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Rev. 14

Effective Date 3/6/00

EMERGENCY PLAN IMPLEMENTING PROCEDURE

EM-103

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

OPERATION AND STAFFING OF THE CR-3 CONTROL ROOM  
DURING EMERGENCY CLASSIFICATIONS

APPROVED BY: Procedure Owner

John J. Stephenson  
(SIGNATURE ON FILE)

DATE: 3/2/00

PROCEDURE OWNER: Radiological Emergency Planning

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## **1.0**      **PURPOSE**

This procedure provides instructions for the operation and staffing of the CR-3 Control Room during emergency classifications at CR-3.

## **2.0**      **REFERENCES**

### **2.1**      **DEVELOPMENTAL REFERENCES**

- 2.1.1      AI-505, Conduct of Operations during Abnormal and Emergency Events
- 2.1.2      Control Room Habitability, NUREG-0737, Item III D.3.4
- 2.1.3      CR-3 Severe Accident Guideline
- 2.1.4      EM-202, Duties of the Emergency Coordinator
- 2.1.5      EM-102, Operation of the Technical Support Center
- 2.1.6      EM-104, Operation of the Operational Support Center
- 2.1.7      EM-210A, Duties of the Radiation Monitoring Team; CR-3 and Generating Complex Personnel and Area Monitoring
- 2.1.8      EM-225, Duties of the Technical Support Accident Assessment Team
- 2.1.9      HPP-409, Inventory and Availability of Emergency Supplies/Equipment
- 2.1.10     NEI 91-04, Revision 1, Severe Accident Issue Closure Guidelines
- 2.1.11     NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 2.1.12     Radiological Emergency Response Plan
- 2.1.13     10CFR50.47, Emergency Plans
- 2.1.14     10CFR50, Appendix E, Emergency Planning and Preparedness for Production and Utilization Facilities

### **3.0 PERSONNEL INDOCTRINATION**

**NOTE: A Safety Assessment was performed for this procedure. A determination was made that this procedure is outside the scope of 10CFR50.59.**

### **3.1 DEFINITIONS**

- 3.1.1 Re-entry - The return of personnel to an area evacuated during an emergency condition.
- 3.1.2 Severe Accident - An accident beyond that assumed in the CR-3 design and licensing basis that results in catastrophic fuel rod failure, core degradation and fission product release in the Rx vessel, Reactor Building, or the environment.

### **3.2 RESPONSIBILITIES**

- 3.2.1 The Nuclear Shift Manager directs Control Room activities and implements this procedure and all actions required to place the plant in as safe a condition as possible to preserve the safety and well being of the general public.
- 3.2.2 The Nuclear Shift Manager is the Emergency Coordinator during the initial phase of the emergency until properly relieved by the Director, Nuclear Plant Operations or designee.
- 3.2.3 The Emergency Coordinator implements the requirements of EM-202.
- 3.2.4 The Emergency Coordinator assigns an individual the task of recording actions taken, information received, notifications made using procedures, log books or any other form of documenting the activities. Plant stabilization takes priority over assignment of these functions. [NOCS 96042]
- 3.2.5 Medical Services is responsible for authorizing the administration of KI.
- 3.2.6 The Nuclear Shift Manager/Emergency Coordinator is authorized to issue potassium iodide (KI).
- 3.2.7 The Nuclear Shift Manager implements mitigation strategies developed and approved by the TSC during a Severe Accident.
- 3.2.8 The Nuclear Shift Manager maintains contact with the Emergency Coordinator located at the TSC by various communication systems.

### 3.3 LIMITS AND PRECAUTIONS

- 3.3.1 RM-A5 monitors the Control Room atmosphere and places the Control Room ventilation system in a recirculation path, through charcoal and HEPA filters, when the high alarm set point on either the gas or iodine channel is reached.
- 3.3.2 If RM-A5 or RM-G1 become inoperable or unreliable, a Health Physics Technician provides additional monitoring equipment and gross iodine analysis. These emergency supplies are provided in the Emergency Kit located in the Control Room.
- 3.3.3 In the event Control Room personnel are unable to arrange for the purchase of food during emergency conditions, a seven day food supply is located and maintained on the 124' elevation of the Control Complex in locked cabinets with key control by the Nuclear Shift Supervisor. [NOCS 40743]

### 3.4 EQUIPMENT

The following equipment is available in the Control Room:

#### 3.4.1 Communication Equipment

- a. State Hot Ringdown [State Warning Point Tallahassee (SWPT), Bureau of Radiation Control, Orlando, Citrus and Levy County notification]
- b. Commercial Telephone System
- c. Florida Emergency Satellite Communication (ESATCOM) [SWPT, Citrus and Levy County notification]
- d. Emergency Notification System (ENS)
- e. Florida Power Corporation (FPC) Microwave Telephone System
- f. Dose Assessment Ringdown Telephone
- g. PAX System
- h. Accident Assessment Ringdown
- i. Portable Transceivers (as assigned by the Emergency Coordinator)
- j. 311 emergency phone
- k. Telecopy Machine (FAX)

### 3.4.2 Other Emergency Related Equipment

RADDOSE IV (Dose Assessment on Support Specialist's computer in office outside the Control Room)

SPDS (Safety Parameters Display System)

Local Government Radio (LGR) Connection (Nuclear Shift Manager's Office)

PICS Archiver Retrieval (Plant Integrated Computer System stored data)

ERDS (Emergency Response Data System)

### 3.4.3 Emergency Kits

Control Room Emergency Kit contents are described in HPP-409, Enclosure 1. General contents include protective clothing, respirators, personnel monitoring devices and smear capability.

### 3.4.4 Potassium Iodide (KI)

The KI tablets are located at the Supervisor Station in the Control Room.

## 4.0 INSTRUCTIONS

### 4.1 CONTROL ROOM

**NOTE: On-shift Operations Personnel may remain in their work areas to perform emergency actions during an Alert, as instructed by the Emergency Coordinator.**

**NOTE: Prior to the TSC becoming fully operational, personnel may be dispatched from the Control Room at the direction of the Emergency Coordinator.**

4.1.1 IF indication of high iodine concentrations are present in the Control Room (e.g., RM-A5 Particulate/Iodine channel off-scale), THEN ISSUE KI tablets to Control Room operators, AND OBTAIN permission from Medical Services for administration. [NOCS 62719, 62720]

4.1.2 During an Alert, Site Area Emergency, or General Emergency classification, on-shift Operations personnel REPORT to the Control Room; off-shift Operations personnel REPORT to the NSM for assignment.

4.1.3 ESTABLISH the following positions in the Control Room during an Alert, Site Area or General Emergency, as personnel become available and the TSC/OSC becomes operational, for monitoring key plant parameters and relaying information to and from the TSC as appropriate.

**NOTE:** The Accident Assessment Control Room Ringdown Communicator is designated by the TSC Accident Assessment Coordinator.

a. Accident Assessment Control Room Ringdown Communicator

- o ESTABLISH communication with the TSC Ringdown Communicator on the Accident Assessment Ringdown phone.
- o COMMUNICATE status of overall plant conditions and questions to the TSC Accident Assessment Team.
- o COMMUNICATE instructions to Control Room Operators for mitigating actions as directed by the TSC Emergency Coordinator.
- o DIRECT Control Room personnel regarding actions to take to mitigate a Severe Accident, based on actions approved by the TSC Emergency Coordinator.

**NOTE:** The Dose Assessment Communicator is an alternate source of radiological and meteorological monitoring data. This individual is assigned to the Control Room by the Dose Assessment Coordinator, or designee, in the TSC.

b. Dose Assessment Communicator

- COLLECT and EVALUATE radiological and meteorological information.
- TRANSMIT the data to the Dose Assessment Team via the Dose Assessment Ringdown phone.

4.1.4 LIMIT access to the Control Room to Plant Staff directly responsible for operation of the plant, technical advisors who may be requested to support operations, and NRC personnel.

4.1.5 ENSURE assignments are made from the OSC of an electrician, Technical Support Technician, HVAC Mechanic, and a Health Physics Technician to the Control Complex, as they become available.

4.1.6 ENSURE repairs within the Control Complex made under the direction of the Nuclear Shift Manager are communicated to TSC/OSC Management. [NOCS 12080]

4.1.7 ENSURE repairs outside the Control Complex are performed by a team dispatched from the TSC/OSC, once the TSC/OSC is operational.



**NOTE: Control Room personnel follow the guidelines for exposure of emergency workers as outlined in EM-104, Section 3.3, during re-entry activities**

**NOTE: Reentry teams consist of at least two people including a Health Physics Technician (HPT)**

- 4.1.8 IF immediate reentry of an operator from the Control Room is necessary to prevent imminent adverse consequences, AND the TSC/OSC is operational, THEN NOTIFY the TSC (via Accident Assessment Control Room Ringdown communicator) of the dispatch.
- 4.1.9 ENSURE completion of Emergency Team Authorization form by the HPT.
- 4.1.10 ASSIGN two operators to the OSC Team Room during a Site Area or General Emergency, when available, for dispatch with emergency teams re-entering the plant. The TSC may request Operators, if available, during the Alert.
- 4.1.11 NOTIFY operators assigned to the TSC/OSC to identify themselves to the OSC Manager for TSC/OSC dispatch availability.
- 4.1.12 IF Operators are not assigned to the TSC/OSC, THEN Operators dispatched from the Control Room, OR re-entry teams in need of an operator, MUST COORDINATE a meeting place with the OSC for briefing of the operator.
- 4.1.13 IF the Control Complex exceeds, or personnel evacuate to or through an area which exceeds, acceptable contamination or airborne activity levels, THEN DON respirators and protective clothing as needed, as provided in the Emergency Kit.
- 4.1.14 IF the Control Complex becomes the alternate location for TSC/OSC staff during an emergency, AND is placed in the emergency recirculation mode, THEN ENSURE Health Physics establishes O<sub>2</sub> and CO<sub>2</sub> monitoring for the Control Complex as outlined in EM-210A, Section 4.2.
- 4.1.15 IMPLEMENT mitigation strategies developed by the TSC Accident Assessment Team and approved by the Emergency Coordinator during a Severe Accident. [NOCS 100056]

# PROCEDURE DEVELOPMENT AND REVISION RECORD

Procedure: EM0103

New Rev: 14

PRR#: 18236

Title: OPERATION AND STAFFING OF THE CR-3 CONTROL ROOM DURING EMERGENCY CLASSIFICATIONS

## MINOR CHANGES

If Minor Changes are included, check the applicable box(es) and provide a list of affected steps.  
The following corrections are incorporated throughout:

- |   |   |
|---|---|
| <input type="checkbox"/> Sentence Structure   | <input type="checkbox"/> Redundant words or phrases                 |
| <input type="checkbox"/> Punctuation  | <input type="checkbox"/> Abbreviations                              |
| <input type="checkbox"/> Capitalization   | <input type="checkbox"/> Obviously incorrect units of measure       |
| <input type="checkbox"/> Spelling   | <input type="checkbox"/> Inadvertently omitted symbols (#, %, etc.) |
| <input type="checkbox"/> Organizational Changes: position titles,<br>department names, or telephone numbers | <input type="checkbox"/> Obvious step numbering discrepancies       |
|   | <input checked="" type="checkbox"/> Format                          |

The following corrections are incorporated in the step(s) indicated: "Throughout" is used in lieu of Step# if a specific change affects a large number of steps.

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Correcting equipment nomenclature that does not agree with field labels or balance of procedure

---

Changing information that is obviously incorrect and referenced correctly elsewhere

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Misplaced decimals that are neither setpoint values nor tolerances

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Reference to a procedure when an approved procedure has taken the place of another procedure

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Fixing branching points when it is clear the branching steps were originally intended but were overlooked or incorrectly stated due to step number changes

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Adding clarifying information such as NOTES and CAUTIONS

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Adding words to clarify steps, NOTES, or CAUTIONS which clearly do not change the methodology or intent of the steps

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## PROCEDURE DEVELOPMENT AND REVISION RECORD

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Procedure: EM0103

New Rev: 14

PRR#: 18236

Title: OPERATION AND STAFFING OF THE CR-3 CONTROL ROOM DURING EMERGENCY CLASSIFICATIONS

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### NON-INTENT CHANGES

Changes are incorporated for the reasons provided. "Throughout" is used in lieu of Step # if a specific change affects a large number of steps. For new or cancelled procedures the reason is provided.

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2.0	Revise Developmental References to include 10CFR50 Appendix E; 10CFR50.47, and NUREG 0654. Replace AI-500 with AI-505. To be in compliance with Writer's Guide.
3.2.4	Added statement that plant stabilization takes priority over assignment of items identified previously in step. Reflects NOCS Commitment 96042
4.1.2	Delete reference for Manager Nuclear Plant Operations to report to the Control Room during an emergency. This individual normally is the RingDown Communicator to the TSC. Since Accident Assessment Team training is required for the Ringdown Communicator, the individual is appointed by the TSC Accident Assessment Coordinator. The individual may or may not be the Manager, Nuclear Plant Operations.
4.1.3	Clarify that the establishment of positions in the Control Room during an emergency is for monitoring key plant parameters and relaying information to the TSC.
4.1.3 NOTE	Delete minimum staffing for Control Room Accident Assessment Team is the Manager, Nuclear Plant Operations. This position is designated by the TSC Accident Assessment Coordinator.
4.1.3.a	Clarify Control Room Accident Assessment Ringdown Communicator responsibilities.
Add 3.2.8	Add statement that NSM maintains contact with the EC located at the TSC by various communication systems. To implement RERP Sect. 12.1.1
Throughout	Revise titles as necessary. Revise NOCS # as necessary; renumber as needed, place section number as needed when referencing other procedures. To meet Writer's Guide.
4.1 NOTE	Clarify Ops personnel may remain in work areas to perform emergency actions during an Alert.
4.1.10	Add to step that the TSC may request operators during an Alert, if they are available.

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Effective Date 3/6/00

EMERGENCY PLAN IMPLEMENTING PROCEDURE

EM-210B

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DUTIES OF THE RADIATION MONITORING TEAM:  
ENVIRONMENTAL SAMPLING AND PLUME TRACKING

APPROVED BY: Procedure Owner

John J. Stephens  
(SIGNATURE ON FILE)

DATE: 3/2/00

PROCEDURE OWNER: Manager, Radiological Emergency Planning

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## **1.0      PURPOSE**

- 1.1      Provides instructions for the Radiation Monitoring Team (RMT) performing environmental sampling and plume tracking in the event of a radiological emergency.

## **2.0      REFERENCES**

### **2.1      DEVELOPMENTAL REFERENCES**

- 2.1.1      10CFR50.47, Emergency Plans
- 2.1.2      10CFR50, Appendix E, Emergency Planning and Preparedness for Production and Utilization Facilities
- 2.1.3      EM-104, Operation of the Operational Support Center
- 2.1.4      EM-210A, Duties of the Radiation Monitoring Team: CR-3 and Generating Complex Personnel and Area Monitoring
- 2.1.5      NUREG 0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 2.1.6      Radiological Emergency Response Plan
- 2.1.7      RSP-101, Basic Radiological Safety Information and Instructions for "Radiation Workers"
- 2.1.8      RSP-600, ALARA Program

## **3.0      PERSONNEL INDOCTRINATION**

**NOTE: A Safety Assessment was performed for this procedure. A determination was made that this procedure is outside the scope of 10CFR50.59.**

### **3.1      DEFINITIONS**

- 3.1.1      **Dose Assessment Coordinator - Lead Technical Support Center (TSC) Chemistry or Radiation Protection designee directing Chemistry and Radiological assessment personnel and advising the Emergency Coordinator on these issues.**

3.1.2 **Environmental Survey Team (EST) Dispatcher** - Health Physics Supervisor or qualified Radiation Monitoring Team designee coordinating activities for the EST. The term "Dispatcher" is also used for this position.

3.1.3 **EST/RMT** - The portion of the RMT that tracks the plume and performs environmental sampling within the Crystal River Generating Complex and within the 10-mile Emergency Planning Zone (EPZ). RMT and EST will be used interchangeably throughout the procedure.

3.1.4 **ESV** - Environmental Survey Vehicle

3.1.5 **Plume Tracking** - Locating, tracking, and monitoring of radiological characteristics (e.g., dose rates and radioactivity levels) of airborne radioactive material.

3.1.6 **Qualified** - Successfully completed appropriate emergency team training and currently listed on Emergency Call Roster.

3.1.7 **Team Leader** - A qualified, Radiation Monitoring Team member performing the lead responsibilities for the Environmental Survey Team.

## 3.2 RESPONSIBILITIES

3.2.1 The Emergency Coordinator (EC) or his designee:

- o Authorizes exposure limits in excess of administrative limits.
- o Ensures ALARA considerations are stressed.
- o Seeks guidance from the Dose Assessment Coordinator, as required, on radiological matters.
- o Approves Emergency Radiation Work Permit (RWP) and Emergency Team Authorization (ETA) forms in accordance with EM-104.
- o Authorizes on-site and off-site plume monitoring.
- o Directs EST to support State of Florida sampling team(s), if requested.

3.2.2 The Dose Assessment Coordinator or designee:

- o Determines the need and makes recommendations to the EC about the feasibility of dispatching the (ESTs), based upon available radiological data and physical plant conditions.
- o Provides the Dispatcher with any special instructions prior to the Team's departure.
- o Keeps the Dispatcher appraised of current or changing conditions affecting the members of the EST.
- o Relays the information provided by the Dispatcher to the EC.

3.2.3 The Dispatcher directs activities of the EST performing environmental sampling and plume tracking, either from the TSC or from the Emergency Operations Facility (EOF).

3.2.4 The EST Leader and EST members perform environmental sampling and plume tracking and ensure implementation of this procedure.

3.2.5 The EST Members collect, analyze and package samples obtained in the field, notifying the EST Leader about any condition that could hamper the team's effort to track the plume (e.g., inadequate supplies, instrument malfunctions, etc.).

3.3 LIMITS AND PRECAUTIONS

3.3.1 Drive safely and comply with traffic laws at all times.

3.3.2 The EST complies with the requirements of and follows the guidelines for exposure of emergency workers during re-entry activities as contained in EM-104.

3.3.3 EST members must be qualified - listed on current emergency roster.

3.3.4 An EST shall consist of at least two (2) persons.

3.3.5 Assessment of location and radiological characteristics of a plume or radioactive material is one factor for determination of emergency classification, determination of what (if any) protective action guides (PAGs) are being approached or exceeded, and to verify and supplement CR-3's other dose assessment capabilities. [NOCS 1592]

3.3.6 Wind shift caused by the sea breeze effect is one occurrence that can seriously affect the ability of the team to track the plume. This phenomenon usually occurs in the daylight hours during the months of March through October. A buildup of a line of heavy clouds or thunderstorms normally takes place at the point of the wind shift caused by the sea breeze.



- 3.3.7 A westerly wind could indicate a sea breeze. Visual aids (e.g., smoke, low cloud movement, etc.) may provide a means of detecting when and where this wind shift is occurring.
- 3.3.8 The team should consider exposure when trying to determine a plume's highest dose rate. Considerable exposure could be received looking for the "highest" gamma dose rate.
- 3.3.9 The RMT has no authority to evacuate personnel outside of the Owner-Controlled Area.

#### 3.4 EQUIPMENT

- 3.4.1 The following equipment should be available:
- o EST supplies as identified in HPP-409.
  - o Vehicle (ESV or backup).
  - o Transceiver and batteries.
  - o Cellular phone in ESV.
  - o UHF, VHF radios.

#### 4.0 INSTRUCTIONS

##### 4.1 EST DISPATCHER

###### 4.1.1 Activation

- 4.1.1.1 REPORT to the TSC upon the declaration of an Alert, Site Area or General Emergency.
- 4.1.1.2 BADGE in at TSC/OSC Card reader.
- 4.1.1.3 NOTIFY Dose Assessment Coordinator of your arrival.
- 4.1.1.4 OBTAIN procedures as needed. (EM-104, EM-210B)
- 4.1.1.5 VERIFY operability of communication.

###### 4.1.2 Operation

- 4.1.2.1 Upon direction from the Dose Assessment Coordinator, DETERMINE manpower needs and select qualified personnel to form the EST.

- 4.1.2.2 ENSURE all EST members are listed on an Emergency Team Authorization form.
- 4.1.2.3 CONDUCT a pre-job briefing prior to the team's departure in accordance with EM-104, Enclosure 4.
- 4.1.2.4 NOTIFY the Dose Assessment Coordinator of teams readiness to depart.
- 4.1.2.5 ESTABLISH contact with the EOF Field Team Dispatcher as needed for EST dispatch coordination.
- 4.1.2.6 ACT as communication liaison between the EST, the Dose Assessment Coordinator, the Dose Assessment Team and the EOF Field Team Dispatcher.
- 4.1.2.7 DIRECT the plume tracking activities with guidance from the Dose Assessment Coordinator and DAT.
- 4.1.2.8 NOTIFY the EST Leader of current or changing conditions, especially meteorological.
- 4.1.2.9 ENSURE the EST Leader reports apparent conflicts with projected plume location and observed meteorological conditions.
- 4.1.2.10 PROVIDE information regarding the location and radiological conditions (e.g., dose rates and airborne radioactivity levels) of a plume or radioactive material to the Dose Assessment Coordinator.
- 4.1.2.11 ENSURE comparisons for field team measurements versus calculated dose rate estimates are completed.
- 4.1.2.12 ENSURE environmental survey results are maintained and transmitted to the EOF. [NOCS 24110]
- 4.1.2.13 ACT as communications backup if the EOF assumes direction of EST.

#### 4.2 ENVIRONMENTAL SURVEY TEAM LEADER

- 4.2.1 PERFORM Team Leader responsibilities as identified in EM-104, Enclosure 4.
- 4.2.2 FILL OUT the ETA in accordance with the requirements of the ERWP and any instructions given at the pre-job briefing (EM-104, Enclosure 4).
- 4.2.3 DIRECT plume monitoring and sampling beyond the site boundary until the State of Florida arrives on the scene and assumes this responsibility. [NOCS 1136]
- 4.2.3.1 DIRECT plume monitoring and sampling activities within the Site boundary until authorization from the EC or EOF Director that the team is recalled.

4.2.4 ENSURE the team takes Potassium Iodine (KI) tablets with them in case there is a need to take them, as directed by the Medical Representative in the TSC/OSC.

IF the Medical Representative is not available,  
THEN coordinate taking KI from the TSC/OSC with the Dose Assessment Coordinator.

4.2.5 TRACK the EST's accumulative exposure.

**4.3 EST PREPARATIONS (AT TSC/OSC)**

4.3.1 REPORT to Local Assembly Area (Health Physics 95' Control Complex) during an Alert declaration. Upon assignment to respond as an emergency team member, REPORT to the TSC/OSC and badge in.

4.3.2 REPORT directly to the TSC/OSC for assignment during the declaration of a Site Area or General Emergency.

4.3.3 FORM the EST as directed by the Dose Assessment Coordinator.

4.3.4 OBTAIN keys for the ESV or backup vehicle from the key locker in the Health Physics Office (95' Control Complex), Health Physics Calibration Lab, or the TSC/OSC Emergency Kit. [NOCS 24290]

4.3.5 OBTAIN survey instruments from the Emergency Kit in the TSC/OSC. [NOCS 24290]

4.3.6 OBTAIN any additional supplies that may be needed that are not part of the supplies located in the ESV (e.g., SCBAs and spare bottles, counting system, E-120 instrument, full face respirators, etc.).

4.3.7 OBTAIN transceiver(s) and spare battery(s) from TSC/OSC emergency supplies. [NOCS 24290]

4.3.8 TEST dose rate instruments to be used from Enclosure 1 and DOCUMENT calibration due dates below:

INSTRUMENT	CALIBRATION DUE DATE
MS-2	
SAM-II	
RM-14/E-120	
RM-16	
AMS-2/3	

4.3.9 DETERMINE counting system efficiencies. Use efficiency values listed on Enclosure 1, if necessary.

4.3.10 OBTAIN Self-Reading dosimetry.

**NOTE: The Emergency RWP and Emergency Team Authorization are defined in EM-104, Operation of the Operational Support Center.**

- 4.3.11 ATTEND pre-job briefing and ensure the Emergency RWP and ETA is filled out and signed in accordance with EM-104.
- 4.3.12 DON protective clothing, if required, in accordance with the Emergency RWP and ETA.
- 4.3.13 PROCEED to ESV.
- 4.3.14 RETAIN thermoluminescent dosimeter (TLD) badges when leaving site.  
[NOCS 13150]

**4.4 TEAM PREPARATIONS (AT ESV)**

- 4.4.1 PROCEED to ESV.
- 4.4.2 DON protective clothing in accordance with the ETA (if not done earlier).
- 4.4.3 NOTIFY Environmental Survey Dispatcher Team of readiness to depart.

**4.5 PLUME TRACKING AND SAMPLE COLLECTION [NOCS 1126, 7450]**

**NOTE: An "Environmental Survey Team" map may be used for plume tracking and locating predesignated monitoring points.**

- 4.5.1 PROCEED to area specified by the Dispatcher.

**NOTE: An E-120 or equivalent instrument as determined by Health Physics Tech, may be necessary to detect very small releases.**

- 4.5.2 MONITOR beta and gamma dose rates en route to the designated area. Dose rates above background could indicate:
  - o Outer fringes of the plume have been reached.
  - o Plume is overhead.
  - o Plume was in area and has deposited sufficient amounts of radioactive materials so that dose rates are elevated.

- 4.5.3 IF elevated dose rates are located in other than the designated plume area,  
THEN note on map (Enclosure 2 or Enclosure 3) or on an environmental survey map (available in ESV Kit),  
AND report this information to the Dispatcher for evaluation.  
(These locations may be chosen as collection sites for environmental samples by the State of Florida.)
- 4.5.4 Upon arrival at the designated area, LOCATE the fringe of the plume by continuously monitoring dose rates with an ion chamber (open window) or E-120.
- 4.5.5 CONTACT the Dispatcher for further instructions if dose rate readings do not indicate that the plume is in the vicinity.
- 4.5.6 IF the encountered dose rates exceed the limits set,  
THEN RETURN to an area of lower radiation levels,  
AND EVALUATE alternatives with the Dispatcher.
- 4.5.7 LOCATE the highest dose rate after the fringe has been identified by traversing the area, as directed by the Dispatcher. Continuously monitor the dose rates, using an ion chamber (window closed).
- 4.5.8 OBTAIN a closed and open window reading using the ion chamber at the highest dose rate area identified in Step 4.5.6 and perform the following:
- o RECORD distance, sector, time and dose rates on Enclosure 4. Distances and sectors for predesignated sample locations are listed in Enclosure 5 for predesignated location points outside the General Complex and on Enclosure 6 for General Complex location points.
  - o SUBTRACT the closed window (gamma) reading from the open window (beta, gamma) reading.
  - o If there is no significant difference, this indicates that the plume is overhead. CONTACT the Dispatcher for further instructions.
  - o If there is a significant difference, this indicates that the plume is at ground level.

**NOTE: Silver Zeolite cartridges must be used if available. Air sample volume should be at least 12 cubic feet.**

- 4.5.9 After the highest dose rate of the plume has been identified, PERFORM the following:
- o COLLECT a small number of 100 cm<sup>2</sup> smears on horizontal surfaces. If dose rates are high, smears may be omitted.
  - o SET UP the air sampling equipment and obtain a particulate and iodine air sample.
- 4.5.10 RETREAT to a low dose area until the specified air sample volume has been obtained. If possible, try to keep the flashing light in sight which indicates proper generator operation.
- 4.5.11 RETURN to the sample collection point and retrieve equipment. Notify the Dispatcher if dose rates have varied.

**NOTE: Samples are counted in the lowest available background area for statistical accuracy.**

- 4.5.12 DETERMINE a low background counting station near the specified area.

#### **4.6 SAMPLE ANALYSIS**

- 4.6.1 Upon arrival at the designated counting station, TAKE any necessary precautions to ensure counting station equipment remains as contamination free as possible.

**NOTE: Background must be less than 1000 cpm so that the minimum detectable activities (MDAs) of  $1.0 \times E-9$  uCi/cc for gross particulates and  $1.0 \times E-7$  uCi/cc for gross iodine can be obtained. [NOCS 7461, 24290]**

- 4.6.2 RUN a one-minute background on the counting system. See Enclosure 1, Formulas and Instrumentation Data Sheet.
- 4.6.3 ANALYZE samples collected using normal counting techniques and report results to the Environmental Survey Dispatcher.
- 4.6.4 IF sample is >5 mRad/hr. smearable, THEN consider storage of smear in lead lined metal box located in the ESV.
- 4.6.5 RETAIN all used filters in envelopes (available in the emergency kits) for precise laboratory analysis. LABEL samples with as much information as possible (time, location, weather conditions, etc.).

4.6.6 LOAD counting equipment in ESV for transport.

4.7 VEHICLE DECONTAMINATION

4.7.1 Environmental Survey Vehicle

NOTE: The EST Leader in conjunction with the Environmental Survey Team Dispatcher decide at what point ESV contamination levels will begin to hinder plume tracking activities or cause excessive exposure to the team. (See NOTE in Section 4.6.)

4.7.1.1 PERFORM a quick beta, gamma survey of the exterior of the ESV and the vehicle's air filter.

4.7.1.2 CONTACT Dispatcher and relay vehicle contamination levels.

4.7.1.3 PROCEED as directed by Dispatcher to any county wash down station or return to the Crystal River Generating Complex for wash down of the ESV, if required.

4.8 TEAM RECALL

4.8.1 RETURN to the TSC/OSC or the EOF when notified by the Dispatcher.

4.8.2 IF a physical turnover is made to the State of Florida representatives,  
THEN PROVIDE copies of surveys or other written information, keeping originals,  
AND OBTAIN in a receipt from the State for anything exchanged.

4.8.3 MAKE arrangements for the ESV to be surveyed, decontaminated and restocked in case needed again.

4.8.4 NOTIFY the Dispatcher of any problems or when ESV has been readied for re-use.

4.8.5 REPORT total exposure received by the EST members to Dosimetry located in the TSC/OSC (internal and external) and UPDATE Emergency Team Authorization form.

4.8.6 INFORM the EST Dispatcher of your availability.

## 4.9 DOCUMENTATION

- 4.9.1 FORWARD documentation and surveys created as a result of this procedure to the OSC Health Physics Coordinator in the TSC. Care must be taken to ensure the documents are free from contamination prior to transmittal. Contaminated documents must be bagged, copied, and the originals discarded as radioactive waste. The copies must then be marked "ORIGINALS CONTAMINATED."



FORMULAS AND INSTRUMENTATION DATA SHEET

## FORMULAS:

$$\mu\text{Ci} / \text{cc} = \frac{(\text{Net cpm})(4.5 \times 10^{-7} \mu\text{Ci} / \text{dpm})(\text{CEI})}{(\text{Eff})(\text{Volume cc})(\text{Y.F.})}$$

$$\text{dpm} = \frac{(\text{Net cpm})}{(\text{Eff.})}$$

Net cpm = Gross cpm - Background cpm

Volume cc = Volume ft<sup>3</sup> x 2.832 E4 cc/ft<sup>3</sup>

Y.F. = 1.19 for SAM - II use only  
(Accounts for difference in yields  
Ba<sup>133</sup>/I<sup>131</sup>)

## COLLECTION EFFICIENCY FACTORS (CEF)

FLOW RATE (CFM) *	SILVER ZEOLITE	CHARCOAL	PART. FILTER
1	1.11	1.11	1.05
2	1.11	1.11	1.05
3	1.18	1.25	1.05
4	1.25	1.43	1.05
5	1.33	1.67	1.05
6	—	1.82	1.05
7	—	2.13	1.05
8	—	2.33	1.05
9	—	2.50	1.05
10	—	2.86	1.05

\*Should use calibrated flow rates when possible.

EFFICIENCIES:

PART	MS-2	RM-14/E-120	SAM-II
IODINE	.20	.10	.03
	.0015	.0015	

$$\text{MDC}_{(\text{TSC})} = 1.96 \sqrt{\frac{C_B}{T_s} + \frac{C_B}{T_B}}$$

$$\text{MDC}_{(\text{ESV})} = 3\sqrt{C_B}$$

C<sub>B</sub> = Background count rate cpm

T<sub>s</sub> = Sample count time min

T<sub>B</sub> = Background count time min

THYROID DOSE FROM AIR SAMPLE RESULTS:

(based on 24 hour exposure)

REM Thyroid =

(I-131 μCi/cc) (2.88E+7 cc breathed/24  
hrs) (1 REM/μCi)

## INSTRUMENT START-UPS: [NOCS 24170]

## MS-2

- o Power unit up - switch in back
- o Verify dial settings per calibration sticker
- o Ensure proper HP-210 probe used with SH-4 sample holder

IF TSC: Run background (5 min. minimum) and calculate MDC.

IF ESV: Run 1 minute background at each sample counting location and calculate MDC per simplified formula.

- o Response check detector

## SAM-II

- o Prior to applying power, note all dial settings and turn high voltage to zero
- o Power unit up - switch in back
- o Increase H.V. gradually until original setting is reached or set per cal sticker
- o Ensure BKG subtract produces BKG reading between 0 and 10 cpm. Adjust using CH-2 window dial
- o Response check detector

## RM-14/E-120

- o Check battery response
- o Response check detector
- o If used for air sample counting, use SH-4 sample holder for proper geometry

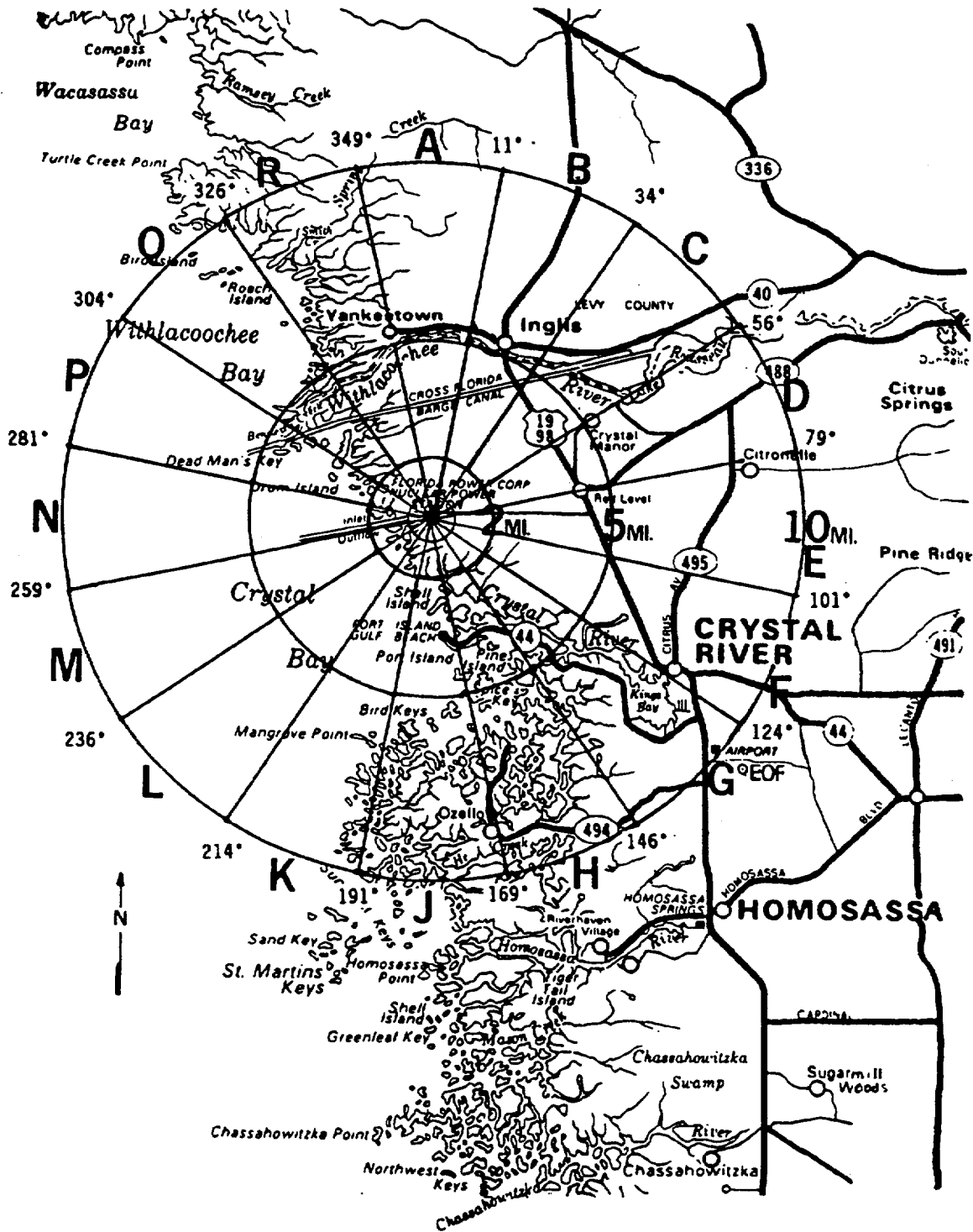
## RM-16

- o Power up - switch in front
- o Check battery, connect to A.C. if available
- o Ensure PHA/Gross switch in gross mode
- o Response check detector
- o Set alarm needles with knobs in front

## AMS-2/3

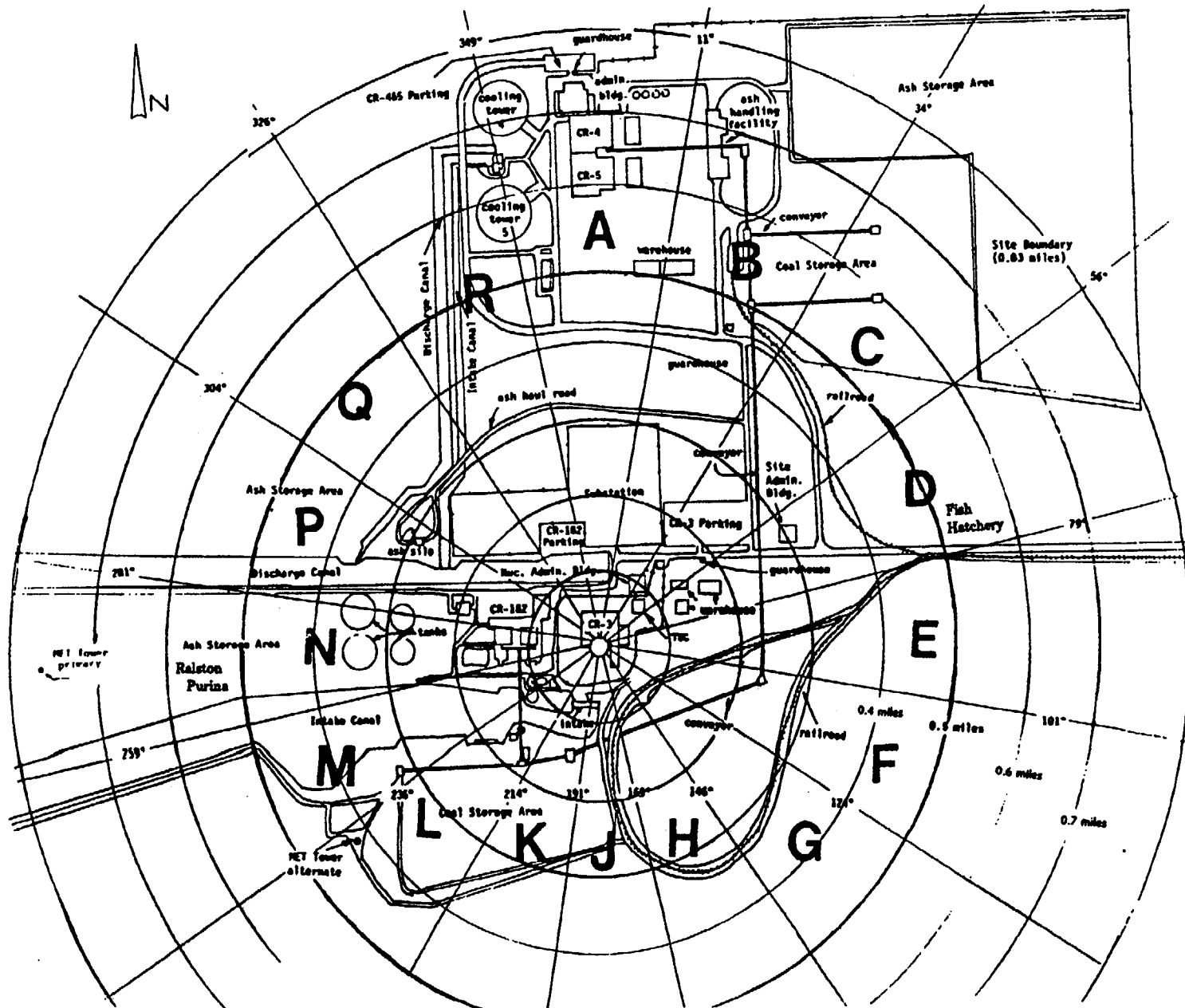
- o Power up - switch in front
- o Start RAS - pump
- o Check flow between 30 and 60 Lpm's
- o Start chart recorder (if desired)
- o Response check detector

**THUMB RULES:** Dose rate can be estimated as follows: 20 mR/min for each R/HR.



If available, utilize an "Environmental Survey Team" map for plume tracking and locating predesignated monitoring points.

OWNER CONTROLLED AREA MAP





ENVIRONMENTAL SURVEY TEAM  
PREDESIGNATED SAMPLE POINTS  
(10 MILE EPZ)

<u>*DESIGNATION</u>	<u>LOCATION</u>	<u>DISTANCE FROM CR-3 (Air Miles)</u>
<b>CITRUS COUNTY:</b>		
H-7	End of S.R. 494 at Ozello.	6.8
H-9	Intersection of S.R. 494 and John Brown Dr.	9.0
G-10A	Water Dept. Bldg. on S.R. 494 Approx. 1.5 Miles from U.S. 19.	9.8
G-10B	Intersection of U.S. 19 and W. Seven Rivers Drive at Crystal River-Homosassa Airport.	9.9
G-9	Intersection of S.R. 44 West and U.S. 19.	9.0
G-7A	End of Dixie Shores Dr. Off S.R. 44 West at The Islands Subdivision.	7.0
G-7B	Intersection of S.R. 44 West and W. Pine Bark Lane at Crystal Shores Subdivision.	7.0
G-5	Bridge Over Salt River on S.R. 44 West.	5.0
J-3	Fort Island Beach at End of S.R. 44 West.	3.4
F-10	Intersection of S.R. 44 East and S.R. 486.	10.0
F-8	Downtown Crystal River at Intersection of U.S. 19 and S.R. 495.	7.8
F-6	Intersection of U.S. 19 North and W. State Park St.	6.4
F-5	Intersection of W. State Park St. and N. Sailboat Ave. Approx. 1.6 Miles From U.S. 19 at Southeast Corner of Hollingswood Ranch.	4.8
E-7	On S.R. 495 at Shamrock Farm House Approx. 3 Miles North of U.S. 19.	7.4
E-8	Intersection of S.R. 495 and SCL Railroad Track.	7.6
E-4	Intersection of U.S. 19 and Generating Complex Access Rd. (Powerline St.).	4.4

\* Designation provides sector & approximate distance from CR-3.

**ENVIRONMENTAL SURVEY TEAM PREDESIGNATED  
SAMPLE POINTS (10 MILE EPZ) (Continued)**

<u>*DESIGNATION</u>	<u>LOCATION</u>	<u>DISTANCE FROM CR-3 (Air Miles)</u>
<b>CITRUS COUNTY: (Cont'd)</b>		
D-4	On U.S. 19 Approx. 2.25 Miles North of Generating Complex Access Rd. at Entrance to Crystal Manor.	4.0
D-7	On S.R. 488 at Entrance to Holiday Heights Subdivision.	7.0
B-4	Intersection of U.S. 19 and Cross Florida Barge Canal.	4.5
D-6	At Old Hydro Dam on N. Riverwood Dr. on Withlacoochee River.	6.4
D-9	Intersection of S.R. 495 and S.R. 488.	8.8
<b>LEVY COUNTY:</b>		
Q-5	County Park at End of County Rd. 40 West.	4.8
R-4	On County Rd. 40 West Approx. 1.5 Miles From County Park.	4.8
R-5	Intersection of County Rd. 40 West and County Rd. 326.	5.0
A-5	Intersection of County Rd. 40 West and Riverside Dr.	5.0
A-7	Intersection of Butler Rd. (County 325) and Jordan Rd.	6.8
B-6	Intersection of County Rd. C-40-A and U.S. 19.	6.2
B-8	On U.S. 19 Approx. 2.5 Miles North of Inglis at Florida Highway Patrol Station.	7.8
C-6	Intersection of County Rd. 40 East and Palm Street.	5.5
C-10	Intersection of County Rd. 40 East and S.E. 115 Ave.	9.8

\* Designation provides sector & approximate distance from CR-3.

**ENVIRONMENTAL SURVEY PREDESIGNATED  
SAMPLE POINTS (GENERATING COMPLEX)**

<u>DESIGNATION</u>	<u>LOCATION</u>
SA-1	North or Ash Haul road under transmission lines
SA-2	Unit 4/5 North Guardhouse
SB-1	At gas pump CR-4/5
SB-2	Culvert railing east of CR-4/5
SC-1	Old CR-4/5 access road under power lines
SC-2	East of CR-4/5 coal pile at site boundary
SD-1	Helo pad
SD-2	North of Mariculture Center at fence on utility pole
SE-1	Railroad loop divergence point
SE-2	On Access road at RR switch
SF-1	South side of RR loop road
SG-1	South side of RR loop road (on fence post)
SH-1	South side of RR loop road (on fence post)
SJ-1	Aerial marker (concrete pad) SE corner of CR-1/2 coal pile on R loop
SK-1	South side of CR-1/2 coal pile road (in median)
SL-1	Aerial marker (concrete pad) SW 1/2 coal pile
SM-1	West of Bldg 1005 CR-1/2 coal conveyor
SN-1	South side of oil tank warehouse
SN-2	Primary met tower
SP-1	East side cooling tower at gate
SQ-1	Under flyash conveyer near processing bldg
SQ-2	North of mechanical cooling towers at midpoint of old ash pond road
SR-1	Pole north of Ash Haul road in field under power lines
SR-2	On dolomite conveyer machine

# PROCEDURE DEVELOPMENT AND REVISION RECORD

Procedure: EM0210B

New Rev: 5

PRR#: 18301

Title: DUTIES OF THE RADIATION MONITORING TEAM: ENVIRONMENTAL SAMPLING AND PLUME TRACKING

## MINOR CHANGES

If Minor Changes are included, check the applicable box(es) and provide a list of affected steps.  
The following corrections are incorporated throughout:

- |   |   |
|---|---|
| <input type="checkbox"/> Sentence Structure   | <input type="checkbox"/> Redundant words or phrases                 |
| <input type="checkbox"/> Punctuation  | <input type="checkbox"/> Abbreviations                              |
| <input checked="" type="checkbox"/> Capitalization  | <input type="checkbox"/> Obviously incorrect units of measure       |
| <input type="checkbox"/> Spelling   | <input type="checkbox"/> Inadvertently omitted symbols (#, %, etc.) |
| <input type="checkbox"/> Organizational Changes: position titles,<br>department names, or telephone numbers | <input type="checkbox"/> Obvious step numbering discrepancies       |
|   | <input type="checkbox"/> Format                                     |

The following corrections are incorporated in the step(s) indicated: "Throughout" is used in lieu of Step# if a specific change affects a large number of steps.

---

Correcting equipment nomenclature that does not agree with field labels or balance of procedure

---

Changing information that is obviously incorrect and referenced correctly elsewhere

---

Misplaced decimals that are neither setpoint values nor tolerances

---

Reference to a procedure when an approved procedure has taken the place of another procedure

---

Fixing branching points when it is clear the branching steps were originally intended but were overlooked or incorrectly stated due to step number changes

---

Adding clarifying information such as NOTES and CAUTIONS

---

Adding words to clarify steps, NOTES, or CAUTIONS which clearly do not change the methodology or intent of the steps



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## PROCEDURE DEVELOPMENT AND REVISION RECORD

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Procedure: EM0210B

New Rev: 5

PRR#: 18301

Title: DUTIES OF THE RADIATION MONITORING TEAM: ENVIRONMENTAL SAMPLING AND PLUME TRACKING

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### NON-INTENT CHANGES

Changes are incorporated for the reasons provided. "Throughout" is used in lieu of Step # if a specific change affects a large number of steps. For new or cancelled procedures the reason is provided.

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Throughout	Capitalized Action Words in Instructions per Writer's Guide. Added reference to NOCS per Writer's Guide.
Sect. 2.0	Deleted Implementing References. Identified Developmental References to include 10CFR50.47, Appendix E and NUREG 0654. Conform to Writer's Guide
3.3.9	Clarified Radiation Monitoring Team has no authority to evacuate personnel outside of the owner-controlled area. This implements RERP and NOCS 10518.
4.4.1	Removed step for RMT to check operability of items in the Environmental Survey Vehicle. Replace with step to "Proceed to ESV". The operability check takes up valuable time and delays dispatch of Team. Operability of the ESV is checked weekly and operability of contents is verified quarterly. Comment from RMT training class and previous drill comment regarding delay in dispatch.
4.6.4	Add clarifier to CONSIDER storage of smear in container in ESV. Comment from RMT training class. NUPOST 38034
4.8.5	Clarify that once total exposure is reported, to update the Emergency Team Authorization form. Comment from RMT training class.
4.8.6	Changed for EST to inform Dispatcher instead of Dose Assessment Coordinator when available after they are recalled. The Team reports to the Dispatcher, who in turn will inform the Dose Assessment Coordinator.
3.1.4	Revised to EST/RMT for alphabetical listing correction in accordance with Writer's Guide.
4.2.3 and 4.2.3.1	Separated Step 4.2.3 to distinguish commitment to monitor plume beyond the site boundary until State of Florida arrives, and the on-site monitoring until recalled by Emergency Coordinator or EOF Director.
4.5.2 Note	Add "as determined by H. P. Tech" for equivalent instrument. Meets intent of Writer's Guide/Qualified Review Comment.
4.5.6	Changed Caution Statement into step. Per Writer's Guide. Renumbered accordingly.
4.3.8, 4.3.9	Separated into two steps. 4.3.8 to list instrument calibration to meet Writer Guide and Qualified Review comment. 4.3.9 captures remainder of what use to be in 4.3.8. Renumbered accordingly.
3.2.1	Clarify EC responsibility to authorize On-site and Off-site plume monitoring. To ensure it is clear FPC is required to monitor off-site plume monitoring.

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