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 Florida Power & Light Co.

SUBJECT: AP 11550.92/HP-92, "Emergency Radiation Team Response- Offsite."

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L-89-457
10 CFR 50
Appendix E

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

DEC 18 1989

Gentlemen:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Procedure Referenced in Emergency Plan

Florida Power & Light Company is submitting a copy of the following procedure which is referenced in the Turkey Point Emergency Plan.

<u>Number</u>	<u>Title</u>	<u>Revision Date</u>
AP 11550.92/ HP-92	Emergency Radiation Team Response-Offsite	November 16, 1989

Very truly yours,

K. N. Harris
Vice President
Turkey Point Plant Nuclear

KNH/JRH/rat

attachment

cc: Stewart D. Ebnetter, Regional Administrator, Region II,
USNRC (2 copies)
Senior Resident Inspector, USNRC, Turkey Point Plant

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This procedure may be affected by an O.T.S.C. (On The Spot Change) verify information prior to use.
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FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT UNITS 3 AND 4
ADMINISTRATIVE PROCEDURE 11550.92
HEALTH PHYSICS PROCEDURE HP-92
JUNE 9, 1989

1.0 Title:

EMERGENCY RADIATION TEAM RESPONSE - OFFSITE

2.0 Approval and List of Effective Pages:

2.1 Approval:

Change Dated 6/9/89 Reviewed by Plant Nuclear Safety Committee: 89-242
and Approved by Plant Manager - Nuclear: 6/9/89 Periodic Review: 6/9/89

2.2 List of Effective Pages:

<u>Page</u>	<u>Date</u>	<u>Page</u>	<u>Date</u>	<u>Page</u>	<u>Date</u>	<u>Page</u>	<u>Date</u>
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3	06/09/89	6	06/09/89	9	11/01/88		

3.0 Scope:

3.1 Purpose:

To direct the response of the Emergency Radiation Team (ERT) in performing off-site monitoring in the event of a radiological emergency.

3.2 Discussion:

3.2.1 The Emergency Plans are designed to protect health and safety of the public and plant personnel, prevent damage to property, and limit the consequences of an event. In the event of a radiological emergency or incident, the ERT may be activated to cope with the emergency.

3.2.2 Four levels of emergency classification are established. In order of increasing seriousness, these are:

Definitions:

1. Unusual Event - The Unusual Event category applies to off-normal events or conditions at the Plant for which no significant degradation of the level of safety of the plant has occurred or is expected. Any release of radioactive material which has occurred or which may be expected is minor and constitutes no appreciable health hazard.

RTSs 86-1918, 86-2022, 87-2032, 88-2075, 89-1186



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2. Alert - This classification is represented by events which involve an actual or imminent substantial degradation of the level of safety of the plant combined with a potential for limited uncontrolled radioactivity from the plant.
3. Site Area Emergency - This classification is composed of events which involve actual or likely major failures of plant functions needed for protection of the public combined with a potential for significant uncontrolled releases of radioactivity from the plant.
4. General Emergency - This classification is composed of events which involve actual or imminent substantial core degradation and potential loss of containment integrity combined with a likelihood of significant uncontrolled releases of radioactivity from the plant.

3.2.3 Composition of the Emergency Radiation Team

The primary Radiation Team Leader is the Health Physics Supervisor. He directs the radiological surveillance performed by the Health Physics technicians under the orders of the Emergency Coordinator. The Health Physics Representative, on-site, is designated as the Interim Radiation Team Leader. The alternate leader is the Nuclear Watch Engineer. The Radiation Team Leader recommends appropriate protective actions to the Emergency Coordinator when not covered by procedure.

3.2.4 The Emergency Radiation Team members shall be dispatched by the Emergency Radiation Team leader into the affected area to perform the following duties, as required:

1. Perform radiation surveys and obtain appropriate samples for radionuclide analysis, both on-site and off-site.
2. Establish and post appropriate radiation and contamination area boundaries.
3. Determine the required protective clothing and equipment needed to enter the affected area.
4. Provide estimates to the Emergency Coordinator of the magnitude and extent of radiological hazards.
5. Monitor personnel and evaluate personnel radiation exposures.
6. Maintain proper records and logs.

3.3 Authority:

3.3.1 10 CFR 50, Appendix E



4.0 Precautions and Limits:

- 4.1 All ERT members should wear personal dosimetry whether on-site or off-site. TLD's and self-reading dosimeters are available at the Florida City Substation.
- 4.2 One member of each monitoring team shall have had training in emergency environmental monitoring procedures.
- 4.3 Initially, airborne activity samples to determine radioiodine concentrations shall be collected using silver zeolite cartridges. During subsequent sampling, charcoal filters may be used. Additional silver zeolite and charcoal cartridges are available at the Florida City Substation. I

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- 4.4 Off-site monitoring teams should assemble at the Florida City Substation or as directed by the Off-site Team Leader while awaiting future assignments.
- 4.5 The dose limits used for off-site monitoring are 5 rem whole body and 25 rem thyroid. I
- 4.6 Thyroid and whole body doses for field monitoring teams should be assessed by field teams and verified and recorded by Health Physics personnel in the TSC.

5.0 Responsibilities:

- 5.1 It is the responsibility of the Emergency Radiation Team Leader to:

- 5.1.1 Notify and assemble the ERT when notified of an emergency condition.
- 5.1.2 Report to the TSC and supervise all phases of the Emergency Radiation Team in its response to radiological emergencies and incidents.
- 5.1.3 Verify, through regular inspections, that all emergency equipment is in good condition and operable (See 11550.90/HP-90, Inventory of Health Physics Emergency Equipment).
- 5.1.4 Ensure training is conducted annually with the Emergency Radiation Team members to ensure that they are properly trained for their Emergency Radiation Team position.

- 5.2 It is the responsibility of each Emergency Radiation Team member to:

- 5.2.1 Be thoroughly familiar with the contents of this procedure and the location of all emergency equipment.
- 5.2.2 Report to the assigned assembly area in a timely manner when notified by the ERT Leader. I



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6.0 References:

- 6.1 Turkey Point Plant Radiological Emergency Plan and Procedures
- 6.2 O-ADM-600, Health Physics Manual
- 6.3 O-HPS-020, Radiation Surveys
- 6.4 O-HPS-021, Surface Contamination Surveys
- 6.5 O-HPS-022, Airborne Contamination Surveys
- 6.6 | O-HPA-070, Decontamination of Personnel |
- 6.7 OP-11550.71, Decontamination of Tools, Equipment, and Areas
- 6.8 AP-11550.90, Inventory of Health Physics Emergency Equipment
- 6.9 EPIP-20125, On-site Emergency Organization

7.0 Records and Notification:

- 7.1 All significant information, events, and actions taken during an emergency period shall be reported to the Emergency Coordinator.
- 7.2 Each monitoring team should record results of all surveys and actions in a monitoring log book.

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3.0 Instructions:

- 8.1 When notified by the Emergency Coordinator that a radiological emergency exists and that the Emergency Plan is initiated, the Emergency Radiation Team shall organize in accordance with EPIP-20125, On-site Emergency Organization.
- 8.2 Unless directed otherwise by the Emergency Coordinator, the Emergency Radiation Team shall perform the following:
 - 8.2.1 Upon declaration of an Alert, Site or General Emergency the ERT shall assemble in the OSC. The interim ERT Leader should open all emergency supply lockers and check all equipment for operability. Survey meters should be source checked prior to use.
 - 8.2.2 The interim ERT Leader should establish communications with the TSC (if operable) or with the Emergency Coordinator in the Control Room.
 - 8.2.3 The ERT Leader shall assemble at the TSC and establish communications with the ERT and the Emergency Coordinator.
- 8.3 Survey kits for Emergency Radiation Monitoring Teams shall be available at the OSC and at the off-site Assembly Area (Florida City Substation). These survey kits are supplied and inventoried according to Operating Procedure 11550.90, Inventory of Emergency Equipment.
- 8.4 Locating the Plume
 - 8.4.1 The ERT Leader shall dispatch the Off-Site Survey Teams as needed from the assembly area in the OSC or from the Site Assembly Area.
 1. There is an Off Site Emergency Kit in the OSC to allow one team to be dispatched directly from the plant site. Any other off-site teams will report to the Florida City Sub Station to pick up additional emergency equipment.
 2. The teams shall be briefed on the extent of the off-site release (or potential of release), the wind direction and other specifics as available.
 3. The off-site teams shall inventory the emergency kits before use and verify that they are equipped in accordance with the inventory lists.
 4. The ERT Leader, or his designee, shall use the wind speed/direction and the plant release data to determine the travel routes into the affected areas for the off-site survey teams.
 5. The FPL access roads have locked gates that may block the survey team from locating the plume. The survey teams leaving the plant site shall check out the gate keys from the south guard house.



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6. The ERT Leader, or his designee, should communicate with the Off-Site Survey Teams using the emergency team portable radios. The off-site team will normally use channel No. 2 for all transmissions.
- 8.4.2 1 If desired, the Radiation Team Leader may request that FPL vehicles be made available for survey activities. Emergency Management Maintenance shall make necessary arrangements. 1
- 8.4.3 The survey teams should try to locate the release plume by placing a highly sensitive survey meter outside the window of the emergency vehicle and continuously monitoring the meter response. An open window survey probe (Beta-Gamma) may be used to aid in locating the lower activity levels near the edges of the plume.
- 8.4.4 1 The ERT Leader, or his designee, should be notified whenever any increase above the background radiation levels is noted by the survey team. The survey team should report their location and the Gamma Radiation levels at the edge of the plume.
- 8.4.5 The survey team shall record the time of entry and exit from the plume. The stay time will be used with the air activity to calculate the dose to the thyroid from exposure to radioiodine. The thyroid dose limit for any individual is 25 rem. (See Section 8.4.10). 1
- 8.4.6 The ERT Leader, or his designee, will instruct the survey team to proceed into the plume to locate the center-line of the release. The vehicle windows should be rolled up when entering the plume.
- 8.4.7 1 The center-line of the plume will be located by finding the area with the highest gamma exposure rate. When the survey team has determined the location of the centerline they shall perform the following actions:
 1. Don respiratory protection equipment and then exit vehicle. The survey team should remove the Air Sampler and ION Chamber (or other Beta-Gamma Survey Meter) from the vehicle and then shut the vehicle doors to reduce contamination inside.
 2. Initiate air samples. The normal sample volume shall be 1×10^5 ml. If the gamma exposure rate is greater than 1R/HR, the sample volume should be reduced to 1×10^4 ml to allow more rapid sampling and reduce the exposure to the survey team. (See Section 8.5.1 - 8.5.4 for details on air sampling). 1
 3. Perform open and closed window surveys of affected area to determine the beta and gamma dose rates. Surveys should be taken at different height gradients to determine if source term is ground deposition or airborne plume. (Ground deposition readings should be taken within 3 inches of the ground.)

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4. Notify the ERT Leader, or his designee, of the center line location and the dose rate results.

NOTE: It may be necessary to exit the plume before using the radio if communication cannot be performed while the survey team is wearing respiratory equipment.

8.4.8 The survey team should exit the affected area as soon as the air sample is obtained. They should notify the ERT Leader, or his designee, when exiting the plume and proceed to an area, outside the plume, as directed by the ERT Leader.

8.4.9 The air samples shall be analyzed by the survey team to determine the concentration of particulate and radioiodine activity. (See instructions for analyzing air samples in section 8.6.)

8.4.10 The results of the air sample analysis will be relayed to the ERT Leader, or his designee, by the Off-Site Survey Team. The survey team will calculate their thyroid dose and report the dose to the ERT Leader, or his designee. The thyroid dose can be obtained by using the Thyroid Exposure Graph in the emergency kits and calculating the stay time in the plume and the airborne I-131 concentration.

8.5 Instructions for Air Sampling:

8.5.1 Off-site air samples will usually be taken with a 12 volt DC air sampler. The sampler has two battery leads that will attach to the battery post in the emergency vehicle. (Verify that the correct polarity is used when connecting the battery leads. The red lead is positive and the black lead is negative).

8.5.2 The air sample heads shall be loaded with a silver zeolite cartridge down stream of a standard particulate filter. Verify that the arrow on the cartridge is pointing in the direction of the sample flow.

8.5.3 The sample volume will normally be 1×10^5 ml. If the gamma exposure rate in the center-line of the plume is greater than 1 R/HR, the sample volume should be reduced to 1×10^4 ml to allow for more rapid sampling and thus reduce the exposure to the survey team. (Lower volume samples may also be required by the ERT Leader if high levels of activity are projected). The sample time is determined by reading out the flow meter indicator attached to the air sampler and calculating the time required to obtain the desired sample volume. A flow chart is provided with the emergency kits to aid in calculating the sample time.

8.5.4 After the desired sample volume is obtained, the filter and iodine cartridge shall be removed from the sample head and placed in separate whirlpaks. The samples should be labeled with location, volume, sample date and time. (Care should be taken to avoid cross contamination of air sample filter and cartridge.)

8.6 Instructions for Analysis of Air Samples:

8.6.1 The air samples shall be analyzed in a low background area outside of the plume. The area should be surveyed to verify that the background levels will not affect the sample analysis.

8.6.2 Single channel detectors (Ludlum Model 2200) or multi channel detectors (Ludlum Model 2218) will be used by the emergency team to analyze the samples for radioactive iodine (I-131).

8.6.3 Initial set-up for use of Ludlum Model 2200

1. Turn the instrument selector switch to "Battery"
2. Check the battery condition by turning the selector to the battery test position and observing the response on the rate meter readout. If the batteries are unsatisfactory, remove the back cover and replace the batteries. Observe that the correct polarity is used when replacing the batteries.
3. After ensuring that the batteries are satisfactory, turn the selector switch from "Battery Check" to "Rate".
4. Turn on the stabilizer using the toggle switch on the back of the meter before counting. Allow 1 minute for the instrument to stabilize the voltage.
5. Adjust the threshold setting to 3.50. Set the window potentiometer to 0.20. Set the window switch to the "ON" position.
6. Proceed to Step 8.6.5.

8.6.4 Initial set-up for use of Ludlum Model 2218

1. Set the High Voltage Potentiometer to 0.00.
2. Turn the instrument selector switch to "Battery"
3. Check the battery condition by depressing the battery test button and observing the response on the rate meter readout. If the batteries are unsatisfactory, remove the back cover and replace the batteries. Observe that the correct polarity is used when replacing the batteries.

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4. Turn the stabilizer to the OFF position using the toggle switch on the front of the meter.



5. Adjust the channel No. 1 settings as listed below:

Channel No. 1 Toggle Switch	= "IN"
Window Setting	= 0.20
Threshold Setting	= 3.50
Multiplier Toggle Switch	= "BYPASS"
Channel function	= "ADD"

6. Adjust the channel No. 2 settings as listed below:

Channel No. 2 Toggle Switch	= "OUT"
Window Setting	= 0
Threshold Setting	= 0
Multiplier Toggle Switch	= "BYPASS"
Channel function	= "OFF"

7. Set the rate meter response switch to "F" (Fast) and the selection switch to "CH 1".
8. Set range multiplier switch to X100.
9. Turn the recycle switch on the back of the meter to "OFF".
10. Set the clock toggle switch to "LIVE".
11. Set the time switch to 01.
12. Set the multiplier to X1.

8.6.5 Adjusting the High Voltage Potentiometer.

1. Set the rate meter response switch to the fast position.
2. Set the probe perpendicular to the Barium-133 check source in the meter housing.

CAUTION: Be careful not to increase the voltage above 1400 volts. The voltage can be read by turning the selector switch to HV on the Ludlum 2200 and by depressing the HV button on the Ludlum 2218.

3. While the probe is in this position adjust the high voltage (HV) control slowly while observing the rate meter movement. Adjust the high voltage control until the maximum count rate is observed on the rate meter.
4. Push the count button and obtain a background count rate (probe should not be near the internal Barium check source for the background check). Record the results.
5. Set the probe perpendicular to the Barium-133 check source in the meter housing. Then press the count button and obtain a one minute source count.



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6. The net CPM for the Barium-133 source should fall within plus or minus 20% of the source value indicated on the side of the instrument. If the results are greater than 20% from the source value, return to Step 8.6.5.1. If the results are within 20% of the source value proceed to Step 8.6.5.7.
7. After setting up the meter and completing the response check with the Barium-133 source, set the detector upright (away from the barium check source) and press the count button and obtain a one minute background count. Record the data.

8.7 Sample Counting

- 8.7.1 Press the count button and obtain a one minute background count. Record the results.

CAUTION: Take appropriate steps to prevent cross-contamination of probe and instrument.

- 8.7.2 Place the silver zeolite cartridge in contact with the end of the detector probe with the flow arrow on the cartridge pointing away from the probe. Press the count button and obtain a one minute sample count with the probe directly over the cartridge. Record the data.

- 8.7.3 Determine the net count rate on the sample by subtracting the background CPM from the sample CPM.

- 8.8 Particulate activity analysis will be performed on the particulate filter alone. The filter should be removed from the whirlpack and placed approximately 1/2" below the window of a HP-210 Beta-Gamma Probe connected to a count rate meter. The particulate activity is calculated using the following formula:

$$\text{Particulate Air Activity} = \frac{(\text{SAMPLE NET CPM}) \times (4.5 \times 10^{-7})}{(\text{VOLUME ml} \times (0.1) \times (0.9))}$$

1 If high sample activity causes the HP-210 probe and count rate meter to exceed the highest scale (Off Scale Reading), survey the particulate filter with a Gamma Dose Exposure Meter and report the results to the ERT Leader, or his designee.

- 8.9 All survey data obtained by the Off-Site Survey Teams should be recorded in the Survey Team Log Book in the Emergency Kit.
- 8.10 The field survey results should be recorded on the status board in the TSC and compared to the projected results that were based on release data.



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- 8.11 Further analysis of the off-site air samples may be performed at the following facilities:

The HP Counting Laboratory (On Site)
The Radiochemistry Laboratory (On Site)

The samples should be counted in accordance with the standard operating procedure for that particular counting facility.

- 8.12 1 The dose limits for plant personnel on the Emergency Off-Site Team are 5 rem - whole body and 25 rem to the thyroid. Estimates of exposure will be calculated by the field teams and communicated to the ERT Leader, or his designee.
- 8.13 When the Emergency Operations Facility (EOF) is established and off-site survey operations are ready to be coordinated with the State of Florida Department of Health and Rehabilitative Services, the direction of the FPL Field Monitoring Teams should be carried out in conjunction with the Corporate Health Physics Group.