu Ci/cc$ 

Solving eqn. 1.7 for the Auxiliary Building & Fuel Handling Area Exhaust vent yields:

 $C_{V(AB)} = 1.1 \times 10^{-6} \mu Ci/cc$ 

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In order to determine the total quantity of Iodine 131 collected on the filter, the values of C above are multiplied by the volume assumed to have passed through the filter

$$Q_{I} = fkC_{v} \quad (1.8)$$

where:

 $Q_{t}$  = The total quantity of Iodine 131 collected on the filter, in  $\mu$ Ci.

 $C_{i}$  = The concentration of Iodine 131 in the vent in  $\mu$ Ci/cc.

- f = The assumed total volume of vent atmosphere that has passed through the filter,  $1.36 \times 10^7$  cc (1 CFM for 8 hours).
- k = The Iodine removal efficiency of the filters: 90%

Solving eqn. 1.8 for the Reactor Building vent yields:

 $Q_{I(RB)} = 40.8 \ \mu Ci$ 

Solving eqn. 1.8 for the Auxiliary Building and Fuel Handling Area vent yields:

$$Q_{I(AB)} = 13.5 \ \mu Ci$$

These values are converted to counts per minute for the Iodine monitoring channels through use of the appropriate calibration curve.

#### Setpoint Calculation 1.4-1 Reactor Building Purge Exhaust Duct Monitor (RM-A1) (Batch Type Releases)

#### INTRODUCTION

Following completion of the analyses required by Section 1.2-1 and determination of release rates and concentration limits in accordance with Section 1.3-1, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### METHODOLOGY

Reactor Building atmosphere is circulated through radiation monitor RM-A6 (containment atmosphere noble gas monitor) and the count rate is observed. The observed count rate is correlated to a corresponding count rate for RM-A1 (Reactor Building purge exhaust duct monitor), and factors are applied to account for background radiation, and the pressure difference between the detector chambers and exhaust vent. The obtained value establishes the maximum allowable setpoint. The alarm/trip setpoint is adjusted to this or a more conservative value prior to initiating the release. If the concentration of radionuclides to be released is less than the effluent monitor LLD "Net CPM" is obtained from the calibration curve by determining the CPM which corresponds to  $2.5E-2 \mu$ Ci/ml, and PDRR is set equal to 1.

#### CALCULATION

RM-A1 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x VF}}{\text{PDRR}} \times \frac{29.9 - \text{V1}}{29.9 - \text{V6}} \times \frac{(\mu C_i / cc / CPM)_{AG}}{(\mu C_i / cc / CPM)_{AI}}\right] + \text{Bkg}$$

where:

Net CPM	=	The observed RM-A6 count rate, in cpm, less background, or obtained from the calibration curve.
VF	=	The vent fraction; that portion of the total plant gaseous release associated with this vent and discharge type. Value can be set to a number between 0 and 1. The summation of the vent fractions of RM-A1 and RM-A2 cannot exceed 1.
PDRR .	=	The noble gas gamma emission Projected Dose Rate Ratio calculated in accordance with Section 1.3. This ratio is the actual projected dose rate divided by the allowable dose rate referenced in Section 1.3-1, relationship 1.4.
V6	=	The actual gauge vacuum reading at RM-A6 at the time of sampling.
VI	Ξ	The actual or average gauge vacuum reading at RM-A1 during normal operation.

(µCi/cc/CPM)A6	=	µCi/cc per cpm for RM-A6. This is based on an actual sample or derived from the calibration curve.
( <i>µ</i> Ci / cc / CPM)A1	=	$\mu$ Ci/cc per cpm for RM-A1. This is based on an actual sample or derived from the calibration curve.
Bkg	=	RM-A1 background count rate in cpm.

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#### Setpoint Calculation 1.4-1A Reactor Building Purge Exhaust Duct Monitor (RM-A1) (Special Release For Functional Testing of the Reactor Building Purge System)

#### **INTRODUCTION**

Following completion of the analyses required by Section 1.2-1 and determination of release rates and concentration limits in accordance with Section 1.3-1, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### METHODOLOGY

Auxiliary Building and Fuel Handling Area atmosphere is continuously passed through radiation monitor RM-A2 and the count rate is observed. The observed count rate is correlated to a corresponding count rate for RM-A1, and factors are applied to account for background radiation and the pressure difference between the detector chambers and exhaust vent. The obtained value establishes the maximum allowable setpoint. The alarm/trip setpoint is adjusted to this or a more conservative value prior to initiating the release. If the concentration of radionuclides to be released is less than the effluent monitor LLD "Net CPM" is obtained from the calibration curve by determining the CPM which corresponds to  $2.5E-2 \ \mu Ci/ml$ , and PDRR is set equal to 1.

#### CALCULATION

RM-A1 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x VF}}{\text{PDRR}} \times \frac{29.9 - \text{V1}}{29.9 - \text{V2}} \times \frac{(\mu \text{Ci}/\text{cc}/\text{CPM})_{\text{A2}}}{(\mu \text{Ci}/\text{cc}/\text{CPM})_{\text{A1}}}\right] + \text{Bkg}$$

where:

Net CPM	=	The observed RM-A2 count rate, in cpm, less background, or obtained from the calibration curve.
VF	=	The vent fraction; that portion of the total plant gaseous release associated with this vent and discharge type. VF can be set to a value from 0 and 1. The sum of RM-A1 and RM-A2 vent fractions can not exceed 1.
PDRR	=	The noble gas gamma emission Projected Dose Rate Ratio calculated in accordance with Section 1.3. This ratio is the actual projected dose rate divided by the allowable dose rate referenced in Section 1.3-1, relationship 1.4.
V2	=	The actual gauge vacuum reading at RM-A2 at the time of sampling.
VI	=	The actual or average gauge vacuum reading at RM-A1 during normal operation.

$(\mu C_i / c_c / CPM)_{A2}$	=	$\mu$ Ci/cc per cpm for RM-A2. This is based on an actual
		sample or derived from the calibration curve.
(µCi/cc/CPM)ai	=	$\mu Ci/cc$ per cpm for RM-A1. This is based on an actual
		sample or derived from the calibration curve.
Bkg	=	RM-A1 background count rate in cpm.

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#### Setpoint Calculation 1.4-1B Reactor Building Purge Exhaust Duct Monitor (RM-A1) (Special Release Following ILRT of Reactor Building)

#### INTRODUCTION

Following completion of the analyses required by Section 1.2-1 and determination of release rates and concentration limits in accordance with Section 1.3-1, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### METHODOLOGY

Net CPM is obtained from the calibration curve by determining the CPM which corresponds to  $2.5E-2 \ \mu Ci/ml$ . This value is combined with the monitor background, vent fraction and projected dose rate ratio (PDRR) to arrive at the monitor setpoint. The obtained value establishes the maximum allowable setpoint. The alarm/trip setpoint is adjusted to this or a more conservative value prior to initiating the release.

Shortly, after beginning the purge, new RM-A1 alarm/trip setpoints are determined using the methodology of Setpoint Calculation 1.4-2.

#### CALCULATION

RM-A1 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x VF}}{\text{PDRR}}\right]$$
 + Bkg

Net CPM	=	A value derived from RM-A1 calibration curve.
VF	=	The vent fraction; that portion of the total plant gaseous release associated with this vent and discharge type. VF can be set to a value from 0 and 1. The sum of RM-A1 and RM-A2 vent fractions can not exceed 1.
PDRR	=	1
Bkg	=	RM-A1 background count rate in cpm.

#### Setpoint Calculation 1.4-2 Reactor Building Purge Exhaust Duct Monitor (RM-A1) (Continuous Type Releases)

#### **INTRODUCTION**

Following completion of the analyses required by Section 1.2-1 and determination of release rates and concentration limits in accordance with Section 1.3-1, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### METHODOLOGY

Reactor Building atmosphere is passing through radiation monitor RM-A1 during a continuous type release. Factors are applied to the observed count rate to account for background radiation and vent fraction. The obtained value establishes the maximum allowable setpoint. The alarm/trip setpoint is adjusted to this or a more conservative value weekly during continuous releases. If the concentration of radionuclides to be released is less than the effluent monitor LLD "Net CPM" is obtained from the calibration curve by determining the CPM which corresponds to  $2.5E-2 \ \mu\text{Ci/ml}$ , and PDRR is set equal to 1.

#### CALCULATION

where:

RM-A1 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x VF}}{\text{PDRR}}\right]$$
 + Bkg

Net CPM	=	The observed RM-A1 count rate, in cpm, less background, or obtained from the calibration curve.
VF	=	The vent fraction; that portion of the total plant gaseous release associated with this vent and discharge type. Value can be set to a number between 0 and 1. The summation of the vent fractions of RM-A1 and RM-A2 cannot exceed 1.
PDRR	=	The noble gas gamma emission Projected Dose Rate Ratio calculated in accordance with Section 1.3. This ratio is the actual projected dose rate divided by the allowable dose rate referenced in Section 1.3-1, relationship 1.4.
Bkg	=	RM-A1 background count rate in cpm.

#### Setpoint Calculation 1.4-3 Auxiliary Building & Fuel Handling Area Exhaust Monitor (RM-A2) (Continuous Type Releases)

#### **INTRODUCTION**

Following completion of the analyses required by Section 1.2-2 and determination of release rates and concentration limits in accordance with Section 1.3-1, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### METHODOLOGY

Auxiliary Building and Fuel Handling Area atmosphere is continuously passing through radiation monitor RM-A2. Factors are applied to the observed count rate to account for background radiation and vent fraction. The obtained value establishes the maximum allowable setpoint. The alarm/trip setpoint is adjusted to this or a more conservative value weekly during continuous releases. If the concentration of radionuclides to be released is less than the effluent monitor LLD "Net CPM" is obtained from the calibration curve by determining the CPM which corresponds to 8E-3  $\mu$ Ci/ml, and PDRR is set equal to 1.

#### CALCULATION

RM - A2 Setpoint (CPM) =	Net CPM x VF	+ Bkg
	PDRR	0

where:		
Net CPM	=	The observed RM-A2 count rate, in cpm, less background, or obtained from the calibration curve.
VF	=	The vent fraction; that portion of the total plant gaseous release associated with this vent and discharge type. Value can be set to a number between 0 and 1. The summation of the vent fractions of RM-A1 and RM-A2 cannot exceed 1.
PDRR	=	The noble gas gamma emission Projected Dose Rate Ratio calculated in accordance with Section 1.3. This ratio is the actual projected dose rate divided by the allowable dose rate referenced in Section 1.3-1, relationship 1.4.
Bko	=	RM-A2 background count rate in com.

#### Setpoint Calculation 1.4-4 Waste Gas Decay Tank Monitor (RM-A11) (Batch Type Releases)

#### **INTRODUCTION**

Following completion of the analyses required by Section 1.2-3 and determination of release rates and concentration limits in accordance with Section 1.3-1, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### **METHODOLOGY**

Prior to initiating a Waste Gas Decay Tank release, its contents are drawn through radiation monitor RM-A11 and returned to the waste gas header. Factors are applied to the observed count rate to account for background radiation and vent fraction. The obtained value establishes the maximum allowable setpoint. The alarm/trip setpoint is adjusted to this or a more conservative value weekly during continuous releases. If the concentration of radionuclides to be released is less than the effluent monitor LLD "Net CPM" is obtained from the calibration curve by determining the CPM which corresponds to 20  $\mu$ Ci/ml, and PDRR is set equal to 1.

#### **CALCULATION**

RM-A11 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x VF x 24.7}}{\text{PDRR x P}}\right]$$
 + Bkg

where:

Net CPM	=	The observed RM-A11 count rate, in cpm, less background, or obtained from the calibration curve.
VF	=	The vent fraction; that portion of the total plant gaseous release associated with this vent and discharge type. Value is equal to 0.5.
PDRR	=	The noble gas gamma emission Projected Dose Rate Ratio calculated in accordance with Section 1.3. This ratio is the actual projected dose rate divided by the allowable dose rate referenced in Section 1.3-1, relationship 1.4.
24.7	=	The maximum pressure (psia) which RM-A11 detector chamber should be subjected to. This corresponds to a flow of 15 CFM from the release line to the vent.
р	=	Pressure (psia) in RM-A11 at time of obtaining net CPM.
Bkg	= .	RM-A11 background count rate in cpm.

#### Setpoint Calculation 1.4-5 Plant Discharge Line Monitor (RM-L2) (Batch Type Releases)

#### INTRODUCTION

Following completion of the analyses required by Section 1.2-4 and determination of release rates and concentration limits in accordance with Section 1.3-2, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### **METHODOLOGY**

Evaporator Condensate Storage Tank or Laundry and Shower Sump Tank contents are circulated through radiation monitor RM-L2 and returned to the auxiliary building sump to obtain the actual count rate at RM-L2 for the concentration contained in the tank for release. The observed count rate is adjusted for release flow, background and statistical counting variations, particular to this release flow path. The resulting value is used as the alarm/trip setpoint and RM-L2 is adjusted to this or a more conservative value prior to initiating the release. If the concentration of radionuclides to be released is less than the effluent monitor LLD use setpoint calculation 1.4-8.

#### CALCULATION

RM-L2 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x AF x (E+D)}}{\sum Ci / (10 \text{ x ECLi}) \text{ x E}}\right] + \text{Bkg} + 3.3\sqrt{\text{Bkg}}$$

where:

Net CPM	=	The observed RM-L2 count rate, in cpm, less back-ground, or obtained from the calibration curve.
AF	=	Administration Factor to account for error in setpoint determination. AF = 0.8.
$\sum C_i / (10 \times ECL_i)$	-	The ratio of the actual gamma emitting concentrations (excluding dissolved and entrained gases) of the tank contents to be released to 10 times as listed in 10 CFR 20 the Effluent Concentration Limits (ECL).
Е	=	The release flow rate of waste to be discharged in gallons per minute. A maximum flow rate of 100 gpm will be used for the Evaporator Condensate Storage Tanks and 40 gpm for the Laundry and Shower Sump Tanks.
D	=	The dilution flow from the Nuclear Services and Decay Heat Sea Water system in gallons per minute.
Bkg	=	RM-L2 background count rate in cpm.
3.3√Bkg	=	A statistical spread on the background count rate which represents a 99.95% confidence level on monitor counting. This factor is included to prevent inadver- tent high/trip alarms due to random counts on the monitor.

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#### Setpoint Calculation 1.4-6 Turbine Building Basement Discharge Line Monitor (RM-L7) (Continuous Type Releases)

#### INTRODUCTION

The activity released through the Turbine Building Basement Discharge Line Monitor RM-L7 is analyzed in accordance with Section 1.2-5. The setpoint is a fixed concentration based on worst case nuclide released at the worst case rate as described in the Methodology Section below. The monitor setpoint is adjusted to ensure isolation of the release pathway if nuclide concentration limits are exceeded.

#### **METHODOLOGY**

The alarm/trip setpoint determination is based on the worst case assumption that I-131 is the only nuclide being discharged. This assumption equates all counts on RM-L7 to I-131 with an ECL of 1E-6 uci/ml. I-131 has the most conservative ECL of the nuclides available to this release path and "visible" to RM-L7. The setpoint is based on assuring 10 ECLs or less of I-131 in the discharge canal and is determined by deriving the cpm from the RM-L7 calibration curve which corresponds to a concentration of 1E-5 uci/ml and applying the flow dilution factor, background counts, and statistical counting variations. The resulting value is used as the alarm/trip setpoint and RM-L7 is adjusted to this or a more conservative value to maintain control on release conditions.

#### CALCULATION

RM-L7 Setpoint (CPM) = 
$$\left[\frac{\text{CPM x (E + D)}}{\text{E}}\right]$$
 + Bkg + 3.3 $\sqrt{\text{Bkg}}$ 

where:

- CPM = The counts per minute corresponding to 1E-5 uci/ml (10 ECLs I-131) from the current RM-L7 calibration curve.
- E = The maximum release flow rate of water able to be discharged in gallons per minute.
- D = The dilution flow from the Nuclear Services and Decay Heat Sea Water system in gallons per minute.
- Bkg = The background count rate at RM-L7 in cpm.
- $3.3\sqrt{Bkg}$  = A statistical spread on the background count rate which represents a 99.95% confidence level on monitor counting. This factor is included to prevent inadvertent high/trip alarms due to random counts on the monitor.

#### Setpoint Calculation 1.4-7 Turbine Building Basement Discharge Line Monitor (RM-L7) (Batch Type Releases)

#### **INTRODUCTION**

Following completion of the analyses required by Section 1.2-4 and determination of release rates and concentration limits in accordance with Section 1.3-2, the monitor setpoint requires adjustment to ensure that alarm and pathway isolation occur if nuclide concentration limits are exceeded.

#### METHODOLOGY

Station Drain Tank (SDT-1) contents are circulated through radiation monitor RM-L7 and returned to the sump to obtain the actual count rate at RM-L7 for the concentration contained in the tank for release. The observed count rate is adjusted for release flow, background and statistical counting variations, particular to this release flow path. The resulting value is used as the alarm/trip setpoint and RM-L7 is adjusted to this or a more conservative value prior to initiating the release. If the concentration of radionuclides to be released is less than the effluent monitor LLD use setpoint calculation 1.4-8.

#### CALCULATION

RM-L7 Setpoint (CPM) = 
$$\left[\frac{\text{Net CPM x AF x (E+D)}}{(\Sigma \text{Ci}/(10 \text{ x ECLi})) \text{ x E}}\right] + \text{Bkg} + 3.3\sqrt{\text{Bkg}}$$

where:

Net CPM	=	The observed RM-L7 count rate, in cpm, less background.	
AF	=	Administration Factor to account for error in setpoint determination. AF = 0.8.	
∑Ci/(10 x ECLi)	=	The ratio of the actual gamma emitting concentrations (excluding dissolved and entrained gases) of the tank contents to be released to 10 times the Effluent Concentration Limits (ECL) as listed in 10 CFR 20.	
E	=	The release flow rate of waste to be discharged in gallons per minute. A maximum flow rate of 600 gpm will be used.	
D	=	The dilution flow from the Nuclear Services and Decay Heat Sea Water system in gallons per minute.	1 1 1 1
Bkg	=	RM-L7 background count rate in cpm.	
3.3√Bkg	=	A statistical spread on the background count rate which represents a 99.95% confidence level on monitor counting. This factor is included to prevent inadvertent high/trip alarms due to random counts on the monitor.	and the second s

#### Setpoint Calculation 1.4-8 Alternate Setpoints Methodology for RM-L2 and RM-L7

The following method may be employed to establish an upper bound fixed setpoint for RM-L7. Once established, the setpoint need not be changed unless the monitor response or background changes significantly, or there is a significant change in secondary plant activity levels.

This method may also be used to establish setpoints for laundry tanks being released through RM-L2, and for low activity (< monitor LLD) ECSTs.

Setpoint = [(cpm/
$$\mu$$
Ci/m]) x (1E-5  $\mu$ Ci/m]) x DF x RF] + Bkg

where:

cpm/µCi/ml	=	The monitor response (slope)
1E-5 µCi∕ml	=	Worst case effluent concentration limit, for major gamma emitting isotopes in waste stream, multiplied by 10.
DF	=	The minimum dilution factor based on maximum tank discharge rate and minimum RW dilution; 100 for ECSTs, 240 for LSSTs, 30 for SDT-1 or CD releases through RM-L7.
RF	_ `	Release fraction. RF is that fraction of site liquid releases allocated to a particular liquid effluent monitor. The sum of the RFs for each liquid effluent monitor must be < = 1 during periods of simultaneous releases from liquid effluent discharge points. During periods when simultaneous discharges are not made, RF may be set to 1 for each monitor.
Bkg	=	Monitor background.

#### CALCULATION OF INHALATION PATHWAY DOSE FACTOR (Pi)

 $P_i = K' (BR)DFA_i$  mrem / year per uCi / m<sup>3</sup>

#### where:

N	OTE:	For the inhalation pathway $P_i = R_i$ , so values of $P_i$ may be
DFAi	=	The maximum organ inhalation dose factor for the child age group for the ith radionuclide, in mrem/pCi. The total body is considered as an organ in the selection of DFA.
BR	=	The Breathing Rate of the child age group = $3700 \text{ m}^3/\text{year}$
K'	=	A constant unit of conversion - 10 <sup>6</sup> pCi/uCi

taken from Table 4.4-3.

References:

- NUREG-0133, Section 5.2.1.1
  Regulatory Guide 1.109, Table E-5, and Table E-9

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## SECTION 2.0 RADIOACTIVE EFFLUENTS DOSE REDUCTION SPECIFICATIONS

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SYSTEM	SPECIFICATION	DOSE PROJECTION CALCULATION	PROJECTION FREQUENCY	FLOW DIAGRAM
Waste Gas Treatment	2.1-1	2.2-1	M∻	2.3-1
Ventilation Exhaust Treatment	2.1-1	2.2-1	M*	2.3-1
Liquid Radwaste Treatment	2.1-2	2.2-1	M*	2.3-2

### RADWASTE REDUCTION SYSTEMS - DOSE PROJECTION

\* When a Radwaste Reduction System is not available for use.

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#### WASTE REDUCTION SPECIFICATION NO. 2.1-1

The WASTE GAS SYSTEM shall be used, as required, to reduce the radioactivity of materials in gaseous waste prior to discharge, when projected monthly air doses due to releases of gaseous effluents from the site to areas at or beyond the SITE BOUNDARY would exceed:

- 1) 0.2 mrad gamma/month \*
- 2) 0.4 mrad beta/month \*

AND

The VENTILATION EXHAUST TREATMENT SYSTEM shall be used, as required, to reduce the quantity of radioactive materials in gaseous waste prior to discharge, when projected monthly air doses due to release of gaseous effluents from the site to areas at or beyond the SITE BOUNDARY would exceed:

1) 0.3 mrem to any organ/month \*

Doses due to gaseous releases from the site shall be projected at least once per 31 days.

\* The limits of the 10CFR50, Appendix I, paragraph B1 criteria were reduced to 1/4 of the monthly portion of the annual limit as explained in correspondence among AIF, Utilities and the NRC dated December 24, 1981.

References:

- 1) Plant Procedures
- 2) Correspondence C.A. Willis (NRC) to S. Pandy (Franklin Research Center) dated 11/20/81 and AIF letter to AIF subcommittee on RETS dated 12/24/81.

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#### WASTE REDUCTION SPECIFICATION NO. 2.1-2

The LIQUID RADWASTE TREATMENT SYSTEM shall be used, as required, to reduce radioactive materials in liquid wastes prior to their discharge, when projected monthly doses due to liquid effluents discharged to UNRESTRICTED AREAS would exceed the following values:

a. 0.06 mrem whole body/month \*

b. 0.2 mrem to any organ/month \*

Doses due to liquid releases shall be projected at least once per 31 days.

\* The limits of the 10CFR50, Appendix I, paragraph A criteria were reduced to 1/4 of the monthly portion of the annual limit as explained in correspondence among AIF, Utilities and the NRC dated 12/24/81.

#### References:

1) Plant Procedures

2) Correspondence C.A. Willis (NRC) to S. Pandy (Franklin Research Center) dated 11/20/81 and AIF letter to AIF subcommittee on RETS dated 12/24/81.

#### DOSE PROJECTION METHODOLOGY 2.2-1 GASEOUS RADWASTE

#### I. INTRODUCTION

Crystal River Unit 3 operating practices require use of the WASTE GAS SYSTEM (Waste Gas Decay Tanks). The normal release paths for gaseous effluents are via the VENTILATION EXHAUST TREATMENT SYSTEM (HEPA and Charcoal Filters). The operability of the VENTILATION EXHAUST TREATMENT SYSTEM is controlled by Section 2.4 of Part I of the ODCM.

As long as these practices and specifications are maintained, the radwaste reduction requirements of Part I, Section 2 are met, and there is no need to project doses prior to the release of gaseous radwaste.

#### II. <u>CALCULATIONS</u>

Dose projection calculations will be necessary if either system is not available for use.

$$D_{o} = 31D_{o}/NDQ$$

where:

- D = Projected Dose (monthly).
- D = Current quarter cumulative dose, including projection for release under evaluation.
- NDQ = Number of days into quarter, where the quarterly periods are:

January 1 through March 31, April 1 through June 30, July 1 through September 31, October 1 through December 31.

References:

1) FSAR 5.5.1, 5.5.2



#### DOSE PROJECTION METHODOLOGY 2.2-2 LIQUID RADWASTE

#### I. <u>INTRODUCTION</u>

Crystal River Unit 3 operating practices require liquid radwastes (except for Laundry and Shower Sump waste and Secondary Drain Tank waste) to be processed prior to releasing them to the environment.

As long as these practices are maintained the radwaste reduction requirements of Section 2.3 of Part I of the ODCM are met, and there is no need to project doses prior to the release of liquid radwaste.

#### II. <u>CALCULATIONS</u>

Dose projection calculations will be necessary if there is a malfunction of LIQUID RADWASTE TREATEMENT SYSTEM equipment and liquid radwaste must be released without prior treatment.

$$D_p = 31D_c/NDQ$$

where:

D = Projected Dose (monthly).

- D = Current quarter cumulative dose, including projection for release under evaluation.
- NDQ = Number of days into quarter, where the quarterly periods are:

January 1 through March 31, April 1 through June 30, July 1 through September 31, October 1 through December 31.

#### References:

1) ODCM Part I, Section 2.3 and 3.3.

#### TOTAL DOSE SPECIFICATION 2.3 (LIQUID AND GASEOUS RELEASES)

The calendar year dose or dose commitment to any member of the public, due to releases of radioactivity and radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrems to the whole body or any organ, (except the thyroid which shall be limited to less than or equal to 75 mrems).

This specification is satisfied by meeting specifications 4.1-1, 4.1-2, and 4.1-3.

If doses exceed twice the limits of specifications 4.1-1, 4.1-2, and 4.1-3 then an analysis shall be performed to confirm continued compliance with 40CFR190(b).

References:

- 1) ODCM Part I, Section 2.10
- 2) Plant Procedures
- 3) 40 CFR 190

#### EFFLUENT FLOW DIAGRAM - GASEOUS

2.3-1



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# SECTION 3.0

RADIOACTIVE EFFLUENTS SAMPLING SPECIFICATIONS

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## TABLE III

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	<u>RELEAS</u>	<u>E TYPE</u>	
SOURCE OF EFFLUENT			METHOD
	BATCH	CONT.	
Evaporator Condensate Storage Tanks	x		3.1-1
Laundry and Shower Sump Tanks	Х		3.1-1
Secondary Drain Tanks	х	Х	3.1-1, 3.1-2
Plant Condensate		Х	3.1-2
Waste Gas Decay Tanks	Х		3.1-3
Reactor Bldg. Purge Exhaust	Х	Х	3.1-4
Auxiliary Bldg. & Fuel Handling Area Purge Exhaust		X	3.1-4
Reactor Bldg. with Both Personnel and Equipment Hatches Open		X	3.1-5

## GASEOUS AND LIQUID EFFLUENT REPRESENTATIVE SAMPLING
#### Representative Sampling Method No. 3.1-1 (Evaporator Condensate Storage Tanks, Laundry & Shower Sump Tanks, Secondary Drain Tank)

To obtain representative samples from these tanks, the contents of the tank to be sampled will be recirculated through two contained volumes and a grab sample will be collected upon completion. No additions of liquid waste will be made to this tank until completion of the release.

#### Representative Sampling Method No. 3.1-2 (Secondary Drain Tank and/or Plant Condensate)

A representative sample may be obtained via grab sample of the Turbine Building Sump or the Secondary Drain Tank, Plant Condensate, or from the release compositor.

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#### Representative Sampling Method No. 3.1-3 (Waste Gas Decay Tank)

Representative gas, iodine, and particulate samples are drawn from the waste gas decay tank sample lines.

No additions of waste gas is allowed into a tank following sampling until the release has been completed.

#### Representative Sampling Method No. 3.1-4 (Reactor Building & Auxiliary Building & Fuel Handling Area Exhaust)

Representative gas, iodine, particulate and tritium samples are taken from these ducts at the location of the radiation monitors. The sample for the Reactor Building Purge Duct is taken form radiation monitor RM-A6 prior to a purge and is drawn from radiation monitor RM-A1 during a purge. The sample for the Auxiliary Building and Fuel Handling Area Exhaust Duct is drawn from RM-A2 during venting since this is a continuous release pathway.

If samples cannot be obtained from the ducts of the Reactor or Auxiliary Building, samples can be obtained from areas of these buildings that are considered to be representative of the radionuclide concentrations present throughout the respective buildings. Sampling times and volumes should be established to assure the LLD Limits of Sections 1.2 and 4.2 for the radionuclides can be met.

#### Representative Sampling Method No. 3.1-5 (Reactor Building With Personnel And Equipment Hatch Opened)

| The following guidelines do not apply when the Personnel Hatch or Equipment Hatch is closed, or when a structure, such as a wooden door, is used in lieu of either Hatch. By having one of these hatches closed, sustained drafts through the RB are prevented.

#### | Guidelines:

The Reactor Building purge exhaust fans should be operational and the supply fans shut down. If the purge exhaust must be shut down then either the personnel hatch or equipment hatch openings should be closed if operational conditions allow.

Monitor the Reactor Building recirculation system by using RM-A6 or by taking general area air samples.

#### **Other Considerations:**

Run the main purge long enough to assure cleanup of the RB atmosphere.

Degas and depressurize the Reactor Coolant System.

Note: Refuel 16 outage will require an additional opening in the Reactor Building wall to facilitate steam generator replacement. The above guidelines/considerations still apply with the steam generator replacement opening treated as a second equipment hatch.

#### Representative Sampling Method No. 3.1-6 (Reactor Building During Integrated Leak Rate Test)

Due to building overpressure, prepurge samples cannot be taken from RM-A6. Representative gas, iodine, particulate and tritium samples may be obtained from the Intermediate Building containment sampling apparatus or the Post-Accident Sampling System.

Representative gas, iodine, particulate, and tritium samples may also be obtained from RM-A6 prior to pressurizing the RB or RM-A1 samples collected from the prior RB purge permit may be used to generate the ILRT batch release permit if no changes to source term are observed.

Reference: Telecon-FPC (Dan Green, Dan Wilder) to NRC (Charles Willis) dated 03/15/85 at 0930; Subject: Personnel and Equipment Hatch Openings.

### SECTION 4.0

### RADIOACTIVE EFFLUENTS

### DOSE CALCULATIONAL SPECIFICATIONS

### TABLE IV CUMULATIVE DOSE CALCULATION

PATHWAY	DOSE SPECIFICATION	NUCLIDE ANALYSIS	CALCULATION METHODOLOGY	DOSE FACTORS			
Noble Gases	4.1-1	4.2-1, 4.2-2 4.2-3	4.3-1	4.4-1			
Radioiodines, Radioactive Particulates Radionuclides other than Noble Gases	4.1-2	4.2-1, 4.2-2 4.2-3	4.3-2	4.4-2 to 4.4-16			
Liquid Effluents	4.1-3	4.2-4, 4.2-5	4.3-3	4.4-17			

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#### DOSE SPECIFICATION 4.1-1 (NOBLE GASES)

The air dose at or beyond the SITE BOUNDARY due to radioactive noble gases released in gaseous effluents shall be limited as follows:

- 1) During any calendar quarter,  $\leq$  5 mrad gamma, and  $\leq$  10 mrad beta radiation.
- 2) During any calendar year,  $\leq$  10 mrad gamma, and  $\leq$  20 mrad beta radiation.

Cumulative dose contributions for the current calendar quarter and current calendar year shall be determined at least once per 31 days.

References:

1) ODCM Part I, Section 2.8

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#### DOSE SPECIFICATION 4.1-2 (RADIOIODINE & PARTICULATES)

The dose to a MEMBER OF THE PUBLIC from I-131, I-133, Tritium and radioactive particulates with half lives of greater than 8 days in gaseous effluents released from the site to areas at or beyond the SITE BOUNDARY shall be limited as follows:

- 1) During any calendar quarter,  $\leq 7.5$  mrem to any organ.
- 2) During any calendar year,  $\leq 15$  mrem to any organ.

Cumulative dose calculations for the current calendar quarter and current calendar year shall be determined at least once per 31 days.

References:

1) ODCM Part I, Section 2.9

#### DOSE SPECIFICATION 4.1-3 (LIQUID EFFLUENTS)

The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released to UNRESTRICTED AREAS shall be limited as follows:

- 1) During any calendar quarter,  $\leq 1.5$  mrem total body.
- 2) During any calendar quarter,  $\leq$  5 mrem any organ.
- 3) During any calendar year,  $\leq$  3 mrem total body.
- 4) During any calendar year,  $\leq$  10 mrem any organ.

Cumulative dose contributions from liquid effluents shall be determined at least once per 31 days.

#### References:

1) ODCM Part I, Section 2.6

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#### NUCLIDE ANALYSIS 4.2-1 REACTOR BUILDING PURGE EXHAUST

NUCL	IDE	SAMPLE SOURCE	LLD <sup>(b)</sup> (uCi/ml)	
A.	Principal Gamma Er	nitters <sup>(a)</sup>		
	Mn-54 Fe-59 Co-58 Co-60 Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Batch release particulate filter for Batch Releases. Weekly Particulate Filter Analysis for continuous(c) type release.	1×10 <sup>-4</sup> /1×10 <sup>-11</sup>	
	Kr-87 Kr-88 Xe-133 Xe-133m Xe-135 Xe-138	Pre-release grab sample for Batch type release. Weekly grab sample for continuous type release.	1×10 <sup>-4</sup>	
В.	Iodine 131	Batch release charcoal filter for Batch Releases. Weekly charcoal filter for continuous releases.	NA/1 x 10 <sup>-12</sup>	
c.	Tritium	Pre-release Grab Sample.	1x10 <sup>-6</sup>	
D.	Gross Alpha	Monthly Particulate Filter Composite	1×10 <sup>-11</sup>	
E.	Sr-89	Quarterly Particulate Filter Composite	1x10 <sup>-11</sup>	
F.	Sr-90	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	
(a) (b)	Other identified ( dose calculations The first value ro	Gamma Emitters not listed in this table shall efers to the LLD for pre-release grab sample;	be included in the second value	

refers to the LLD for weekly Particulate Filter Analysis.(c) Reactor Building Purge is considered continuous after minimum of one Reactor Building volumes have been released on a continuous basis (i.e., first one volume is a batch type).

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#### NUCLIDE ANALYSIS 4.2-2 AUXILIARY BUILDING AND FUEL HANDLING AREA EXHAUST

NUCI	LIDE	SAMPLE SOURCE	LLD <sup>(b)</sup> (uCi/ml)	;
Α.	Principal Gamma	Emitters <sup>(a)</sup>		-
	Mn-54 Fe-59 Co-58 Co-60 Zn-65	Weekly Particulate Filter Analysis.	1×10-4/1×10-11	
	Mo-99 Cs-134 Cs-137 Ce-141 Ce-144			i
	Kr-87 Kr-88 Xe-133 Xe-133m Xe-135 Xe-138	Monthly Grab Sample.	1×10 <sup>-4</sup>	
Β.	Iodine 131	Weekly Charcoal Filter Analysis.	1x10 <sup>-12</sup>	
c.	Tritium	Monthly Grab Sample.	1×10 <sup>-6</sup>	
D.	Gross Alpha	Monthly Particulate Filter Composite	1×10 <sup>-11</sup>	
E.	Sr-89	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	
F.	Sr-90	Quarterly Particulate Filter Composite	1×10 <sup>-11</sup>	

(a) Other identified Gamma Emitters not listed in this table shall be included in dose calculations.

(b) The first value refers to the LLD for pre-release grab sample; the second value refers to the LLD for weekly Particulate Filter Analysis.

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### NUCLIDE ANALYSIS 4.2-3 WASTE GAS DECAY TANKS

NUCI	_IDE	SAMPLE SOURCE	LLD <sup>(b)</sup> (µCi/ml)
Α.	Principal	Gamma Emitters <sup>(a)</sup>	
	Mn-54 Fe-59 Co-58 Co-60 Zn-65 Mo-99 Cs-134 Cs-137 Ce-141	– Weekly Particulate Filter sample (from RM-A2)	1×10 <sup>-4</sup> /1×10 <sup>-11</sup>
	Ce-144 Kr-87 Kr-88 Xe-133 Xe-133m Xe-135 Xe-138	— Pre-release Grab sample	1×10 <sup>-4</sup>
в.	Iodine 13	31 Weekly Charcoal Filter (from RM-A2)	1×10 <sup>-12</sup>

(a) Other identified Gamma Emitters not listed in this table shall be included in dose and setpoint calculations.

(b) The first value refers to the LLD for pre-release grab sample; the second value refers to the LLD for weekly Particulate Filter Analysis.

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#### NUCLIDE ANALYSIS 4.2-4 EVAPORATOR CONDENSATE STORAGE TANKS, LAUNDRY AND SHOWER SUMP TANKS, SECONDARY DRAIN TANK

NUC		SAMPLE SOURCE	LLD(uCi/ml)
Α.	Principal Gamma	Emitters (a)	
	Mn-54 Fe-59 Co-58 Co-60		:
	Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Pre-release Grab Sample	5x10 <sup>-7</sup>
в.	Iodine 131	Pre-Release Grab Sample	1×10 <sup>-6</sup>
c.	Dissolved and Entrained Noble		
	Gases	Monthly Grab Sample	1×10 <sup>-5</sup>
D.	Tritium	Monthly Composite	1×10 <sup>-5</sup>
Ε.	Gross Alpha	Monthly Composite	1×10 <sup>-7</sup>
F.	Sr-89	Quarterly Composite	5×10 <sup>-8</sup>
G.	Sr-90	Quarterly Composite	5×10 <sup>-8</sup>
Н.	Fe-55	Quarterly Composite	1×10 <sup>-6</sup>

(a) Other identified Gamma Emitters not listed in this table shall be included in dose calculations.

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#### NUCLIDE ANALYSIS 4.2-5 SECONDARY DRAIN TANK AND/OR PLANT CONDENSATE

NUC	LIDE	SAMPLE SOURCE	LLD(uCi/ml)	
Α.	Principal Gamma	Emitters (a)		
	Mn-54 Fe-59 Co-58 Co-60			
	Zn-65 Mo-99 Cs-134 Cs-137 Ce-141 Ce-144	Weekly Composite	5x10-7	
Β.	Iodine 131	Weekly Composite	1×10 <sup>-6</sup>	
c.	Dissolved and Entrained Noble			
	Gases	Monthly Grab Sample	1×10 <sup>-5</sup>	
Đ.	Tritium	Monthly Composite	1×10 <sup>-5</sup>	
Ε.	Gross Alpha	Monthly Composite	1×10 <sup>-7</sup>	
F.	Sr-89	Quarterly Composite	5×10 <sup>-8</sup>	
G.	Sr-90	Quarterly Composite	5×10 <sup>-8</sup>	
Н.	Fe-55	Quarterly Composite	1×10 <sup>-6</sup>	

(a) Other identified Gamma Emitters not listed in this table shall be included in dose calculations.

#### DOSE CALCULATION 4.3-1 (NOBLE GAS)

The air dose at or beyond the SITE BOUNDARY due to noble gases released in gaseous effluents is calculated as follows:

$$\begin{split} D_{\gamma} &= 3.17 \ x \ 10^{-8} \sum \ M_{_{i}}(X/Q) Q_{_{i}} & mrad \\ D_{\beta} &= 3.17 \ x \ 10^{-8} \sum \ N_{_{i}}(X/Q) Q_{_{i}} & mrad \end{split}$$

where:

	$D_{\gamma}$	=	The air dose at or beyond the SITE BOUNDARY due to gamma emissions from noble gases in gaseous effluents in mrad/time period.
	$D_{\beta}$	=	The air dose at or beyond the SITE BOUNDARY due to beta emissions from noble gases in gaseous effluents in mrad/time period.
3.17	x 10 <sup>-8</sup>	=	The number of years in one second, yr/sec.
	M,	=	The air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/year per uCi/m³.
	N,	=	The air dose factor due to beta emissions for each identified noble gas radionuclide, in mrad/year per uCi/m³.
	X/Q	=	The highest calculated annual average relative concentration for areas at or beyond the UNRESTRICTED AREA Boundary, 2.5 x $10^{-6}$ sec/m <sup>3</sup> .
	Q <sub>i</sub>	=	Total $\mu$ Ci of isotope i released during the calendar quarter or calendar year, as appropriate.

#### DOSE CALCULATION 4.3-2 (RADIOIODINES & PARTICULATES)

The dose to an individual at or beyond the SITE BOUNDARY due to I-131, I-133, Tritium and radioactive particulates with half lives of greater than 8 days is calculated as follows:

 $D = 3.17 \times 10^{-8} \sum WR_{i}Q_{i}$  mrem

where:

I	D	=	The radiation dose to an individual at or beyond the UNRESTRICTED AREA BOUNDARY, in mrem.
I	R,	=	The dose factor for each identified radionuclide, i, in m²(mrem/year) per uCi/sec or mrem/year per uCi/m³.
١	W	=	X/Q for inhalation pathway, 2.5 x $10^{-6}$ sec/m <sup>3</sup> the site boundary and 7.5 x $10^{-7}$ sec/m <sup>3</sup> at the critical receptor.
١	W	=	D/Q for food and ground plane pathway, 1.9 x $10^{-8}m^{-2}$ the site boundary and 5.7 x $10^{-9}\ m^{-2}$ at the critical receptor.
(	Q <sub>i</sub>	=	Total $\mu\text{Ci}$ of isotope i released during the calendar quarter or calendar year, as appropriate.
3.17	x 10 <sup>-8</sup>	=	The number of years in one second, yr/sec.

Reference:

NUREG 0133, Section 5.3.1 FSAR, Table 2-20

#### DOSE CALCULATION 4.3-3 (LIQUID EFFLUENTS)

The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released to UNRESTRICTED AREAS is calculated as follows:

$$D = \sum_{i} \left[ A_{ir} \sum_{k} t_{k} C_{ik} F_{k} \right]$$

where:

- D = The cumulative dose commitment to the total body or any organ, T, from the liquid effluents for the total time period  $\Sigma t_k$  in mrem.
- tk = The length of the kth time period over which C<sub>ik</sub> is averaged for all liquid releases, in hours.
- $_{C_{ik}}$  = The average concentration of radionuclide, i, in undiluted liquid effluent during time period t<sub>k</sub> from any liquid release, in  $\mu$ Ci/ml.
- Air = The site related ingestion dose commitment factor to the total body or any organ for each identified principal gamma and beta emitter as shown in Table 4.4-17 of this manual, in mrem-ml per hour-μCi.
- $F_k$  = Waste flow rate / (Waste flow rate + Dilution flow rate)\*

Dilution flow rate is the sum of available circulating water and Nuclear Services and Decay Heat Seawater flow. Units 1 and 2 circulating water flow may be included.

References:

- 1) NUREG 0133, Section 4.3.
- 2) \*Telecon/Meeting Summary with C. Willis (USNRC) dated 01/16/85 regarding  ${\rm F}_{\rm k}$

Nuclide	Ni β-Air * (DFi <sup>β</sup> )	Li β-Skin ** (DFSi)	Mi γ-Air * (DFi <sup>τ</sup> )	Ki γ-Body ** (DFBi)
Kr-83m	2.88E+2		1.93E+1	7.56E-2
KR-85m	1.97E+3	1.46E+3	1.23E+3	1.17E+3
Kr-85	1.95E+3	1.34E+3	1.72E+1	1.61E+1
Kr-87	1.03E+4	9.73E+3	6.17E+3	5.92E+3
Kr-88	2.93E+3	2.37E+3	1.52E+4	1.47E+4
Kr-89	1.06E+4	1.01E+4	1.73E+4	1.66E+4
KR-90	7.83E+3	7.29E+3	1.63E+4	1.56E+4
Xe-131m	1.11E+3	4.76E+2	1.56E+2	9.15E+1
Xe-133m	1.48E+3	9.94E+2	3.27E+2	2.51E+2
Xe-133	1.05E+3	3.06E+2	3.53E+2	2.94E+2
Xe-135m	7.39E+2	7.11E+2	3.36E+3	3.12E+3
Xe-135	2.46E+3	1.86E+3	1.92E+3	1.81E+3
Xe-137	1.27E+4	1.22E+4	1.51E+3	1.42E+3
Xe-138	4.75E+3	4.13E+3	9.21E+3	8.83E+3
Ar-41	3.28E+3	2.69E+3	9.30E+3	8.84E+3

DOSE FACTORS FOR EXPOSURE TO A SEMI-INFINITE CLOUD OF NOBLE GASES

<u>mrad-m</u><sup>3</sup> \* µci-yr

<u>mrem-m</u><sup>3</sup> µCi-yr \*\*

#### References:

- NUREG 0133
  USNRC Regulatory Guide 1.109, Table B-1

#### CALCULATION OF INHALATION PATHWAY DOSE FACTOR (R<sub>i</sub>)

 $R_i = K' (BR)DFA_i$  mrem / year per uCi / m<sup>3</sup>

#### where:

K'	=	A constant unit of conversion - 10 <sup>6</sup> pCi/uCi
BR	=	The Breathing Rate of the represented age group:
		1400 m <sup>3</sup> /yr - infant 3700 m <sup>3</sup> /yr - child 8000 m <sup>3</sup> /yr - teen 8000 m <sup>3</sup> /yr - adult
DFAi	=	The maximum organ inhalation dose factor for the represented age group for the ith radionuclide, in $mrem/pCi$ .

#### References:

- NUREG-0133, Section 5.3.1.1
  Regulatory Guide 1.109, Table E-5, and Tables E-7 through E-10

# Inhalation Dose Factors (R<sub>i</sub>) - Infant

Nuclide	<u>Bone</u>	Liver_	T. Body	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-LLI</u>
H-3	6.47E2	6.47E2	6.47E2	6.47E2	6.47E2	6.47E2	6.47E2
Cr-51	ND	ND	8.95E1	1.32E1	1.32E1	1.28E4	3.57E2
Mn-54	ND	2.53E4	4.98E3	4.98E3	4.98E3	9.95E5	7.06E3
Fe-55	1.97E4	1.17E4	3.33E3	ND	ND	8.69E4	1.09E3
Fe-59	1.36E4	2.35E4	9.48E3	ND	ND	1.02E6	2.48E4
Co-58	ND	1.22E3	1.82E3	ND	ND	7.77E5	1.11E4
Co-60	ND	8.02E3	1.18E4	ND	ND	4.51E6	3.19E4
Ni-63	3.39E5	2.04E4	1.16E4	ND	ND	2.09E5	2.42E3
Zn-65	1.93E4	6.26E4	3.11E4	ND	3.25E4	6.47E5	5.14E4
Rb-86	ND	1.90E5	8.82E4	ND	ND	ND	3.04E3
Sr-89	3.98E5	ND	1.14E4	ND	ND	2.03E6	6.40E4
Sr-90	4.09E7	ND	2.59E6	ND	ND	<b>1.12E7</b>	1.31E5
Y-91	5.88E5	ND	1.57E4	ND	ND	2.45E6	7.07E4
Zr-95	1.15E5	2.79E4	2.03E4	ND	3.11E4	1.75E6	2.17E4
Nb-95	1.57E4	6.43E3	3.78E3	ND	4.72E3	4.79E5	1.27E4
Ru-103	2.02E3	ND	6.79E2	ND	4.24E3	5.52E5	1.61E4
Ru-106	8.68E4	ND	1.09E4	ND	1.07E5	1.16E7	1.64E5
Ag-110m	9.98E3	7.22E3	5.00E3	ND	1.09E4	3.67E6	3.30E4
Te-125m	4.76E3	1.99E3	6.58E2	1.62E3	ND	4.47E5	1.29E4
Te-127m	1.67E4	6.90E3	2.07E3	4.87E3	3.75E4	1.31E6	2.73E4
Te-129m	1.41E4	6.09E3	2.23E3	5.47E3	3.18E4	1.68E6	6.90E4
I-131	3.79E4	4.44E4	1.96E4	1.48E7	5.18E4	ND	1.06E3
Cs- <u>1</u> 34	3.96E5	7.03E5	7.45E4	ND	1.90E5	7.97E4	1.33E3
Cs-136	4.83E4	1.35E5	5.29E4	ND	5.64E4	1.18E4	1.43E3
Cs-137	5.49E5	6.12E5	4.55E4	ND	1.72E5	7.13E4	1.33E3
Ba-140	5.60E4	5.60E1	2.90E3	ND	1.34E1	1.60E6	3.84E4
Ce-141	2.77E4	1.67E4	1.99E3	ND	5.25E3	5.17E5	2.16E4
Ce-144	3.19E6	1.21E6	1.76E5	ND	5.38E5	9.84E6	1.48E5
Pr-143	1.40E4	5.24E3	6.99E2	ND	1.97E3	4.33E5	3.72E4
Nd-147	7.94E3	8.13E3	5,00E2	ND	3.15E3	3.22E5	3.12E4

# Inhalation Dose Factors (R<sub>i</sub>) - Child

<u>Nuclide</u>	<u>Bone</u>	<u>Liver</u>	T. Body	<u>Thyroid</u>	<u>Kidney</u>	Lung_	<u>GI-LLI</u>
H-3	1.12E3	1.12E3	1.12E3	1.12E3	1.12E3	1.12E3	1.12E3
Cr-51	ND	ND	1.54E2	8.55E1	2.43E1	1.70E4	1.08E3
Mn-54	ND	4.29E4	9.51E3	ND	1.00E4	1.58E6	2.29E4
Fe-55	4.74E4	2.52E4	7.77E3	ND	ND	1.11E5	2.87E3
Fe-59	2.07E4	3.34E4	1.67E4	ND	ND	1.27E6	7.07E4
Co-58	ND	1.77E3	3.16E3	ND	ND	1.11E6	3.44E4
Co-60	ND	1.31E4	2.26E4	ND	ND	7.07E6	9.62E4
Ni-63	8.21E5	4.63E4	2.80E4	ND	ND	2.75E5	6.33E3
Zn-65	4.26E4	1.13E5	7.03E4	ND	7.14E4	9.95E5	1.63E4
Rb-86	ND	1.98E5	1.14E5	ND	ND	ND	7.99E3
Sr-89	5.99E5	ND	1.72E4	ND	ND	2.16E6	1.67E5
Sr-90	1.01E8	ND	6.44E6	ND	ND	1.48E7	3.43E5
Y-91	9.14E5	ND	2.44E4	ND	ND	2.63E6	1.84E5
Zr-95	1.90E5	4.18E4	3.70E4	ND	5.96E4	2.23E6	6.11E4
Nb-95	2.35E4	9.18E3	6.55E3	ND	8.62E3	6.14E5	3.70E4
Ru-103	2.79E3	ND	1.07E3	ND	7.03E3	6.62E5	4.48E4
Ru-106	1.36E5	ND	1.69E4	ND	1.84E5	1.43E7	4.29E5
Ag-110m	1.69E4	1.14E4	9.14E3	ND	2.12E4	5.48E6	1.00E5
Te-125m	6.73E3	2.33E3	9.14E2	1.92E3	ND	4.77E5	3.38E4
Te-127m	2.49E4	8.55E3	3.02E3	6.07E3	6.36E4	1.48E6	7.14E4
Te-129m	1.92E4	6.85E3	3.04E3	6.33E3	5.03E4	1.76E6	1.82E5
I-131	4.81E4	4.81E4	2.73E4	1.62E7	7.88E4	ND	2.84E3
Cs-134	6.51E5	1.01E6	2.25E5	ND	3.30E5	1.21E5	3.85E3
Cs-136	6.51E4	1.71E5	1.16E5	ND	9.55E4	1.45E4	4.18E3
Cs-137	9.07E5	8.25E5	1.28E5	ND	2.82E5	1.04E5	3.62E3
Ba-140	7.40E4	6.48E1	4.33E3	ND	2.11E1	1.74E6	1.02E5
Ce-141	3.92E4	1.95E4	2.90E3	ND	8.55E3	5.44E5	5.66E4
Ce-144	6.77E6	2.12E6	3.61E5	ND	<b>1.17E6</b>	1.20E7	3.89E5
Pr-143	1.85E4	5.55E3	9.14E2	ND	3.00E3	4.33E5	9.73E4
Nd-147	1.08E4	8.73E3	6.81E2	ND	4.81E3	3.28E5	8.21E4

# Inhalation Dose Factors (R<sub>i</sub>) - Teen

<u>Nuclide</u>	Bone	Liver	T. Body	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	1.27E3	1.27E3	1.27E3	1.27E3	1.27E3	1.27E3	1.27E3
Cr-51	ND	ND	1.35E2	7.49E1	3.07E1	2.09E4	3.00E3
Mn-54	ND	1.70E0	8.40E3	ND	1.27E4	1.98E6	6.68E4
Fe-55	3.34E4	2.38E4	5.54E3	ND	ND	1.24E5	6.39E3
Fe-59	1.59E4	3.70E4	1.43E4	ND	ND	1.53E6	1.78E5
Co-58	ND	2.07E3	2.78E3	ND	ND	1.34E6	9.52E4
Co-60	ND	1.51E4	1.98E4	ND	ND	8.72E6	2.59E5
Ni-63	5.80E5	4.34E4	1.98E4	ND	ND	3.07E5	1.42E4
Zn-65	3.86E4	1.34E5	6.24E4	ND	8.64E4	1.24E6	4.66E4
Rb-86	ND	1.90E5	8.40E4	ND	ND	ND	1.77E4
Sr-89	4.34E5	ND	1.25E4	ND	ND	2.42E6	3.71E5
Sr-90	1.08E8	ND	6.68E6	ND	ND	1.65E7	7.65E5
Y-91	6.61E5	ND	1.77E4	ND	ND	2.94E6	4.09E5
Zr-95	1.48E5	4.58E4	3.15E4	ND	6.74E4	2.69E6	1.49E5
Nb-95	1.86E4	1.03E4	5.66E3	ND	1.00E4	7.51E5	9.68E4
Ru-103	2.10E3	ND	8.96E3	ND	7.43E3	7.83E5	1.09E5
Ru-106	9.84E4	ND	1.24E4	ND	1.90E5	1.61E7	9.60E5
Ag-110m	1.38E4	1.31E4	7.99E3	ND	2.50E4	6.75E6	2.73E5
Te-125m	4.88E3	2.24E3	6.67E2	1.40E3	ND	5.36E5	7.50E4
Te-127m	1.80E4	8.16E3	2.18E3	4.38E3	6.54E4	1.66E6	1.59E5
Te-129m	1.39E4	6.58E3	2.25E3	4.58E3	5.19E4	1.98E6	4.05E5
I-131	3.54E4	4.91E4	2.64E4	1.46E7	8.40E4	ND	6.49E3
Cs-134	5.02E5	1.13E6	5.49E5	ND	3.75E5	1.46E5	9.76E3
Cs-136	5.15E4	1.94E5	1.37E5	ND	1.10E5	1.78E4	1.09E4
Cs-137	6.70E5	8.48E5	3.11E5	ND	3.04E5	1.21E5	8.48E3
Ba-140	5.47E4	6.70E1	3.52E3	ND	2.28E1	2.03E6	2.29E5
Ce-141	2.84E4	1.90E4	2.17E3	ND	8.88E3	6.14E5	1.26E5
Ce-144	4.89E6	2.02E6	2.62E5	ND	1.21E6	1.34E7	8.64E5
Pr-143	1.34E4	5.31E3	6.62E2	ND	3.09E3	4.83E5	2.14E5
Nd-147	7.86E3	8.56E3	5.13E2	ND	5.02E3	3.72E5	1.82E5

# Inhalation Dose Factors $(R_i)$ - Adult

<u>Nuclide</u>	<u>Bone</u>	<u>Liver</u>	<u>T. Body</u>	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	1.26E3	1.26E3	1.26E3	1.26E3	1.26E3	1.26E3	1.26E3
Cr-51	ND	ND	1.00E2	5.95E1	2.28E1	1.44E4	3.32E3
Mn-54	ND	3.96E4	6.30E3	ND	9.84E3	1.40E6	7.74E4
Fe-55	2.46E4	1.70E4	3.94E3	ND	ND	7.21E4	6.03E3
Fe-59	1.18E4	2.78E4	1.06E4	ND	ND	1.02E6	1.88E5
Co-58	ND	1.58E3	2.07E3	ND	ND	9.28E5	1.06E5
Co-60	ND	1.15E4	1.48E4	ND	ND	5.97E6	2.85E5
Ni-63	4.32E5	3.14E4	1.45E4	ND	ND	1.78E5	1.34E4
Zn-65	3.24E4	1.03E5	4.66E4	ND	6.90E4	8.64E5	5.34E4
Rb-86	ND	1.35E5	5.90E4	ND	ND	ND	1.66E4
Sr-89	3.04E5	ND	8.72E3	ND	ND	1.4E6	3.5E5
Sr-90	9.92E7	ND	6.10E6	ND	ND	9.60E6	7.22E5
Y-91	4.62E5	ND	1.24E4	ND	ND	1.70E6	3.85E5
Zr-95	1.07E5	3.44E4	2.33E4	ND	5.36E4	1.77E6	1.50E5
Nb-95	1.41E4	7.76E3	4.21E3	ND	7.74E3	5.05E5	1.04E5
Ru-103	1.53E3	ND	6.58E2	ND	5.83E3	5.05E5	1.10E5
Ru-106	6.91E4	ND	8.72E3	ND	1.34E5	9.36E6	9.12E5
Ag-110m	1.08E4	1.00E4	5.94E3	ND	1.97E4	4.63E6	3.02E5
Te-125m	3.42E3	1.58E3	4.67E2	1.05E3	1.24E4	3.14E5	7.06E4
Te-127m	1.26E4	5.77E3	1.57E3	3.29E3	4.58E4	9.60E5	1.50E6
Te-129m	9.76E3	4.67E3	1.58E3	3.44E3	3.66E4	1.16E6	3.83E5
I-131	2.52E4	3.58E4	2.05E4	1.19E7	6.13E4	ND	6.28E3
Cs-134	3.73E5	8.48E5	7.28E5	ND	2.87E5	9.76E4	1.04E4
Cs-136	3.90E4	1.46E5	1.10E5	ND	8.56E4	1.20E4	1.17E4
Cs-137	4.78E5	6.21E5	4.28E5	ND	2.22E5	7.52E4	8.40E3
Ba-140	3.90E4	4.90E1	2.57E3	ND	1.67E1	1.27E6	2.18E5
Ce-141	1.99E4	1.35E4	1.53E3	ND	6.26E3	3.62E5	1.20E5
Ce-144	3.43E6	1.43E6	1.84E5	ND	8.48E5	7.78E6	8.16E5
Pr-143	9.36E3	3.75E3	4.64E2	ND	2.16E3	2.81E5	2.00E5
Nd-147	5.27E3	6.10E3	3.65E2	ND	3.56E3	2.21E5	1.73E5

### Calculation of Ingestion Dose Factor Grass-Cow-Milk Pathway

$$R_{i}^{c}[D/Q] = K'\left[\frac{Q_{F}(U_{ap})}{\lambda_{i} + \lambda_{w}}\right]F_{m}(r)(DFL_{i})_{s}\left[\frac{f_{P}f_{s}}{Y_{p}} + \frac{(1 - f_{P}f_{s})e^{-\lambda_{i}t_{h}}}{Y_{s}}\right]e^{-\lambda_{i}t_{h}}$$

where:		Unit = m²mrem/yr per µCi/sec <u>Reference Tab</u>	<u>le R.G. 1.109</u>	
K' =	=	A constant of unit conversion, 10° pCi/Ci.		
QF =	=	The cow's consumption rate, 50 kg/day (wet weight)	E-3	
Uap =	=	The receptor's milk consumption rate for age (a), in liters, yr Infant & Child - 330 Teen - 400 Adult - 310	E-5	
Ys =		The agricultural productivity by unit area of pastu feed grass 0.7 kg/m²	ire E-15	
Ys =	=	The agricultural productivity of unit area of stored feed 2.0 kg/m²	E-15	
Fm =	=	The stable element transfer coefficients, in days/kg	g. E-1	
t =	=	Fraction of deposited activity retained on cow's feed grass 1.0 radioiodine 0.2 particulates	E-15	
tr =	-	Transport time from pasture to receptor, in sec. 1.73x10 <sup>5</sup> sec (2 days)	E-15	
th =	=	Transport time from crop field to receptor, in sec. 7.78x10° sec. (90 days	E-15 s)	
(DFLi)a =	-	The maximum organ ingestion dose factor for the ith radionuclide for the receptor in age group (a), in mrem/pCi	E-11 E-14	to
λι =	=	The decay constant for the ith radionuclide, in sec	-1	
$\lambda_{\mathrm{W}}$ =	-	The decay constant for removal of activity on leaf plant surfaces by weathering $5.73 \times 10^{-7} \text{ sec}^{-1}$ (corresponding to a 14 day half-life).	and E-15	
fp :	=	Fraction of the year that the cow is on pasture (dimensionless) = 1*.		
fs	=	Fraction of the cow feed that is pasture grass while the cow is on pasture (dimensionless) = 1*.		

 $^{*}\ensuremath{\mathsf{Milk}}$  cattle are considered to be fed from two potential sources, pasture grass and stored feeds.

Note: The above equation does <u>not</u> apply to the concentration of tritium in meat. A separate equation is provided in NUREG 0133, section 5.3.1.4 to determine Tritium value.

Reference: The equation for  $R^{\rm c}_{,i}$  (D/Q) was taken from NUREG-0133 Section 5.3.1.3

.

# Ingestion Dose Factors $(R_i^c)$

# Grass-Cow-Milk Pathway (Infant)

<u>Nuclide</u>	Bone	Liver	T. Body	Thyroid	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	2.38E3	2.38E3	2.38E3	2.38E3	2.38E3	2.38E3	2.38E3
Cr-51	ND	ND	1.61E5	1.05E5	2.30E4	2.05E5	4.71E6
Mn-54	ND	3.89E7	8.83E6	ND	8.63E6	ND	1.43E7
Fe-55	1.35E8	8.72E7	2.33E7	ND	ND	4.26E7	1.11E7
Fe-59	2.26E8	3.94E8	1.55E8	ND	ND	1.17E8	1.88E8
Co-58	ND	2.43E7	6.06E7	ND	ND	ND	6.05E7
Co-60	ND	8.81E7	2.08E8	ND	ND	ND	2.10E8
Ni-63	3.49E10	2.16E9	1.21E9	ND	ND	ND	1.07E8
Zn-65	5.55E9	1.90E10	8.78E9	ND	9.24E9	ND	1.61E10
Rb-86	ND	2.23E10	1.10E10	ND	ND	ND	5.70E8
Sr-89	ND	1.45E6	9.98E5	ND	ND	ND	4.93E5
Sr-90	1.22E11	ND	3.10E10	ND	ND	ND	1.52E9
Y-91	7.33E4	ND	1.95E3	ND	ND	ND	5.26E6
Zr-95	6.84E3	1.67E3	1.18E3	ND	1.80E3	ND	8.30E5
Nb-95	5.93E5	2.44E5	1.41E5	ND	1.75E5	ND	2.06E8
Ru-103	8.68E3	ND	2.90E3	ND	1.81E4	ND	1.06E5
Ru-106	1.90E5	ND	2.38E4	ND	2.25E5	ND	1.44E6
Ag-110m	3.86E8	2.82E8	1.87E8	ND	4.03E8	ND	1.46E10
Te-125m	1.51E8	5.04E7	2.04E7	5.07E7	ND	ND	7.18E7
Te-127m	4.21E8	1.40E8	5.10E7	1.22E8	1.04E9	ND	1.70E8
Te-129m	5.60E8	1.92E8	8.62E7	2.15E8	1.40E9	ND	3.34E8
I-131	2.72E9	3.21E9	1.41E9	1.05E12	3.75E9	ND	1.15E8
Cs-134	3.65E10	6.80E10	6.87E9	ND	1.75E10	7.18E9	1.85E8
Cs-136	2.03E9	5.96E9	2.22E9	ND	2.37E9	4.85E8	9.05E7
Cs-137	5.15E10	6.02E10	4.27E9	ND	1.62E10	6.55E9	1.88E8
Ba-140	2.41E8	2.41E5	1.24E7	ND	5.73E4	1.48E5	5.92E7
Ce-141	4.34E4	2.64E4	3.11E3	ND	8.16E3	ND	1.37E7
Ce-144	2.33E6	9.52E5	1.30E5	ND	3.85E5	ND	1.33E8
Pr-143	1.49E3	5.56E2	7.37E1	ND	2.07E2	ND	7.85E5
Nd-147	8.86E2	9.10E2	5.57E1	ND	3.51E2	ND	5.77E5

# **Ingestion Dose Factors (** $R_i^c$ **)**

### Grass-Cow-Milk Pathway (Child)

<u>Nuclide</u>	<u>Bone</u>	Liver	<u>T. Body</u>	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	1.57E3	1.57E3	1.57E3	1.57E3	1.57E3	1.57E3	1.57E3
Cr-51	ND	ND	1.02E5	5.66E4	1.55E4	1.03E5	5.41E6
Mn-54	ND	2.09E7	5.58E6	ND	5.87E6	ND	1.76E7
Fe-55	1.12E8	5.93E7	1.84E7	ND	ND	3.35E7	1.10E7
Fe-59	1.21E8	1.96E8	9.75E7	ND	ND	5.67E7	2.04E8
Co-58	ND	1.21E7	3.72E7	ND	ND	ND	7.08E7
Co-60	ND	4.32E7	1.27E8	ND	ND	ND	2.39E8
Ni-63	2.96E10	1.59E9	1.01E9	ND	ND	ND	1.07E8
Zn-65	4.13E9	1.10E10	6.85E9	ND	6.94E9	ND	1.93E9
Rb-86	ND	8.77E9	5.39E9	ND	ND	ND	5.64E8
Sr-89	6.69E9	ND	1.91E8	ND	ND	ND	2.59E8
Sr-90	1.12E11	ND	2.83E10	ND	ND	ND	1.50E9
Y-91	3.91E4	ND	1.04E3	ND	ND	ND	5.21E6
Zr-95	3.85E3	8.46E2	7.53E2	ND	1.21E3	ND	8.83E5
Nb-95	3.18E5	1.24E5	8.84E4	ND	1.16E5	ND	2.29E8
Ru-103	4.29E3	ND	1.65E3	ND	1.08E4	ND	1.11E5
Ru-106	9.24E4	ND	1.15E4	ND	1.25E5	ND	1.44E6
Pg-110m	2.09E8	1.41E8	1.13E8	ND	2.63E8	ND	1.68E10
Te-125m	7.38E7	2.00E7	9.84E6	2.07E7	ND	ND	7.12E7
Te-127m	2.08E8	5.60E7	2.47E7	4.97E7	5.93E8	ND	1.68E8
Te-129m	3.17E8	8.85E7	4.92E7	1.02E8	9.31E8	ND	3.87E8
I-131	1.30E9	1.31E9	7.46E8	4.34E11	2.15E9	ND	1.17E8
Cs-134	2.26E10	3.71E10	7.84E9	ND	1.15E10	4.13E9	2.00E8
Cs-136	1.04E9	2.85E9	1.84E9	ND	1.52E9	2.26E8	1.00E8
Cs-137	3.22E10	3.09E10	4.55E9	ND	1.01E10	3.62E9	1.93E8
Ba-140	1.17E8	1.03E5	6.84E6	ND	3.34E4	6.12E4	5.94E7
Ce-141	2.19E4	1.09E4	1.62E3	ND	4.78E3	ND	1.36E7
Ce-144	1.62E6	5.09E5	8.66E4	ND	2.82E5	ND	1.33E8
Pr-143	7.19E2	2.16E2	3.57E1	ND	1.17E2	ND	7.76E5
Nd-147	4.47E2	3.62E2	2.80E1	ND	1.99E2	ND	5.73E5

# Ingestion Dose Factors ( $R_i^c$ )

# Grass-Cow-Milk Pathway ( Teen)

<u>Nuclide</u>	Bone	<u>Liver</u>	T. Body	Thyroid	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	9.94E2	9.94E2	9.94E2	9.94E2	9.94E2	9.94E2	9.94E2
Cr-51	ND	ND	5.00E4	2.78E4	1.09E4	7.13E4	8.40E6
Mn-54	ND	1.40E7	2.78E6	ND	4.18E6	ND	2.87E7
Fe-55	4.45E7	3.16E7	7.36E6	ND	ND	2.00E7	1.37E7
Fe-59	5.21E7	1.22E8	4.70E7	ND	ND	3.87E7	2.88E8
Co-58	ND	7.95E6	1.83E7	ND	ND	ND	1.10E8
Co-60	ND	1.64E6	3.70E6	ND	ND	ND	3.14E7
Ni-63	1.82E10	8.35E8	4.01E8	ND	ND	ND	1.33E8
Zn-65	2.11E9	7.32E9	3.41E9	ND	4.68E9	ND	3.10E9
Rb-86	ND	4.73E9	2.22E9	ND	ND	ND	6.99E8
Sr-89	2.70E9	ND	7.73E7	ND	ND	ND	3.22E8
Sr-90	6.61E10	ND	1.63E10	ND	ND	ND	1.86E9
Y-91	1.58E4	ND	4.24E2	ND	ND	ND	6.48E6
Zr-95	1.66E3	5.22E2	3.59E2	ND	7.68E2	ND	1.21E6
Nb-95	1.41E5	7.80E4	4.29E4	ND	7.56E4	ND	3.34E8
Ru-103	1.81E3	ND	7.74E2	ND	6.39E3	ND	1.51E5
Ru-106	3.75E4	ND	4.73E3	ND	7.24E4	ND	1.80E6
Ag-110m	9.64E7	9.12E7	5.55E7	ND	1.74E8	ND	2.56E10
Te-125m	3.00E7	1.08E7	4.02E6	8.39E6	ND	ND	8.86E7
Te-127m	8.44E7	2.99E7	1.00E7	2.01E7	3.42E8	ND	2.10E8
Te-129m	1.11E8	4.11E7	1.75E7	3.57E7	4.63E8	ND	4.16E8
I-131	5.38E8	7.53E8	4.05E8	2.20E11	1.30E9	ND	1.49E8
Cs-134	9.81E9	2.31E10	1.07E10	ND	7.34E9	2.80E9	2.87E8
Cs-136	4.59E8	1.80E9	1.21E9	ND	9.82E8	1.55E8	1.45E8
Cs-137	1.34E10	1.78E10	6.20E9	ND	6.06E9	2.35E9	2.53E8
Ba-140	4.87E7	5.96E4	3.14E6	ND	2.02E4	4.01E4	7.51E7
Ce-141	8.89E3	5.93E3	6.81E2	ND	2.79E3	ND	1.70E7
Ce-144	6.58E5	2.72E5	3.54E4	ND	1.63E5	ND	1.65E8
Pr-143	2.89E2	1.15E2	1.44E1	ND	6.73E1	ND	9.53E5
Nd-147	1.82E2	1.98E2	1.19E1	ND	1.16E2	ND	7.15E5

# Ingestion Dose Factors ( $R_i^c$ )

# Grass-Cow-Milk Pathway (Adult)

<u>Nuclide</u>	<u>Bone</u>	<u>Liver</u>	T. Body	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	2.63E2	7.63E2	7.63E2	7.63E2	7.63E2	7.63E2	7.63E2
Cr-51	ND	ND	2.86E4	1.71E4	6.27E3	3.80E4	7.20E6
Mn-54	ND	8.40E6	1.60E6	ND	2.50E6	ND	2.57E7
Fe-55	2.51E7	1.73E7	4.04E6	ND	ND	9.67E6	9.95E6
Fe-59	2.99E7	7.02E7	2.69E7	ND	ND	1.96E7	2.34E8
Co-58	ND	4.72E6	1.06E7	ND	ND	ND	9.51E7
Co-60	ND	1.64E7	3.62E7	ND	ND	ND	3.08E8
Ni-63	6.73E9	4.66E8	2.27E8	ND	ND	ND	9.73E7
Zn-65	1.37E9	4.37E9	1.97E9	ND	2.92E9	ND	2.75E9
Rb-86	ND	2.59E9	1.21E9	ND	ND	ND	5.11E8
Sr-89	1.47E9	ND	4.21E7	ND	ND	ND	2.35E8
Sr-90	4.69E10	ND	1.15E10	ND	ND	ND	1.35E9
Y-91	8.60E3	ND	2.29E2	ND	ND	ND	4.73E6
Zr-95	1.06E3	3.04E2	2.06E2	ND	4.77E2	ND	9.63E5
Nb-95	5.65E5	2.44E5	9.59E3	ND	2.43E5	ND	1.95E9
Ru-103	1.02E3	ND	4.39E2	ND	3.89E3	ND	1.19E5
Ru-106	2.04E4	ND	2.58E3	ND	3.94E4	ND	1.32E6
Ag-110m	5.83E7	5.39E7	3.20E7	ND	1.06E8	ND	2.20E10
Te-125m	1.63E7	5.90E6	2.18E6	4.90E6	6.63E7	ND	6.50E7
Te-127m	4.58E7	1.64E7	5.58E6	1.17E7	1.86E8	ND	1.54E8
Te-129m	6.05E7	2.26E7	9.58E6	2.08E7	2.53E8	ND	3.05E8
I-131	2.97E8	4.24E8	2.43E8	1.39E11	7.27E8	ND	1.12E8
Cs-134	5.65E9	1.34E10	1.10E10	ND	4.33E9	1.44E9	2.35E8
Cs-136	2.69E8	1.06E9	7.65E8	ND	5.92E8	8.11E7	1.21E8
Cs-137	7.38E9	1.01E10	6.61E9	ND	3.43E9	1.14E9	1.95E8
Ba-140	2.70E7	3.39E4	1.77E6	ND	1.15E4	1.94E4	5.55E7
Ce-141	4.85E3	3.28E3	3.72E2	ND	1.52E3	ND	1.25E7
Ce-144	3.58E5	1.50E5	1.92E4	ND	8.87E4	ND	1.21E8
Pr-143	1.94E2	7.79E1	9.62E0	ND	4.49E1	ND	8.50E5
Nd-147	9.49E1	1.10E2	6.56E0	ND	6.41E1	ND	5.26E5

### Calculation of Ingestion Dose Factor Grass-Cow-Meat Pathway

$\mathbf{R}_{i}^{m}\left[\mathbf{D}/\mathbf{Q}\right] = \mathbf{K}'\left[\frac{\mathbf{Q}_{\mathrm{F}}[\mathbf{U}_{\mathrm{ap}}]}{\lambda_{i} + \lambda_{w}}\right] \mathbf{F}_{\mathrm{f}}(\mathbf{r}) (\mathbf{D}\mathbf{F}\mathbf{L}_{i})_{s} \left[\frac{\mathbf{f}_{\mathrm{p}}\mathbf{f}_{\mathrm{s}}}{\mathbf{Y}_{\mathrm{p}}}\right] + \left[\frac{\left(\mathbf{l} - \mathbf{f}_{\mathrm{p}}\mathbf{f}_{\mathrm{s}}\right) \mathbf{e}^{-\lambda_{i}t_{\mathrm{h}}}}{\mathbf{Y}_{\mathrm{s}}}\right] \mathbf{e}^{-\lambda_{i}}$	†1

where:	Ur	nit = m²mrem/yr per µCi/sec <u>Reference Table R.C</u>	<u>i. 1.109</u>
K'	=	A constant of unit conversion 10 <sup>6</sup> pCi/uCi.	
$\mathbf{Q}_{\mathbf{F}}$	=	The cow's consumption rate, 50 kg/day (wet weight)	E-3
Uap	=	The receptor's meat consumption rate for age (a),	E-5
		Infant - 0 Teen - 65 Child - 41 Adult -110	
Yp	=	The agricultural productivity by unit area of pasture feed grass 0.7 kg/m²	E-15
Ys	=	The agricultural productivity of unit area of stored feed 2.0 kg/m²	E-15
Ff	=	The stable element transfer coefficients, in days/kg.	E-1
r	=	Fraction of deposited activity retained on cow's feed grass 1.0 radioiodine 0.2 particulates	E-15
tr	=	Transport time from pasture to receptor, in sec. 1.73x10 <sup>6</sup> sec (20 days)	E-15
th	=	Transport time from crop field to receptor, in sec. 7.78x10 <sup>6</sup> sec. (90 days)	E-15
(DFLi)a	=	The maximum organ ingestion dose factor for the ith radionuclide for the receptor in age group (a), in mrem/pCi	E-11 to E-14
λı	=	The decay constant for the ith radionuclide, in sec $\cdot$	
дw	=	The decay constant for removal of activity on leaf and plant surfaces by weathering, 5.73 x $10^{-7}$ sec <sup>-1</sup> (corresponding to a 14 day half-life).	E-15
fp	=	Fraction of the year that the cow is on pasture (dimensionless) = 1*.	
fs	=	Fraction of the cow feed that is pasture grass while the cow is on pasture (dimensionless) = 1.	

\*Milk cattle are considered to be fed from two potential sources, pasture grass and stored feeds. Following the development in Regulatory Guide 1.109, the values of  $f_p$  and  $f_s$  will be considered unity, in lieu of site specific information provided in the annual land census report by the licensee.

Note: The above equation does <u>not</u> apply to the concentration of tritium in meat. A separate equation is provided in NUREG 0133, section 5.3.1.4 to determine Tritium value.

Reference: The equation deriving  $R_{i}^{*}$  (D/Q) was taken from NUREG 0133, Section 5.3.1.4.

 $t_{f}$  in NUREG 0133 is equivalent to  $t_{s}$  in R.G. 1.109 Table E-15.

# **Ingestion Dose Factors (** $R_i^m$ **)**

# Grass-Cow-Meat Pathway (Child)

<u>Nuclide</u>	<u>Bone</u>	<u>Liver</u>	T. Body	Thyroid	<u>Kidney</u>	<u>Lung</u>	<u>GI-LLI</u>
H-3	2.34E2	2.34E2	2.34E2	2.34E2	2.34E2	2.34E2	2.34E2
Cr-51	ND	ND	8.82E3	4.89E3	1.34E3	8.93E3	4.68E5
Mn-54	ND	7.99E6	2.13E6	ND	2.24E6	ND	6.70E6
Fe-55	4.57E8	2.42E8	7.50E7	ND	ND	1.37E8	4.49E7
Fe-59	3.81E8	6.16E8	3.07E8	ND	ND	1.79E8	6.42E8
Co-58	ND	1.65E7	5.04E7	ND	ND	ND	9.60E7
Co-60	ND	6.93E7	2.04E8	ND	NÐ	ND	3.84E8
Ni-63	2.91E10	1.56E9	9.91E8	ND	ND	ND	1.05E8
Zn-65	3.76E8	1.00E9	6.22E8	ND	6.30E8	ND	1.76E8
Rb-86	ND	5.77E8	3.55E8	ND	ND	ND	3.71E7
Sr-89	4.92E8	ND	1.40E7	ND	ND	ND	1.90E7
Sr-90	1.04E10	ND	2.64E9	ND	ND	ND	1.40E8
Y-91	1.81E6	ND	4.83E4	ND	ND	ND	2.41E8
Zr-95	2.69E6	5.91E5	5.26E5	ND	8.46E5	ND	6.16E8
Nb-95	3.09E6	1.20E6	8.61E5	ND	1.13E6	ND	2.23E9
Ru-103	1.55E8	ND	5.97E7	ND	3.91E8	ND	4.02E9
Ru-106	4.44E9	ND	5.54E8	ND	5.99E9	ND	6.90E10
Ag-110m	8.41E6	5.68E6	4.54E6	ND	1.06E7	ND	6.76E8
Te-125m	5.69E8	1.54E8	7.59E7	1.60E8	ND	ND	5.49E8
Te-127m	1.77E9	4.78E8	2.11E8	4.24E8	5.06E9	ND	1.44E9
Te-129m	4.78E9	5.05E8	2.81E8	5.83E8	5.31E9	ND	2.21E9
I-131	1.66E7	1.67E7	9.49E6	5.52E9	2.74E7	ND	1.49E6
Cs-134	9.22E8	1.51E9	3.19E8	ND	4.69E8	1.68E8	8.16E6
Cs-136	1.73E7	4.74E7	3.07E7	ND	2.53E7	3.77E6	1.67E6
Cs-137	1.33E9	1.28E9	1.88E8	ND	4.16E8	1.50E8	7.99E6
Ba-140	4.39E7	3.85E4	2.56E6	ND	1.25E4	2.29E4	2.22E7
Ce-141	2.22E4	1.11E4	1.64E3	ND	4.86E3	ND	1.38E7
Ce-144	2.32E6	7.26E5	1.24E5	ND	4.02E5	ND	1.89E8
Pr-143	3.35E4	1.01E4	1.66E3	ND	5.45E3	ND	3.61E7
Nd-147	1.18E4	9.60E3	7.43E2	ND	5.27E3	ND	1.52E7

# **Ingestion Dose Factors (** $R_i^m$ **)**

Grass-Cow-Meat Pathway (Teen)

Nuclide	<u>Bone</u>	<u>Liver</u>	T. Body	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	1.94E2	1.94E2	1.94E2	1.94E2	1.94E2	1.94E2	1.94E2
Cr-51	ND	ND	5.65E3	3.14E3	1.24E3	8.07E3	9.49E5
Mn-54	ND	6.98E6	1.39E6	ND	2.08E6	ND	1.43E7
Fe-55	2.38E8	1.69E8	3.93E7	ND	ND	1.07E8	7.30E7
Fe-59	2.15E8	5.01E8	1.94E8	ND	ND	1.58E8	1.19E9
Co-58	ND	1.41E7	3.25E7	ND	ND	ND	1.94E8
Co-60	ND	5.83E7	1.31E8	ND	ND	ND	7.60E8
Ni-63	1.52E10	1.07E9	5.15E8	ND	ND	ND	1.71E8
Zn-65	2.50E8	8.69E8	4.06E8	ND	5.56E8	ND	3.68E8
Rb-86	ND	4.06E8	1.91E8	ND	ND	ND	6.01E7
Sr-89	2.60E8	ND	7.44E6	ND	ND	ND	3.09E7
Sr-90	8.05E9	ND	1.99E9	ND	ND	ND	2.26E8
Y-91	9.56E5	ND	2.56E4	ND	ND	ND	3.92E8
Zr-95	1.51E6	4.78E5	3.28E5	ND	7.02E5	ND	1.10E9
Nb-95	1.79E6	9.93E5	5.47E5	ND	9.63E5	ND	4.25E9
Ru-103	8.58E7	ND	3.67E7	ND	3.03E8	ND	7.17E9
Ru-106	2.36E9	ND	2.97E8	ND	4.55E9	ND	1.13E11
Ag-110m	5.07E6	4.80E6	2.92E6	ND	9.15E6	ND	1.35E9
Te-125m	3.03E8	1.09E8	4.05E7	8.47E7	ND	ND	8.94E8
Te-127m	9.42E8	3.34E8	1.12E8	2.24E8	3.82E9	ND	2.35E9
Te-129m	9.61E8	3.57E8	1.52E8	3.10E8	4.02E9	ND	3.61E9
I-131	8.97E6	1.26E7	6.75E6	3.66E9	2.16E7	ND	2.48E6
Cs-134	5.23E8	1.23E9	5.71E8	ND	3.91E8	1.49E8	1.53E7
Cs-136	9.96E6	3.92E7	2.63E7	ND	2.13E7	3.36E6	3.15E6
Cs-137	7.24E8	9.63E8	3.36E8	ND	3.28E8	1.27E8	1.37E7
Ba-140	2.39E7	2.93E4	1.54E6	ND	9.94E3	1.97E4	3.69E7
Ce-141	1.18E4	7.88E3	9.05E2	ND	3.71E3	ND	2.25E7
Ce-144	1.23E6	5.08E5	6.60E4	ND	3.04E5	ND	3.09E8
Pr-143	1.76E4	7.03E3	8.76E2	ND	4.09E3	ND	5.79E7
Nd-147	6.32E3	6.87E3	4.12E2	ND	4.04E3	ND	2.48E7

# Ingestion Dose Factors ( $R_i^m$ )

# Grass-Cow-Meat Pathway (Adult)

<u>Nuclide</u>	Bone	Liver	<u>T. Body</u>	<u>Thyroid</u>	<u>Kidney</u>	Lung	GI-LLI
H-3	3.25E2	3.25E2	3.25E2	3.25E2	3.25E2	3.25E2	3.25E2
Cr-51	ND	ND	7.06E3	4.22E3	1.56E3	9.37E3	1.78E6
Mn-54	ND	9.16E6	1.75E6	ND	2.72E6	ND	2.80E7
Fe-55	2.93E8	2.02E8	4.72E7	ND	ND	1.13E8	1.16E8
Fe-59	2.69E8	6.32E8	2.42E8	ND	ND	1.76E8	2.11E9
Co-58	ND	1.83E7	4.10E7	ND	ND	ND	3.70E8
Co-60	ND	7.52E7	1.66E8	ND	ND	ND	1.41E9
Ni-63	1.89E10	1.31E9	6.33E8	ND	ND	ND	2.73E8
Zn-65	3.56E8	1.13E9	5.12E8	ND	7.58E8	ND	7.13E8
Rb-86	ND	4.86E8	2.27E8	ND	ND	ND	9.59E7
Sr-89	3.08E8	ND	8.83E6	ND	ND	ND	4.93E7
Sr-90	1.24E10	ND	3.05E9	ND	ND	ND	3.59E8
Y-91	1.13E6	ND	3.03E4	ND	ND	ND	6.24E8
Zr-95	1.89E6	6.06E5	4.10E5	NÐ	9.51E5	ND	1.92E9
Nb-95	2.29E6	1.28E6	6.86E5	ND	1.26E6	ND	7.74E9
Ru-103	1.05E8	ND	4.54E7	ND	4.02E8	ND	1.23E10
Ru-106	2.80E9	ND	3.54E8	ND	5.40E9	ND	1.81E11
Ag-110m	6.70E6	6.19E6	3.69E6	ND	1.22E7	ND	2.53E9
Te-125m	3.59E8	1.30E8	4.81E7	1.08E8	1.46E9	ND	1.43E9
Te-127m	1.12E9	3.99E8	1.36E8	2.85E8	4.53E9	ND	3.74E9
Te-129m	1.15E9	4.28E8	1.82E8	3.94E8	4.79E9	ND	5.78E9
I-131	1.08E7	1.54E7	8.85E6	5.06E9	2.65E7	ND	4.07E6
Cs-134	6.57E8	1.56E9	1.29E9	ND	5.06E8	1.68E8	2.74E7
Cs-136	1.28E7	5.04E7	3.63E7	ND	2.80E7	3.84E6	5.73E6
Cs-137	8.72E8	1.19E9	7.81E8	ND	4.05E8	1.35E8	2.31E7
Ba-140	2.90E7	3.64E4	1.90E6	ND	1.24E4	2.08E4	5.96E7
Ce-141	1.41E4	9.51E3	1.08E3	ND	4.41E3	ND	3.63E7
Ce-144	1.46E6	6.09E5	7.82E4	ND	3.61E5	ND	4.93E8
Pr-143	2.09E4	8.39E3	1.04E3	ND	4.85E3	ND	9.17E7
Nd-147	7.17E3	8.29E3	4.96E2	ND	4.85E3	ND	3.99E7

# Calculation of Ingestion Dose Factor Vegetation Pathway

$$R_{i}^{v}\left[D/Q\right] = K'\left[\frac{r}{Y_{v}\left(\lambda_{i}+\lambda_{w}\right)}\right]\left(DFL_{i}\right)_{a}\left[U_{a}^{L}f_{L}e^{-\lambda_{i}t_{L}}+U_{a}^{s}f_{g}e^{-\lambda_{i}t_{h}}\right]$$

where:	Unit	ts = m²∙mrem/yr per uCi/sec.	<u>Reference Table, F</u>	<u>R.G. 1.109</u>
K'	=	A constant of unit conversion, 10° pCi/	uCi.	
$U_a^L$	=	The consumption rate of fresh leafy veg	etation by the	E-5
		Infai Chile Teen Adul	nt 0 d 26 42 t 64	
$U_a^s$	=	The consumption rate of stored vegetation	on by the	E-5
		receptor in age group (a), in kg/yr Infa Child Teen Adul	nt 0 d 520 630 t 520	
(DFLi)a	=	The maximum organ ingesting dose factor radionuclide for the receptor in age gr in mrem/pCi.	for the ith E-1 roup (a),	.1 to E-14
fL	=	The fraction of the annual intake of fr vegetation grown locally. (default 1.0)	E-15	
fg	=	The fraction of the annual intake of st grown locally. (default 0.76)	E-15	
tı.	=	The average time between harvest of lea and its consumption, 8.6 x 10 <sup>4</sup> seconds (	E-15	
th	=	The average time between harvest of sto and its consumption, 5.18 x 10° seconds	E-15	
Yv	=	The vegetation areal density, 2.0 kg/m <sup>2</sup>		E-15
r	=	Fraction of deposited activity retained	on the	E-15
		1.0 0.2	radioiodine particulates	
λi	=	The decay constant for the ith radionuc	lide, in sec <sup>-1</sup>	
λw	=	The decay constant for removal of activ plant surfaces by weathering, 5.73 x 10 (corresponding to a 14 day half-life).	ity on leaf and <sup>-7</sup> sec <sup>-1</sup>	E-15

- Note: The above equation does <u>not</u> apply to the concentrations of tritium in vegetation. A separate equation is provided in NUREG 0133, section 5.3.1.5 to determine tritium values.
- Reference: The equation deriving  $R_i^v$  (D/Q) was taken from NUREG 0133, Section 5.3.1.5.



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# Ingestion Dose Factors ( $R_i^v$ )

# Vegetation Pathway (Child)

<u>Nuclide</u>	Bone	Liver	<u>T. Body</u>	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	4.01E3	4.01E3	4.01E3	4.01E3	4.01E3	4.01E3	4.01E3
Cr-51	ND	ND	1.18E5	6.54E4	1.79E4	1.19E5	6.25E6
Mn-54	ND	6.61E8	1.76E8	NÐ	1.85E8	ND	5.55E8
Fe-55	8.00E8	4.24E8	1.31E8	ND	ND	2.40E8	7.86E7
Fe-59	4.07E8	6.58E8	3.28E8	ND	ND	1.91E8	6.85E8
Co-58	ND	6.47E7	1.98E8	ND	ND	ND	3.77E8
Co-60	ND	3.78E8	1.12E9	ND	ND	ND	2.10E9
Ni-63	3.95E10	2.11E9	1.34E9	ND	ND	ND	1.42E8
Zn-65	8.13E8	2.17E9	1.35E9	ND	1.36E9	ND	3.80E8
Rb-86	ND	4.52E8	2.78E8	ND	ND	ND	2.91E7
Sr-89	3.74E10	ND	1.07E9	ND	ND	ND	1.45E9
Sr-90	1.24E12	ND	3.15E11	ND	ND	ND	1.67E10
Y-91	1.87E7	ND	5.01E5	ND	ND	ND	2.49E9
Zr-95	3.92E6	8.63E5	7.68E5	ND	1.23E6	ND	9.00E8
Nb-95	4.10E5	1.60E5	1.14E5	ND	1.50E5	ND	2.95E8
Ru-103	1.54E7	ND	5.92E6	ND	3.88E7	ND	3.98E8
Ru-106	7.45E8	ND	9.30E7	ND	1.01E9	ND	1.16E10
Ag-110m	3.23E7	2.18E7	1.74E7	ND	4.06E7	ND	2.59E9
Te-125m	3.51E8	9.50E7	4.67E7	9.84E7	ND	ND	3.38E8
Te-127m	1.32E9	3.56E8	1.57E8	3.16E8	1.94E9	ND	1.07E9
Te-129m	8.58E8	2.40E8	1.33E8	2.77E8	2.52E9	ND	1.05E9
I-131	1.43E8	1.44E8	8.18E7	4.76E10	2.36E8	ND	1.28E7
Cs-134	1.60E10	2.63E10	5.55E9	ND	8.15E9	2.92E9	1.42E8
Cs-136	4.44E8	1.22E9	7.90E8	ND	6.50E8	9.69E7	4.29E7
Cs-137	2.39E10	2.29E10	3.38E9	ND	7.46E9	2.68E9	1.43E8
Ba-140	2.77E8	2.43E5	1.62E7	ND	7.91E4	1.45E5	1.40E8
Ce-141	6.56E5	3.27E5	4.86E4	NÐ	1.43E5	ND	4.08E8
Ce-144	1.27E8	3.98E7	6.78E6	ND	2.21E7	ND	1.04E10
Pr-143	1.46E5	4.39E4	7.26E3	ND	2.38E4	ND	1.58E8
Nd-147	7.23E4	5.86E4	4.54E3	ND	5.47E1	ND	9.28E7

# **Ingestion Dose Factors (R\_i^v)**

# Vegetation Pathway (Teen)

<u>Nuclide</u>	Bone	Liver	T. Body	<u>Thyroid</u>	<u>Kidney</u>	Lung	<u>GI-LLI</u>
H-3	4.10E3	4.10E3	4.10E3	4.10E3	4.10E3	4.10E3	4.10E3
P-32	1.60E9	9.91E7	6.20E7	ND	ND	ND	1.34E8
Cr-51	ND	ND	6.19E4	3.44E4	1.36E4	8.84E4	1.04E7
Mn-54	ND	4.52E8	8.97E7	ND	1.35E8	ND	9.27E8
Fe-55	3.25E8	2.31E8	5.38E7	ND	ND	1.46E8	9.98E7
Fe-59	1.83E8	4.28E8	1.65E8	ND	ND	1.35E8	1.01E9
Co-58	ND	4.38E7	1.01E8	ND	ND	ND	6.04E8
Co-60	ND	2.49E8	5.60E8	ND	ND	ND	3.24E9
Ni-63	1.61E10	1.13E9	5.44E8	ND	ND	ND	1.81E8
Zn-65	4.24E8	1.47E9	6.87E8	ND	9.43E8	ND	6.24E8
Rb-86	ND	2.73E8	1.28E8	ND	ND	ND	4.04E7
Sr-89	1.57E10	ND	4.50E8	ND	ND	ND	1.87E9
Sr-90	7.51E11	ND	1.85E11	ND	ND	ND	2.11E10
Y-91	7.87E6	ND	2.11E5	ND	ND	ND	3.23E9
Zr-95	1.75E6	5.52E5	3.80E5	ND	8.12E5	ND	1.27E9
Nb-95	1.92E5	1.06E5	5.85E4	ND	1.03E5	ND	4.54E8
Ru-103	6.85E6	ND	2.93E6	ND	2.41E7	ND	5.72E8
Ru-106	3.09E8	ND	3.90E7	ND	5.97E8	ND	1.48E10
Ag-110m	1.52E7	1.44E7	8.76E6	ND	2.75E7	ND	4.04E9
Te-125m	1.48E8	5.34E7	1.98E7	4.14E7	ND	ND	4.37E8
Te-127m	5.52E8	1.96E8	6.56E7	1.31E8	2.24E9	ND	1.37E9
Te-129m	3.69E8	1.37E8	5.84E7	1.19E8	1.54E9	ND	1.39E9
I-131	7.70E7	1.08E8	5.79E7	3.15E10	1.86E8	ND	2.13E7
Cs-134	7.10E9	1.67E10	7.75E9	ND	5.31E9	2.03E9	2.08E8
Cs-136	4.65E7	1.83E8	1.23E8	ND	9.96E7	1.57E7	1.47E7
Cs-137	1.01E10	1.35E10	4.69E9	ND	4.59E9	1.78E9	1.92E8
Ba-140	1.39E8	1.71E5	8.97E6	ND	5.78E4	1.15E5	2.15E8
Ce-141	2.83E5	1.89E5	2.17E4	ND	8.90E4	ND	5.41E8
Ce-144	5.27E7	2.18E7	2.82E6	ND	1.30E7	ND	1.33E10
Pr-143	6.99E4	2.79E4	3.48E3	ND	1.62E4	ND	2.30E8
Nd-147	3.66E4	3.98E4	2.39E3	ND	2.34E4	ND	1.44E8
# TABLE 4.4-15

# Ingestion Dose Factors ( $R_i^v$ )

# Vegetation Pathway (Adult)

<u>Nuclide</u>	<u>Bone</u>	<u>Liver</u>	T. Body	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-LLI</u>
H-3	5.11E3	5.11E3	5.11E3	5.11E3	5.11E3	5.11E3	5.11E3
Cr-51	ND	ND	4.66E4	2.79E4	1.03E4	6.18E4	1.17E7
Mn-54	ND	3.11E8	5.94E7	ND	9.27E7	ND	9.54E8
Fe-55	2.09E8	1.45E8	3.37E7	ND	ND	8.06E7	8.29E7
Fe-59	1.29E8	3.02E8	1.16E8	ND	ND	8.45E7	1.01E9
Co-58	ND	3.09E7	6.92E7	ND	ND	ND	6.26E8
Co-60	ND	1.67E8	3.69E8	ND	ND	ND	3.14E9
Ni-63	1.04E10	7.21E8	3.49E8	ND	ND	ND	1.50E8
Zn-65	3.18E8	1.01E9	4.57E8	ND	6.76E8	ND	6.37E8
Rb-86	ND	2.19E8	1.02E8	ND	ND	ND	4.32E7
Sr-89	1.03E10	ND	2.96E8	ND	ND	ND	1.65E9
Sr-90	6.05E11	ND	1.48E11	ND	ND	ND	1.75E10
Y-91	5.13E6	ND	1.37E5	ND	ND	ND	2.82E9
Zr-95	1.19E6	3.83E5	2.59E5	ND	6.00E5	ND	1.21E9
Nb-95	1.42E5	7.90E4	4.24E4	ND	7.81E4	ND	4.79E8
Ru-103	4.79E6	ND	2.06E6	ND	1.83E7	ND	5.59E8
Ru-106	1.93E8	ND	2.44E7	ND	3.72E8	ND	1.25E10
Ag-110m	1.06E7	9.78E6	5.81E6	ND	1.92E7	ND	3.99E9
Te-125m	9.66E7	3.50E7	1.29E7	2.90E7	3.93E8	ND	3.86E8
Te-127m	3.49E8	1.25E8	4.26E7	8.93E7	1.42E9	ND	1.17E9
Te-129m	2.56E8	9.55E7	4.05E7	8.79E7	1.07E9	ND	1.29E9
I-131	8.09E7	1.16E8	6.63E7	3.79E10	1.98E8	ND	3.05E7
Cs-134	4.66E9	1.11E10	9.07E9	ND	3.59E9	1.19E9	1.94E8
Cs-136	4.47E7	1.77E8	1.27E8	ND	9.82E7	1.35E7	2.01E7
Cs-137	6.36E9	8.70E9	5.70E9	ND	2.95E9	9.81E8	1.68E8
Ba-140	1.29E8	1.62E5	8.47E6	ND	5.52E4	9.29E4	2.66E8
Ce-141	1.97E5	1.33E5	1.51E4	ND	6.20E4	ND	5.10E8
Ce-144	3.29E7	1.37E7	1.77E6	ND	8.15E6	ND	1.11E10
Pr-143	6.25E4	2.51E4	3.10E3	ND	1.45E4	ND	2.74E8
Nd-147	3.36E4	3.89E4	2.33E3	ND	2.27E4	ND	1.87E8

## Calculation of Dose Factors

in the Ground Plane Pathway ( $R_i^G$  [D/Q])

$$R_{i}^{G}[D/Q] = K'K''(SF)(DFG_{i})\left[\left(1 - e^{-\lambda i t}\right)/\lambda_{i}\right]$$

units = m<sup>2</sup> mrem/yr per uCi/sec

where:

Reference Table,R.G.1.109

K'	=	A constant unit of conversion, 10° pCi/µCi.	
К″	=	A constant unit of conversion, 8760 hr/yr	
SF	=	The shielding factor, 0.7(dimensionless)	E-15
λi	=	The decay constant for the ith radionuclide, sec $^{-1}$	
t	=	The exposure period, 4.73 x 10 <sup>®</sup> sec (15 years)	
DFGi	=	The ground plane dose conversion factor for the	
2101		ith radionuclide (mrem/hr per pCi/m²)	E-6

Reference: The equation deriving  $R_i^G$  [D/Q] was taken from NUREG 0133, Section 5.3.1.2.

Dose Factors Ground Plane Pathway ( $R_i^G$  [D/Q])

	<u>T. Body</u>	<u>Skin</u>
Cr-51	4.65E6	5.5E6
Mn-54	1.39E9	1.63E9
Fe-55	0	0
Fe-59	2.73E8	3.21E8
Co-58	3.79E8	4.44E8
Co-60	2.15E10	2.53E10
Ni-63	0	0
Zn-65	7.47E8	8.57E8
Rb-86	8.98E6	1.02E7
Sr-89	2.17E4	2.52E4
Y-91	1.07E6	1.21E6
Zr-95	2.45E8	2.84E8
Nb-95	1.41E7	1.66E7
Ru-106	4.22E8	5.07E8
Ag-110m	3.44E9	4.02E9
Te-125m	1.55E6	2.13E6
Te-127m	9.17E4	1.08E5
Te-129m	1.98E7	2.31E7
I-131	1.72E7	2.08E7
Cs-134	6.85E9	8.0E9
Cs-136	1.51E8	1.72E8
Cs-137	1.03E10	1.20E10
Ba-140	2.06E7	2.35E7
Ce-141	1.37E7	1.54E7
Ce-144	6.95E7	8.05E7
Pr-143	0	0
Nd-147	8.40E6	1.01E7

Units are m²·mrem/yr per  $\mu Ci/sec$ 

#### CALCULATION OF LIQUID EFFLUENT ADULT INGESTION DOSE FACTORS

Air = 1.14E5 (21BFi+5Bli)DFi

- Air = Composite dose parameter for the total body or critical organ of an adult for nuclide i, for all appropriate pathways, mrem/hr per µi/ml
- 1.14E5 = units conversion factor, 10<sup>6</sup>pci/µci x 10<sup>3</sup> ml/kg ÷ 8760 hr/yr
- BF: = Bioaccumulation factor for nuclide i, in fish, pCi/kg per pCi/L, from Table A-1 of Regulatory Guide 1.109 (Rev. 1) or Table A-8 of Regulatory Guide 1.109 (original draft).
- Bli = Bioaccumulation factor for nuclide i, in invertebrates, pCi/kg per pCi/L, from Table A-1 of Regulatory Guide 1.109 (Rev. 1) or Table A-8 of Regulatory Guide 1.109 (original draft).
- DFi = Dose conversion factor for nuclide i, for adults in pre-selected organ τ, in mrem/pCi, from Table E-11 or Regulatory Guide 1.109 (Rev. 1) or Table A-3 of Regulatory Guide 1.109 (original draft).

Reference: The equation for Saltwater sites from NUREG 0133, Section 4.3.1, where  $U_W/D_W = 0$  since no drinking water pathway exists.

# Liquid Effluent - Adult Ingestion Dose Factors ( $A_{i\tau}$ )

<u>Nuclide</u>	Bone	Liver	T. Body	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-LLI</u>
H-3	2.82E-1	2.82E-1	2.82E-1	2.82E-1	2.82E-1	2.82E-1	2.82E-1
Na-24	4.57E-1	4.57E-1	4.57E-1	4.57E-1	4.57E-1	4.57E-1	4.57E-1
Cr-51	ND	ND	5.58EO	3.34E0	1.23E0	7.40E0	1.40E3
Mn-54	ND	7.06E3	1.35E3	ND	2.10E3	ND	2.16E4
Mn-56	ND	1.78E2	3.15E1	ND	2.26E2	ND	5.67E3
Fe-55	5.11E4	3.53E4	8.23E3	ND	ND	1.97E4	2.03E4
Fe-59	8.06E4	1.90E5	7.27E4	ND	ND	5.30E4	6.32E5
Co-58	ND	6.03E2	1.35E3	ND	ND	ND	1.22E4
Co-60	ND	1.73E3	3.82E3	ND	ND	ND	3.25E4
Ni-63	4.96E4	3.44E3	1.67E3	ND	ND	ND	7.18E2
Ni-65	2.02E2	3.31E1	1.20E1	ND	ND	ND	6.65E2
Cu-64	ND	2.14E2	1.01E2	ND	5.40E2	ND	1.83E4
Zn-65	1.61E5	5.13E5	2.32E5	ND	3.43E5	ND	3.23E5
Zn-69	3.43E2	6.56E2	4.56E1	ND	4.26E2	ND	9.85E1
Br-83	ND	ND	7.25E-2	ND	ND	ND	1.04E-1
Br-84	ND	ND	9.39E-2	ND	ND	ND	7.37E-7
Br-85	ND	ND	3.86E-3	ND	ND	ND	LE-18
Rb-86	ND	6.24E2	2.91E2	ND	ND	ND	1.23E2
Rb-88	ND	1.79E0	9.49E-1	ND	ND	ND	2.47E-11
Rb-89	ND	1.19E0	8.34E-1	ND	ND	ND	6.89E-14
Sr-89	4.99E3	ND	1.43E2	ND	ND	ND	8.00E2
Sr-90	1.23E5	ND	3.01E4	ND	ND	ND	3.55E3
Sr-91	9.18E1	ND	3.71E0	ND	ND	ND	4.37E2
Sr-92	3.48E1	ND	1.51E0	ND	ND	ND	6.90E2
Y-90	6.06E0	ND	1.63E-1	ND	ND	ND	6.42E4
Y-91m	5.73E-2	ND	2.22E-3	ND	ND	ND	1.68E-1
Y-91	8.88E1	ND	2.37E0	ND	ND	ND	4.89E4
Y-92	5.32E-1	ND	1.56E-2	ND	ND	ND	9.32E3
Y-93	1.69E0	ND	4.66E-2	ND	ND	ND	5.35E4
Zr-95	1.59E1	5.11EO	3.46E0	ND	8.02E0	ND	1.62E4
Zr-97	8.81E-1	1.78E-1	8.13E-2	ND	2.68E-1	ND	5.51E4

# Liquid Effluent - Adult Ingestion Dose Factors (A $_{i\tau}$ )

<u>Nuclide</u>	Bone	<u>Liver</u>	T. Body	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-LLI</u>
Nb-95	4.47E2	2.49E2	1.34E2	ND	2.46E2	ND	1.51E6
Mo-99	ND	9.05E-4	1.72E-4	ND	2.05E-3	ND	2.10E-3
Tc-99m	1.30E-2	3.66E-2	4.66E-1	ND	5.56E-1	1.79E-2	2.17E1
Tc-101	1.33E-2	1.92E-2	1.88E-1	ND	3.46E-1	9.81E-3	5.77E-14
Ru-103	1.07E2	ND	4.60E1	ND .	4.07E2	ND	1.25E4
Ru-105	8.89E0	ND	3.51E0	ND	1.15E2	ND	5.44E3
Ru-106	1.59E3	ND	2.01E2	ND	3.06E3	ND	1.03E5
Ag-110m	1.57E3	1.45E3	1.33E1	ND	2.85E3	ND	5.91E5
Sb-124	2.77E2	5.23E0	1.09E2	6.70E1	ND	2.15E2	7.83E3
Sb-125	2.20E2	2.37E0	4.42E1	1.95E1	ND	2.30E4	1.94E4
Sb-126	1.13E2	2.31E0	4.09E1	6.95E1	ND	6.95E1	9.27E3
Te-125m	2.17E2	7.86E1	2.91E1	6.52E1	8.82E2	ND	8.66E2
Te-127m	5.48E2	1.96E2	6.68E1	1.40E2	2.23E3	ND	1.84E3
Te-127	8.90E0	3.20E0	1.93E0	6.60E0	3.63E1	ND	7.03E2
Te-129m	9.31E2	3.47E2	1.47E2	3.20E2	3.89E3	ND	4.69E3
Te-129	2.54E0	9.55E-1	6.19E-1	1.95E0	1.07E1	ND	1.92E0
Te-131m	1.40E2	6.85E1	5.71E1	1.08E2	6.94E2	ND	6.80E3
Te-131	1.59E0	6.66E-1	5.03E-1	1.31E0	6.99E0	ND	2.26E-1
Te-132	2.04E2	1.32E2	1.24E2	1.46E2	1.27E3	ND	6.24E3
I-130	3.96E1	1.17E2	4.61E1	9.91E3	1.82E2	ND	1.01E2
I-131	2.18E2	3.12E2	1.79E2	1.02E5	5.35E2	ND	8.23E1
I-132	1.06E1	2.85E1	9.96E0	9.96E2	4.54E1	ND	5.35EO
I-133	7.54E1	1.30E2	3.95E1	1.90E4	2.26E2	ND	1.16E2
I-134	5.56EO	1.51E1	5.40E0	2.62E2	2.40E1	ND	1.32E-2
I-135	2.32E1	6.08E1	2.24E1	4.01E3	9.75E1	ND	6.87E1
Cs-134	6.84E3	1.63E4	1.33E4	ND	5.27E3	1.75E3	2.85E2
Cs-136	7.16E2	2.83E3	2.04E3	ND	1.57E3	2.16E2	3.21E2
Cs-137	8.78E3	1.20E4	7.85E3	ND	4.07E3	1.35E3	2.32E2
Cs-138	6.07E0	1.20E1	5.94E0	ND	8.81E0	8.70E-1	5.12E-5
Ba-139	7.85E0	5.59E-3	2.30E-1	ND	5.23E-3	3.17E-3	1.39E1
Ba-140	1.64E3	2.06E0	1.08E2	ND	7.02E-1	1.18E0	3.38E3
Ba-141	3.81E0	3.69E-3	1.29E-1	ND	2.68E-3	1.63E-3	1.80E-9
Ba-142	1.72E0	1.77E-3	1.08E-1	ND	1.50E-3	1.00E-3	2.43E-18
La-140	1.57E0	7.94E-1	2.10E-1	ND	ND	ND	5.83E4
La-142	8.06E-2	3.67E-2	9.13E-3	ND	ND	ND	2.68E2

<u>Nuclide</u>	<u>Bone</u>	<u>Liver</u>	<u>T. Body</u>	<u>Thyroid</u>	<u>Kidney</u>	<u>Lung</u>	<u>GI-LLI</u>
Ce-141	3.43E0	2.32E0	2.63E-1	ND	1.08E0	ND	8.86E3
Ce-143	6.04E-1	4.46E2	4.94E-2	ND	1.97E-1	ND	1.67E4
Ce-144	1.79E2	7.47E1	9.59E0	ND	4.43E1	ND	6.04E4
Pr-143	5.79E0	2.32E0	2.87E-7	ND	1.34E0	ND	2.54E4
Pr-144	1.90E-2	7.87E-3	9.64E-4	ND	4.44E-3	ND	2.73E-9
Nd-147	3.96E0	4.58E0	2.74E-1	ND	2.68E0	ND	2.20E4
W-187	9.16E0	7.66E0	2.68E0	ND	ND	ND	2.51E3
Np-239	3.53E-2	3.47E-3	1.91E-3	ND	1.08E-2	Nd	7.11E2

# Liquid Effluent - Adult Ingestion Dose Factors $(A_{i\tau})$

SECTION 5.0

ENVIRONMENTAL MONITORING

### Table 5.1-1

#### Environmental Radiological Monitoring Station's Locations

STATION	LOCATION	DIRECTION FROM PLANT	APPROX. DISTANCE FROM PLANT (mi)
C04	State Park Old Dam on River near road intersection	ENE	10.6
C07	Crystal River Public Water Plant	ESE	7.4
C09	Fort Island Gulf Beach	S	3.2
C10	Indian Waters Public Water Supply	ESE	6.0
C13	Mouth of Intake Canal	WSW	4.6
C14H	Head of Discharge Canal	N	0.1
C14M	Midpoint of Discharge Canal	W	1.2
C14G	Discharge Canal at Gulf of Mexico	W	2.5
C18	Yankeetown City Well	N	5.3
C19	NW Corner State Roads 488 & 495	ENE	9.6
C29	Discharge Area	W	2.0
C30	Intake Area	WSW	3.4
C40	Near E. Site Boundary & well pump station CR-South #5	Е	3.6
C41	Onsite meteorological tower	SW	0.4
C46	North Pump Station	Ν	0.4
C47	Office of Radiation Control, Orlando	ESE	78
C48A <sup>1</sup>	Onsite North of CR 4 & 5	Ν	0.4
C48B1	Onsite NNE of CR 4 & 5	NNE	0.9

NOTE: Distances are approximate. More than one type of sample media(e.g. air and water) are obtained at some stations. For multi-media stations there may be minor difference in distance for each type of sample. <sup>1</sup>If vegetation is not available, then select another suitable nearby location. The ENE sector is also an acceptable sector based on D/Q values.

4.

OFF-SITE DOSE CALCULATION MANUAL

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# Table 5.1-2

#### Environmental Radiological Monitoring Station's Locations-Groundwater Monitoring Wells

STATION	LOCATION	DIRECTION FROM PLANT	APPROX. DISTANCE FROM PLANT(mi)
CR3-2	CR-3 Site Perimeter, Just Outside of Protected Area Fence	E	0.1
CR3-4	CR-3 Site Perimeter, Just Outside of Protected Area Fence	SSE	0.086
CR3-5	CR-3 Site Perimeter, Just Outside of Protected Area Fence	SSW	0.051
CR3-6S	CR-3 Site Perimeter, Just Outside of Protected Area Fence	W	0.038
CR3-6D	CR-3 Site Perimeter, Just Outside of Protected Area Fence	W	0.038
CR3-7	CR-3 Site Perimeter, Just Outside of Protected Area Fence	WNW	0.060
CR3-8	CR-3 Site Perimeter, Just Outside of Protected Area Fence	WNW	0.073
CR3-9	CR-3 Site Perimeter, Just Outside of Protected Area Fence	NW	0.1
CR3-10	CR-3 Site Perimeter, Just Outside of Protected Area Fence	NNE	0.1

The above listed wells have been included in the REMP as a result of information provided in the groundwater flow study completed January 22, 2007 by EnHydro, LLC.

# TABLE 5.1-3

# RING TLDs (INNER RING)

LOCATION	DIRECTION	<u>APPROX. DISTANCE (Mi.)</u>
C27	W	0.4
C60	Ν	0.9
C61	NNE	0.9
C62	NE	1.2
C63	ENE	0.9
C64	E	0.8
C65	ESE	0.3
C66	SE	0.4
C67	SSE	0.3
C68	S	0.3
C69	SSW	0.3
C41	SW	0.4
C70	WSW	0.7
C71	WNW	0.6
C72	NW	0.3
C73	NNW	0.7

## TABLE 5.1-4

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## RING TLDs (5 MILE RING)

LOCATION	DIRECTION	APPROX. DISTANCE (Mi.)
C18	Ν	5.3
C03	NNE	4.9
C04	NE	6.0
C74	ENE	5.1
C75	E	4.0
C76	ESE	5.6
C08	SE	5.7
C77	SSE	3.4
C09	S	3.2
C78	WSW	4.6
C14G	W	2.5
C01	NW	4.8
C79	NNW	5.0





Environmental Monitoring Sample Station Locations



# Environmental Monitoring TLD Locations





# Environmental Monitoring TLD Locations

# (5 mile)



FIGURE 5.4 SECTION 6.0

CR3 Groundwater Monitoring Well Locations Deep Wells Are Also Installed at #'s 1, 3, 6



Wells # 1 & 3 are not routinely sampled by the REMP

OFF-SITE DOSE CALCULATION MANUAL

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#### 6.1 ORIGIN AND PURPOSE OF THE OFFSITE DOSE CALCULATIONAL MANUAL

The Offsite Dose Calculation manual was developed to support the implementation of the Radiological Effluent Technical Specifications required by 10 CFR 50, Appendix I, and 10 CFR 50.36. The purpose of the manual is to provide the NRC with sufficient information relative to effluent monitor setpoint calculations, effluent related dose calculations, and environmental monitoring to demonstrate compliance with radiological effluent controls.

#### 6.2 CHANGES

The ODCM shall be changed in accordance with Technical Specifications (ref. ITS 5.6.2.3). In addition, interdepartmental reviews shall be performed as appropriate.

#### 6.3 <u>REVIEW</u>

The ODCM and its implementation shall be reviewed every 24 months (ref. FSAR 1.7.1.18)

This section moved to section 1.

#### 6.5 RADIOACTIVE EFFLUENT RELEASE REPORT

This report is submitted as required by Technical Specification 5.7.1.1.c to Crystal River Facility Operating License No. DPR-72. The following information is included:

A summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant as outlined in Regulatory Guide 1.21 (Rev. 1, 1974) with data summarized on a quarterly basis following the format of Appendix B thereof.

An annual summary of hourly meteorological data collected over the previous years. (In lieu of submittal, this data is maintained on-site and is available to the NRC upon request.)

A list and description of unplanned releases to unrestricted areas.

Change to the Process Control Program (PCP) Changes to the Off-Site Dose Calculation Manual (ODCM) Significant changes to Radioactive Waste Treatment Systems

A list of new Environmental Radiological Monitoring Program dose calculation location changes identified by the land-use census.

Information relating to effluent monitors being inoperable for 30 or more days.

A summary of dose estimates to demonstrate compliance with the dose specifications of the ODCM.

NOTE: The results of the effluent report may reflect different quantities, concentrations, and dose estimates than those of the year end summary from the effluent management system. This is based on a year-end data review and correction of release data (e.g. removing miss-identified isotopes) and accounting for actual site dilution for liquid releases which are difficult to account for in real time.



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#### 6.6 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

This report is submitted as required by Technical Specification 5.7.1.1.b to Crystal River Facility Operating License No. DPR-72. The following information is included:

- Summaries
- Interpretations
- Unachievable LLDs, and
  - An analysis of trends of the results of the radiological environmental studies and previous annual reports.
  - An assessment of any observed impact of plant operation on the environment.
  - NOTE: If harmful effects or evidence of irreversible damage are detected by the monitoring, the Report shall provide an analysis of the problem and a planned course of action to alleviate the problem.
- Summarized and tabulated results, in the format of Regulatory Guide 4.8 (December 1975), of all radiological environmental samples taken during the report period.
  - NOTE: If some results are not available for inclusion, the report shall note and explain the reason for the missing results. The missing results shall be submitted as soon as possible in a supplementary report.
- A summary description of the REMP.
- A map of all sampling locations keyed to a table giving distances and directions from the reactor.
- Unavailability of milk or fresh leafy vegetable samples required by Table 2-7 of Technical Specifications.
- The results of land-use censuses.
- Results of Interlaboratory Comparison Program.
- Results of any unplanned release or spill of radioactive material that could have the potential to contaminate the groundwater as reported to maintain compliance with the groundwater protection initiative.

#### ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT Cont'd OBJECTIVE 2.4 from NEI 07-07

Document all on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year in the Annual Radiological Environmental Operating Report (AREOR) for REMP or the Annual Radioactive Effluent Release Report (ARERR) for the RETS as contained in the appropriate reporting procedure, beginning with the report for calendar year 2006.

#### Acceptance Criteria:

- a. The appropriate changes to the ODCM/ODAM or to the appropriate procedures were expected to be completed in a timeframe to support the 2007 report of 2006 performance for plants that were operating or decommissioning when the GPI was adopted. For new plants, appropriate procedures that require inclusion of significant on-site leaks/spills into ground water and all on-site ground water results shall be developed and implemented prior to initial receipt of nuclear fuel.
- b. Reporting of on-site ground water sample results shall be as follows:
  - i Ground water sample results that are taken in support of the GPI but are not part of the REMP program (e.g. samples obtained during the investigatory phase of the Action Plan circa year 2006) are reported in the ARERR required by 10 CFR 50.36a (a)(2).
  - ii Once the long-term monitoring sample points have been established per Objective 1.3, acceptance criterion d, the results are reported in the AREOR for those sample points that are included in the REMP as described in the ODCM/ODAM. The sample results for those long-term monitoring sample points that are not included in REMP are reported in the ARER.
- c. In addition to 2.4.b, voluntary communications shall be included in an annual report as follows:
  - i A description of all spills or leaks that were communicated per Objective 2.2 acceptance criterion a shall be included in the ARERR.
  - ii All <u>on-site</u> or off-site ground water sample results that exceeded the REMP reporting thresholds as described in the ODCM/ODAM that were communicated per section 6.7 acceptance criterion b shall be included in either the ARERR and/or in the AREOR.

#### 6.7 <u>Voluntary Reporting as a Result of Groundwater Radioactive Contamination</u> OBJECTIVE 2.2 from NEI 07-07

#### NOTE

The following communication protocol only applies to licensed radioactive materials that are generated as a result of plant operations.

#### NOTE

Baseline radioactivity levels resulting from normal plant effluent releases should be evaluated and considered prior to initiating the following communication protocol (e.g., tritium in rain water or clean systems that are made up from water sources that receive licensed effluent releases).

#### NOTE

Communication time requirements for water samples that exceed reporting criteria start following notification of sample results from an applicable vendor or corporate laboratory to the CR-3 Environmental & Chemistry Section.

- A. Unplanned or uncontrolled release of radioactive material from the protected area
  - 1. INVESTIGATE and document the event.
  - 2. INITIATE a Nuclear Condition Report for documentation purposes.
- B. Industry groundwater protection voluntary communication protocol for spills or leaks that reach or could potentially reach the groundwater
  - 1. DOCUMENT any event meeting the criteria in this section in the plant 10 CFR 50.75 (g) file.

#### NOTIFICATION REQUIREMENTS (Cont'd)

NOTE
The contact position for the State Official is:
Department of Health
Bureau of Radiation Control
Environmental Administrator
The contact position for the Local Officials are:
Citrus County Emergency Management Director
AND
Levy County Emergency Management Director

NOTE

The groundwater beneath CR-3 is too saline and brackish to be a source of potable water and will never be used as a source of drinking water.

Make informal\* communication as soon as practicable to appropriate State/Local officials, with follow-up notification to the NRC, as appropriate, regarding significant\* on-site leaks/spills into ground water and <u>on-site</u> or <u>off-site</u> water sample results exceeding the criteria in the REMP as described in the ODCM/ODAM.

Acceptance Criteria:

This guidance provides a threshold for voluntary communication. Some States may require different communication thresholds; the licensee shall document any agreements with State/Local officials that differs from Industry guidance.

a. Communication to the designated State/Local officials shall be made before the end of the next business day if an inadvertent leak or spill to the environment has or can potentially get into the ground water <u>and</u> exceeds any of the following criteria:

- i. If a spill or leak exceeding 100 gallons from a source containing licensed material,
- ii. If the volume of a spill or leak cannot be quantified but is likely to exceed 100 gallons from a source containing licensed material, or
- iii. Any leak or spill, regardless of volume or activity, deemed by the licensee to warrant voluntary communication.

To determine whether a leak or spill would trigger voluntary communication, consider the clarification in the following three text boxes in addition to 2.2.a i to iii above:

LEAK OR SPILL: The "leak or spill" represents an inadvertent event or perturbation in a system or component's performance. This event threshold is intended to ensure that State/Local officials are made aware that there has been an event of interest at the site and to keep them apprised of the licensee's action to contain and, as needed, remediate the event. "Leak or spill" events that meet the criteria shall be communicated regardless of whether or not the on-site ground water is, or could be used as, a source of drinking water.

The quantity of liquid resulting from leaks or spills of solid materials or waste or steam leaks should be evaluated with respect to 2.2.a. i to iii, inclusive.

\* see glossary at end of section

SOURCE CONTAINING LICENSED MATERIAL: A liquid, including steam, for which a statistically valid positive result is obtained when the sample is analyzed to the following a priori lower limits of detection (analytical sensitivity).

The analytical sensitivity for identifying a source containing licensed material is, at a minimum, the licensee's lower limits of detection that are required for radioactive liquid effluents for all isotopes.

POTENTIAL TO REACH GROUND WATER

Spills or leaks with the potential to reach ground water:

Spill or leak directly onto native soil or fill,

Spill or leak onto an artificial surface (i.e. concrete or asphalt) if the surface is cracked or the material is porous or unsealed,

Spill or leak that is directed into unlined or non impervious ponds or retention basins (i.e. water hydrologically connected to ground water).

A spill or leak inside a building or containment unit is generally unlikely to reach ground water, particularly if the building or containment unit has a drain and sump system. However, the sump and drain system should be evaluated as part of the SSC risk assessment.

A spill or leak to a semi-impermeable or impermeable surface that is recaptured or remediated per Objective 1.4 before the close of the next business day does not trigger the voluntary communication protocol. The licensee shall document any agreement with State/Local officials that differs from this Industry guidance as part of their record. For example, some states or local authorities have indicated that they do not wish leaks/spills to be included in the voluntary communication protocol or that the voluntary communication should be completed in a shorter timeframe.

b. Communication with the designated State/Local officials shall be made before the end of the next business day for a water sample result

- i Of off-site ground water or surface water that exceeds any of the REMP reporting criteria for water as described in the ODCM/ODAM, or
- ii Of on-site surface water, that is hydrologically connected to ground water, or ground water that is or could be used as a source of drinking water, that exceeds any of the REMP reporting criteria for water as described in the ODCM/ODAM

The licensee shall document the basis for concluding that the on-site ground water is not or would not be considered a source of drinking water. Examples of a defensible basis are documents from the regulatory agency with jurisdiction over ground water use.

c. When communicating to the State/Local officials, be clear and precise in quantifying the actual release information as it applies to the appropriate regulatory criteria (i.e. put it in perspective). The following information should be provided as part of the informal communication:

- i A statement that the communication is being made as part of the NEI Ground Water Protection Initiative,
- ii The date and time of the spill, leak, or sample result(s),
- iii Whether or not the spill has been contained or the leak has been stopped,
- iv If known, the location of the leak or spill or water sample(s),
- v The source of the leak or spill, if known,
- vi A list of the contaminant(s) and the verified concentration(s),
- vii Description of the action(s) already taken and a general description of future actions,
- viii An estimate of the potential or bounding annual dose to a member of the public if available at this time, and
- ix An estimated time/date to provide additional information or follow-up.
- d. Voluntary communication to State and/or Local officials may also require NRC notification under 10 CFR 50.72(b)(2)(xi). Licensees should perform these notifications consistent with their existing program.
- e. Contact NEI by email to <u>GW\_Notice@nei.org</u> as part of a voluntary communication event as described in Objective 2.2.

THIRTY-DAY REPORTS OBJECTIVE 2.3 from NEI 07-07

Submit a written 30-day report to the NRC for any water sample result for <u>on-site</u> ground water that is or may be used as a source of drinking water that exceeds any of the criteria in the licensee's existing REMP as described in the ODCM/ODAM for 30-day reporting of <u>off-site</u> water sample results. Copies of the written 30-day reports for both on-site and off-site water samples shall also be provided to the appropriate State/Local officials.

#### Acceptance Criteria:

a. All ground water samples taken for the Industry Initiative shall be analyzed and compared to the standards and limits contained in the station's REMP as described in the ODCM/ODAM. Pre-2006 ODCM/ODAM requirements specify a written 30-day report to the NRC for REMP sample results that exceed any of the REMP reporting criteria. Under the Initiative, a written 30-day NRC report is also required for all on-site sample results that exceed any of the REMP reporting criteria and could potentially reach the ground water that is or could be used in the future as a source of drinking water. If the ground water is not currently used for drinking water (see objective 2.2 acceptance criterion b for documentation needed to establish a defensible basis for determining the beneficial use(s) of ground water).

The initial discovery of ground water contamination greater than the REMP reporting criterion is the event documented in a written 30-day report. It is not expected that a written 30-day report will be generated each time a subsequent sample(s) suspected to be from the same "plume" identifies concentrations greater than any of the REMP criteria as described in the ODCM/ODAM. The licensee should evaluate the need for additional reports or communications based on unexpected changes in conditions.

- b. The 30-day special report should include:
  - A statement that the report is being submitted in support of the GPI,
  - ii A list of the contaminant(s) and the verified concentration(s),
  - iii Description of the action(s) taken,
  - iv An estimate of the potential or bounding annual dose to a member of the public, and
  - v Corrective action(s), <u>if</u> necessary, that will be taken to reduce the projected annual dose to a member of the public to less than the limits in 10 CFR 50 Appendix I.
- c. All written 30-day NRC reports generated under item 2.3.a are to be concurrently forwarded to the designated State/Local officials.

#### GLOSSARY (sections 6.6 and 6.7)

AREOR means the Annual Radiological Environmental Operating Report – summarizes the results of the REMP to the NRC.

ARERR means the Annual Radioactive Effluent Release Report as required by 10 CFR 50.36a (a)(2) – summarizes the releases of liquid, airborne, and solid wastes from the facility and provides the calculated doses attributable to those releases.

*Ground water* as used in the GPI, means any subsurface water, whether in the unsaturated or vadose zone, or in the saturated zone of the earth.

*Informal (communication)* means a communication, typically by telephone, between licensee personnel and the State/Local officials. Subsequent notification of the NRC under 10 CFR 50.72 should be performed consistent with station policy.

*Licensed material* (from 10 CFR 20.1003) means source material, special nuclear material, or byproduct material received, possessed, used, transferred or disposed of under a general or specific license issued by the Commission.

ODCM/ODAM means the Offsite Dose Calculation Manual or Offsite Dose Assessment Manual or equivalent document. The licensee's manual required by Technical Specification that contains the dose assessment methodology and radiological effluent technical specifications.

*REMP* means the Radiological Environmental Monitoring Program specified by the ODCM/ODAM that provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides, which lead to the highest potential radiation exposures of individuals resulting from the station operation.

*RETS* means the Radiological Effluent Technical Specifications required to control the release of radioactive liquids and airborne materials from the site. Standard radiological effluent technical specifications are found in NUREG CR-1301.

Significant (leak or spill) means an item or incident that is of interest to the public or stakeholders. It does not imply or refer to regulatory terminology nor is it intended to indicate that the leak or spill has public health and safety or environmental protection consequences.

Voluntary as used in the GPI, means not required by statute or regulation.

**Verbs** "*may*", "*shall*", "*should*", "*will*", and "*would*" have the meanings commonly used in the nuclear power industry (see ANSI N42.14-1999). "Shall" denotes a requirement; "should" denotes a recommendation; "may" denotes permission.



#### 6.8 Pathway Exemptions from Appendix I Calculations

Crystal River Unit 3's (CR-3) effluents limitations are primarily based on 10 CFR 50, Appendix I, which is the standard for assessing whether a power reactor effluents program is ALARA. 10 CFR 50 Appendix I is implemented by CR-3's Improved Technical Specifications and the Offsite Dose Calculation Manual (ODCM). Appendix I limits are significantly lower than the health and safety standards of 10CFR20, and lower than the EPA fuel cycle standard of 40 CFR 190.

To aid licensees in establishing methods to demonstrate compliance with effluent technical specification or ODCM specifications which are based on Appendix I, the NRC issued guidance documents in the form of NUREGs and regulatory guides (e.g. NUREG-0133 and R.G 1.109 being the primary documents). In establishing an effluents program, licensees were required to determine the primary release pathways and receptors and to include these in the routine effluents program. Calculations which are performed to demonstrate compliance with Appendix I derived limits usually use conservative assumptions which more than compensate for leaving out insignificant pathways.

Regulatory Position C of Regulatory Guide 1.109, provides guidance for determining whether a questionable pathway is significant enough to include in the effluents program (i.e. whether to apply all of the ODCM and Technical specification limitations and sampling and analysis requirements) for purposes of demonstrating compliance with Appendix I derived limits. Position C states that if the dose contribution is 10 % or greater than the combination of all other pathways then it should be added to the program. This means that pathways which are <10% of ODCM pathways need not be included in Appendix I dose calculations. When a pathway is suspected or will be created an evaluation should be done. If the results show a significant contribution to off-site exposure (10% or greater) then this pathway should be accounted for in Appendix I calculations. If the pathway is significant and will exist for a prolonged period it should also be identified in the ODCM. This does not mean that pathways which do not meet this criteria should be ignored or not otherwise evaluated.

If a pathway is not included in Appendix I calculations it may still be subject to the 10 CFR 20. Part 20 and RG 1.109 do not provide explicit descriptions or methods for performing non-ODCM pathway analysis. But part 20 requires that surveys (evaluations) be done. Surveys or evaluations need not be done for every release; a one-time bounding evaluation can be done to provide reasonable assurance that the process will not result in more than a negligible dose.

#### **Releases to the Settling Ponds**

Releases of tritium contaminated waste water to the on-site settling ponds fits the scenario of a pathway that is not significant enough to warrant including in Appendix I dose calculations. CR-3 releases about 400 curies of tritium per year, of which < 1% is routed to the settling ponds. The dose due to the ~ 400 Curies tritium released through normal pathways is generally a small fraction (on the order of 10%) of the total dose from all radionuclides. This further diminishes the importance of the dose contribution from tritium released to the ponds to a small fraction of 1% of total dose, a lot less than the 10% criteria of Position C. Releases to the settling ponds have been authorized by the NRC

#### Settling Ponds – History

- 1979 As a result of a violation FPC committed to making no releases to the ponds. Reference Inspection Report 79-35.
- 1981 Installed oily water separator to meet NPDES requirements.
- 1983 Letter to NRC outlining need to make pond releases due to having to take oily water separator offline. Outlined controls including sampling and analysis
- 1984 Letter to NRC outlining need to make pond releases due to having to take oily water separator offline. Outlined controls including sampling and analysis. Plan was specific about taking 2 liter samples. Not clear why 2 although it may have been common practice at the time to take 2 liters, with one liter being a backup sample.
- 1986 Letter to NRC scope expands scope of pond releases to include any time release could violate any NPDES permit parameter. Use same controls as outlined in 1984 letter. NRC OKs this plan.
- 1988 Dose assessment of pond releases shows that a group of releases result in dose on the order of 1e-5 mrem, a very small fraction of the limit.

#### Power Rx Effluent & Direct Radiation Limits in Unrestricted and Controlled Areas

Unrestricted Area (Beyond Site Boundary):

From Appendix I

Air Dose: 10 mrad/y gamma 20 mrad/y beta

From Nureg-0472

Dose Rate: 500 mrem/y from Noble Gases 1500 mrem/y from I-131, H-3, and Part. w/ t<sub>1/2</sub> > 8 days

From 10 CFR 20

2 mrem EDE in any 1 hr from external sources only

#### Unrestricted Area (Real Receptor):

Doses apply to a real receptor location

From Appendix I

Liquids: 3 mrem/y

Gases: 15 mrem/y I-131, H-3, & particulates w/ t1/2 > 8 d

#### From 40 CFR 190 (EPA Fuel Cycle Standard)

25 mrem to the TB or any organ except thyroid 75 mrem to thyroid

These doses include direct radiation from outside storage tanks, radwaste storage, etc.

From 10 CFR 20

100 mrem/y, TEDE

#### **Controlled Area:**

Dose applies at real receptor location

From 10 CFR 20

100 mrem/y, TEDE (From Effluents & Outside storage/activities)

# Socioeconomics

S-2

1. Taxes Paid 2005 - 2008 (6 Pages)

## **Progress Energy Florida**

		PGN Portion
_	Tax Year	Taxes Paid
	2005	8,445,007.23
	2006	8,998,383.61
	2007	10,072,126.94
	2008	9,941,453.81

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#### Progress Energy Florida CR3 Property Tax

		91.7806%	1.6994%	6.5200%
2008	Total	Progress Energy	Seminole Electric	Municipalities
ssessed Value - Real Property - AK1002397	202,501,698.00	185,857,273.43	3,441,313.86	13,203,110.71
Assessed Value - Tangible Personal - AK2619694	498,982,457.00	457,969,092.93	8,479,707.87	32,533,656.20
Total Market Value - Crystal River 3	701,484,155.00	643,826,366.36	11,921,021.73	45,736,766.91
Municipalities Exemption-Real	(13,203,111.00)	0.00	0.00	(13,203,111.00)
Muncipalities Exemption-TPP	(32,533,656.00)	0.00	0.00	(32,533,656.00)
Amendment 1 Exemption	(25,000.00)	(24,545.52)	(454.48)	0.00
Total Taxable Value	655,722,388.00	643,801,820.85	11,920,567.25	(0.09)
Gross Millage Rate	16 0852	16 0852	16.0852	
Gross Taxes	10 547 425 76	10 355 681 05	191 744 71	
ess 4% Discount	421.897.03	414.227.24	7,669,79	
Total Net Property Taxes Due from SECI	10,125,528.73	9,941,453.81	184,074.92	
check	(0.02)			1
		91.7806%	1.6994%	6.5200%
2007	Total	Progress Energy	Seminole Electric	Municipalities
Assessed Volue Real Branatty AK1002207	108 401 660 00	182 112 501 01	3 371 077 70	12 937 002 26
Assessed Value - Real Property - ART002397	130,421,002.00	102,112,091.91	3,311,911.12 9 N3N 188 EE	12,331,032.30 34 645 656 01
Total Market Value - Crystel Piver 2	729 796 768 00	669 811 852 /5	12 402 166 29	47 582 7/0 27
lunicipalities Exemption Real	(12 937 093 00	009,011,002.45 0.00	12,402,100.28 0.00	(12 937 092 00)
	(34,645,657,00)	0.00	0.00	(34 645 657 00)
Iotal Taxable Value	682 214 019 00	669 811 852 45	12,402 166 28	0.27
				0.2,
Gross Millage Rate	15.6638	15.6638	15.6638	
Gross Taxes	10,686,063.95	10,491,798.89	194,265.05	
ess 4% Discount	427,442.56	419,671.96	7,770.60	
Total Net Property Taxes Due from SECI	10,258,621.39	10,072,126.94	186,494.45	
	(0.02)			
	<b>-</b> / I	91.7806%	1.6994%	6.5200%
2006	lotal	Progress Energy	Seminole Electric	Municipalities
Assessed Value - Real Property - AK1002397	204 807 945 00	187 973 960 77	3 480 506 22	13 353 478 01
Assessed Value - Tangible Personal - AK2619694	422 548 920 00	387 817 934 07	7.180.796.35	27,550,189,58
Total Market Value - Crystal River 3	627 356 865 00	575 791 894 84	10 661 302 56	40 903 667 60
Municipalities Exemption-Real	(13.353.478.00)	0.00	0.00	(13,353,478,00)
Muncipalities Exemption-TPP	(27,550,190.00)	0.00	0.00	(27,550,190.00)
Total Taxable Value	586,453,197.00	575,791,894.84	10,661,302.56	(0.40)
				<u> </u>
Gross Millage Rate	16.2790	16.2790	16.2790	
Gross Taxes	9,546,871.59	9,373,316.26	173,555.34	
Less 4% Discount	381,874.86	374,932.65	6,942.21	
Total Net Property Taxes Due from SECI	9,164,996.73	8,998,383.61	166,613.13	:
	0.01			
		91 7806%	1 6004%	6 5200%
2005	Total	Progress Energy	Seminole Electric	Municipalities
			200000	
Assessed Value - Real Property - AK1002397	163,958,300.00	150,481,911.49	2,786,307.35	10,690,081.16
Assessed Value - Tangible Personal - AK2619694	370,022,381.00	339,608,761.42	6,288,160.34	24,125,459.24
Total Market Value - Crystal River 3	533,980,681.00	490,090,672.91	9,074,467.69	34,815,540.40
Municipalities Exemption-Real	(12,658,296.00)	0.00	0.00	(12,658,296.00)
Muncipalities Exemption-TPP	(24,125,458.00)	0.00	0.00	(24,125,458.00)
Total Taxable Value	497,196,927.00	490,090,672.91	9,074,467.69	(1,968,213.60)
Gross Millage Rate	17.9495	17.9495	17.9495	
Gross Taxes	8,924,436.24	8,796,882.53	162,882.16	
Less 4% Discount	356,977.45	351,875.30	6,515.29	-
Total Net Property Taxes Due from SECI	8,567,458.79	8,445,007.23	156,366.87	=

(0.02)

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# Janice A Warren,C.F.C Tax Collector Citrus County 210 N Apopka Ave Suite 100 Inverness, FI 34450-4298

		Account		2007 Assessed	2007 Actual	2008 Assessed-	2008 Actual	Due	Date
Parcel-No	FPC-ID	Number	Туре	Value	Taxes	Value	Taxes	date	mailed
1000165	09-007	1000165	R	4,000	60.31	4,080	63.17	11/30	11/26
1000203	09-008	1000203	R	29,800	449.33	33,575	519.82	11/30	11/26
1002362 CR	09-016	1002362	R	142,107,337	2,136,903.27	155,702,422	2,404,324.43	11/30	11/26
1002397 CR3	and and the		1952	27 A. S.	영상은 물질을 받는				
Participants	09-017	1002397	R	185,484,570	2,789,177.46	189,298,587	2,923,109.40	11/30	11/26
1002401 CR	09-019	1002401	R	264,977	3,984.54	348,477	5,381.11	11/30	11/26
1002427 CR	09-021	1002427	R	811,345	12,200.40	662,098	10,223.99	11/30	11/26
1002508 CR	09-022	1002508	R	811,345	12,200.40	662,098	10,223.99	11/30	11/26
1002524 CR	09-023	1002524	R	1,572,010	23,638.70	1,332,398	20,598.63	11/30	11/26
1047111	09-027	1047111	R	954,700	14,394.83	954,720	14,781.34	11/30	11/26
1047242 CR	09-028	1047242	R	875,147	13,195.32	923,743	14,301.76	11/30	11/26
1047528	09-029	1047528	R	722,400	10,892.25	722,415	11,184.73	11/30	11/26
1047544	09-030	1047544	R	67,300	1,014.75	67,320	1,042.28	11/30	11/26
1047561	09-031	1047561	R	1,179,500	17,784.33	1,244,825	19,272.88	11/30	11/26
1047579	09-032	1047579	R	143,700	2,166.69	143,735	2,225.37	11/30	11/26
1047609	09-033	1047609	R	15,100	227.67	15,130	234.25	11/30	11/26
1047650	09-035	1047650	R	483,300	7,287.12	502,010	7,772.32	11/30	11/26
1047706	09-036	1047706	R	241,600	3,642.81	241,655	3,741.40	11/30	11/26
1047722	09-037	1047722	R	241,600	3,642.81	241,655	3,741.40	11/30	11/26
1047731	09-038	1047731	R	781,700	11,786.36	816,765	12,645.48	11/30	11/26
1047838	09-039	1047838	R	200,000	3,015.57	200,090	3,097.87	11/30	11/26
1047862	09-040	1047862	R	599,800	9,043.70	599,845	9,287.03	11/30	11/26
1050006	09-042	1050006	R	1,754,000	26,375.34	1,774,205	27,396.91	11/30	11/26
1050235	09-043	1050235	R	5,900	88.72	5,950	91.88	11/30	11/26
1053552	09-044	1053552	R	815,300	12,259.88	834,020	12,878.76	11/30	11/26
1053561	09-045	1053561	R	203,800	3,064.59	203,830	3,147.51	11/30	11/26
1054095	09-046	1054095	R	200,000	3,007.45	200,090	3,089.75	11/30	11/26
1054460	09-047	1054460	R	26,500	398.50	26,520	409.53	11/30	11/26

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1054630	09-048	1054630	R	1,377,600	20,715.31	1,404,285	21,684.69	11/30	11/26
1057728	09-049	1057728	R	22,500	338.34	22,525	347.85	11/30	11/26
1083591	09-050	1083591	R	185,100	2,783.39	185,130	2,858.74	11/30	11/26
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1084521	09-051	1084521	R	30.600	460.14	30,600	· _	n/a	
1084547	09-052	1084547	R	208,000	3,127.75	208.080	3.213.13	11/30	11/26
1084652	09-053	1084652	R	227,200	3,416.48	227,205	3,508.45	11/30	11/26
1085322	09-054	1085322	R	74,500	1,120.27	74,545	1.151.12	11/30	11/26
1086418	09-055	1086418	R	33,700	506.76	33,745	521.10	11/30	11/26
1201381	09-057	1201381	R	24,000	361.87	23,460	363.22	11/30	11/26
1201390	09-058	1201390	R	41,700	628.76	41,822	647.52	11/30	11/26
1463165	09-060	1463165	R	9,600	178.35	9,605	182.31	11/30	11/26
1463173	09-061	1463173	R	6,300	118.99	6,375	122.70	11/30	11/26
1489211	09-062	1489211	R	196,200	2,950.31	196,265	3,030.67	11/30	11/26
1492882	09-063	1492882	R	13,600	204.51	13,600	210.01	11/30	11/26
1493242	09-064	1493242	R	1,225,500	18,428.15	1,251,030	19,318.15	11/30	11/26
1494753	09-065	1494753	R	85	-	85	-		
1495202	09-066	1495202	R	1,345,800	20,237.15	1,357,535	20,962.77	11/30	11/26
1503051	09-067	1503051	R	997,300	14,996.66	997,390	15,401.48	11/30	11/26
1504244	09-068	1504244	R	21,100	317.29	21,165	326.82	11/30	11/26
1505810	09-069	1505810	R	905,500	13,616.25	905,590	13,983.92	11/30	11/26
1506913	09-070	1506913	R	75,600	1,136.82	75,294	1,162.68	11/30	11/26
1507006	09-118	1507006	R	52,200	784,94	34,020	525.32	11/30	11/26
1507723	09-071	1507723	R	1,536,800	23,109.25	1,536,885	23,732.25	11/30	11/26
1512026	09-072	1512026	R	129,800	1,951.84	129,880	2,005.57	11/30	11/26
1513804	09-073	1513804	R	18,700	281.19	18,785	290.08	11/30	11/26
1513812	09-074	1513812	R	685,400	10,306.53	685,440	10,584.41	11/30	11/26
1516510	09-075	1516510	R	484,000	7,278.01	484,075	7,474.98	11/30	11/26
1520851	09-076	1520851	R	566,100	8,512.57	566,100	8,741.58	11/30	11/26
1568676	09-077	1568676	R	966,100	14,527.47	966,195	14,919.77	11/30	11/26
1568749	09-078	1568749	R	4,300	64.65	4,335	66.93	11/30	11/26
1569206	09-079	1569206	R	966,100	14,527.47	966,195	14,919.77	11/30	11/26
1569486	09-080	1569486	R	634,100	9,535.11	634,185	9,792.94	11/30	11/26

1570417	09-081	1570417	R	800,100	12,031.31	800,190	12,356.36	11/30	11/26
1572541	09-082	1572541	R	9,600	144.75	9,690	150.03	11/30	11/26
1572550	09-083	1572550	R	19,400	292.51	19,465	301.37	11/30	11/26
1572568	09-084	1572568	R	68,000	1,025.28	68,000	1,052.79	11/30	11/26
1573815	09-085	1573815	R	29,100	438.78	29,155	451.38	11/30	11/26
1577268	09-087	1577268	R	107,000	1,613.35	108,889	1,685.88	11/30	11/26
1631009	09-088	1631009	R	4,600	69.37	4,675	72.37	11/30	11/26
1656389	09-089	1656389	R	8,900	134.18	8,925	138.17	11/30	11/26
1658535	09-090	1658535	R	4,300	197.92	4,335	200.20	11/30	11/26
1659591	09-091	1659591	R	4,300	64.82	4,335	67.10	11/30	11/26
1672295	09-116	1672295	R	1,141,300	22,085.11	1,146,897	23,226.59	11/30	11/26
1695911	09-092	1695911	R	9,600	144.75	9,690	150.03	11/30	11/26
1858534	09-093	1858534	R	4,300	64.82	4,335	67.10	11/30	11/26
1860822	09-094	1860822	R	3,900	58.80	3,910	60.53	11/30	11/26
1861128	09-095	1861128	R	8,600	129.68	8,670	134.22	11/30	11/26
1862876	09-096	1862876	R	2,800	42.22	2,805	43.43	11/30	11/26
2271442	09-099	2271442	R	22,600	339.83	22,695	350.45	11/30	11/26
2278781	09-100	2278781	R	187,300	2,824.10	187,340	2,900.48	11/30	11/26
2390352	09-103	2390352	R	193,100	2,911.53	195,508	3,026.94	11/30	11/26
2449829	09-104	2449829	R	85	25.29	85	-	11/30	11/26
2503301	09-106	2503301	R	4,600	69.37	4,675	72.37	11/30	11/26
2503319	09-107	2503319	R	19,800	298.53	19,890	307.94	11/30	11/26
2594691	09-109	2594691	R	170,000	2,664.75	170,000	2,742.61	11/30	11/26
2620251	09-111	2620251	R	655,472	9,856.50	655,472	10,121.67	11/30	11/26
2647434 CR	09-119	2647434	R	29,100	447.42	16,038	<u>2</u> 56.94	11/30	11/26
2698951	09-041	2698951	R	70,500	1,062.99	70,550	1,092.27	11/30	11/26
2705884	09-020	2705884	R	318,500	4,813.36	327,570	5,082.28	11/30	11/26
2705892	09-018	2705892	R	3,739,700	56,258.79	3,864,975	59,706.16	11/30	11/26
2953098	09-120	2953098	R	4,626,600	69,571.32	4,742,770	73,236.86	11/30	11/26
3230485	09-	3230485	R	314,100	4,735.95	314,560	4,870.16	11/30	11/26
3289494	09-	3239494	R	63,400	955.93	63,495	983.06	11/30	11/26
3395970		3395970	R	270,700	4,081.57	302,607	4,685.10	11/30	11/26
Sub-Total Real Property	/			366,573,173	5,517,880.56	384,065,880	5,936,430.76		
2322497	09-004	2322497	P	12,655,035	190,810.79	14,604,882	226,118.61	11/30	11/26
2322501	09-115	2322501	P	8,322,269	161,042.71	8,787,076	177,953.04	11/30	11/26
2619546	09-114	2619546	P	4,282,476	80,197.55	4,710,691	87,861.26	11/30	11/26
2619694 CR3	09-005	2619694	<u> </u>	496,729,449	7,469,443.91	466,423,801	7,202,419.32	,11/30	11/26
3321766			<u>۲</u>	893,198,828	13,431,252.30	917,798,344	14,172,451.11	11/30	11/26
Sub-Total Personal Prop	perty			1,415,188,057	21,332,747.26	1,412,324,794	21,866,803.34		

1					
Grand Total	1,781,761,230	26,850,627.82	1,796,390,674	27,803,234.10	
# Socioeconomics

S-5

# 1. 2008 Contributions in Citrus County (6 Pages)

# **2008 Contributions in Citrus County**

Fiscal Year equals 2008 AND Coding Sheet: County/Counties Served is 'Citrus' 7/20/2009

			Fund/No	County/ Countie s
Status/Date	Amount Payee/Reference	Budget Description	tes	Served
Paid	\$500.00 Boys and Girls Club of	Florida \ PE Florida \ North Coastal \ Boys and Girls Club of Citrus	North	FL\Citrus
Scheduled: 11/13/2008	Citrus County	County CGPE volunteers Day of Caring and assist with 2008 budget	Coastal	
Paid: 11/13/2008	Request [9535473]	to reorganize in 2009	Region	
Paid	\$3,206.50 United Way of Citrus	Progress Energy Foundation \ Energy Neighbor Fund \ Florida \ United	PE	FL\Citrus
Scheduled: 10/29/2008	County	Way of Citrus County Funding for Energy Neighbor Fund and Special	Foundatio	
Paid: 10/29/2008	Request [9536775]	Needs Program (wire transfer).	n	
Paid	\$1,159.40 United Way of Citrus	Progress Energy Foundation \ Energy Neighbor Fund \ Florida \ United	PE	FL\Citrus
Scheduled: 11/19/2008	County	Way of Citrus County Funding for Energy Neighbor Fund and Special	Foundatio	
Paid: 11/19/2008	Request [9536776]	Needs Program (wire transfer).	n	
Paid	\$600.00 Habitat for Humanity o	f Florida \ PE Florida \ North Coastal \ Habitat for Humanity of Citrus	North	FL\Citrus
Scheduled: 10/28/2008	Citrus County Inc.	County Inc cg-sponsorship Realtors Assn/Citrus 2008 olf tournament	Coastal	
Paid: 10/28/2008	Request [9535409]	for Habitat for Humanity	Region	
Paid Scheduled: 9/15/2008 Paid: 9/15/2008	\$500.00 Junior Achievement of Citrus County Request [9535410]	Florida \ PE Florida \ North Coastal \ Junior Achievement of Citrus County cg-sponsor 2008 annual fundraiser breakfast	North Coastal Region	FL\Citrus

					County/ Countie
Status/Date	Amount	Payee/Reference	Budget Description	Fund/No tes	s Served
Paid Scheduled: 10/24/2008 Paid: 10/24/2008	\$500.00	Citrus County Family Resource Center, Inc. Request [9535411]	Florida \ PE Florida \ North Coastal \ Citrus County Family Resource Center, Inc cg-sponsor a child for the holidays program 2008; volunteer council	North Coastal Region	FL\Citrus
Paid Scheduled: 5/7/2008 Paid: 5/7/2008	\$1,000.00	South Levy Recreational Park, Inc. Request [9535404]	Florida \ PE Florida \ North Coastal \ South Levy Recreational Park, Inc. rf2008 July 4th fireworks display, Inglis	North Coastal Region	FL\Citrus
Paid Scheduled: 9/2/2008 Paid: 9/2/2008	\$500.00	United Way of Citrus County Request [9535388]	Florida \ PE Florida \ North Coastal \ United Way of Citrus County CG-corporate sponsor Kings Bay 5K run 08NVO08; hosted by 7 Rivers Regional Med. Cntr	North Coastal Region	FL\Citrus
Paid Scheduled: 9/2/2008 Paid: 9/2/2008	\$3,000.00	Mike Hampton Pitchin-In Foundation Request [9535387]	Florida \ PE Florida \ North Coastal \ Mike Hampton Pitchin-In Foundation CG-Circle of Friends 4th Annual Country Rocks the Canyon Concert, 2008	North Coastal Region	FL\Citrus
Paid Scheduled: 9/1/2008 Paid: 9/1/2008	\$500.00	Gulf Ridge Council Inc., Boy Scouts Of America Request [9535399]	Florida \ PE Florida \ North Coastal \ Gulf Ridge Council Inc., Boy Scouts Of America CGMcGregor Smith Boy Scout Reservation, Gulf Ridge Council Day of Caring event	North Coastal Region	FL\Citrus
Paid Scheduled: 10/21/2008 Paid: 10/21/2008	\$1,000.00	Kings Bay Rotary Charitable Foundation, Inc. Request [9535398]	Florida \ PE Florida \ North Coastal \ Kings Bay Rotary Charitable Foundation, Inc CGsponsor Stone Crab Jam, 11/15/08	North Coastal Region	FL\Citrus

Status/Date	Amount Payee/Reference	Budget Description	Fund/No tes	County/ Countie s Served
Paid Scheduled: 9/2/2008 Paid: 9/2/2008	\$650.00 CFCC Foundation Request [9535384]	Florida \ PE Florida \ North Coastal \ CFCC Foundation CG-Taste of Citrus sponsor (260CT08), plus 6 extra tkts.	North Coastal Region	FL\Citrus
Paid Scheduled: 9/2/2008 Paid: 9/2/2008	\$1,000.00 Citrus County Chronicle Request [9535386]	Florida \ PE Florida \ North Coastal \ Citrus County Chronicle CG-Newspapers in Education sponsorship	North Coastal Region	FL\Citrus
Paid Scheduled: 9/2/2008 Paid: 9/2/2008	\$2,800.00 Caruth Camp Challeng Request [9535383]	e Florida \ PE Florida \ North Coastal \ Caruth Camp Challenge RF-sponsor golf tournament for Camp Caruth, 20NOV08	North Coastal Region	FL\Citrus
Paid Scheduled: 9/2/2008 Paid: 9/2/2008	\$280.00 Citrus 20/20 Request [9535385]	Florida \ PE Florida \ North Coastal \ Citrus 20/20 CG-Save Our Waters fundraiser 9/9/08, table	North Coastal Region	FL\Citrus
Paid Scheduled: 7/28/2008 Paid: 7/28/2008	\$3,206.50 United Way of Citrus County Request [9535025]	Progress Energy Foundation \ Energy Neighbor Fund \ Florida \ United Way of Citrus County Funding for Energy Neighbor Fund and Special Needs Program (wire transfer).	PE Foundatio n	FL\Citrus
Paid Scheduled: 7/9/2008 Paid: 7/9/2008	\$1,500.00 Citrus County Economic Developmen Council, Inc. Request [9535005]	Florida \ FL - Corporate Contributions - PA/ED \ Economic Development t - Florida \ Citrus County Economic Development Council, Inc Sponsorship of annual industry appreciation week.Michele Cavallo (\$1500.00)	t Economic Developm ent - FL	FL\Citrus

Status/Date	Amount	Pavee/Reference	Budget Description	Fund/No tes	County/ Countie s Served
Paid Scheduled: 7/21/2008 Paid: 7/21/2008	\$2,100.00	Friends of Homosassa Springs Wildlife Park Request [9534911]	Florida \ PE Florida \ North Coastal \ Friends of Homosassa Springs Wildlife Park 2008 Wildlife Week in the Park sponsorshiprf	North Coastal Region	FL\Citrus
Paid Scheduled: 7/18/2008 Paid: 7/18/2008	\$500.00	Citrus County Education Foundation Request [9534899]	Florida \ PE Florida \ North Coastal \ Citrus County Education Foundation 2008 Galaxy of Stars sponsorship (Teacher of the Year)-contact Rose Fagler	North Coastal Region	FL\Citrus
Paid Scheduled: 5/28/2008 Paid: 5/28/2008	\$500.00	Citrus County Child Advocacy Center, aka Jessie's Place Request [9534904]	Florida \ PE Florida \ North Coastal \ Citrus County Child Advocacy Center, aka Jessie's Place Support Jessie's Place for traumatized childrencontact CG	North Coastal Region	FL\Citrus
Paid Scheduled: 4/28/2008 Paid: 4/28/2008	\$500.00	Hospice of Citrus County Request [9534903]	Florida \ PE Florida \ North Coastal \ Hospice of Citrus County 2008 Camp Good Hopeemployee contact Bonnie SaylorCG	North Coastal Region	FL\Citrus
Paid Scheduled: 3/24/2008 Paid: 3/24/2008	\$500.00	Crystal River High School Request [9534901]	Florida \ PE Florida \ North Coastal \ Crystal River High School 2008 Project Graduationcontact RF	North Coastal Region	FL\Citrus
Paid Scheduled: 6/18/2008 Paid: 6/18/2008	\$500.00	YMCA of the Suncoast Citrus Branch Request [9534907]	Florida \ PE Florida \ North Coastal \ YMCA of the Suncoast Citrus Branch Summer Camp Campaign-CG	North Coastal Region	FL\Citrus

			Fund/No	County/ Countie s
Status/Date	Amount Payee/Reference	Budget Description	tes	Served
Paid Scheduled: 6/19/2008 Paid: 6/19/2008	\$1,000.00 Citrus 20/20 Request [9534905]	Florida \ PE Florida \ North Coastal \ Citrus 20/20 Adopt-a-Shore coastal clean up Tshirt purchaseCG	North Coastal Region	FL\Citrus
Paid Scheduled: 7/15/2008 Paid: 7/15/2008	\$5,000.00 American Cancer Society Request [9534887]	Florida \ PE Florida \ North Coastal \ American Cancer Society 2008 Cattle Baron's Ball sponsorshipcontact Carla Groleau	North Coastal Region	FL\Citrus
Paid Scheduled: 3/13/2008 Paid: 3/13/2008	\$500.00 Lecanto High School Request [9534871]	Florida \ PE Florida \ North Coastal \ Lecanto High School 2008 Nature Coast - Carla Groleau	North Coastal Region	FL\Citrus
Paid Scheduled: 3/24/2008 Paid: 3/24/2008	\$5,000.00 Black Diamond Foundation, Inc Request [9534834]	Florida \ PE Florida \ North Coastal \ Black Diamond Foundation, Inc 2008 BDF Scholarship - Carla Groleau	North Coastal Region	FL\Citrus
Paid Scheduled: 3/13/2008 Paid: 3/13/2008	\$500.00 Big Brothers Big Sisters Request [9534705]	Florida \ PE Florida \ North Coastal \ Big Brothers Big Sisters 2008 Nature Coast - Vol. Comm.	North Coastal Region	FL\Citrus
Paid Scheduled: 4/25/2008 Paid: 4/25/2008	\$4,053.50 United Way of Citrus County Request [9534568]	Progress Energy Foundation \ Energy Neighbor Fund \ Florida \ United Way of Citrus County Funding for Energy Neighbor Fund and Special Needs Program (wire transfer).	PE Foundatio n	FL\Citrus

Status/Date	Amount Payee/Reference	Budget Description	Fund/No tes	County/ Countie s Served
Paid Scheduled: 4/3/2008 Paid: 4/3/2008	\$25,000.00 Citrus County Education Foundation Request [9531614]	Progress Energy Foundation \ Foundation Board \ 2008 Grants \ Citrus County Education Foundation Funding to enhance the Power Industry Academy at Withlacoochee Technical Institute, which currently focuses on electricity. Contacts: Martha Barnwell, Rose Fagler, Carla Groleau	PE Foundatio n	FL\Citrus
Paid Scheduled: 3/6/2008 Paid: 3/6/2008	\$573.75 March of Dimes (Florida Bay Chapter) Request [9534367]	Progress Energy Foundation \ Employee Giving Campaign \ March of Dimes (Florida Bay Chapter) 2007 eGiving Campaign Matching Funds	PE Foundatio n	FL\Citrus
Paid Scheduled: 3/13/2008 Paid: 3/13/2008	\$2,000.00 Art Center of Citrus County Request [9534203]	Florida \ FL Corporate Contributions - CCD \ Art Center of Citrus County Sponsorship of the 2008-2009 "Welcome to the World of Theatre and Art" season. Contact: Woody Dicus	FL Corporate Contributi ons	FL\Citrus

Grand Totals (32 \$70,129.65 items)

# Socioeconomics

# S-7

1. Site Certification Application, Crystal River Unit 3 Uprate Project, Crystal River Florida, June 2007 (Excerpts, 15 pages)



VOLUME 1 OF II

SUBMITTED BY:

PROGRESS ENERGY FLORIDA, INC. 299 1<sup>ST</sup> AVENUE NORTH ST. PETERSBURG, FLORIDA 33701

Scott Osbourn, P.E. Professional Registered Engineer No. 57557

Golder Associates Inc. 5100 West Lemon Street, Suite 114 Tampa, Florida 33609

June 2007



in nearby counties for SO<sub>2</sub>,  $PM_{10}$ , O<sub>3</sub>, and NO<sub>2</sub>. Summaries of the maximum pollutant concentrations measured in Pinellas and Marion Counties from 2003 through 2005 are presented in Table 2.3.7-7. These data indicate that the maximum air quality concentrations measured in the region are well below applicable standards.

Given the lack of industrial development in the vicinity of the plant, existing concentrations of other criteria pollutants, i.e., CO and Pb, which are usually associated with an urban environment, are expected to be well below the AAQS.

#### 2.3.7.3 Measurement Programs

All information (i.e., meteorology and air quality data) was compiled from offsite monitoring stations maintained and operated by the FDEP, Pinellas County, Marion County, or cooperating governmental agencies (i.e., NWS). No significant changes in these programs are anticipated after the construction and operation of the Project.

Meteorological data were obtained from the NWS surface and upper-air station at the Tampa International Airport. These data were obtained for the five-year periods from 2001 through 2005 from which the joint frequency of wind direction and wind speed were developed, and from 1991 through 1995 from which the atmospheric stability and a five-year average of mixing heights were developed. The wind sensors at the Tampa International Airport have been located 22 ft above grade. Regular surface observations are taken just before each hour, seven days per week. Upper-air soundings are conducted twice per day at 0700 and 1900 Eastern Standard Time at Ruskin.

#### 2.3.8 Noise

#### 2.3.8.1 Background

In 2005, the county commissioners enacted ordinance No. 2005-05 which can be found in Chapter 21, Article II of the Code of Ordinances for the County of Citrus Florida. The intent of this ordinance is to protect the health, safety, and welfare, and to protect the aesthetic and property values of properties within unincorporated Citrus County by providing for abatement of excessive and unnecessary noise.



Receiving Land Use Category	Time	Sound Le Limit (dBA)	vel
Residential	7 a.m. — 10 p.m. 10 p.m. — 7 a.m.	60 55	
Governmental-owned building or property, institutional or recreational	7 a.m. — 10 p.m. 10 p.m. — 7 a.m.	55 50	
Commercial or business	7 a.m. — 10 p.m. 10 p.m. — 7 a.m.	65 60	
Industrial or manufacturing Agricultural	At all times At all times	75 75	

As defined in the ordinance, the noise from any activity or from any permissible use of property within the applicable land use district classifications of Citrus County shall be deemed a violation if the total noise level as measured on the A-scale due to both ambient noise, and the alleged source of the offensive noise, exceeds the noise levels which are prescribed in the above table, the measurement of which is based upon decibels. All such measurements as well as the method employed shall be consistent with section 21-17 of Chapter 21, Article II of the Code of Ordinances, and shall represent the A-weighted sound pressure level which is exceeded ten percent of the time ( $L_{10}$ ) during the observation period.

#### 2.3.8.2 Noise Measurement Procedures

A comprehensive ambient noise monitoring program was performed at seven locations at or near the CR3 Uprate Project (Figure 2.3.8-1). The equipment used to monitor the baseline noise levels operated in the slow response mode to obtain accurate, integrated, A-weighted sound pressure levels. A windscreen was used because all measurements were taken outdoors. The microphone was positioned so that a random incidence response, as specified by the American National Standard Institute (ANSI), was achieved. The sound level meter and octave band analyzer were calibrated immediately prior to and just after the sampling period to provide a quality control check of the sound level meter's operation during monitoring.

Integrated sound pressure level (SPL) data consisting of the following noise parameters were collected at each location:

- L<sub>eq</sub> The sound pressure level averaged over the measurement period; this parameter is the continuous steady sound pressure level that would have the same total acoustic energy as the real fluctuating noise over the same time period;
  - Max The maximum sound pressure level for the sampling period, and;
  - Min The minimum sound pressure level for the sampling period.
  - $L_n$  The sound pressure levels which were exceeded n% of the time during sampling period.

The SPL data were analyzed and reported in both decibels (dB) and A-weighted decibels (dBA). The higher the decibel value, the louder the sound. The SPL averages were calculated using the following formula:

Average SPL = 
$$10 \text{ Log} \frac{\sum_{i=1}^{N} 10^{(\text{SPLi}/10)}}{N}$$
  
where: N = number of observations  
SPL<sub>i</sub> = individual sound pressure level in data set.

Monitoring was conducted using the sound level meter mounted on a tripod at a height of 1.5 m (5 ft) abovegrade. Local meteorological conditions were measured during the monitoring periods. Detailed field notes were recorded by the operator during monitoring and including major noise sources in the area.

The SPLs and octave band data were collected at the monitoring locations, for a minimum of 10 continuous minutes, using measurement techniques set forth by ANSI S12.9-1993/Part 3 (ANSI, 1993).

The noise monitoring equipment used during the study included:

- 1. Continuous Noise Monitoring Equipment
  - a. Larson Davis Model 824 Precision Integrating Sound Level Meter with Real Time Frequency Analyzer
  - b. Larson Davis Model PRM902 Microphone Preamplifier
  - c. Larson Davis Model 2560 Prepolarized 1/2" Condenser Microphone
  - d. Windscreen, tripod, and various cables
- 2. Sound Level Meter Calibration Unit
  - a. Larson Davis Model CAL200 Sound Level Calibrator, 94/114 dB at 1,000 Hz.



The Larson Davis sound level meter complies with Type I--Precision requirements set forth for sound level meters and for one-third octave filters. The calibration certificates are provided in Appendix 10.5-1.

Of the seven monitoring locations, four (Sites 1 through 4) were chosen to delineate the laydown and construction areas of the future CR3 Uprate Project. The other three monitoring sites (Sites 5 through 7) were selected to determine the baseline noise levels at property lines.

#### 2.3.8.3 Existing Ambient Sound Pressure Level Conditions

The daytime and nighttime ambient noise levels for each of the monitoring sites are indicated in Table 2.3.8-1. Since there are no residential communities adjacent to the plant, the commercial sound level limits from the Code of Ordinances for Citrus County were used for comparison. The sound level limits are 65 dBA during the daytime and 60 dBA at night. In accordance with the ordinance, the  $L_{10}$  from each sampling period were used for compliance with the sound level limits.

The highest  $L_{10}$  noise levels measured during the study were 70 dBA at Site 3 during the daytime and 74 dBA at Site 6 during the nighttime. The elevated daytime and nighttime noise levels at Site 3 were due to the constant plant operations in that area. Since the location of Site 3 is not near any boundary, it does not have to comply with any sound level limits. All other daytime noise levels were at or below the 65 dBA limit. The high nighttime noise level at Site 6 was due to a train arriving at the plant. The L<sub>90</sub> at this location was 40 dBA which would be more consistent with the nighttime noise levels in the area of Site 6 without the influence of the noise generated by the train. The nighttime noise levels at Sites 5 and 7 were well below the nighttime limit of 60 dBA.

#### 2.3.9 Other Environmental Features

Several environmental features have been established at the CREC in coordination with state and federal agencies as described below:

The Mariculture Center, a multi-species fish hatchery was established to mitigate fisheries impacts related to the once-through cooling water system at Crystal River Units 1, 2, and 3. The Center has four spawn rooms and eight one-acre ponds. Red drum, spotted seatrout, pink shrimp and striped mullet were the species initially selected for culture. Pigfish, silver fish, blue crab and stone crab were added and cultured at the Center. The Mariculture Center continues to operate to offset the



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TABLE 2.3.8-1
Baseline Ambient Sound Pressure Levels (dBA) Observed at the Crystal River Energy Complex

Site	Coordinates	Date	Time		Sound Level	s (dBA)		Observations
				Min	Max	Lio	Leq	
1. On-site North of reactor	28° 57' 32.6" N	11-Apr-07	Daytime	60	85	65	66	Plant traffic and plant operations
	82° 41' 52.7"W	11-Apr-07	Nighttime	61	76	62	63	Plant traffic, plant operations, and insect noise
2. On-site East of reactor	28° 57' 28.1" N	11-Apr-07	Daytime	63	68	65	64	Plant operations, conveyor, and fence construction
	82° 41' 37.6"W	11-Apr-07	Nighttime	62	66	63	63	Plant operations, conveyor, and insect noise
3. On-site South of reactor	28° 57' 22.96" N	11-Apr-07	Daytime	67	75	70	70	Plant operations, conveyor, and traffic
	82° 41' 51.3"W	11-Apr-07	Nighttime	69	72	71	70	Plant operations, conveyor, and insect noise
4. West of plant near cooling	28° 57' 34.7" N	11-Apr-07	Daytime	52	60	57	55	Plant traffic, plant operations, and cooling tower ops,
towers	82° 42' 15.2"W	11-Apr-07	Nighttime	56	63	60	59	Plant traffic and rain
5. Northeast corner of fenceline	28° 58' 11.0" N	11-Apr-07	Daytime	47	57	51	50	Coal plant operations and air plane traffic
	82° 41' 07.8"W	11-Apr-07	Nighttime	47	63	57	55	Coal plant operations and insect noise
6. Intersection of Tallahasse and	28° 57' 35.4" N	11-Apr-07	Daytime	42	68	\$6	53	Traffic, powerline buzz, and neighoring facility noise
Powerline Rd	82° 38' 00.2" W	11-Apr-07	Nighttinc	39	95	74	73	Traffic, powerline buzz, insects, and train passing
7. Middle point on Powerline Rd	28° 57' 34.2" N	11-Apr-07	Daytime	39	74	62	59	Traffic, powerline buzz, and airplane traffic
	82° 39' 37.5"W	11-Apr-07	Nighttime	44	54	47	46	Plant operations and powerline buzz
Commercial Maximum Allowabl	e Sound Pressure Le	vels (L <sub>10</sub> )	Daytime			65		
1			Nighttime			60		

Source: Golder Associates Inc, 2007



resulting from project construction. No significant adverse effects on local elementary, middle, or high school enrollment are anticipated.

#### 4.6.5 Construction Noise Impacts

The impacts of noise on human populations are dependent upon the proximity of institutional and residential land uses to construction activities and the type and extent of noise sources. The nearest locations that could potentially be impacted by noise (i.e., critical receptor) from the proposed facility construction area are located approximately three miles south of the power block. The location is Fort Island County Park in the city of Crystal River.

Construction of the CR3 Uprate Project will require demolition of the current steam turbine and erection of the new steam turbine and cooling system. The use of construction equipment, such as dump trucks, cranes, bulldozers, front-end loaders, air compressors, grinders, and welders will be required. These sources have maximum noise levels ranging from about 70 to 90 dBA (measured at a distance of 50 ft).

The evaluation of noise impacts from construction activities was performed using previous results from noise propagation computer programs to estimate noise levels (CADNA A). Noise source levels are entered as octave band sound power levels. The user can specify coordinates, either rectangular or polar. To determine noise impacts from the CR3 Uprate Project's construction activities, the receptor grid used for the modeling was 10 x 10 meters out to a distance of 4 kilometers. All noise sources are assumed to be point sources; line sources can be simulated by several point sources. Sound propagation is calculated by accounting for hemispherical spreading and three other useridentified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the American National Standard Institute Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Direction source characteristics and reflection can be simulated using path-specific attenuation. Giving the coordinates and height of the barrier can specify attenuation due to barriers. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the sourcereceptor path. Total and A-weighted SPLs (filtered to approximate human hearing) are calculated. Background noise levels can be incorporated into the program and are used to calculate overall SPLs.



The model was performed to predict the maximum noise levels produced by a combination of likely noise sources with and without background noise levels. A conservative estimate of the number and types of construction equipment was assumed to calculate construction noise levels.

Table 4.6.5-1 lists the major types of equipment expected to be used during the construction of the Project and their associated noise characteristics. For the purpose of the construction noise impact analyses, all of the equipment was conservatively assumed to be operating simultaneously at peak power. Mechanical and electrical installation activities may occur at night; however, these activities have minimal noise levels and are much less than the existing plant.

The noise levels resulting from these combinations of equipment were input as multiple sources to the model. Octave bands were estimated from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliance* (EPA, 1971). It is unlikely that all the equipment would be operating simultaneously and continuously, and, therefore, this impact assessment is conservative. Background SPL values were incorporated into the model to calculate impacts at the locations identified in Section 2.3.8. Only the atmospheric attenuation option was enabled during the noise modeling runs.

The construction noise impacts at three plant property-line monitoring locations shown in Figure 4.6.5-1 are presented in Table 4.6.5-2. The  $L_{10}$  and  $L_{eq}$  are from background noise monitoring and the background with construction impacts are presented in the table. As shown in Table 4.6.5-2, the estimated  $L_{eq}$  noise levels during the construction of the Project are estimated to be less than 73 dBA. The predicted noise levels are not expected to adversely impact the sensitive receptors identified in the vicinity of the Project Area. The noise estimates are conservative and include only atmospheric attenuation. The actual or measured noise levels due to construction are expected to be lower than predicted. Elevated noise during initial start up is not accounted for in these predictions.

#### 4.7 Impacts on Landmarks and Sensitive Areas

Results of a search of the Florida Master Site File conducted for the CR3 Uprate Project indicates that within Citrus County, there are 174 known archaeological sites, eight known structures, and two recorded cemeteries. Activities related to the CR3 Uprate Project will not affect the cultural resources in the identified review area.

## TABLE 4.6.5-1

Source	Modeled Source		Sound Power Level (dB) for Octave Band Center Frequency (Hz)								Overal Powe	Overall Sound Power Level	
	Height <sup>a</sup> (m)	31.5	63	125	250	500	1K	2K	4K	8K.	(dB)	(dBA)	
Front End Loader 1	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5	
Front end Loader 2	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5	
Truck 1	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3	
Truck 2	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3	
Truck 3	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3	
Bulldozer 1	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9	
Bulldozer 2	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9	
Crane 1	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5	
Crane 2	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5	
Welder 1	1.8	0.0	102.6	110.6	105.6	98.6	<b>9</b> 8.6	93.6	88.6	84.6	103.6	112.7	
Welder 2	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7	
Grinder 1	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7	
Grinder 2	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7	
Grinder 3	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7	

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Figure 4.6.5-1 Construction Noise Map Progress Energy Florida Crystal River Unit 3 Uprate Project



#### 5.6.2 <u>Monitoring Programs</u>

#### 5.6.2.1 Ambient Air Quality Monitoring

In accordance with requirements of 40 CFR 52.21(m) and Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceed the significant emission rates, as described above.

An exemption from the preconstruction ambient monitoring requirements is available if certain criteria are met. If the predicted increase in ambient concentrations, due to the proposed modification, is less than specified *de minimis* concentrations, then the modification can be exempted from the pre-construction air monitoring requirements for that pollutant per FDEP rule. The proposed Project will result in PSD review for only PM emissions and, as such, no preconstruction ambient monitoring is required.

#### 5.6.2.2 Air Emissions Monitoring

Continuous emission monitoring (CEM) for the pollutant of concern (PM) is not technologically feasible for a project of this type. In lieu of air emissions monitoring, the permittee typically certifies that the cooling towers were constructed and installed to achieve the specified drift rate. This certified drift rate, in combination with monitoring of the circulating water flow rate, serve as a surrogate for demonstrating air emissions compliance.

#### 5.7 Noise Impacts

#### 5.7.1 Impacts

Sound propagation involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components, the noise source and the transmission path, are easily quantified (i.e., direct measurements or through predictive calculations), the effects of noise to humans is the most difficult to determine due to the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by

humans is very subjective, and just like odors and taste, is very difficult to predict a response from one individual to another.

The noise predictions for the CR3 Uprate Project were developed using the CADNA A computer model. The noise impacts of the CR3 Uprate Project were evaluated using the sound power levels  $(L_w)$  (Appendix 10.5.1) for the various operating equipment associated with the CR3 Uprate Project. The location of each noise source was based on its location in the computerized plot plan. The computerized drawing was imported into the CADNA A model for the noise analysis.

CADNA A is an environmental noise propagation computer program that was developed to assist with noise propagation calculations for major noise sources and projects. Noise sources are entered as octave band sound power levels,  $L_w$ . Locations of the noise sources, buildings, and receptors are input directly on the base map and can be edited throughout the modeling process. All noise sources are assumed to be a point, line, area or vertical area source, and can be specified by the user. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs are calculated. Sources modeled included the cooling towers.

Table 5.7.1-1 presents the noise impacts of the CR3 Uprate Project. When predicted levels from cooling towers are combined with baseline noise levels there is no significant increase to the noise level at monitoring sites 5, 6, and 7. With the exception of Site 6 Night, the predicted noise levels of the baseline sites would be at or lower than Citrus County noise standards for residential land use of 60 dBA during the daytime and 55 dBA during the nighttime. The predicted noise levels are not expected to adversely impact the sensitive receptors identified in the vicinity of the Project Area.



Figure 5.7.1-1 shows the maximum predicted noise level compared with the  $L_{eq}$  baseline sound level observed during the nighttime at Site 6. This figure also shows a comparison of various noise sources and their respective sound levels.

Intermittent noise sources during routine startup, testing, and maintenance, and emergency conditions will include steam venting. Such activities would not normally occur simultaneously and would last for a short duration. The noise impacts of these conditions would not be expected to cause a nuisance.

#### 5.8 Changes to Non-Aquatic Species Population

#### 5.8.1 Impacts

No adverse impacts to non-aquatic species are anticipated during the operation of CR3 following completion of the CR3 Uprate Project. All of the CR3 facilities will be located primarily upon previously-impacted areas which does not provide suitable natural areas for wildlife. The existing CR3 site has been disturbed during prior construction of the existing CR3 facilities, including removal of vegetative communities, topographic grading, and hydrologic alteration. The CR3 facility does not provide critical habitat for wildlife; therefore the operation of CR3 is not anticipated to result in the reduction of any populations of non-aquatic species.

No adverse impacts to federal- or state-listed terrestrial plants or animals are expected during facility operations, due to the existing developed nature of the habitat within the site. No long term change in the populations of any threatened or endangered species is anticipated as a result of operation of CR3.

No changes in wildlife populations at the adjacent undeveloped areas are anticipated, including listed species. Noise and lighting impacts are minimal, and not anticipated to deter the continued use of the undeveloped forested areas within the vicinity by listed species of wildlife based upon evidence from existing power facilities in Florida.

#### 5.8.2 Monitoring

Because no significant impacts to non-aquatic species populations are anticipated, no monitoring program is proposed.





# **Terrestrial Ecology**

**T-7** 

1. Environmental Support Document, Crystal River Unit 3, South Cooling Tower Laydown Area, Citrus County Florida, May 2009 **Golder Associates Inc.** 5100 West Lemon Street Suite 114 Tampa, FL USA 33609 Telephone: (813) 287-1717 Fax: (813) 287-1716



# ENVIRONMENTAL SUPPORT DOCUMENT CRYSTAL RIVER UNIT 3 SOUTH COOLING TOWER LAYDOWN AREA CITRUS COUNTY, FLORIDA

Submitted to:



Progress Energy Florida, Inc. 299 Ist Ave. N. - PEF-903 St. Petersburg, FL 33701

Submitted by:

Golder Associates Inc. 5100 West Lemon Street Suite 114 Tampa, FL 33609

Distribution:

5 Copies - Progress Energy Florida, Inc. 1 Copy - Golder Associates Inc.

May 2009

093-89529

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- Appendix B USACE Jurisdictional Determination Forms
- Appendix C Topographic Survey
- Appendix D Florida Natural Areas Inventory Element Occurrence Report
- Appendix E Uniform Mitigation Assessment Method Forms



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### **1.0 INTRODUCTION**

Progress Energy Florida, Inc. (PEF) is proposing the construction of a new forced draft cooling tower to mitigate thermal impacts from its planned Extended Power Uprate project at the Crystal River Unit 3 (CR3) Nuclear Plant. The site is located in Section 32, Township 17 South, Range 16 East, in Crystal River, Citrus County, Florida (Figure 1).

The south cooling tower project identified a need for laydown space for tower construction activities. PEF is proposing to develop a 4.13-acre area on the south side of the discharge canal, adjacent to the CR3 Nuclear Facility Training Center (target shooting range) (Figure 2), in order to provide the required laydown area. The laydown area design shall take into account a requirement to modify the north berm at the target shooting range. This berm will need to be extended 100 to 150 feet (ft) and raised to a total height of 20 ft (from the current height of 17 ft) along its full extent.

#### 2.0 METHODOLOGY

#### 2.1 Habitat Classification

Project biologists from Golder Associates Inc. (Golder) identified upland and wetland habitats within and adjacent to the project area through field verification and review of the Florida Department of Transportation's (FDOT) Florida Land Use, Cover, and Forms Classification System (FLUCFCS) Handbook (FDOT, 1999) (Figure 3), U.S. Department of Agriculture (USDA)/Natural Resources Conservation Service (NRCS) soils maps (USDA, 2006) (Figure 4), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (Figure 5), and Southwest Florida Water Management District (SWFWMD) land use database (SWFWMD, 2007). In addition, Federal Emergency Management Agency (FEMA) databases were also queried (FEMA, 2007) (Figure 6).

Where necessary, upland and wetland habitats were field revised and reassigned FLUCFCS codes according to their predominant vegetative cover.

#### 2.2 Approximate Wetland Delineation

Approximate jurisdictional wetland boundaries were identified in accordance with the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, and the criteria identified in Chapter 62-340, Florida Administrative Code (F.A.C.). Specifically, the site was examined for the presence of hydrophytic vegetation, hydric soils, and hydrologic indicators. The landward extent of jurisdictional wetlands and other surface waters was flagged in the field on March 17, 2009. Neither the wetland nor other surface water boundaries have been reviewed or verified by the regulatory agencies; however, they were marked in the field with high visibility flagging tape and sequentially numbered for future identification.

Wetland and other surface water boundary locations are depicted on the land use/land cover map. Dominant vegetation, soil conditions, and hydrologic indicators were documented for each wetland and other surface water. USACE Routine Wetland Determination Data Forms are included in Appendix A, and USACE Jurisdictional Determination forms are included in Appendix B. Additionally, wetland and other surface water boundary points were surveyed by professional land surveyors and are included in the Topographic Survey (Appendix C).

#### 2.3 Listed Species Assessment

The proposed laydown site was assessed for the presence of threatened, endangered, and/or species of special concern in March 2009 via meandering pedestrian transects. Listed plant species are those plants that are listed by the USFWS or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, of special concern, or commercially exploited. Listed animal species are those animals that are listed as endangered, threatened, or of special concern federally by the USFWS or within the state of Florida by the Florida Fish and Wildlife Conservation Commission (FFWCC).

County-specific geographic information system data were obtained from the Florida Natural Areas Inventory (FNAI), which maintains a database of known occurrences of listed species throughout Florida. An FNAI report was obtained specifically for the area within 1 square mile of the site, as well as for a  $\pm 2$ -mile radius of that 1-square-mile area (FNAI Map, Matrix Unit ID 21566, Appendix D). In addition, the FFWCC Bald Eagle Nest Locator database (FFWCC, 2009) was used to identify the location and status of any bald eagle nests in the vicinity of the site (Figure 7).

All observations of listed and non-listed wildlife species within and adjacent to the project area were documented. These observations included direct sightings of species or signs of their presence, including tracks, scat, nests, and, typically with avifauna, calls.

#### 2.4 Wetland Functional Assessment

Rather than an acre-for-acre mitigation or the use of mitigation ratios, the calculation of mitigation requirements involves use of a wetland functional assessment value multiplied by the acreage of impact to determine the required number of mitigation credits to offset wetland impacts. Wetland functional assessments typically involve ranking the subject wetland relative to several variables, such as vegetation, wildlife utilization, hydrology, and surrounding landscape conditions. The goal of the functional assessment is to determine the ecological value of the wetland prior to disturbance, to ensure that mitigation is designed to replace the wetland's ecological functions rather than merely the acreage of fill. Using this rationale, a 2-acre wetland dominated by exotic vegetation with altered hydrology and little wildlife utilization would have a lower functional value and thus require fewer mitigation credits as compared to a 2-acre wetland supporting a diverse assemblage of native flora and fauna and unaltered hydrologic regime.

Information was collected prior to and during the field reconnaissance in order to prepare a wetland functional assessment for each FLUCFCS type utilizing the Florida Department of Environmental Protection's Uniform Mitigation Assessment Method (UMAM). UMAM quantifies the quality or health of wetlands and other surface waters through evaluation of several variables, including location and landscape support, water environment, and community structure as defined under Chapter 62-345, F.A.C. UMAM scores and associated documents are provided in Appendix E.

### 3.0 RESULTS

#### 3.1 Habitat Classification/Approximate Wetland Delineation

#### Uplands

The cooling tower laydown project is on an approximately 4.13-acre site located just north of the CR3 Nuclear Facility Training Center (target shooting range). The proposed laydown area is surrounded to the north, west, and south by a  $\pm$ 10- to 20-foot berm, portions of which were constructed to provide protection from target shooting activities on the adjacent site. Upland land use on the proposed laydown site is limited primarily to Utilities (FLUCFCS 830). This area was composed of ruderal and/or transitional vegetation, including saltbush (*Baccharis halimifolia*), winged sumac (*Rhus copallina*), poison ivy (*Toxicodendron radicans*), Bermudagrass (*Cynodon dactylon*), fireweed (*Erechtites hieracifolius*), and flamevine (*Ampelopsis arborea*). Other vegetation observed included poorman's pepper (*Lepidium virginicum*), goldenrod (*Solidago* sp.), bushy broomsedge (*Andropogon glomeratus*), cranesbill (*Geranium carolinianum*), Indian clover (*Melilotus indica*), prickly pear cactus (*Opuntia humifusa*), and plantain (*Plantago virginica*). Small areas of disturbed temperate hardwood forest (FLUCFCS 425) were also included in the eastern portion of the site and are dominated by red cedar (*Juniperus virginiana*), cabbage palms (*Sabal palmetto*), and Brazilian pepper (*Schinus terebinthifolius*).

Historic use of the proposed laydown area site included shrimp farming activities. Pond liner materials and associated debris still exist on the site. Fill material was also historically introduced onto the site in order to construct a haul road and adjacent CR3 Nuclear Facility Training Center. A meteorological tower is housed at the terminus of the haul road.

#### Wetlands and Other Surface Waters

A Stream and Waterway (FLUCFCS 510), small area of Wetland Hardwood Forest (FLUCFCS 610), were identified within the proposed laydown area project boundary. Additionally, a Saltwater Marsh (FLUCFCS 642) bounds the laydown area to the north and west, while Canals and Locks (FLUCFCS 816) border the site to the south. These wetlands and other surface waters are described below.

#### Streams and Waterways (FLUCFCS 510)

This area consists of a 0.07-acre ditch, located on the northern portion of the laydown area site. The ditch is bisected by an access haul road. This ditch appears to be a remnant of the shrimp ponds that were historically on this site. The ditch also appears to have been connected to another pond at one time, via a culvert on its east end; however, this culvert no longer appears to function. Vegetation consists of a shrub and subcanopy layer composed of saltbush, Florida privet, wax myrtle, winged sumac, sugarberry (*Celtis laevigata*), and Brazilian pepper. Understory vegetation is dominated by thickets of poison ivy and flamevine.

#### Wetland Hardwood Forest (FLUCFCS 610)

This 0.04-acre wetland is located in the central portion of the proposed laydown area, south of the access road. The canopy layer is sparse and consists primarily of sugarberry and sabal palm. The subcanopy and shrub layers include saltbush, wax myrtle, Florida privet, and winged sumac. Understory vegetation is sparse and composed primarily of flamevine, with lesser amounts of bushy broomsedge and poison ivy.

#### Saltwater Marsh (FLUCFCS 642)

This wetland habitat is located adjacent to the northern and western boundaries of the proposed laydown area. Sparse canopy, where it exists, is dominated by red cedar and cabbage palms. The subcanopy is also sparse, consisting of black mangroves (*Avicennia germinans*) and Florida privet. Saltbush, marsh elder (*Iva frutescens*), christmasberry (*Lycium carolinianum*), and wax myrtle dominate the shrub layer, with lesser amounts of white mangrove (*Laguncularia racemosa*) and Brazilian pepper. Groundcover species include black needlerush (*Juncus roemerianus*), saltgrass (*Distichlis spicata*), saltwort (*Batis maritima*), sea purslane (*Sesuvium portulacastrum*), broomsedge, and bushy broomsedge.

The proposed laydown area construction activities have been designed so that adverse secondary impacts to this wetland are avoided by providing a minimum 15-ft, average of 25-ft, buffer between construction activities and this system.

#### Canals and Locks (FLUCFCS 816)

This is a 0.006-acre portion of shoreline of the man-made intake canal, located along the southwestern boundary, of the laydown area site. Vegetation along the man-made canal shoreline is

sparse and consists of upland species such as beggar ticks (*Bidens pilosa*) and an approximately 5-10 foot strip of wetland species such as saltwort, sea purslane and sea blite (*Suaeda linearis*).

According to the FEMA flood zone maps, the site occurs in a coastal high hazard zone, Zone VE, and is prone to inundation from tidal floods (Figure 6).

### Soils

Two NRCS soil types were identified in the proposed south cooling tower area (Figure 4). These soil types are described below (USDA, 2006).

#### 22- Quartzipsamments, 0 to 5 percent slopes

This is the dominant soil type on the proposed cooling tower laydown area. This soil is nearly level to gently sloping and has been reworked and shaped by earthmoving activities. Historically, many of these areas were sloughs, marshes, shallow ponds, or other areas of standing water that have been filled with sandy soil materials to match the level of the surrounding landscape, or higher. Depth to water table is typically greater than 80 inches, depending on the thickness of the fill material and drainage of the underlying soils. Permeability is also variable, but generally very rapid. Vegetation tolerant of very low fertility and droughty conditions is common.

#### 38- Rock Outcrop - Homosassa-Lacoochee Complex

This soil type consists of limestone rock outcrop and Homosassa and Lacoochee soils that are common to tidal saltwater marshes and offshore islands along the Gulf Coast. These soils are flooded daily by high tides and/or periodically flooded by exceptional high tides and storm tides. Vegetation common to this soil type includes smooth cordgrass, marshhay cordgrass, seashore saltgrass, and other forage grasses and forbs.

#### 3.2 Listed Species Assessment

#### Flora

Four listed plant species were identified by FNAI within 1 square mile of the project site (FNAI, Matrix Unit ID 21566, Appendix D). Of the four listed plants, the state classifies three as endangered and the remaining one as threatened. In addition, the USFWS classifies one of the four species as federally endangered.

A description of these species follows.

#### Cooley's Water Willow (Justicia cooleyi)

The USFWS and the FDACS list Cooley's water willow as endangered. This flowering perennial herb grows up to 16 inches tall and has erect, square, hairy stems with few branches. Cooley's water willow is found in mesic hardwood hammocks over limestone (FNAI, 2000). Due to limited quantity and disturbed nature of the preferred habitat located within the laydown area site, it is unlikely that this species is present.

#### Corkwood (Leitneria floridana)

The FDACS lists corkwood as threatened. This deciduous shrub or small tree (up to 15 ft) typically occurs in colonies. The reddish stem contains small corky patches and conspicuous leaf scars. Corkwood leaves are alternate, with entire margins, clustered at the top of the stems; mature leaves are smooth above and softly hairy beneath. This plant occurs along edges of marshy openings and along small drainages in coastal hydric hammocks; occurs along fresh or tidal marshes; and is frequently associated with sawgrass (*Cladium jamaicense*) and toothleaf (*Stillingia sylvatica*) (FNAI, 2000). Due to the lack of potential habitat on the laydown area site, it is unlikely that this species is present; however, this species may occur within the saltwater marsh adjacent to the project site.

#### Pinewood Dainties (Phyllanthus leibmannianus spp. platylepis)

The FDACS lists pinewood dainties as endangered. This flowering perennial herb has smooth, slender, unbranched stems. This plant grows 12 to 20 inches tall, rising from a blackish woody stem. Leaves are alternate, spirally arranged around the stem, widest above the middle with rounded or pointed tips, dark green above, pale green and conspicuously veined below, and sessile. This plant occurs in hardwood-palm hammocks, flatwoods, and Gulf hammocks with a high hydroperiod and fine-textured, highly drained soils of limestone (NatureServe Explorer, 2009). Due to limited quantity and disturbed nature of one of this species' preferred habitats on the laydown area site, it is unlikely that this plant is present.

#### Pinkroot (Spigelia loganoides)

The FDACS lists pinkroot as endangered. Pinkroot is a flowering perennial herb up to 8 inches tall, with several sparingly branched stems that grow from a slightly woody base. It is typically found in floodplain forests and upland and hydric hardwood hammocks over limestone (FNAI, 2000). Due to

limited quantity and disturbed nature of this species' preferred habitat on the laydown area site, it is unlikely to be present.

#### Fauna

The habitat types identified in the laydown area that serve as the principal wildlife habitat types include temperate hardwood forests, and wetland/aquatic areas such as streams and waterways and a small wetland hardwood forest. Habitats such as canals and locks and utilities are of relatively lower value to wildlife.

Based on habitat requirements and availability, Golder and FNAI identified a total of 19 listed wildlife species as being likely to occur or with a potential to occur within 1 square mile of the project area (FNAI, 2009). Of these 19 species, the USFWS lists 4 as threatened and 3 as endangered. The FFWCC lists 10 of the 19 species as species of special concern, 5 as endangered, and the remaining 4 as threatened. USFWS- and FFWCC-listed species are discussed in the following paragraphs. The bald eagle (*Haliaeetus leucocephalus*) is also included in the following discussion due to its protection under the Federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, as well as Florida's Bald Eagle Management Plan.

#### Fish

#### Gulf Sturgeon (Acipenser oxyrinchus desotoi)

The USFWS lists the Gulf sturgeon as threatened, and the FFWCC lists it as a species of special concern. This large sturgeon, approximately 5 to 7.5 ft in length, forages in the Gulf of Mexico and associated estuaries. It spawns in most major coastal rivers in areas with limestone outcrops. Adults and subadults spend the three coldest months in the Gulf and the remainder of the year in rivers where spawning occurs (February to April) (FNAI, 2001). It is unlikely that the Gulf sturgeon is present within the project area.

#### Reptiles

#### Loggerhead (Caretta caretta)

Both the USFWS and the FFWCC list loggerheads as threatened. They inhabit marine coastal and oceanic waters, nesting on coastal sand beaches, often near the dune line. Juvenile turtles frequent

bays, inlets, and lagoons. Due to lack of preferred habitat, it is unlikely that the loggerhead is present within the project area.

#### Green Turtle (Chelonia mydas)

Both the USFWS and the FFWCC list the green turtle as endangered. Green turtles inhabit estuarine and marine coastal and oceanic waters, nesting on coastal sand beaches, often near the dune line. Juveniles frequent coastal bays, inlets, lagoons, and offshore worm reefs. Due to lack of preferred habitat, it is unlikely that the green turtle is present within the project area.

#### Eastern Indigo Snake (Drymarchon couperi)

Both the USFWS and the FFWCC list the eastern indigo snake as threatened. These snakes can occur within a broad range of suitable habitats, from scrub and sandhill to wet prairies. In its northern range, it is often commensal with the gopher tortoise, using the tortoises' burrows for shelter during the winter (FNAI, 2001). Due to the lack of preferred habitat within the project area, it is unlikely that the eastern indigo snake is present.

#### Gopher Tortoise (Gopherus polyphemus)

The FFWCC currently lists the gopher tortoise as threatened. Gopher tortoises are commonly found in dry upland habitats, such as sandhills, scrub, xeric oak hammock, and dry pine flatwoods. They are also found in pastures and old fields (FNAI, 2001). Due to the lack of preferred habitat within the project area, it is unlikely that the gopher tortoise is present.

#### Birds

#### Scott's Seaside Sparrow (Ammodramus maritimus peninsulae)

The FFWCC lists Scott's seaside sparrow as a species of special concern. Sparrows present along the Gulf coast inhabit areas dominated by extensive stands of black needlerush, with smooth cordgrass and scattered areas of saltgrass. Due to the presence of saltwater marshes adjacent to the project site, there is a potential that this species is present nearby.

#### Piping Plover (Charadrius melodus)

Both the USFWS and the FFWCC list the piping plover as threatened. They inhabit open sandy beaches, as well as tidal mudflats and sandflats along the coast (FNAI, 2001). In 2001, FNAI
identified one adult foraging along the intake canal southwest of the site (Appendix D) (FNAI, 2009). Due to the presence of saltwater marshes adjacent to the laydown area, there is a potential that this species is present nearby.

#### Marian's Marsh Wren (Cistothorus palustris marianae)

The FFWCC lists Marian's marsh wren as a species of special concern. They inhabit tidal marshes dominated by black needlerush on the Gulf coast (FNAI, 2001). Due to the presence of saltwater marshes adjacent to the laydown area, there is a potential that this species is present nearby.

#### Snowy Egret (Egretta thula)

The FFWCC lists the snowy egret as a species of special concern. It is widely distributed in Florida in both freshwater and coastal wetlands, as well as surface waters (FNAI, 2001). It is likely to forage in the saltwater marsh and surface waters adjacent to the project area.

#### **Tricolored Heron** (*Egretta tricolor*)

The FFWCC lists the tricolored heron as a species of special concern. It inhabits a variety of wetland and surface water habitats, such as ditches, pond and lake edges, and coastal areas (FNAI, 2001). It is likely to forage in the saltwater marsh and surface waters adjacent to the project area.

#### White Ibis (Eudocimus albus)

The FFWCC lists the white ibis as a species of special concern. It inhabits a variety of wetland habitats, including freshwater and brackish marshes, salt flats, forested wetlands, wet prairies, swales, and man-made ditches (FNAI, 2001). It is likely to forage in the saltwater marsh and surface waters adjacent to the project area.

#### American Oystercatcher (*Haematopus palliatus*)

The FFWCC lists the American oystercatcher as a species of special concern. Oystercatchers typically require large areas of beach, sandbar, mud flat, and shellfish beds for foraging, and are more common on the Gulf coast (FNAI, 2001). In 1987, FNAI identified eight pairs of oystercatchers atop a spoil island west of the site (Appendix D) (FNAI, 2009). Due to the presence of mud flats/saltwater marshes adjacent to the project site, there is a potential for these birds to be present nearby.



#### Bald Eagle (Haliaeetus leucocephalus)

Although the bald eagle is not currently classified by the USFWS or the FFWCC as threatened or endangered, it is protected under the Federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, as well as Florida's Bald Eagle Management Plan. Bald eagles typically inhabit areas close to coastal areas, bays, rivers, lakes, or other bodies of water that provide concentrations of food sources (FNAI, 2001).

Two active bald eagle nests are known to occur within approximately 1 mile of the project site. Nest CI004 is located approximately 1 mile northeast of the site and was last active in 2008; nest CI042 is located approximately 0.7 mile southeast of the site and was last listed as active in 2007 (FFWCC, 2009) (Figure 7). In addition one inactive bald eagle nest (CI012) was identified approximately 1.5 miles southeast of the project site. This nest was last reported active in 1991. Impacts to bald eagles may be avoided through adherence to the management plan guidelines of 330- to 660-ft construction setback from any active nests.

#### Wood Stork (Mycteria americana)

Both the USFWS and the FFWCC list the wood stork as endangered. Wood storks prefer nesting in cypress swamps and mixed forested wetlands, and they forage mainly in shallow water in freshwater marshes, swamps, lagoons, ponds, tidal creeks, flooded pastures, and ditches (FNAI, 2001). Due to lack of preferred nesting habitat, it is unlikely that this species nests nearby; however, it may occasionally forage adjacent to the project site.

#### Roseate Spoonbill (Platalea ajaja)

The FFWCC lists the roseate spoonbill as a species of special concern. It forages in shallow water of variable salinity, including marine tidal flats and ponds, coastal marshes, mangrove-dominated inlets and pools, and freshwater sloughs and marshes (FNAI, 2001). Therefore, it can reasonably be expected to found foraging within the saltwater marsh adjacent to the laydown area project site.

#### Black Skimmer (Rynchops niger)

The FFWCC lists the black skimmer as a species of special concern. They inhabit coastal waters, including beaches, bays, estuaries, sandbars, and tidal creeks (FNAI, 2001). There is a potential that the black skimmer utilizes the saltwater marsh adjacent to the laydown area project site.

#### Least Tern (Sterna antillarum)

The FFWCC lists the least tern as threatened. They are present in coastal areas throughout Florida, including beaches, lagoons, bays, and estuaries (FNAI, 2001). In 1987, FNAI identified six pairs of terns via vocalization atop a spoil island west of the site (Appendix D) (FNAI, 2009). There is a potential that they are present in the saltwater marsh adjacent to the project site.

#### Mammals

#### Florida Mouse (Podomys floridanus)

The FFWCC lists the Florida mouse as a species of special concern. They prefer xeric upland habitats with sandy soils, such as scrub, sandhills, and ruderal sites, and they often inhabit burrows of the gopher tortoise (FNAI, 2001). Due to the lack of gopher tortoise habitat on the project site, it is unlikely that the Florida mouse is present.

#### Manatee (Trichechus manatus)

Both the USFWS and the FFWCC list the manatee as endangered. Manatees inhabit bays, rivers, and coastal waters (FNAI, 2001). There is a designated manatee aggregation site approximately 0.18 mile northeast of the proposed laydown area, within the discharge canal of the Crystal River Energy Complex. According to the FNAI report, up to five manatees use this area for short periods of cool weather, mostly during the spring when manatees disperse northward from Crystal River (Appendix D) (FNAI, 2009). Adverse impacts are not anticipated to manatees as a result of the construction laydown area project.

#### Florida Black Bear (Ursus americanus floridanus)

The FFWCC lists the Florida black bear as threatened. They prefer large upland forests and large swamps (FNAI, 2001). It is not likely that the Florida black bear is present within the project site due to the absence of large, contiguous tracts of mixed forested wetlands and mixed hardwood-conifer forests.

Golder project scientists conducted a general listed species survey on March 17, 2009. Afterward, Golder compiled a complete list of all wildlife species observed within and adjacent to the project area; it is provided in the table below.

Table 1: Faunal Species Observed Within and Adjacent to the Project Area
Progress Energy Florida, Inc.

COMMON NAME	SCIENTIFIC NAME	OBSERVATION TYPE*	LISTED STATUS**	
AVIFAUNA			FFWCC	USFWS
Great Egret	Ardea alba	0, V	NL	NL
Northern Cardinal	Cardinalis cardinalis	A, V	NL	NL
Laughing Gull	Larus atricilla	O, A, V	NL	NL
Northern Mockingbird	Mimus polyglottos	V	NL	NL
Osprey	Pandion haliaetus	V, F	NL	NL
Rufous-sided Towhee	Pipilo erythrphthalmus	V	NL	NL
Eastern Phoebe	Sayornis phoebe	0, V	NL	NL
MAMMALS				
Nine-banded Armadillo	Dasypus novemcintus	· V	NL	NL
Bobcat	Felis rufus	0, V	NL	NL

**\*OBSERVATION TYPE** A = Audio cue from species V = V isual observation of species, including tracks and/or scat

NL = Not Listed

**\*\*LISTED STATUS** 

 $\mathbf{O} = Off-site$ 

 $\mathbf{F} = Flyover$ 

No listed floral or faunal species were observed on or adjacent to the site. In addition, neither bald eagles nor their nests were encountered. According to the FFWCC database, the closest active bald eagle nest is located well outside the 660-ft recommended bald eagle nest buffer zone (± 0.7 mile southeast of the project area) (Figure 7).

#### 3.3 Wetland Functional Assessment

A forested wetland (WL B - 0.04 acre), a remnant shrimp pond/ditch consisting of two portions (SW I - 0.04 acre + 0.03 acre), and a man-made canal shoreline (SW II - 0.006 acre), were identified on the proposed laydown area site. All of these systems combined comprise less than 0.50 acre of impacts (0.116 acre total) and appear to provide marginal value and function to fish and wildlife. UMAM evaluations were conducted for all three systems and produced functional losses of 0.017-acre credit for the forested wetland, 0.003-acre credit for the intake canal shoreline, and 0.026-acre credit for the remnant shrimp pond/ditch for a total of 0.046-acre credit (Appendix E).

The lost wetland functions will be replaced through the purchase of 0.05 mitigation credit from an agency-approved mitigation bank as discussed below.

**Golder Associates** 

The laydown area site is within the service area of the SWFWMD-permitted Upper Coastal Mitigation Bank (UCMB). The UCMB is a 148.76-acre mitigation bank located at the headwaters of the Homosassa River, approximately 600 ft south of the Homosassa Wildlife Park, and approximately 1,700 ft north of the Withlacoochee State Forest in the town of Homosassa, Citrus County, Florida (Figure 8). UCMB offers state mitigation credits for forested and non-forested wetlands. Purchase of credits from the UCMB would promote wetland restoration and conservation efforts within the southwest Florida region to offset the loss of wetland functions attributed to construction of the project.

Federal credits are not currently available at the UCMB; however, according to the UCMB manager, the USACE is in the process of permitting the new phase of the bank (Earth Balance, May 2009). Upon receipt of the approved jurisdictional determination, Golder will, if necessary, prepare a detailed mitigation proposal and submit it to the USACE.

#### 4.0 AVOIDANCE AND MINIMIZATION

Efforts to eliminate and/or reduce impacts to wetlands resulted in redesign of the original project layout to avoid a tidally influenced wetland system associated with the northern and western portions of the site.

The original design utilized the entire cooling tower laydown area site, without a wetland buffer zone, which would result in secondary impacts to the saltwater marsh (FLUCFCS 642) that borders the site to the north and west. Project refinement provided for the use of a minimum 15-ft buffer zone, with an average of 25 ft, eliminating these secondary impacts. Therefore, wetland impacts were reduced through utilization of previously disturbed uplands (FLUCFCS 425 and 830), in addition to a small disturbed wetland (FLUCFCS 610) and other surface waters (FLUCFCS 510 and 816), to the greatest extent practicable.

F/N: H:\PROJECTS\2009proj\093-89529 PEF CR3 South Cooling Tower Laydown Area\200 Reports\Final Report\4-Env Support Doc\_FINAL14May09.docx



#### 5.0 **REFERENCES**

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# **Terrestrial Ecology**

# **T-9**

1. Florida Scrub Jay Observations Map



# **Terrestrial Ecology**

# **T-10**

1. CR123 Percolation Ponds

2. Florida Wood Stork Colonies Core Foraging Areas

# **CR123** Percolation Ponds





# T-12

1. Gopher Tortoise Observations Map



# **Terrestrial Ecology**

## **T-14**

- 1. Procedure MNT-TRMX-00176, Transmission Vegetation Management Program
- 2. Procedure MNT-TRMX-00193, TVM Program: Off Row Tree Cutting Guidelines
- 3. Progress Energy Florida General Guidelines for Herbicide Applications on Transmission Rights of Way
- 4. Progress Energy Florida General Guidelines for Vegetation Maintenance/RE-Clearing of Transmission Rights of Way
- 5. MNT-TRMX-00000, Transmission Maintenance Program Policy

Document title

# **Transmission Vegetation Management Program**

Document number

# MNT-TRMX-00176

Applies to: Transmission Operations & Planning Department – Carolinas and Florida

Keywords: maintenance; transmission - maintenance line

#### 1.0 Introduction

Progress Energy Transmission employs an Integrated Vegetation Management Program (IVMP) that combines various components to manage the growth of vegetation on the electric transmission utility right of way (ROW). Through the use of different, integrated methods, the optimum results (reliability, etc.) occur reducing the need to employ reliability-based trimming/removal and danger tree cutting.

Progress Energy Transmission utilizes easements, permits and/or company owned lands for the right of way on which the transmission lines are constructed. The routine inspection and maintenance of the right of ways (ROW) are extremely important for the safety of the public and the personnel that are responsible for the operation/maintenance of the transmission lines. Maintaining right of ways in accordance with established procedures results in a high level of transmission line reliability.

#### 2.0 Program Policies, Procedures, Components and Specifications (FAC-003 R1)

#### 2.1 Program Objectives

Ensure the reliability of the transmission system by minimizing vegetation related interruptions, while maintaining compliance with regulatory, environmental and safety requirements/standards.

#### 2.2 Philosophy

Our philosophy is based upon employing the proper, most economical vegetation management techniques to ensure the effectiveness of our program in a wide variety of environments. This is achieved through communication, continuous learning and assessing best management practices throughout the industry.

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# 2.3 **Program Scope**

The visual inspection and appropriate maintenance of transmission line right of ways comprise the Transmission Vegetation Management Program.

Inspections (periodic aerial and as needed ground patrols) are performed to monitor vegetation growth, right of way contractor effectiveness and encroachments within the right of way. Maintenance activities may include any of the following: re-clearing vegetation (mechanical clearing, hand cutting and herbicide application), tree trimming/removal, danger tree cutting and encroachment licensing/removal.

All transmission lines at voltages of 200 KV and higher will maintain 100% compliance with the MNT-TRMX-00176 specifications and cycle frequencies. All transmission lines at voltages less than 200KV will utilize MNT- TRMX-00176 as a standard and apply appropriate IVM methods as required to ensure the reliability of the line.

This procedure shall be followed in accordance with Section 3 "Preventive Maintenance Program" requirements in the Transmission Maintenance Procedures Policy (<u>MNT-TRMX-00000</u>).

## 2.4 Program Work Components

All work performed shall be in accordance with ANSI, OSHA and other applicable safety requirements, laws and Progress Energy guidelines. The following describes the various components that are utilized in the Progress Energy Transmission's Integrated Vegetation Management Program.

**Right of way re-clearing** (using mechanical equipment – e.g., rotary mowers, Kershaw, Hydro-Ax, etc.) - All of the wooded sections of the right-of-way are to be re-cleared with mechanical equipment, where possible, to the full width as noted in a detail description. All undergrowth is to be cut within six (6) inches of the ground. All vines on poles and brush around poles in fields are to be cut and removed out of cropped areas. Cut all leaning trees that have been pulled into the right-of-way by storms. All brush cut from stream banks or drainage ditches must be removed from streams and ditches so as not to impede the flow of water. When run ways are cut through existing canals, the canal must be restored to original condition allowing drainage to continue as it did before our operation. Vista screens and trimmed trees are not to be cut during re-clearing operations without specific instructions from Company representative.

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**Right of way re-clearing** (hand-cutting) - All of the wooded sections of the right-ofway that cannot be re-cleared with mechanical equipment are to be hand cut to the full width as noted in a detail description. All undergrowth is to be cut within six (6) inches of the ground or current water level. All vines on poles and brush around poles in fields are to be cut and removed out of cropped areas. Cut all leaning trees that have been pulled into the right-of-way by storms. All brush cut from stream banks or drainage ditches must be removed from streams and ditches so as not to impede the flow of water. Vista screens and trimmed trees are not to be cut during re-clearing operations without specific instructions from a Progress Energy representative.

**Right of way re-clearing** (herbicides) – Where appropriate, the primary method of vegetation control on transmission right of ways may be established as, or converted to, the use of herbicides. Herbicides may also be applied on a case by case basis on areas of line right of ways that cannot be effectively, or efficiently, mowed or hand-cut. The application of herbicides on Transmission ROW shall be in accordance with procedure <u>EVC-EDGC-00001</u> (Herbicide Usage on Rights-of-Way *Energy Delivery Carolinas only*) and all applicable TVM specifications.

**Tree removal/trimming** - All trees requiring removal/trimming should be removed or trimmed so as to obtain sufficient clearance to prevent a hazard to operations for the removal/trimming cycle. Vegetation within the ROW that will reach a height of more than 12' at maturity will be evaluated for removal including follow up with the landowners.

**Off right of way tree cutting** – Off right of way trees are those trees located outside the defined right of way width. These trees, due to their height if they were to fall could make contact with the conductor or fall to within five feet of the outermost conductor, grow into the conductor or due to conductor blowout could make contact with the conductor. All trees cut are to be cut according to <u>MNT-TRMX-00193</u> (TVM: Off Right of Way Tree Cutting Guidelines).

**Danger tree cutting** – Danger trees are those trees located inside or outside the designated right of way that are in decline/diseased, have structural defects, leaning towards the right of way or are dead. These trees, due to there height if they were to fall could make contact with the conductor or fall to within five feet of the outermost conductor. These trees should be inspected and assessed thoroughly for structural integrity before climbing is performed. When the safety of the crew is at risk if the tree is climbed, alternate mechanical or other methods shall be utilized to perform the removal safely.

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# 2.4.1 Program Component Frequency Targets

The actual frequency for specific facilities may vary significantly from the target frequency based on the integrated program components that are being employed and on site/facility specific factors (such as - but not limited to: indigenous vegetation, easement/permit width and rights, construction type, voltage, IVM activities, environmental restrictions, regulatory requirements, etc.) Right of way maintenance frequency intervals for program component tasks are identified below. These frequency intervals will be used to determine the calendar year in which the work will be scheduled.

	Task	PE Carolinas	PE Florida
.1.1	Right of Way 1. Re-clearing (mechanical)	36 months	48-60 months
	2. Re-clearing (hand-cutting)	36 months	48-60 months
	3. Re-clearing (herbicides)	36 months	48 months
	4. Tree removal/trimming	36 months	48-60 months
	5. Off-R/W Tree Cutting	As Needed*	As Needed*

 Reliability-based danger tree cutting is performed as needed when danger trees are identified.

### 2.5 Work Specifications and Procedures

#### 2.5.1 Work Specifications

Standards for specific work will be developed for all work practices and incorporated into contract documents for each project or work activity. These standards/specifications will incorporate ANSI-300 and ANSI-Z133 as appropriate.

# 2.5.2 Off Right-of-Way Tree Cutting

Standards found in <u>MNT-TRMX-00193</u> (TVM: Off Right of Way Tree Cutting Guidelines).

# 3.0 Inspections (FAC-003 R1.1)

2.4

Aerial patrols will be conducted in accordance with all applicable Progress Energy Safety Rules, OSHA regulations, work practices, and regulatory requirements. Patrols will be conducted with qualified Progress Energy Transmission personnel to look for and document conditions of the following: ROW/Vegetation clearances encroachments - line equipment - substation equipment.

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The frequencies for inspections impact Right of way and line maintenance and are defined in procedure <u>MNT-TRMX-00051</u> (Transmission Line Equipment Maintenance and Inspection Schedules). The general guidelines for TVM Aerial Patrol Inspections and reactive work completion are defined in procedure <u>MNT-TRMX-00195</u> (TVM Program: Aerial Patrol Inspection Guidelines).

When multiple aerial patrols are planned for a calendar year, they will be scheduled across the growing season to ensure that growth issues are detected.

## 4.0 TVM Clearance Requirements (FAC-003 R1.2)

Progress Energy Transmission vegetation clearance requirements for the TVM program have been established. These clearances comply with the program vegetation clearances requirements of FAC-003.

#### 4.1 Vegetation Clearances Following VM Work (FA-003 R1.2.1)

The vegetation clearances to be achieved at the time of TVM work completion will comply with the following guidelines:

#### 4.1.1 Clearances Achieved at the Time of TVM Work

#### 4.1.1.1 Vegetation Clearance: Floor Growth

The vegetation to conductor clearances to be obtained at the time of TVM work completion will use the maximum operating sag of the conductor as the reference point for TVM work for vegetation clearances. The clearance to be obtained at the time of TVM work will use the following criteria to target the clearances at the time of TVM work:

- Clearances will include the appropriate 'minimum' conductor to vegetation clearances defined in Table 4 or Table 5 of <u>MNT-TRMX-00191</u> (TVM Program: Vegetation Clearance Tables)
- Clearances will also include distances for vegetation re-growth as defined in Table 3 of <u>MNT-TRMX-00191</u> (TVM Program: Vegetation Clearance Tables)
- These combined distances are to be obtained at the time of TVM work below the maximum operating sag point of the conductor
- Minimum safe working distances may also impact clearance requirements at the time work is completed as defined in Table 1 or Table 2 of <u>MNT-TRMX-00191</u> (TVM Program: Vegetation Clearance Tables)

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# 4.1.1.2 Vegetation Clearance: Side Growth

To ensure side growth and conductor side-swing impacts are limited, the TVM program targets providing vegetation side growth clearance based on the following criteria:

- Vegetation clearances will be maintained to provide for conductor blowout from less than 4.1 psf wind loading or equivalent to approximately 40 mph winds (i.e., sub-tropical storm winds)
- Clearances will include the appropriate 'minimum' conductor to vegetation clearances as defined in Table 4 or Table 5 of <u>MNT-TRMX-00191</u> (TVM Program: Vegetation Clearance Tables)

### 4.1.2 Safe Working Clearances

For all vegetation work, the minimum safe working distances defined in Table 1 and Table 2 of <u>MNT-TRMX-00191</u> (TVM Program: Vegetation Clearance Tables) will be observed.

The majority of all work is normally completed at normal operating (loading/temperature) conditions that ensure the safe working clearances can be observed with no special precautions. When operating conditions and vegetation growth reduce clearances to less than the minimum safe working distances, the work will be rescheduled under the appropriate operating conditions to ensure that safe working clearances can be observed.

# 4.2 Minimum Vegetation to Conductor Clearances (FA-003 R1.2.2)

The minimum conductor to vegetation clearances, Clearance 2 in FAC-003 (R1.2.2), will be maintained under all rated electrical operating conditions. These clearances are defined in Table 4 and Table 5 of <u>MNT-TRMX-00191</u> (TVM Program: Vegetation Clearance Tables).

The clearances included in these tables were developed and based on Table 5, IEEE 516-2003, phase to ground distances with appropriate altitude correction factors applied.

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# 5.0 Personnel Qualifications (FAC-003 R1.3)

The following qualifications represent the minimum level of experience and/or education to be hired for the following positions.

# 5.1 Field Inspector/Right of Way Specialist

# Minimum Qualifications:

- 1. Bachelors Degree in Forestry or related field, or 2 year technical degree with 1 years experience, or 5 years experience in utility vegetation management
- 2. General understanding of Integrated Vegetation Management techniques
- 3. Understanding of ANSI Z-133 and A-300
- 4. Understanding of basic electrical systems and causes of vegetation related interruptions
- 5. General knowledge of proper herbicide uses and application methods
- 6. Must obtain state pesticide applicators license within 1 year, or work under the direction of an Area Forester
- 7. Must obtain ISA certification within 1 year, or work under the direction of an Area Forester

### 5.2 Lead Forester/Area Forester

#### Minimum Qualifications:

- 1. Bachelors degree in forestry or related field and 3 years utility vegetation management experience or 2 year technical degree and 5 years experience in utility vegetation management
- 2. Working knowledge of Integrated Vegetation Management techniques
- 3. Knowledge of NERC Standard FAC-003-1 and its requirements for the Transmission Vegetation Management Program
- 4. Working knowledge of ANSI Z-133 and A-300
- 5. Working knowledge of an Integrated Vegetation Management Program including practical applications of herbicides

# 6.0 Mitigation (FAC-003 R1.4)

For all locations (spans) on the transmission system where the minimum vegetation clearances cannot be obtained to meet the target frequency cycle for the program component activity, the location will be documented. The following will provide the documentation for all mitigation sites and reactive work:

**Planned Mitigation** – planned/documented vegetation management work that is scheduled more frequently than TVM program standard frequencies to mitigate vegetation-related clearance issues to ensure the reliability of the system.

 Every span that requires maintenance other than the Program Component Frequencies, in paragraph 2.4.1, will be documented and tracked, including the mitigation measures for that location (i.e., shorter frequencies, etc).

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**Reactive Work** – vegetation related work identified in the field, not previously documented or planned, that requires action before scheduled cycle work to mitigate a potential reliability clearance issue.

• The TVM Program reactive work scheduling and tracking process will track all reactive work assigned and completed by TVM personnel.

### 7.0 Imminent Threat Communications (FAC-003 R1.5)

During the course of TVM work and inspections, any situation or condition that is observed and deemed to present an imminent threat to the Transmission System shall be reported in accordance with the <u>MNT-TRMX-00192</u> (TVM: Imminent Threat Communication Procedure).

### 8.0 Annual Work Plan (FAC-003 R2)

An annual work plan for the year will be maintained for each area managed by an area forester. The plan will be developed for each component activity by line or complete line maintenance. The plan will be developed using previous work completion dates, cycle length and based on annual growth cycles. Changes to the annual plan shall be documented with criteria for any changes and mitigation plans. Each area forester shall maintain a file for reportable lines with work completion information and a line completion form for each activity or complete line maintenance.

# 9.0 Transmission Vegetation Outage Reporting (FAC-003 R3)

On a periodic basis, as defined by the Region Reliability Organization, the TVM Program will report any outage that meets the criteria defined in FAC-003. In addition, the outage reporting will utilize the following criteria for meeting the FAC-003 reporting requirements:

- The general exclusion criteria in the <u>MNT-TRMX-00194</u> (Transmission Outage Reporting Process)
- Side growth vegetation-related outages resulting from tropical storm or higher winds (40 mph or greater)
- Vegetation-related outages due to human or animal interference, such as: animal severing tree; vehicle contact with tree, removal or digging or moving of vegetation; logging; arboricultural or horticultural or agricultural activities; etc.)
- Vegetation related outages that result from vegetation falling into lines from outside the ROW that result from natural disasters shall not be considered reportable (examples of disasters that create non-reportable outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, major storms as defined either by <u>MNT-TRMX-00194</u> --- the Transmission Outage Reporting Process, ice storms, and floods)
- Transmission vegetation categories (<u>Attachment A</u>, <u>Attachment B</u>, <u>Attachment C</u>
  <u>Attachment D</u>)

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Attachment A Transmission Vegetation Categories



Attachment B Category 1 Vegetation



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Attachment C Category 2 Vegetation



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# Attachment D Category 3 Vegetation



MNT-TRMX-00176

Document title



# TVM Program: Off ROW Tree Cutting Guidelines

Document number

# MNT-TRMX-00193

Applies to: Transmission Department (Progress Energy, Carolinas and Progress Energy, Florida)

Keywords: maintenance; transmission – maintenance line; vegetation management; clearances; r/w; row; r/w maintenance; transmission line maintenance

### 1.0 Off Right of Way Tree Cutting Guideline

Off right-of-way trees are trees located outside the legal right of way boundary. These trees living or dead due to their height have the potential to impact the reliability and/or damage the transmission system by falling into or having branches encroach into conductors due to restrictive right of way widths.

Off right-of-way trees may be identified through routine aerial/ground patrols or identified while performing cyclical maintenance on a line. Off right-of-way tree locations are documented and completion of work confirmed by the tree crew's weekly production reports.

Tree crews performing removal of off right of way trees should be trained in all applicable safe working practices and should evaluate each tree individually. Methods should be selected following assessment of the tree and the surrounding environment, the safest and most efficient method should be used. Trees may be removed at ground level or may be topped to a safe height below the conductors; where applicable the trunk should be girdled and sprayed with an approved herbicide to prevent future problems.

Any tree that has the potential to contact transmission/distribution facilities or property of value shall have a rope, push pole or other mechanical device to allow the crew to control the direction of fall. This methodology should also be used when topping of an off right-of-way tree is performed.

The "Off Right-of-Way Tree Cutting Guideline" will be used for the entire day when the temperature is predicted to reach, or exceed, 95 degrees.

#### 2.0 Interim Off Right of Way Tree Cutting Guidelines

The guideline below gives techniques for handling trees of specific sizes and under special conditions. The guidelines are to show the minimum size tree where the technique is required. Using his professional judgment, the foreman should use any of the techniques on smaller trees when necessary to safely cut trees.

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- All trees greater than 15 inches DBH should be cut using a rope to insure the direction of fall.
- All trees greater than 10 inches DBH should be cut using 2 push poles to insure the direction of fall.
- All vines must be cut from off right of way trees before cutting the tree or, when it is not possible to cut vines in the top of the tree, the tree will be roped to insure the direction of fall.

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# **Progress Energy Florida**

GENERAL GUIDELINES FOR HERBICIDE APPLICATIONS ON TRANSMISSION RIGHTS-OF-WAY

February 26, 2004

### A. SCOPE

These specifications cover the Herbicide Application of existing transmission rights-of-way (ROW).

#### **B. OWNER'S RESPONSIBILITIES**

- 1. Progress Energy Florida is referred to as the Owner. The transmission contract inspector is referred to as the Designated Representative (DR) or Area Senior Forester (ASF).
- 2. Owner's Easement of Record gives the right of Ingress and Egress of the ROW to the Contractor and the right to inspect and maintain the ROW per the specifications.
- 3. Owner shall provide all general drawings necessary for the proper execution of the work. Owner shall provide the Contractor with access to its facilities for the purpose of obtaining additional map information, drawings, or easement documentation. When these are not available, field assistance will be provided.

### C. CONTRACTOR'S RESPONSIBILITIES

- 1. Contractor shall at all times be aware of the nature and characteristics of Owner's electric facilities, before they begin any work. Contractor understands that the electric circuits shall at all times remain energized during the performance of their work, unless otherwise agreed upon and scheduled by the Owner. Contractor is required to utilize all necessary and proper protective equipment (if applicable), procedures, and mechanical devices for the protection of its employees and others. Contractor shall not interfere with the normal operation of such electric circuits or the electrical circuits that are adjacent to, under-built, or parallel to the facilities found within their Scope of Work. All negligent Contractor caused electric service interruptions are subject to repair at Contractor's expense.
- 2. The Contractor shall at all times comply with all Safety Standards set forth by state and federal governing agencies and guidelines as they pertain to our industry and the services that they perform. The agencies and standards of concern include, but are not limited to: OSHA, ANSI, DOT, EPA, and FDACS. Contractor Safety is of the utmost importance to the Owner. Periodic safety inspections may be performed by the Owner's ASF. Any individual, crew, or Contractor that refuses to comply with the Safety standards as set forth by the Owner, industry and/or its governing agencies will be asked leave immediately.
- 3. The Contractor shall furnish all supervision, labor, material, and equipment necessary to perform their ROW Herbicide application responsibilities.
- 4. The Contractor shall do all work in accordance with the specifications contained in this contract, **unless specifically authorized by the Owner's ASF.**
- 5. The Contractor shall visit the site to determine access and extent of work involved prior to

submitting any formal evaluation for consideration by the Owner.

- 6. The Contractor shall provide field supervision with a means of immediate communication accessible to the Owner's ASF.
- 7. All Owner's buildings and facilities (substation control houses, etc) are off limits to the Contractor unless accompanied or approved by the Owner's ASF.

### 8. TRANSMISSION ACCESS

- a. Access to transmission line ROW's shall be limited to Public Road Crossings. Permission for ROW access over adjacent lands shall be secured by the Contractors, and any negligent damage resulting to the ROW or private property shall be the Contractor's responsibility. Failure to correct any negligent damage caused by the Contractor or its agents, will result in a delay of payment for services rendered until the matter is satisfactorily resolved.
- b. Owner assumes no responsibility for the condition or maintenance of any road, structure, or ROW that may be used by the Contractor in performing their work or in transferring materials to and from their site of work.
- c. Any temporary bridge or water crossing provided by the Contractor for maintaining the ROW must remain intact as a convenience to the Owner for inspection purposes. Logs, soil, and/or poles placed in ditches, or any waterway, to provide crossings shall be promptly removed to restore drainage conditions that existed prior to construction.

#### 9. **FENCES**, GATES, AND GAPS

- a. The Contractor shall leave all fences, gates, and gaps in the same or better condition than in which they were found, prior to providing maintenance. If existing fences, gates, or gaps along the ROW are in poor condition prior to the start of herbicide application and could allow livestock to escape, it will be the Contractor's responsibility to contact the customer or landowner to inform them of their existing fence condition. Furthermore, gates should always remain left as found. When gates or gaps are missing, preventing easy access to the Owners ROW, the ASF should be notified in order to pursue landowner compliance regarding accessibility.
- b. Fences damaged during a herbicide application or inspection, as a result of Contractor's negligence, will be promptly repaired and restored by the Contractor to at least as good of a condition as said fences were before beginning the work outlined in this contract.

#### 10. PROPERTY DAMAGE/COMPLAINTS

Property damage resulting from negligence by the Contractor shall be the Contractor's responsibility. Contractors will settle all complaints that are attributed to their own negligence. Contractors will contact the customer within 24 hours of receiving the complaint in order to resolve them in a timely manner. The Contractor will periodically update the Owner's ASF with the status or results of any formal claim the Contractor receives from the Owner's Claims Department. This should be done via e-mail, or in writing, in order to document the communications.

#### 11. ENVIRONMENTAL RESPONSIBILITIES

- 1. The contractor is responsible for leaving the ROW in the same or better condition than in which it was found. At no time should Contractor leave trash, containers, supplies, or other products on the Owner's ROW or on private property.
- 2. Citrus Canker Eradication is a concern of the Owner. The Contractor shall at all times follow the best management practices for working in and around Citrus groves as outlined in Appendix D.
- 3. Contractors operating equipment that have the potential of spilling fluids shall at all times have the means necessary to clean up or contain an accidental spill (i.e. hydraulic fluid spill kit).
- 4. Contractor should always use low ground pressure equipment when working in designated wetland areas; however, care <u>must always</u> be exercised to avoid destroying or damaging the root mat.
- 5. For all treatments, used herbicide containers shall be properly disposed of in accordance with label instructions and/or applicable regulations. All empty liquid containers shall be triple rinsed and disposed of according to label directions. Container recycling should always be practiced when certified recycling opportunities are available. Documentation of the Contractors recycling efforts shall be passed on to the Owner's ASF in a timely manor.
- 6. At no time shall rinsate or unused products be dumped on or along the Owners Substation sites or Transmission Line ROW's.

### 12. TRANSMISSION PRESCRIPTIONS

Contractor shall supply the Owner's ASF, on every project, with a job prescription and a formal cost analysis prior to the commencement of work. The prescription will be utilized to demonstrate the Contractors knowledge of the conditions that are currently present and require their attention as part of the Scope of Work and General Specifications involved in

the project. A prescription entails a detailed analysis of how the Contractor plans to provide a Herbicide Application service to the Owners ROW that meets or exceeds the expectations set forth within these general specifications. The prescription shall include, but is not limited to, the following items: beginning and ending dates, starting and stopping points, project name or line code acronym(s), line voltage(s), anticipated extras and associated costs, equipment types and estimated man-hours, actual project line mileage and ROW width, ground conditions, **designated wetlands**, dominant types of vegetation that will be targeted, and documentation of any existing damage and **access issues** found with regards to the Owners facilities. The prescription should also include a list of any exceptions or problems that would keep the Contractor from meeting the terms of these general specifications or the projects Scope of Work.

- a. The Owner reserves the right to accept or reject job prescriptions and submittals. The prescriptions will take into consideration all the *General Guidelines* for Herbicide Applications including, but not limited to, the following:
  - i) a list of specialized equipment to be used along with prescribed locations,
  - ii) a list of herbicide product(s) and mix rates, and a list of locations and application techniques when utilizing herbicides,
  - iii) when necessary Subcontractors may be used, but must be approved by the Owner's ASF prior to the commencement of any prescribed work. Additionally, the Owner reserves the right to request any Subcontractor to submit any reasonable information regarding their company, prior to the commencement of work. The cost associated with securing a Subcontractor should also be included into a project prescription.
- b. The Owner's ASF will perform "on site" prescription approval within 10 working days of the Contractor's submittal.
- c. All Transmission ROW's will be maintained from recorded easement edge to recorded easement edge, and from structure to structure, unless otherwise requested by the Owner's ASF. The ROW width the Contractor plans to maintain should be reflected in their prescription. Any questions concerning ROW width should be resolved in the field with the Owner's ASF prior to the submittal of any proposal or formal bid.
- d. When a neighboring utility (i.e. Peace River Co-Operative, Orlando Utilities Company, or others) has facilities that parallel, or are on the Owner's designated ROW the Contractor shall not perform ROW maintenance for the neighboring portion of that ROW. However, if field conditions exist that require maintenance on a neighboring ROW in order to meet the General Specifications for Herbicide Applications around the Owner's facilities, a minimum of 30' of ground clearance shall be maintained between the Owner's facilities and from the neighboring ROW

and/or facilities.

- e. All exceptions and deviations from the Owner's guidelines for Herbicide Application ROW's should be noted and highlighted in the Contractor's job prescription for Owner review prior to submittal approval.
- f. The Contractor should document any existing damage to the Owner's facilities in their prescription or in some other form prior to the submittal of any proposal for approval.
- g. There are a limited number of historical records regarding past customer problems for most of the Owner's Transmission projects. Therefore, all legitimate problems that the Contractor may incur with customers or ROW neighbors should be documented and reported to the Owner's ASF for resolution.
- h. **The Contractor is responsible for leaving all ROW's in the same, or better condition in which it was found.** All ruts and holes created by the Contractor's activities must be filled to make the ROW accessible for future use.
- i. An FDACS-approved Herbicide Production report should be supplied by the Contractor for reporting all Herbicide applications. Copies of all production reports should be correctly filled out and submitted to the Owner's ASF weekly for their review.
- j. The Contractor will submit anticipated start and completion dates with their job prescription.

### 3. City, County, State, or Federal PROPERTY

Permission may be required from a City, County, State, or Federal representatives before any Herbicide Applications are performed within their jurisdictions. Contractor should check with the Owner's ASF for specific City/County Ordinances or State/Federal laws and/or requirements that may affect their performance and effectiveness prior to submitting a prescription on an assigned project.

#### 4. SPECIFIC TREES

- a. Low growing shrubs or trees, such as yaupon, wax myrtle, or crepe myrtles should be preserved UNLESS they present an accessibility issue for the Owner.
- b. Contractor shall not treat within the ROW any improved landscaping that does not have a mature height of over twelve (12) feet. This includes any citrus trees, berry bushes, ornamental shrubs, or ornamental trees whose mature height will not exceed 12 feet (exceptions: when accessibility between the structures is

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desired, and when exotic pest species or any other undesirable species exists that the applicator is specifically directed to control by the ASF).

#### D. CREW INFORMATION

1 Owner reserves the right to restrict work-days. All weekend and holiday work must be pre-approved in advance by the Owner's ASF. Start and stop times must comply with all local noise ordinances. All alternative work schedules must be authorized by the Owner's ASF and documented in the Contractors prescription.

#### 2. CREW APPEARANCE

Each crewmember shall wear a standard company uniform starting within two weeks of employment. Every Contractor employee shall have the appropriate footwear for their assigned tasks. If rolling or crushing injuries are probable, then Safety Toe Shoes shall be warn prior to beginning any work on the Owner's ROW. Additionally, the Owner will require that every contract employee shall be equipped with the appropriate Personal Protective Equipment (in good condition) needed for the safe completion of assigned tasks or responsibilities. Failure to have the appropriate PPE, as defined by manufacturer's label or MSDS sheet, will require the contractor to discontinue all activities until personal safety becomes their priority. All Contractor personnel should look, dress, and act professionally. Contractor ID badges should be visible at all times and worn by the Contractor's **supervision** and **right-of-way specialists** when working for and representing the Owner.

### 3. CONDUCT

All Foremen will be required to have the ability to communicate *in English* and be accessible to customers for questions when asked. Courtesy to the customer is required at all times. A customer's personal property, such as ladders or chairs, should not be used by the crew to perform maintenance tasks or for any other reason. Crews should not climb on fences, buildings, or roofs. All trash from meals and drinking cups will be cleaned up and disposed of. No trash or daily human waste products should be disposed of improperly.

#### 4. IDENTIFICATION CARDS

All full time and temporary Crew Foreman shall *display* a Contractor Photo ID Card. *Each* foreman should have his supervisor's business card, with appropriate contact numbers, to distribute to customers if requested.
### E. EQUIPMENT

All equipment *will be* authorized by the Owner's ASF *and* shall be in safe and operable conditions. Only minor equipment repairs are to be performed on the Owner's designated ROW. All equipment that has the potential of leaking or loosing fluids or oil shall have the appropriate spills kits with them in case an unforeseen accident occurs.

### F. CUSTOMER RELATIONS

- 1. Before any herbicide application work is done in residential areas, an Owner approved door card must be left at the home or business for notification purposes at least five calendar days or not greater than 30 days prior to starting their work. Undeveloped property does not require notification for herbicide application work. However, the Contractor should make every reasonable attempt to respect private property owners (including grove owners/operators, farmers, ranchers, etc...) and their rights at all times. The Contractor should always make every effort to notify adjacent landowners of their intentions.
- 2. The Contractor must provide the Owner with a local telephone number for customer contact.
- 3. Any customer that refuses to allow a Herbicide Application will be reported to the Owner's ASF as soon as reasonably possible. The report should include the name, address, telephone number, line code, structure number(s), and information about the customer concern(s). The Owner's ASF will work with the customer and/or neighbor and the Contractor to resolve the situation.
- 4. Contractors will report all valid customer complaints concerning their operation to the Owner's ASF on a per job basis.
- 5. Contractors will use past refusal and complaint information provided by the Owner's ASF(s) to avoid conflicts with customers. The Contractor will review historical information with the Owner's ASF prior to beginning their work. Customers with a documented request(s) for personal notification should be contacted verbally before any work is done at their location.

### G. OTHER

1. Contractors will deliver, email, or fax their daily work locations and crew sizes to the Owners ASF at least 24 hrs. prior to beginning work on the Owner's designated ROW. The Owner's ASF will in turn notify Progress Energy's ECC representatives to let them know that our qualified contractors will be working on a designated 230kV or 500kV right-of way

when required.

- 2. Contractors will use an Owner approved production report and supply copies of those reports to the Owner's ASF upon request (see attachment ?).
- 3. During the course of normal daily activities in the service area, Contractors shall **<u>immediately</u>** report the location of any tree contacting or growing extremely close to transmission lines to the Owner's ASF. Any Danger Tree which could fall onto the Owners facilities shall also be reported **<u>immediately</u>**.

### H. TRANSMISSION & DISTRIBUTION FACILITIES

- 1. Any laterals or taps that are not energized, and will not be energized in the near future, should not be worked. These facilities should be highlighted as part of the Contractors proposed prescription.
- 2. All taps that are energized are to be considered part of the Owner's project circuit.
- 3. Any questions concerning circuit configuration should be addressed immediately (prior to the submittal of any contract proposal). Transmission maps should accurately reflect all easement and fee properties occupied by the Owner. Questions concerning the accuracy of the Owner-supplied maps should be addressed with the Owner's ASF prior to the submittal of any prescription and formal contract proposal.

### I. GENERAL SPECIFICATIONS FOR HERBICIDE USE

- 1. All work will be performed according to federal EPA and the State of Florida Department of Agriculture and Consumer Services. All products must be used consistent with its label. "The label is the law".
- 2. The Contractor will be responsible for reviewing the Florida Department of Agriculture and Consumer Services Registry of Persons Requiring Prior Notification of the Application of Pesticides prior to starting any project and notifying those persons if required.
- 3. The Contractor will be responsible for the storage, application, record keeping, and disposal of herbicides and containers unless the Owner's ASF specifies otherwise as per the projects Scope of Work.
- 4. Contractors are required to hold a current Certified Commercial Applicator License from the State of Florida Department of Agriculture and Consumer Services. **Copies of the license will be supplied to the Owner's ASF prior to beginning any assigned work.** These individuals are responsible for the training and direct supervision of qualified applicators.
- 5. Herbicides will only be applied by qualified or Certified Commercial applicators. A qualified applicator is a person that the Contractor has trained regarding the product,

application method, and meets any federal or state regulations. Qualified applicators will be under the direct supervision of a certified commercial applicator.

- 6. It is the Owner's intention to have all adjacent property owners **notified** prior to performing herbicide applications. Notification of individual property owners will only be required as a courtesy, in cases where the property owner is on the property at the time of spraying. After notification, or at any other time, a property owner objects to the herbicide application, the Contractor crew will immediately stop the application. The Contractor will make a reasonable effort to obtain permission. If efforts to obtain consent are unsuccessful, the Contractor will immediately leave the property and shall notify the Owners ASF within twenty-four (24) hours of the circumstances involved, listing names of persons refusing permission, their address, telephone number, reason for refusal and a record of the Contractor's efforts to obtain permission. The Owners ASF shall then take or recommend such action as it deems appropriate. Additionally, **permission** should be obtained from **private property** owners (only applies to ROW's where the Owner has limited or no easement rights to remove trees) when we intend to perform any herbicide applications on their property. This includes City, County, or State ROW's.
- 7. The Contractor will submit with their Transmission prescriptions a listing of all herbicide formulations and rates of applications to be used on the Owner's ROW. The Contractor will also submit an approximate number of acres intending to be treated. Herbicide formulations are subject to Owner approval. A **minimum of 95% control** between the Owners structures is required for up to one year after the initial application on the targeted brush, trees and/or their root systems. If less than 95% is controlled, it will be the Contractor's responsibility to re-treat the areas in question at their own expense within 60 days of receiving written notification of the problem.
- 8. The Contractor must make every effort to prevent any chemical concentrate or solution spillage on and off Transmission ROW's. The Owner will immediately be notified of any spillage or related accident on or off their ROW's. Proper cleanup of such an accident will be the Contractor's responsibility.
- 9. The Contractor will be responsible for all off-site complaints and damage resulting from herbicide over-spray or drift.
- 10. The Contractor shall maximize his use of herbicides when reasonably possible except where prohibited by the Land Owners, land-use requirements, permit restrictions, or by the label or the law.

### J. LOW VOLUME FOLIAR HERBICIDE TREATMENT

1. Low volume foliar treatments are products that control undesirable vegetation and are

applied to plant leaf surface areas in small concentrated quantities. The products are absorbed in plant tissue and translocated to the plants root system in order to control the plant.

- 2. Use this treatment in primarily low-density brush areas on any vine, hardwood, or conifer species.
- 3. Only use mixes that are approved by the Owner's ASF.
- 4. All trees  $\leq 4$ " in diameter and vines should be chemically treated by basal or low volume applications except for:
  - a. Trees next to property lines where damage to neighboring property could occur.
  - b. Trees, which may have roots, grafted to desirable trees.
  - c. Trees near desirable plants (trees, crops, landscapes) where the herbicide may move into contact with their foliage or roots.
  - d. When rain or strong winds exist (> than 10mph). If these conditions exist, the trees should not be treated until conditions improve.
  - e. When rain is forecast, the contractor will consult the Owners ASF prior to any application.

### K. STUMP HERBICIDE TREATMENT

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- 1. Stump treatments are products that are applied to the stump's cut surface at low pressure and are absorbed by the tree to control the tree surviving root system.
- 2. Any live hardwood, exotic tree, or vine that is removed shall be stump treated. After removal, the stump is to be treated the same day unless field conditions prohibit such an application.
- 3. Only use mixes that are approved by Owner's ASF.
- 4. Apply the herbicide to the top of the stump around the cambium area. Also treat the topside of the exposed bark around the stump. Do not treat the center of the stump unless the diameter is less than four inches. Be sure to clean off any sawdust and remove any dirt or duff layer from around the exposed bark before treating. Do not treat stumps that are standing in water unless the product in use is labeled for that application.
- 5. Trees that are topped at fence height shall be treated with a low volume basal application. Stems greater than 4 inches in diameter need to be girdled at least (18) inches above ground

level and treated, with an approved basal product, from that point down.

### L. FOLIAGE HERBICIDE TREATMENT

- 1. Foliage treatments are products that are applied to the plants leaf surface and are absorbed to control the plant systemically or by bud inhibition.
- 2. Use this treatment in low to high-density brush areas on vines, hardwoods, exotics, or conifer species.
- 3. Only use mixes and application techniques that are approved by Owner.
- 4. Applications should be made when the woody species are actively growing. This is normally late spring to early fall. Foliage treatments require complete coverage to assure a high percentage of control. Applications should not be made on species that will not interfere with Owner's facilities or accessibility. The method of application is commonly referred to as selective vegetation management
- 5. Foliage treatments on stump sprouts should only be made after the sprouts have grown to a minimum of 4 feet in height. This allows adequate leaf surface area for effective root control.
- 6. All chemical side trimming with herbicides must be pre-approved by the Owner's ASF prior to the commencement of any work.

### M. SOIL HERBICIDE TREATMENT

- 1. Soil treatments are products that are applied to the soil and absorbed by the plant's root system to control the plant.
- 2. Use this type of treatment is limited to industrial bare ground applications (i.e. Substation floors).
- 3. Only use products that are approved by the Owner's ASF, the Florida Department of Agriculture and Consumer Services, and the EPA. Furthermore, consult the product label before application for information on how to properly apply the product, where to apply it, and for rate of application information. The "Label is the Law"!
- 4. Applications can be made year round. However, most products available for these types of treatment are NOT approved for use in the Owner's ROW's by the Florida Department of Agriculture and Consumer Services. All applications must be made within label parameters. A special effort must be made while making soil applications to recognize non-target areas, and treat them accordingly with buffer zones.

- 5. All areas that are hand cut by the Contractor shall have a herbicide applied to the stumps; this should be accomplished through individual treatments.
- N. UNFAVORABLE CONDITIONS THAT MIGHT WARRANT HERBICIDE APPLICATIONS UNNECESSARY, INEFFECTIVE, OR UNLAWFUL RELATIVE TO MOST APPLICATION TECHNIQUES ARE:
  - a. Trees/brush next to property lines where damage to neighboring property could occur.
  - b. Trees/brush near desirable plants (trees, crops, landscaping) where the herbicide may move into contact with the foliage or roots.
  - c. Trees, which may have roots, grafted to desirable trees.
  - d. Within Saturated Soils: If this condition exists, the treatment should not be made until soil conditions improve. Treatments in saturated soil can result in a less effective control and can move the product to damage off target plants. Furthermore, the product label may restrict its use in a saturated environment. Therefore its use would be a violation of the label and a violation of the law! Special considerations must also be given to all applications to prevent any potential ground water contamination.
  - e. When drought conditions exist: off target plants are more susceptible to damage under these conditions, especially in sandy soils.
  - f. High temperatures may cause product volatility, which could damage off-target plants.
  - g. When rain or strong winds exist (> 10 mph). If these conditions exist, the trees/brush should not be treated until conditions improve. Rain immediately after treatment can result in a less effective control and can move certain products off ROW to damage off target plants. Strong winds can cause spray drift, which could damage off target plants.

h. Soil active products within a Sandy Soil Environment: soil applied products do not bond as well with sandy soils as they do in clay soils and may move through the soil to damage off target plants.

# **Progress Energy Florida**

# **GENERAL GUIDELINES FOR**

### **VEGETATION MAINTENANCE/RE-CLEARING**

OF

### **TRANSMISSION RIGHTS-OF-WAY**

March 8, 2006

### A. SCOPE

These specifications cover the re-clearing or maintenance of existing Transmission Rights-Of-Way (ROW).

### **B. OWNER'S RESPONSIBILITIES**

- 1. Progress Energy Florida is referred to as the Owner. The Transmission Maintenance Area Senior Forester is referred to as the Designated Representative (DR).
  - 2. Owner gives the right of Ingress and Egress of the ROW to the Contractor and the right to inspect and maintain the ROW per these specifications.
  - 3. Owner shall provide all general drawings necessary for the proper execution of the work. Owner shall provide the Contractor with access to its facilities for the purpose of obtaining additional map information, drawings, or easement documentation. When these are not available, field assistance will be provided.

### C. CONTRACTOR'S RESPONSIBILITIES

- 1. Prior to submitting any request for pricing (whether that request pertains to project, time and material, and/or capital work), the Contractor must be "Qualified" to perform the services for which they seek a Progress Energy contract. The Owner's DR can deem the Contractor as "Qualified" to submit pricing if the Contractor meets the following conditions:
  - a. Contractors must be approved through the Contractor Safety Program prior to use. Before selecting a contractor to provide services for Progress Energy, the DR will request information from contractors on their safety record and programs via FRM-SUBS-00478, "Contractor Safety Information/Checklist", FRM-SUBS-00482
    "Contractor Safety Information/Checklist for Small Contractors". Written safety programs will be requested on a CD-ROM or diskette, if possible. This information shall be requested as part of the bid package or pre-qualification process and before a Progress Energy contract is established.
  - b. Contractors must submit in writing a list of Utility references documenting their past experiences in performing the same type of services that they are submitting pricing for. This list should include the names, addresses, and phone numbers of the person or persons responsible for overseeing and evaluating their past performance.
  - c. Contractors shall submit in writing a work history that details any applicable experience that is related to the services performed for which they are submitting pricing.
- 2. Contractor shall at all times be aware of the nature and characteristics of Owner's electric

circuits, before work is commenced in the vicinity thereof. Contractor understands that the electric circuits shall at all times remain energized during the performance of their work, unless otherwise agreed upon and scheduled by the Owner. Contractor is required to utilize all necessary and proper protective equipment, procedures, and mechanical devices for the protection of its employees and others. Contractor shall not interfere with the normal operation of such electric circuits or the electrical circuits that are adjacent to, under-built, or parallel to the facilities found within their Scope of Work. Electric service interruptions caused by the contractor's negligence are subject to repair at Contractor's expense.

- 3. The Contractor shall at all times comply with all Safety Standards set forth by state and federal governing agencies and guidelines as they pertain to our industry and the services that they perform. The agencies and standards of concern include, but are not limited to: OSHA, ANSI, DOT, EPA, and FDACS. Contractor Safety is of the utmost importance to the Owner. Periodic safety inspections will be performed by the Owner's DR. Any individual, crew, or Contractor that does not comply with the Safety standards as set forth by the industry and its governing agencies will be asked leave immediately.
- 4. The Contractor shall furnish all supervision, labor, material, and equipment necessary to perform their ROW re-clearing responsibilities.
- 5. The Contractor shall do all work in accordance with the specifications contained in this contract, **unless specifically authorized by the Owner's DR.**
- 6. The Contractor shall visit the site to determine access and extent of work involved prior to submitting any formal evaluation for consideration by the Owner.
- 7. The Contractor shall provide field supervision with a means of immediate communication accessible to the Owner's DR.
- 8. All Owner's buildings and facilities (substation control houses, etc) are off limits to the Contractor unless accompanied or approved by the Owner's DR.

### 9. TRANSMISSION ACCESS

- a. Access to transmission line ROW's shall be limited to Public Road Crossings. ROW access over adjacent lands shall be secured by the Contractors. Damage resulting to the ROW or private property by the contractor's negligence shall be the Contractor's responsibility. Failure to correct any negligent damage caused by the Contractor or its agents, will result in a delay of payment for services rendered until the matter is satisfactorily resolved.
- b. Owner assumes no responsibility for the condition or maintenance of any road, structure, or ROW that may be used by the Contractor in performing their work or in

transferring materials to and from their site of work. Payment will be made to the Contractor by the Owner for work done in constructing, improving, repairing or maintaining any road, structure, or ROW for use in performance of work under these specifications only **if prescribed and approved** during the projects evaluation process.

c. Any temporary bridge or water crossing provided by the Contractor for re-clearing the ROW must remain intact as a convenience to the Owner for inspection purposes. Logs, soil, and/or poles placed in ditches, or any waterway, to provide crossings shall be promptly removed to restore drainage conditions that existed before crossing construction.

### 10. FENCES, GATES, AND GAPS

- a. The Contractor shall leave all fences, gates, and gaps in the same or better condition as they found it when they began their work. If existing fences, gates, or gaps along the ROW are in poor condition prior to the start of re-clearing and could allow livestock to escape, it will be the Contractor's responsibility to contact the customer or landowner to inform them of their existing fence condition. Furthermore, gates should always be left in the same condition as found upon arrival. Open, closed locked or unlocked even for short periods.
- b. Contractors negligence that results in damaged fences during the re-clearing operations will be promptly repaired and restored by the Contractor to a condition at least as good as they were in before beginning the work outlined in this contract.

### 11. PROPERTY DAMAGE/COMPLAINTS

Property damage resulting from negligence by the Contractor shall be the Contractor's responsibility. Contractors will settle all complaints that are attributed to their own negligence. Contractor will contact a concerned customer within 24 hours of receiving a complaint in order to resolve all concerns in a timely manner. Contractors will periodically update the Owner's DR with the status or results of any formal claim they receive from the Owner's DR. This should be done via e-mail, or in writing, in order to document the communications.

### 12. TRANSMISSION PRESCRIPTIONS

On every project the contractor shall supply the Owner's DR, with a job prescription and a formal cost analysis prior to the commencement of work. The prescription will be utilized to demonstrate the Contractors knowledge of the conditions that currently exist and require their attention as part of the Scope of Work and General Specifications involved in the project. A prescription is a detailed analysis of how the Contractor plans to re-clear the owners ROW to meet or exceed the expectations set forth within these general specifications. The prescription shall include, but is not limited to, the following items:

beginning and ending dates, starting and stopping points, incentive and disincentives, project name or line code acronym(s), line voltage(s), anticipated extras and associated costs, equipment types and estimated man-hours, project mileage and ROW width, ground conditions, dominant types of vegetation that will be targeted, and documentation of any existing damage found with regards to the Owners facilities. The Contractor understands that his prescription should be competitive and may be compared to competing submittals with other Qualified Contractors. The prescription should also include a list of any exceptions or problems that would keep the Contractor from meeting the terms of these general specifications or the projects Scope of Work.

- a. The Owner reserves the right to accept or reject job prescriptions and submittals. The prescriptions will take into consideration all the *General Guidelines* for ROW Re-clearing including, but not limited to, the following:
  - i) a list of specialized equipment to be used along with prescribed locations,
  - ii) a list of herbicide product(s) and mix rates, names of Owner approved applicators performing prescribed work, and a list of locations and application techniques for utilizing herbicides,
  - iii) when necessary or required, the Contractor's recommendation to follow-up any mechanical or manual tree removals with a foliar, ground or stump applied treatment to control undesirable root sprouting.
  - iv) when necessary Subcontractors may be used, but must be approved by the Owner's DR prior to the commencement of any prescribed work. Additionally, the Owner reserves the right to request any Subcontractor to submit any reasonable information regarding their company, prior to the commencement of work. The cost associated with securing a Subcontractor should also be included into a project prescription.
- b. The Owner's DR will perform "on site" prescription approval within 10 working days of the Contractor's submittal.
- c. All Transmission ROW's of record will be maintained from edge to edge, and from structure to structure, unless otherwise requested by the Owner's DR. The ROW width the Contractor plans to maintain should be reflected in their prescription. Any questions concerning ROW width should be resolved in the field with the Owner's DR prior to the submittal of any proposal or formal bid.
- d. When a neighboring utility (i.e. Peace River Co-Operative, Orlando Utilities Company) has facilities that parallel, or are on the Owner's designated ROW the Contractor shall not perform ROW maintenance for the neighboring portion of that ROW. However, if field conditions exist that require maintenance on a neighboring

utility's ROW in order to meet the General Specifications for Re-Clearing the Owner's facilities, a minimum of 30' of ground clearance shall be maintained between the Owner's facilities and from the neighboring utility's ROW and/or facilities.

e. All exceptions and deviations from the Owner's guidelines for re-clearing ROW's should be noted and highlighted in the Contractor's job prescription for Owner review prior to submittal approval.

- f. Mechanical clearing of brush (i.e. Brown Tree Cutter) and trees in and around the Owner's Transmission structures is strictly prohibited (i.e. Brown Tree Cutter). If accessibility to a tower is impaired by trees, brush, weeds or grasses, then the tower will to be manually cleared. "Bent Steel", damaged ground wires and poles are of great concern to the Owner. If mechanical clearing is performed in or around a structure, and the structure exhibits "bent steel" or ground wire damage, the Contractor may be held responsible for the damage to that structure. The Contractor should document any existing damaged to the Owner's facilities in their prescription or in some other form prior to the submittal of any proposal or formal bid for approval.
- g. There are a limited number of historical records regarding past customer problems for portions of the Owner's Transmission system. Therefore, all legitimate problems that the Contractor may incur with customers or ROW neighbors should be documented and reported to the Owner's DR for future use.
- h. Trees planted in a nursery type environment, obviously planted in our ROW for future use, do not have to be removed at ground level unless they do not meet minimum clearance requirements from the Owners electrical conductors. Notify the DR of these situations when they are discovered during the preparation of your prescriptions.
- i. The Contractor is responsible for leaving all ROW's in the same, or better, condition than they were in prior to re-clearing activities. All ruts and holes must be filled to make the ROW accessible for future use.
- j. The Contractor must report all herbicide applications (see Appendix F for an example) should supply an FDACS-approved Herbicide Application report. Copies of all application reports should be correctly filled out and submitted to the Owner's DR periodically for their review.
- k. The Contractor will submit anticipated start and completion dates with their job prescription.

### D. TREE PRUNING CLEARANCES

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Tree pruning clearances will vary depending upon the type and voltage of the power line and the species of tree. Power lines with higher voltages require greater clearances because of their sensitivity. Fast growing trees also require greater clearances than slow growing trees. All trees of species that have a mature height of greater than 12 feet, growing in the Owner's dedicated easement of record should be REMOVED at ground level. All exceptions (i.e. DOT ROW) should be noted and approved by the Owner's DR prior to only pruning the tree(s). If a tree is interfering with distribution and transmission facilities, the tree should be trimmed for both at the same time. If facilities such as leaning poles or sagging wires will greatly affect the shape of an off ROW tree, the Owner's DR should be contacted to see if adjustments can be made.

#### 1. TRANSMISSION FACILITIES

Trees that are in a transmission ROW or a road ROW that are directly under transmission facilities **should** be removed. Permission may be required from the property owners in some cases. Trees will only be trimmed under transmission facilities with the Owner's DR approval. When trees are trimmed under or to the side of facilities a minimum of 20 feet of clearance should be obtained or the tree should be trimmed to the edge of the ROW, whichever is greater. ROW clearing width may vary with every Contractor prescription, subject to the Owner's DR's approval.

### 2. OTHER FACILITIES

Owner does not require clearance for foreign distribution facilities, street lights, guard lights, TV cables, telephone cables, private electrical wires, or underground wires. Refer to Owner's DR for questions regarding private owned electrical facilities.

### **3. CITY PROPERTY**

Permission may be required from a City representative before any tree pruning or removals are performed at City parks or on City Trees.

### 4. **SPECIFIC TREES**

- a. Low growing shrubs or small tree species, such as yaupon holly, native virburnum, or crepe myrtles (species that do not attain a mature height of more than 12 ft.) should be trimmed and/or preserved UNLESS they present an accessibility issue for the Owner.
- b. Palm trees interfering with facilities should be removed. Palm trees should not be trimmed without the Owner's DR approval.

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### **E. TREE REMOVAL**

Tree removal is an important part of the Owner's Transmission Line Re-Clearing Program. Trees may be removed under the following guidelines:

### 1. NOTIFICATION

The adjacent property owner must be notified of our intent to remove a tree within a designated easement or right-of-way. Adjacent property owners will also be notified if a Danger Tree exists on private property and must be removed. Tree species located on Owner's Transmission ROW or substations owned in fee should be removed if they have a mature height of greater than 12 feet. Trees located on road right-of-way, county, or flood control property may require permission from the Owner's DR or the proper governing agency prior to their removal. Additionally, some municipalities may require tree removal permits. It is the contractors' responsibility to secure any necessary permits. In unusual situations, when the proper controlling or governing authority cannot be contacted, the . Owner's DR should be consulted before the tree(s) are removed.

### 2. HERBICIDE TREATMENT - HARDWOOD TREES

Any live hardwood trees or vines that are removed at ground or fence level shall be treated with an Owner approved herbicide mix. See Herbicide Specifications. This also applies to tractor crews. Furthermore, hardwood "spears" left by a mechanical tree trimming unit should be felled to ground level and treated with an oil based herbicide mix to prevent resprouting.

### 3. DEAD/DANGER TREES - DISTRIBUTION AND TRANSMISSION

Dead or Danger trees will only be removed if there is a danger of the tree or limbs falling and damaging the Owner's Transmission or Distribution conductors. Dead trees originating off of the Owner's designated right-of-way may be cut and stacked on private property. Private property owners should be notified of our intentions prior to the tree being removed. Dead trees will be hauled from city, county, state, or school property unless otherwise permitted by the appropriate governing agency or the Owner's DR. Dead trees on unimproved property which endanger the Owner's facilities may be cut and left on the property without notifying the property owner. Progress Energy's Florida Danger tree definition is: **"Trees outside of** 

the normally cleared right-of-way identified as dead, diseased, dying, or leaning toward the line of sufficient height to impact the line if they should fall.

### F. CHIP DISPOSAL

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- 1. Contractors will remove or dispose of all tree trimming or removal brush and debris resulting from their operation in residential areas. Brush should be chipped and hauled the same day unless the crew has consent from the property owner. Debris may be chipped and/or left on the Owner's designated right-of-way with the consent of the Owner's DR. No green waste should be left in wetland areas without the Owner's DR approval. *Please see Appendix "C" for more information regarding the Owner's Wood Stacking Guidelines.*
- 2. Chip Disposal sites are the responsibility of the Contractor to identify and secure access to prior to the start of any project. A list of chip disposal sites should be submitted to the Owner's DR prior to the start of any project. The Contractors prescription should include information on how the green waste will be properly disposed of.
- 3. It is the Contractor's responsibility to obtain permission to dispose of brush, chips, and logs on private property.
- 4. The Contractor will notify the Owner's DR of the location and volume of any chips provided to public groups, schools, community programs, etc.

### G. CREW INFORMATION

1. Owner reserves the right to restrict work-days. All weekend and holiday work must be pre-approved in advance by the Owner's DR. All alternative work schedules must be authorized by the Owner's DR and documented in the Contractors prescription.

### 2. CREW APPEARANCE

Each crewmember shall wear a standard company uniform starting within two weeks of employment. Each crew member will have safety toe boots, hard hats, safety glasses and ear protection upon arrival prior to commencement of any work. The Foreman is to wear a different color hard hat with the word "FOREMAN" on the hat for customer identification. All personnel should look, dress, and act professionally. Contractor ID badges should be visible at all times by the Contractor's supervision when working for and representing the Owner (whether it is supplied by the Owner or the Contractor).

### 3. CONDUCT

All Foremen will be required to have the ability to communicate *in English* and be accessible to customers for questions when asked. Courtesy to the customer is required at all times. A customers' personal equipment, such as ladders or chairs, should not be used by the crew to perform maintenance tasks or for any other reason. Crews should not climb on fences, buildings, or roofs. All trash from meals and drinking cups will be

cleaned up and disposed of. No trash or daily human waste products should be disposed of with the Contractors green waste.

Show-up time: will be defined as up to two hours of Labor and Equipment time, billable to the Owner when approved in advance by the DR, in the unlikely event that weather conditions prohibit the Contractor from leaving their designated showup location in the morning.

In the event that a weather delay is realized during the course of a normal work day, the Contractor's DR shall contact the Owner's DR within ½ hour of the weather event for instructions and advice as to whether or not the Contractor can safely continue working on that day. Hours missed due to weather delays will be made up at the Owner's DR's discretion.

### 5. IDENTIFICATION CARDS

All full time and temporary Crew Foreman shall *display* a Contractor Photo ID Card. *Each* foreman should have his supervisor's business card, with appropriate contact numbers, to distribute to customers if requested.

### H. EQUIPMENT

- 1. All equipment *will be* authorized by the Owner's DR *and* shall be in safe and operable conditions. Only minor equipment repairs (no oil changing) are to be performed on the Owner's designated ROW. All equipment that has the potential of leaking or loosing fluids or oil shall have the appropriate spills kits with them in case an unforeseen accident occurs.
- 2. Climbing spurs are only to be used on tree removals. Mechanical trimming units will only be permitted to operate in rural and un-improved areas on the Owner's designated right-of-way. All other areas designated areas for a mechanical trimming unit need to be pre-approved by the Owner's DR.
- 3. All bucket and split-dump chipper trucks will display an identification number at least 10 *inches in size* on both sides and on the back of the truck. *All bucket and manual trucks will have an individual identification number.*

### I. TREE PRUNING QUALITY

- 1. All tree pruning shall be governed by approved principles of modern arboriculture. Techniques utilized will be consistent with the practices of natural, lateral, and directional pruning techniques.
- 2. Cuts are to be made back to the main stem or to a limb at least one-third the diameter of the portion being removed. Deciduous tree limbs shall not be stubbed off at the edge of the

clearing limits, except where authorized by the Owner's DR.

- 3. Wherever possible, all pruning cuts should be made to direct future growth and sprouting away from the conductors, provide longer periods of clearance, and reduce future work that may be required. This method is referred to as directional tree trimming. When trees are approved by the Owner's DR to be left to grow under power lines, they are to be trained so that future growth will be away from the Owner's facilities. The vertical growth should be removed and the horizontal growth left. Trees growing into power lines from the side should have their horizontal growth removed and their vertical growth left directed away from the conductors.
- 4. The Contractor should only use the drop-crotch method in directional tree pruning to thinout undesirable growth of a tree with their DR's approval. This is a method of pruning requires removing limbs at a crotch **inside** the tree canopy rather than cutting it elsewhere. Where practical, cuts should be made to large diameter branches made well within the crown. Shaping through the use of many cuts of small diameter branches in the outer crown should be avoided.
- 5. Branch collar cut refers to the cutting of a limb just outside the point of the intersection with the trunk of the tree or another limb. All tree pruning should be done using the branch collar cut method. When properly made, it will reduce the exposed surface area of the cut and will allow the tree's protective zone to aid in covering the wound. Living branches should be removed by making cuts as close as possible to the branch collar. Dead branches should be removed by making cuts as close as possible to the living tissue that surrounds the dead branch at the base. Do not make flush or stub cuts.
- 6. A minimum of cuts should be utilized to achieve required clearances.
- 7. Precautions shall be taken to avoid stripping or tearing of bark when cutting large limbs.
- 8 Where line-clearance pruning adversely affects the shape of a tree, additional pruning may be done to give the tree satisfactory shape and appearance. Conifers should be trimmed in a natural manner that allows them to retain as much of their natural shape as possible.
- 9. Climbing spurs should not be used except in cases involving tree removal work.

### J. TREE PRUNING BRUSH HANGERS/CLEANUP

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Trees should be cleaned of all brush hangers immediately after trimming. Small brush on the ground should be raked and hauled off. The work site should be left in a neat and workman like condition.

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### K. CUSTOMER RELATIONS

1. Before any tree pruning or tree removals are done, an Owner approved door card must be left at the home or business for notification purposes at least five calendar days prior to starting work. Homeowners should always receive, from the Contractor, a courtesy knock to acknowledge their intentions of entering the property. Undeveloped property does not require notification for tree pruning. Furthermore, undeveloped property does not require notification of tree removals that will take place if the Contractor is working in the Owner's dedicated easement. However, the Contractor shall make every reasonable attempt to respect private

property owners and their rights at all times. The Contractor should always make every effort to notify adjacent landowners of their intentions.

2. The Contractor must provide the Owner with a local telephone number for customer contact.

Any customer that refuses to allow the specified clearance or the removal of a tree will be reported to the Owner's DR as soon as reasonably possible. The report should include the name, address, telephone number, and information about the customer concern(s). Legitimate refusals, that affect the Owner's Reliability of providing a safe electrical service, will be reported to the Owner's DR immediately. The Owner's DR will work with the customer or neighbor and the Contractor to resolve the situation.

4. Contractors will report all **valid** customer complaints concerning their operation to the Owner's DR on a **per job** basis. The Contractor must report to the Owner any tree, or portion of a ROW, where specified clearance cannot be obtained before performing any work. The

Owner reserves the right to disapprove work not meeting specifications. Work not meeting specifications will have to be completed at the Contractor's expense.

5. Contractors will use past refusal and complaint information provided by the Owner's DR(s) to avoid conflicts with customers. The Contractor will review historical information with the Owner's DR prior to beginning their work. Customers with a documented request(s) for personal notification should be contacted verbally before any work is done at their location.

### L. OTHER

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1. Contractors will deliver, email, or fax their daily work locations and crew sizes to the Owners DR at least 24 hrs. prior to beginning work on the Owner's designated right-of-way. The Contractor will in turn notify Progress Energy's ECC representatives to let them know that their qualified employees will be working on a designated 230kV or 500kV rights-of way. *ECC should be notified prior to beginning work and when work is completed at the end of the day. ECC's contact number is: 727-820-5717.* 

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- 2. Contractors will use an Owner approved time and production reports when necessary and supply copies of those reports to the Owner's DR upon request (see Appendix D and E).
- 3. During the course of normal daily activities in the service area, Contractors should immediately report the location of any tree contacting or growing extremely close to transmission lines to the Owner's DR. Any Danger Tree which could fall onto the Owners facilities should also be reported <u>immediately</u>.

### M. TRANSMISSION & DISTRIBUTION FACILITIES

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- 1. Any laterals or taps that are not energized, and will not be energized in the near future, should not be worked. These facilities should be highlighted as part of the Contractors proposed prescription.
- 2. All taps that are energized are to be considered part of the Owner's project circuit.
- 3. Any questions concerning circuit configuration should be addressed immediately (prior to the submittal of any contract proposal). Transmission maps should accurately reflect all easement and fee properties occupied by the Owner. Questions concerning the accuracy of the Owner-supplied maps should be addressed with the Owner's DR prior to the submittal of any prescription and formal contract proposal.

### N. REACTIVE REQUESTS ON ASSIGNED MAINTENANCE CIRCUITS

- 1. All requests will be inspected and completed within 10 working days.
- 2. Adjustments in the contractors work plan or prescription may be required if the Owners DR determines that the safety and reliability of the Owners facilities could be improved with an immediate response by any and/or all available assigned Contractor resources. In the unlikely event that a contractor cannot respond to an assigned circuit requiring reactive work, the Owner reserves the right to deduct any and all expenses associated with securing additional resources to correct the problem from the Contractor's final project invoice.

### O. REACTIVE REQUESTS ON UN-ASSIGNED MAINTENANCE CIRCUITS

- 1. All customer-generated (internal and external alike) service requests (CSR's) for maintenance will receive a verbal response from the Contractor concerning the level of action or inaction they will make regarding the request. This communication can be done in conjunction with or in lieu of door hangers within 5 working days of receiving the request.
- 2. Valid CSR's will be completed and closed within 10 working days. A written response referring to the status of the CSR should be sent (via e-mail) to the Owner's DR as soon as

possible.

### 3. <u>CSR GUIDELINES</u>:

Trees are not to be pruned or removed unless they clearly exist within the Owner's easement or ROW. Secondly, the tree(s) in question must present a service reliability or safety issue in order to be considered for an immediate maintenance response. This would include all of the Owner's facilities, Transmission and Distribution alike.

Trees are not to be pruned or removed unless they interfere with the Owner's electrical facilities.

Trees are not to be pruned or removed if the circuit is going to be worked on a proactive basis within the next three months. Exceptions may be made with the Owner's DR, and will be paid for on a Time and Equipment basis.

Trees interfering with the Transmission and/or the Distribution facilities of the Owner should be pruned or removed if they meet the following criteria:

- a. Trees containing tree houses, swings, etc. contact customer and notify DR of the location;
- b. Trees adjacent to pools, child care/play areas;
- c. Dead or Danger trees where there is a danger of the tree or limbs falling and damaging electrical facilities.

### T. GENERAL SPECIFICATIONS FOR HERBICIDE USE

- 1. All work will be performed according to federal EPA and the State of Florida Department of Agriculture and Consumer Services. All products must be used consistent with its label. The label is the law.
- 2. The Contractor will be responsible for reviewing the current list of Florida Department of Agriculture and Consumer Services Registry of Persons Requiring Prior Notification of the Application of Pesticides prior to starting any project.
- 3. The Contractor will be responsible for the purchase, storage, application, record keeping, and disposal of herbicides unless the Owner's DR specifies otherwise as per the projects Scope of Work.
- 4. Contractors are required to hold a current Certified Commercial Applicator License from the State of Florida Department of Agriculture and Consumer Services. Copies of the license will be supplied to the Owner's DR. These individuals are responsible for the training and direct supervision of qualified applicators. The following positions require a current commercial applicator license from the State of Florida Department of Agriculture and Consumer Services.:

Account Manager Supervisor or General Foreman ROW Specialist Applicator: for applications other that stump or basal treatments

- 5. Herbicides will only be applied by qualified applicators. A qualified applicator is a person that the Contractor has trained regarding the product, application method, and meets any federal or state regulations. Qualified applicators will be under the direct supervision of a certified commercial applicator.
- 6. It is the Owner's intention to have all adjacent property owners **notified** prior to performing herbicide applications. Additionally, **permission** should be obtained from private property owners when we intend to perform any herbicide applications on their property. This includes City, County, or State ROW's.
- 7. The Contractor will submit with their Transmission prescriptions a listing of all herbicide formulations and rates of applications to be used on the Owner's ROW. The Contractor will also submit an approximate number of acres intending to be treated. Herbicide formulations are subject to Owner approval. A **minimum of 95% control** is required for up to two years after the initial application on the targeted brush, trees and/or their root systems. If less than 95% is controlled, it will be the Contractor's responsibility to re-treat the areas in question at their own expense within 60 days of being notified of the problem.
- 8. The Contractor must make every effort to prevent any chemical concentrate or solution spillage on and off Distribution and Transmission ROW's. The Owner will immediately be notified of any spillage or related accident on or off their ROW's. Proper cleanup of such an accident will be the Contractor's responsibility.
- 9. The Contractor will be responsible for all off-site complaints and damage resulting from herbicide over-spray or drift unless otherwise pre-approved by the Owner's DR.
- 10. The Contractor shall maximize his use of herbicides when reasonably possible except where prohibited by the Owners specifications, land-use, or by law.

### U. LOW VOLUME FOLIAR HERBICIDE TREATMENT

1. Low volume foliar treatments are products that control undesirable vegetation and are applied to the plants leaf surface area in small concentrated quantities. The products are absorbed in plant tissue and translocated to the plants root system in order to control the plant.

- 2. Use this treatment in primarily low-density brush areas on any vine, hardwood, or conifer species.
- 3. Only use mixes that are approved by the Owner's DR.
- 4. All trees  $\leq 4$ " in diameter and vines should be chemically treated by basal or low volume applications except for:
  - a. Trees next to property lines where damage to neighboring property could occur.
  - b. Trees, which may have roots, grafted to desirable trees.
  - c. Trees near desirable plants (trees, crops, landscapes) where the herbicide may move into contact with their foliage or roots.
  - d. When rain or strong winds exist (> than 10mph). If these conditions exist, the trees should not be treated until conditions improve.

### V. STUMP HERBICIDE TREATMENT

- 1. Stump treatments are products that are applied to the stump's cut surface at low pressure and are absorbed by the tree to control the tree surviving root system.
- 2. Any live hardwood tree or vine that is removed shall be stump treated. After removal, the stump is to be treated the same day unless field conditions prohibit such an application.
- 3. Only use mixes that are approved by Owner's DR.
- 4. Apply the herbicide to the top of the stump around the cambium area. Also treat the topside of the exposed bark around the stump. Do not treat the center of the stump unless the diameter is less than four inches. Be sure to clean off any sawdust and remove any dirt or duff layer from around the exposed bark before treating. Do not treat stumps that are standing in water unless the product in use is labeled for that application.
- 5. Trees that are topped at fence height shall be treated with a low volume basal application. Stems greater than 4 inches in diameter need to be girdled at least (18) inches above ground level and treated, with an approved basal product, from that point down.
- 6. SOME CONDITIONS THAT WOULD WARRANT NO TREATMENTS ARE:
  - a. Trees next to property lines where damage to neighboring property could occur.
  - b. Trees, which may have roots, grafted to desirable trees.
  - c. Trees near desirable plants (trees, crops, landscapes) where herbicide may move into

contact with their foliage or roots.

d. When rain or strong winds exist (> 10 mph). If these conditions exist, the trees should be treated at a later date.

### W. FOLIAGE HERBICIDE TREATMENT

- 1. Foliage treatments are products that are applied to the plants leaf surface and are absorbed to control the plant.
- 2. Use this treatment in low to high-density brush areas on any vines, hardwoods, or conifer species.
- 3. Only use mixes that are approved by Owner.
- 4. Applications should be made when the woody species are actively growing. This is normally late spring to early fall. Foliage treatments require complete coverage to assure a high percentage of control. Applications should not be made on species that will not interfere with Owner's facilities or accessibility. The method of application is commonly referred to as selective vegetation management
- 5. Foliage treatments on stump sprouts should only be made after the sprouts have grown to a minimum of 4 feet in height. This allows adequate leaf surface area for effective root control.
- 6. All chemical side trimming with herbicides must be pre-approved by the Owner's DR prior to the commencement of any work.

### 7. SOME CONDITIONS THAT WOULD WARRANT NO TREATMENTS ARE:

- a. Trees/brush next to property lines where damage to neighboring property could occur.
- b. Trees/brush near desirable plants (trees, crops, landscapes) where the herbicide may move into contact with the foliage or roots.
- c. When rain or strong winds exist (> 10 mph). If these conditions exist, the trees/brush should not be treated until conditions improve. Rain immediately after treatment can result in a less effective control and can move the product to damage off target plants. Strong winds can cause the spray to drift, which could damage off target plants.
- d. High temperatures may cause product volatility, which could damage off-target plants.

### X. SOIL HERBICIDE TREATMENT

- 1. Soil treatments are products that are applied to the soil and absorbed by the plant's root system to control the plant.
- 2. Use this type of treatment is limited to industrial bare ground applications (i.e. Substation floors).
- 3. Only use products that are approved by the Owner's DR, the Florida Department of Agriculture and Consumer Services, and the EPA. Furthermore, consult the product label before application for information on how to properly apply the product, where to apply it, and for rate of application information. The Label is the Law!
- 4. Applications can be made year round. However, most products available for these types of treatment are NOT approved for use in the Owner's ROW's by the Florida Department of Agriculture and Consumer Services. All applications must be made within label parameters. A special effort must be made while making soil applications to recognize non-target areas, and treat them accordingly with buffer zones.
- 5. Treated trees/brush below 10 feet in height should not be mechanically removed before or after treatment. Treated trees/brush above 10 feet in height on private property do not have to be mechanically removed unless the property owner requests. Soil applied products in the pellet form should only be used in low to medium density brush areas and only in rural or industrial areas.
- 6. All areas that are hand cut by the Contractor shall have a herbicide applied to the stumps; this should be accomplished through individual treatments.
- 7. SOME CONDITIONS THAT WOULD WARRANT NO TREATMENT ARE:
  - a. Trees/brush next to property lines where damage to neighboring property could occur.
  - b. Trees/brush near desirable plants (trees, crops, landscaping) where the herbicide may move into contact with the foliage or roots.
  - c. Within Saturated Soils: If this condition exists, the treatment should not be made until soil conditions improve. Treatments in saturated soil can result in a less effective control and can move the product to damage off target plants. Furthermore, the product label may restrict its use in a saturated environment. Therefore its use would be a violation of the label and a violation of the law!

- d. Drought conditions. Off target plants are more susceptible to damage under these conditions, especially in sandy soils.
- e. Within a Sandy Soil Environment: Soil applied products do not tie up in sandy soils as much as in clay soils and may move through the soil to damage off target plants.

# Appendix A

### PROGRESS ENERGY / FLORIDA MOWING & HAND CUT DEFINITIONS

<u>Feet Cut-</u> Linear footage measured parallel to the transmission line (along the line) The <u>actual footage</u> <u>cut</u> is recorded.

<u>Feet Width</u>- Footage cut perpendicular to the transmission line (Across the right of way) The <u>actual</u> <u>footage cut</u> is recorded.

<u>Total Acres</u>- Record <u>Actual Acres cut</u> (length of Feet cut, multiplied by width of cut feet, Divide the total by 43,560 sq. feet, or check the appropriate box.

Hand Cut Acres- Actual acreage cut with a chain saw or brush ax.

Mow acres- Actual acres cut by rotary equipment.

Wetland Acres- Actual acres cut by hand or mechanical equipment in natural standing water.

### Appendix B

### PROGRESS ENERGY / FLORIDA TREE TRIMMING & DANGER TREE REPORT DEFINITIONS

**Trimming**- Record the Actual footage of trim parallel to the line (along the line)

**Danger Tree Cut-** Tree is cut to eliminate the HAZARD of a tree that could endanger the line or any other transmission facility including poles and guys. \*(Brush will <u>not</u> be removed)

**Danger Tree Crown Reduction-** The tree is pruned so that it is no longer a HAZARD, height reduction, \* (Wood and Brush will be left at the site)

<u>Cut and Remove</u>- Trees are cut and \*(all Brush <u>is removed</u>).

# **Appendix C**

# Florida First Cycle Reclamation Wood Stacking Guideline

Due to the magnitude of work and enormous volume of wood produced by Florida / Progress Energy tree crews re-clearing and reclaiming easement held transmission rights of way back to their stated widths. The following practice will be utilized when possible for the first re-clearing cycle.

Wood that is too large to be chipped and blown on the right of way shall be cut to manageable pieces (24 inches or less) and stacked on the very edge of the rights of way, to decompose naturally.

Customer pre-notification of re-clearing activities will include an explanation of this practice.

The property must be upland unmanaged property with limited access.

The wood must be too large to safely run through a truck pulled chipper and blown onto the right of way. (Larger than 6 inches)

The wood is to be cut in pieces less than 24 inches.

The wood shall be stacked no higher than 48 inches.

### Exceptions

### Wet Lands with no truck access.

Trees will be felled parallel to the conductors, limbed and cut as necessary to lay flat and left where they fell providing they do not impede truck access. This practice will be followed unless a requirement from valid permit or law directs otherwise.

#### Upland managed properties, rural home sites, pasture, agricultural lands, or commercial sites.

All brush and wood shall be removed in the most economical manner, unless specifically requested by the landowner.

### **Benefits:**

The "stacking wood" practice is much less expensive than complete removal and disposal.

Often the landowner or neighbor utilizes the wood as firewood.

Creates temporary wild life habitat.

Provides temporary vegetation suppression

Stacking short lengths promotes faster biodegradation of the wood.

Gives a workman like appearance, indicating that Progress Energy respects the landowners land.

### Risk:

Cutting and stacking is more expensive than just dropping and leaving large trees where they fall.

Liability issues could arise if damage should be caused by stacked wood.

Document title

# **Transmission Maintenance Program Policy**

Document number

### MNT-TRMX-00000

Applies to: Transmission Operations & Planning Department – Carolinas and Florida

Keywords: maintenance; transmission – maintenance general

### **NERC-Compliance Related**

This document is NERC-compliance related. Changes to Section 6.0 could impact compliance to PRC-005, PRC-008, PRC-017, or PRC-018. All proposed changes to this document must be reviewed by Transmission Component Engineering.

### 1.0 Policy

The Company is committed to providing reliable, continuous, and quality service to its customers. The Transmission Department is committed to operating and maintaining the transmission system in the safest and most reliable means possible. This program will ensure that equipment, components, and systems are proactively maintained at intervals that promote safety and reliability. Results of an effective maintenance program include extended equipment life, lower total life cycle cost, enhanced system reliability, and improved customer satisfaction. The Substation Maintenance, Transmission Line Maintenance, and Relay Maintenance procedures were developed to achieve these goals in the most efficient and cost effective means possible.

### 2.0 Basis

Preventive maintenance procedures describe what minimum tasks are to be performed during maintenance. Preventive maintenance procedure content and performance intervals will be determined based on a combination of manufacturer's recommendations, industry benchmarking, maintenance experience, and historical internal knowledge. The maintenance procedures are reviewed and revised on an as-needed basis. A mandatory review of the procedures is also performed every two years.

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### 3.0 **Preventive Maintenance Program**

The preventive maintenance program applies to relay, substation and line preventive maintenance work orders. All preventive maintenance work will be prioritized and evaluated on an ongoing basis. The Transmission Department's planning process requires prioritization and scheduling of work to insure that the objectives of safe and reliable operation of the system are met through the most effective utilization of resources. Work is prioritized and scheduled in accordance with procedure <u>ADM-TRMX-00020</u>, Transmission Maintenance Work Management – Work Screening and Prioritization.

### 4.0 Responsibilities

### 4.1 Asset Management

4.1.1 Revises and performs bi-annual reviews of the maintenance procedures.

### 4.2 Area Maintenance Crews

- 4.2.1 Conducts maintenance in accordance with procedures; exceeds requirements of the procedure if conditions warrant additional action.
- 4.2.2 If excessive preventive maintenance is required, generates a repair maintenance work order for the equipment.
- 4.2.3 Completes documentation in accordance with the procedures.
- 4.2.4 Schedules work by targeting higher priority work orders while taking into consideration potential impact on customers and coordination with other work, to achieve the highest level of reliability at the lowest cost.

### 5.0 Revisions

Asset Management is responsible for maintaining and revising the Transmission Maintenance Procedures in accordance with corporate procedure <u>PRO-SUBS-00001</u>. Proposed changes or recommendations from personnel other than the responsible engineer should be submitted using <u>FRM-TRMX-00282</u>.

### 5.1 Revision Process

- 5.1.1 The responsible engineer will review proposed changes or revisions, whether self initiated or initiated from other personnel.
- 5.1.2 If the proposed changes are initiated through <u>FRM-TRMX-00282</u>, and the recommendation is rejected, the engineer should notify the originator of the reason for rejection. If changes are to be incorporated in the procedure, the engineer will request the procedure from corporate services for revision.
- 5.1.3 The engineer will complete the draft revision and route it for review.
- 5.1.4 A minimum of one other qualified person will perform a review.
- 5.1.5 The responsible engineer will resolve the comments from the reviewer.
- 5.1.6 The responsible engineer will route the procedure for approval. Approval
  - requires a minimum of unit manager signature.

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### 6.0 NERC Compliance

### 6.1 Applicability

6.1.1 PRC-005 and PRC-017

NERC Reliability Standards PRC-005 and PRC-017 require a maintenance and testing program be developed and implemented for transmission protection systems (100kV and above) and Special Protection Systems (SPS). The components required shall include but are not limited to the following:

- Protective Relays
- Instrument Transformers
- Communication Systems
- Batteries

NERC Reliability Standard PRC-005 also requires a maintenance and testing program for generation protective systems. The scope of protective systems at generation sites includes the following:

- Protection of generators
- Protection of generator step-up transformers, auxiliary transformers, and start-up transformers
- Protection of buswork associated with generators and the abovespecified transformers.

The Transmission department is responsible for the relay preventive maintenance at generation sites in accordance with interface agreements.

### 6.1.2 PRC-008

NERC Reliability Standard PRC-008 requires a maintenance and testing program be developed and implemented for underfrequency load shedding (UFLS) equipment. The scope of this standard is limited to the under-frequency load shedding protective relays.

### 6.1.3 PRC-018

Requirement R6 of NERC Reliability Standard PRC-018 requires a maintenance and testing program be developed and implemented for Disturbance Monitoring Equipment.

### 6.2 Compliance Intervals

The preventive maintenance program for the equipment identified in sections 6.1.1 and 6.1.2 above specifies intervals at which preventive maintenance (maintenance and testing) should be performed. Completion of the preventive maintenance work orders shall not exceed 25% of the specified time interval for the maintenance or testing of the equipment. If a maintenance or testing activity cannot be completed within the allowable time interval plus 25%, an engineering evaluation will be completed to determine the impact on reliability and equipment operation.

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### 6.3 Protective Relays

### Maintenance Program

The relay maintenance program includes the necessary verification to ensure proper calibration of protective relays. Maintenance of protective relays is accomplished through Transmission procedures that address:

- Visual and Mechanical Inspections
- Protective and Auxiliary Relays
- Underfrequency
- Transmission Bank Protection
- Transmission Line Protection
- Bus Protection
- Transmission Capacitor Protection
- Numerical Relays and Devices
- Generator/Step-up/Auxiliary Transformer
- Start-up Transformer

### Testing Program

The testing program includes the operational testing of the Protection System to insure it operates as designed and includes the dc control circuit. Operational testing of relays is performed periodically and in accordance with the Functional Guideline Procedure.

### 6.4 Instrument Transformers

### Maintenance Program

Maintenance of instrument transformers is the verification that protective devices/metering are receiving proper potential and current inputs from the instrument transformers. There is no periodic maintenance program for instrument transformers. Measurement of proper potential or current from the instrument transformers is performed during installation, when the equipment is relocated, and/or when problems are identified with the equipment. This is based on a combination of manufacturer's recommendations, industry benchmarking, maintenance experience, and historical internal knowledge.

### Testing Program

Testing of transmission-class instrument transformers (i.e., CCVTs, oil-filled CTs, and oil-filled PTs) that provide protective relay inputs shall be performed to ensure the viability of the equipment. Periodic testing of these devices is defined in the applicable maintenance procedures and includes one or more of the following:

- Doble power factor testing
- Secondary voltage and phase angle measurements
- Partial discharge testing
- Moisture and dissolved gas analysis

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There is no periodic testing program for other types of instrument transformers (e.g., potential transformers and current transformers that are only used for revenue and metering, current transformers mounted on transformer and breaker bushings). Testing of these devices is performed during installation, when the equipment is relocated, and/or when problems are identified with the equipment. This is based on a combination of manufacturer's recommendations, industry benchmarking, maintenance experience, and historical internal knowledge.

### 6.5 Communications Systems

### Maintenance Program

The maintenance program includes verification of frequencies, transmit and receive power levels, and receiver margins. Maintenance of communication equipment is performed on a periodic basis and in accordance with the Data and Carrier procedure.

### **Testing Program**

This program shall include the testing to ensure that the communications system is operating as designed. At a minimum, testing should verify the proper dc control circuit operation and that the appropriate actions occur when the communications system is initiated. Verification of communications systems is performed during operational testing conducted during Transmission Line Protection testing.

### 6.6 Batteries

### Maintenance Program

The battery maintenance program includes multiple tests and checks including the verification of the proper battery cell voltage and fluid level, specific gravity of each cell, as well as the inspection of the hardware that make up the complete battery system. Maintenance of batteries is performed on a periodic basis and in accordance with the Substation Battery Maintenance and Battery Charger procedures.

#### **Testing Program**

Impedances/loading tests to ensure the viability of the battery system are performed periodically under the Battery and Battery Charger procedure.

### 6.7 Schedules

The schedules for maintenance and testing activities are contained in the following procedures:

- Substation Equipment Maintenance Schedules
- Relay Maintenance Schedules

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