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Monticello Nuclear Generating Plant
Operated by Nuclear Management Company, LLC

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10 CFR 50, Appendix E
Section V

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Emergency Plan Implementing Procedures

Furnished with this letter is a revision to the Monticello Nuclear Generating Plant Emergency Plan Implementing Procedures. The following procedures are revised:

| Procedure | Procedure Title | Revision |
|---|---|---|
| A.2-INDEX | A.2 Emergency Plan Implementing Procedure Index | 78 |
| A.2-410 | Out-of-Plant Surveys | 12 |

Please post changes in your copy of the Monticello Nuclear Generating Plant Emergency Plan Implementing Procedures. Superseded procedures should be destroyed. This revision does not reduce the effectiveness of the Monticello Nuclear Generating Plant Emergency Plan.

Please contact Douglas A. Neve, Licensing Manager, at 763-295-1353 if you require further information.

Jeffrey S. Forbes
Site Vice President
Monticello Nuclear Generating Plant

c: Regional Administrator – III, NRC (w/ two copies of enclosure)
NRR Project Manager, NRC (w/o enclosure)
Resident Inspector, NRC (w/o enclosure, EPIP dist. by Monticello Document Control)
Minnesota Dept. of Commerce (w/o enclosure)

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2807 West County Road 75 • Monticello, Minnesota 55362-9637
Telephone. 763.295.5151 • Fax: 763 295.1454

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| REVIEW AND APPROVALS | | | | |
|---|---|---|---|---|
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| PROCEDURE | PROCEDURE TITLE |
|---|---|
| 000 Series | Organization |
| A.2-001 | Emergency Organization |
| 100 Series | Activation |
| A.2-101 | Classification of Emergencies |
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| A.2-104 | Site Area Emergency |
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| A.2-106 | Activation and Operation of Technical Support Center |
| A.2-107 | Activation and Operation of Operations Support Center |
| A.2-108 | Access Control During Emergencies |
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| 200 Series | Assessment |
| A.2-201 | On-Site Protective Action |
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| A.2-208 | Core Damage Assessment |
| A.2-209 | Responsibilities of Radiological Emergency Coordinator |
| A.2-210 | Engineering Support in the TSC |

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| 800 Series | EOF Procedures (Con't) |
|---|---|
| A.2-807 | Off-Site Dose Assessment and Protective Action Recommendations |
| A.2-808 | Radiological Monitoring and Control at the EOF |
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## EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS



* The following Instruction sections begin with a new page for ease of use in the field: 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.13, & 6.14.

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## 1.0 PURPOSE

This procedure provides instructions for the activation of Off-site Radiological Monitoring Teams (Field Teams) and the various methods of radiological and environmental monitoring during a declared Emergency at either the Monticello or Prairie Island plants.

## 2.0 APPLICABILITY

2.1 Abnormal conditions exist which involve an airborne or liquid radiological release to the Monticello plant environs and out-of-plant surveys have been requested.

2.2 An emergency (Alert or higher classification) has been declared at the Prairie Island Nuclear Generating Plant and Monticello's assistance has been requested.

## 3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Radiological Emergency Coordinator (REC) is responsible for:

3.1.1 Overall direction and control of the Field Teams until these responsibilities are assumed by the Emergency Operations Facility (EOF).

3.2 The Radiation Protection Support Supervisor (RPSS) is responsible for:

3.2.1 Overall direction and control of the Field Teams after these responsibilities are transferred from the Technical Support Center (TSC).

3.3 The Field Team Communicator(s) are responsible for:

3.3.1 Coordination of the Field Teams via radio communication from the TSC or EOF.

3.4 The Field Teams (each team consists of one Radiation Protection Specialist and one Nuclear Plant Helper) are responsible for:

3.4.1 Implementation of this procedure.

3.4.2 Maintaining a constant communication link with the Field Team Communicator in the TSC or EOF.

3.4.3 Performing surveys in accordance with applicable instructions contained in this procedure and as directed by the Field Team Communicator.

3.5 The Sample Courier(s) are responsible for:

3.5.1 Transportation of samples (taken by the Field Teams) to the EOF.

## 4.0 DISCUSSION

Off-site surveys during an emergency are normally performed by sister plant Radiation Protection personnel when the EOF is fully activated. Prior to this, off-site surveys must be performed by the affected plant's Radiation Protection personnel. Surveys of on-site, out-of-plant areas are always assigned to the affected plant's Radiation Protection personnel.

During the initial stage of an emergency, the number of personnel available to perform surveys may be limited. The REC will make decisions on deployment of personnel resources. When the RPSS position is staffed and the EOF is fully operational, control of the Field Teams will be transferred to the RPSS.

There are normally two vehicles designated for off-site monitoring purposes. The Radiation Protection Coordinator and Security maintain control of the keys (24 or 25) for these vehicles.

The EOF Count Room is the primary off-site facility for the receipt and analysis of radioactive samples. The EOF Count Room is staffed by Chemistry personnel from the affected plant who are familiar with its equipment and operation. Unless circumstances dictate otherwise, the EOF Count Room will be used for most samples taken pursuant to this procedure.

## 5.0 PRECAUTIONS

5.1 Monitoring and sampling instruments ***SHALL*** be operated in accordance with standard procedures for each instrument type.

5.2 During off-hours activations, Field Team personnel should verify their fitness-for-duty (FFD) with appropriate supervisory personnel (F/T communicator) prior to engaging in activities which directly affect the Health and Safety of the public (e.g. off-site surveys to validate MIDAS projections). This confirmation may be conducted via radio (or telephone) and need not occur in person.

5.3 Minnesota has severe weather conditions which can seriously affect instrument operation. The following guidelines have been established to eliminate or minimize cold weather instrument problems:

5.3.1 Allow approximately 5 minutes for the instrument to warm up completely.

5.3.2 If the outside temperature is greater than 32°F(0°C), instrument use is not restricted by temperature.

5.3.3 If the outside temperature is between 32°F (0°C) and 0°F (-18°C), use the instrument outside no more than 5 (five) minutes.

5.3.4 If the outside temperature is between 0°F (-18°C) and -20°F (-28°C), use the instrument outside no more than 2 (two) minutes.

5.3.5 If the outside temperature is below -20°F (-28°C), the instrument should not be used outside unless special batteries (alkaline or Ni-Cd) are installed in the instrument. These batteries increase the minimum temperature range to -40°F (-40°C) but allows less than 30 seconds of use in this type of environment.

5.4 If an instrument malfunctions or "pegs out" during survey operations, immediately exit the area by the same route used to enter, and obtain a new instrument if necessary.

5.5 During radio and cellular phone communications, observe the following precautions:

5.5.1 Since radio and cellular phone communications can be intercepted by commercially available scanners, all communications must be brief, factual and free of all exclamatory or alarming expressions.

5.5.2 Carefully word data transmission to minimize confusion, in particular, avoid abbreviations such as "mrem" which could be misinterpreted as "rem".

5.5.3 Use the phonetic alphabet when communicating sample points location, etc., as follows:

| | | | | | |
|---|---|---|---|---|---|
| A | ALPHA | J | JULIET | S | SIERRA |
| B | BRAVO | K | KILO | T | TANGO |
| C | CHARLIE | L | LIMA | U | UNIFORM |
| D | DELTA | M | MIKE | V | VICTOR |
| E | ECHO | N | NOVEMBER | W | WHISKEY |
| F | FOXTROT | O | OSCAR | X | X-RAY |
| G | GOLF | P | PAPA | Y | YANKEE |
| H | HOTEL | Q | QUEBEC | Z | ZULU |
| I | INDIA | R | ROMEO | | |

5.5.4 Preface each communication with the title or name of the receiving party and your title and name. For example: "Monticello TSC"; Monticello Field Team 1..."

After the communication is completed, request the receiving party to repeat the message, if numerical data was relayed.

End message transmission with an appropriate termination phrase. For example: "Monticello Field Team 1, out." During drills always include the words, "THIS IS A DRILL," with each transmission.

5.6 Observe respiratory protection and exposure precautions at all times while performing off-site monitoring. If substantial airborne activity or contamination is suspected, don appropriate protective clothing as directed by the REC (or RPSS) IAW the following guidelines:

5.6.1 Field Team members should don respirators with GMR canisters if the following conditions occur:

A. A General Emergency is declared and the affected sectors have been evacuated; and

B. Measured dose rates are more than 100 mrem/hr true Beta.

5.6.2 Respiratory equipment may be removed if the following is indicated:

A. Field measurements of gross iodine activity indicates less than 1E-7 μCi/CC; or

B. The REC/RPSS indicates that no significant iodine is or has been released from the plant; and

C. Measured dose rates are less than 100 mrem/hr true Beta.

5.7 Exposures of survey team personnel ***SHALL*** be IAW administrative control levels. All Field Team members and Sample Couriers ***SHALL*** have proper dosimetry, which is frequently checked. They ***SHALL*** remain alert to their own exposure and request relief if cumulative exposure approaches administrative control levels. The Emergency Director may authorize exposure limit extensions if necessary (refer to A.2-401). All exposures ***SHALL*** be maintained AS LOW AS REASONABLY ACHIEVABLE aided by the following guidelines:

5.7.1 Field Teams should not linger in areas greater than 100 mr/hr.

5.7.2 Field Teams should not proceed to areas projected to be greater than 1000 mr/hr unless directed by the REC or RPSS.

5.7.3 Field Teams ***SHALL NOT*** proceed to areas projected to exceed 10,000 mr/hr.

5.8 During off-site monitoring operations, vehicles and/or survey instruments could become highly contaminated and plume, ground contamination or background radiation conditions may be encountered which could interfere with sample analysis or survey results. Remain alert to these conditions and take appropriate precautions to ensure accurate sample/survey results (i.e., move away from vehicle to analyze samples, prevent instrument contamination by bagging instrument, prevent sample from cross-contamination, etc.).

## 6.0 INSTRUCTIONS

### 6.1 Field Team Activation

6.1.1 If responding to a MNGP event, refer to the OSC tagboard to determine Field Team assignment.

6.1.2 Obtain Emergency vehicle keys. (From the Radiation Protection Controlled Key Cabinet or Security Key Cabinet.) If necessary obtain a dose rate meter for use enroute to the EVES Building.

6.1.3 Log in on RWP 902. If responding to an event at MNGP, then retain your personal dosimetry (TLD, and electronic dosimeter) from the plant when exiting. If responding to an event at Prairie Island or circumstances prevent use of normal plant dosimetry, then obtain dosimetry from the Emergency Kits in the EVES building.

6.1.4 At the EVES Building initiate Form 5790-410-02 (OUT-OF-PLANT SURVEY CHECKLIST).

6.1.5 Obtain one (1) Instrument Kit (aluminum case) and one (1) Equipment Kit (grey case) from the storage area in the EVES Building.

**NOTE: Emergency Instrument and Equipment Kits may be stored in the vehicles.**

6.1.6 Ensure that each member of the monitoring team has dosimetry (one TLD and either an electronic dosimeter, or a 0-200 mR DRD and a 0-5000 mR DRD).

6.1.7 Record the applicable dosimetry information for each member of the team on Form 5790-410-02.

6.1.8 Obtain a count rate meter with 2" pancake probe and dose rate meter from the cabinet and perform the applicable operability and source checks. Leave the instruments on.

**NOTE: A "check source" is provided in the EVES Building for this purpose.**

6.1.9 Obtain one (1) cellular phone and one (1) cellular phone adapter unit from the EVES Building and install in vehicle.

6.1.10 Perform an operability check of the mobile radios by establishing contact with the TSC or EOF (when staffed). Obtain a phone number in the area (TSC or EOF) to call. Perform an operability check of the cellular phone by calling the number obtained.

**NOTE: Instructions for using the cellular phones are located in each vehicle.**

6.1.11 For emergency events at the Monticello plant, contact the Field Team Communicator (TSC/EOF). When ready to depart, obtain updated information pertaining to the event and wait for further instructions.

6.1.12 If responding to a PI event, refer to Section 6.3 of EPIP A.2-702 (RESPONSE TO AN EMERGENCY AT PRAIRIE ISLAND) for travel routes and instructions for response to the Prairie Island EOF.

6.1.13 When departing the plant site area (or entering PI 10 mile EPZ), initiate a plume search (if applicable) IAW Section 6.2 of this procedure.

6.1.14 Document all survey/sample data on Form 5790-410-01 (EMERGENCY SAMPLE RESULTS LOG) or Form 5790-410-03 (GROUND DEPOSITION SAMPLE RESULTS LOG) as applicable.

6.1.15 Report all survey/sample results to the Field Team Communicator.

6.1.16 Forward samples which require further analysis (as directed by the Field Team Communicator) to the EOF Count Room via sample courier or retain the samples for future analysis and/or disposal as directed.

6.1.17 When directed, return to the EOF for debriefing and reassignment. Complete and submit all sample result logs and Form 5790-410-02 to the RPSS for review.

### 6.2 Plume Search Procedure

6.2.1 With the count rate meter on the lowest scale (on which meter deflection can be observed) place the probe on the dashboard facing the windshield and observe the instrument for meter deflection while in transit.

6.2.2 If a meter deflection is observed, stop the vehicle and perform a dose rate survey in accordance with Section 6.5

**NOTE: A BETA reading indicates that the plume has been encountered. A GAMMA reading with zero BETA indicates the plume is elevated or displaced.**

6.2.3 Report the survey results to the Field Team Communicator as recorded on Form 5790-410-01.

**NOTE: If the survey location is NOT at a predesignated survey point, identify the location using known landmarks or road intersections, etc.**

**6.3 Particulate and Iodine Air Sampling**

6.3.1 Install a particulate filter and a Silver Zeolite cartridge into the air sampler cartridge/filter holder.

6.3.2 Connect the air sampler to the vehicle power supply and start the air sampler.

**NOTE 1: Engine should be running to maintain a steady battery voltage.**

**NOTE 2: If precipitation is occurring, the sample should be drawn from a covered area. The umbrella included in the Emergency Kit may be used for this purpose.**

6.3.3 Record the sample START TIME, SURVEY POINT (sample location), sample FLOW RATE and SURVEY TYPE on Form 5790-410-01.

6.3.4 When the desired sample time has lapsed, stop the air sampler and record the sample STOP TIME.

**NOTE: Whenever possible air samples should be a standard 25 cu. ft. sample (i.e. 7.07 E+5 CCs or approximately 10 minute sample run time).**

6.3.5 Calculate and record the sample volume in cubic centimeters (cc) using the following formula:

Sample Volume in CCs = (Flow Rate in CFM) x (Sample Time in Minutes) x (2.83 E+4 CCs/$ft^3$).

6.3.6 Remove the particulate filter and the Silver Zeolite cartridge from the filter cartridge holder, place them in SEPARATE plastic sample bags and seal the bags.

6.3.7 Complete a pre-printed sample label including the sample time and date, sample location, sample volume and the contact dose rate and attach a label to each sample bag.

6.3.8 In a low background area (i.e. < 1000 CPM) determine the gross activity of each sample by using the following methods:

A. Particulate Activity

1. Count the particulate filter using a count rate meter with a 2" pancake probe. Subtract the background to determine the Net CPM of the sample.

2. Calculate the gross particulate activity of the sample using the Gross Particulate Activity Table (FIGURE 7.4) or the following formula:

$$\text{ACTIVITY } (\mu Ci/CC) = \frac{(\text{NET CPM}) \times (4.5 \text{ E-7 } \mu Ci/DPM)}{(\text{PROBE EFFICIENCY}) \times (\text{SX VOLUME in CCs}) \times (\text{CF})}$$

**NOTE 1: Probe Efficiency = 0.1 (10%) for Count Rate Meter with a 2″ pancake probe.**

**NOTE 2: Correction Factor (CF) = 0.3 for 4″ filter paper counted with a 2″ pancake probe or 1.0 for 2″ filter paper counted with a 2″ pancake probe.**

B. Iodine Activity

1. Count the Silver Zeolite cartridge using a count rate meter with a 2″ pancake probe. Subtract the background to determine the Net CPM of the sample.

2. Calculate the sample activity using the Gross Iodine Activity Table (FIGURE 7.1) and the following formula:

$$\text{IODINE ACTIVITY } (\mu Ci/CC) = \frac{(\mu Ci(s) \text{ on cartridge determined by Table})}{(\text{SX volume in CCs})}$$

6.3.9 Record the results on Form 5790-410-01.

## 6.4 Gaseous Air Sampling

**CAUTION**

**If hands are contaminated, handle chamber with clean surgeon gloves.**

6.4.1 Obtain the gas sampling chamber, suction bulb and filter assembly from the Emergency Kit.

6.4.2 Install a new filter in the filter holder assembly.

6.4.3 Connect the suction bulb, sample chamber and filter assembly such that air passes through the filter assembly into the sample chamber then to the suction bulb.

6.4.4 Open the stop cocks on the gas sample chamber, squeeze the suction bulb ten (10) times to obtain a representative sample, then shut the stop cocks on the gas sampling chamber.

6.4.5 Record the SAMPLE TIME, SURVEY POINT, (sample location) and SAMPLE TYPE on Form 5790-410-01.

6.4.6 In a low background area (i.e., <1000 CPM) determine the activity of the gas sample (μCi/CC of Xe 133 equivalent) using the following method:

A. Count the gas sample chamber using a count rate meter with a 2" pancake probe by placing the probe on the chamber over the mylar window. Record the results as GROSS CPM on Form 5790-410-01;

B. Obtain a second "empty" gas sample chamber from the Emergency Kit and count the "empty" chamber using a count rate meter with a 2" pancake probe by placing the probe on the chamber over the mylar window. Record the result as the BACKGROUND CPM in Form 5790-410-01;

C. Calculate the NET CPM.

D. Determine the gas sample activity by using the NET CPM and the Gas Chamber Table (FIGURE 7.2).

6.4.7 Record the sample results on Form 5790-410-01.

6.4.8 Complete a pre-printed sample label with all applicable sample data. Place the sample in a plastic sample bag, seal the bag and attach the label to the bag.

6.5 **Stationary Dose Rate Survey**

6.5.1 Energize the instrument and allow the instrument to stabilize (approximately 30 seconds) then re-zero the meter.

6.5.2 Perform a BETA/GAMMA survey of the area as follows:

A. With the window open, hold the instrument approximately one (1) meter from ground level and survey the area for the maximum meter deflection;

B. Record the "WINDOW OPEN" (BETA/GAMMA) reading.

C. Close the instrument window and obtain the GAMMA reading;

D. Record the 'WINDOW CLOSED' (GAMMA) reading.

E. Calculate the "TRUE BETA" reading as follows:

TRUE BETA = (WINDOW OPEN - WINDOW CLOSED)
X (BETA CORRECTION FACTOR)

**NOTE: Assume a BETA CORRECTION FACTOR of 5.0 if the BETA CORRECTION FACTOR for the instrument is unknown.**

F. Record the TRUE BETA results on Form 5790-410-01.

**NOTE: If the survey location is NOT a predesignated survey point, identify the location using known landmarks or road intersections, etc.**

## 6.6 Liquid Sampling

6.6.1 Obtain a 1 liter sample bottle and install the bottle in the holder.

**NOTE: An additional supply of sample bottles are available at the EOF.**

6.6.2

**CAUTION**

**Use the appropriate radiological precautions when handling potentially radioactive samples.**

Cast or lower the bottle into the water to be sampled, allow the bottle to fill completely then withdraw and cap the bottle.

6.6.3 Bag the sample bottle, complete a pre-printed label. Attach the label to the sample bottle, label and seal the plastic bag.

6.6.4 Record the sample TIME, SURVEY POINT (sample location) and SURVEY TYPE on Form 5790-410-01.

6.6.5 In a low background area (i.e., <1000 CPM) determine the gross activity of the sample using the following method:

A. Count the sample using a count rate meter with a 2" pancake probe by placing the probe on the sample as indicated on the Gross Liquid Activity Table (FIGURE 7.3). Subtract the background to determine the Net CPM of the sample.

B. Record the background, and Net CPM on Form 5790-410-01 (EMERGENCY SAMPLE RESULTS LOG);

C. Determine the activity of the sample using the Gross Liquid Activity Table (FIGURE 7.3) and the NET CPM of the sample.

6.6.6 Record the sample results on Form 5790-410-01.

## 6.7 Discharge Canal Sampling (Monticello Only)

6.7.1 Obtain 1 liter sample bottles from an Emergency Kit or from the Chemistry lab.

6.7.2 Obtain the keys for one of the Plant vehicles (if needed) and a hand held radio. (Radios are available in the TSC and OSC. Use talk group 2A unless directed otherwise.)

6.7.3 Proceed to the Discharge Canal Sample Station (DCSS) located on the south bank of the discharge canal approximately 550' downstream of the discharge structure. (FIGURE 7.5) Sample point (3) of on-site liquid sample locations map.

6.7.4 In the DCSS Building locate pumps P-112A and P-112B. Verify the sample flow into the drain trough down stream of CW-27 is at least 10 GPM as indicated by reading flow indicator FIS-1905 centered above pumps P-112A and P-112B.

6.7.5 Using a 1 liter bottle, take the desired sample(s) from the 1.5 inch line dumping water into the trough.

6.7.6 Bag the sample bottle, complete a pre-printed sample label, attach the label to the sample bottle, label and seal the plastic bag.

6.7.7 Record the sample TIME, SAMPLE POINT (sample location) and SURVEY TYPE on Form 5790-410-01.

6.7.8 Determine the gross activity of the sample using the following method:

A. Count the sample using a count rate meter with a 2" pancake probe by placing the probe on the sample as indicated in Gross Liquid Activity Table (FIGURE 7.3). Subtract the background to determine the Net CPM of the sample.

B. Record the background and Net CPM on Form 5790-410-01;

C. Determine the activity of the sample using the Gross Liquid Activity Table (FIGURE 7.3) and the Net CPM of the sample.

6.7.9 Record sample results on the Form 5790-410-01.

**6.8 Ground Deposition - Direct Frisk Survey**

6.8.1 Obtain a count rate meter with a 2" pancake probe or equivalent.

6.8.2 Proceed to the designated survey point and carefully scan flat surfaces in the area (e.g., roads, lawns, mailboxes, vehicles, fields, etc.).

6.8.3 Record the sample TIME and SURVEY POINT (sample location) on Form 5790-410-03.

6.8.4 Calculate the ground deposition activity as follows:

$$\mu Ci/m2 = \frac{\text{Gross CPM - BKGD CPM}}{400}$$

6.8.5 Record sample results on Form 5790-410-03.

**6.9 Ground Deposition - Smear Samples**

6.9.1 Obtain the appropriate number of cloth smears from the Emergency Kit and number the smears (if necessary).

6.9.2 Proceed to area to be surveyed and smear selected smooth surfaces (e.g., cars, mail boxes, machinery, rain gutters etc.).

**NOTE: Each smear area should be clearly identified on a map of the area or in a written description of the area.**

6.9.3 Place the smear(s) in plastic sample bag(s) and seal and label the bag(s).

6.9.4 Record the sample TIME AND SURVEY POINT (sample location) SURVEY TYPE on Form 5790-410-03.

6.9.5 In a low background area (i.e., <1000 CPM), calculate the smearable activity of each smear sample using the following method:

A. Establish an area suitable for counting potentially contaminated smears;

B. Determine the background CPM;

C. Remove the smear(s) from the bag(s) and count using count rate meter with a 2" pancake probe.

D. Calculate the ground deposition activity as follows:

$$\mu Ci/m2 = \frac{\text{Smear CPM - BKGD CPM}}{200}$$

6.9.6 Rebag the smear sample(s). Contact the Field Team Communicator and arrange to have the sample(s) transported to the EOF Count Room for analysis or retain the sample(s) for future analysis and proper disposal.

6.9.7 Record smear sample results on Form 5790-410-03.

**6.10 Ground Deposition - Gamma Dose Rate Survey**

6.10.1 Obtain a dose rate meter. Energize the dose rate meter and allow the instrument to stabilize (approximately 30 seconds) then re-zero the meter.

6.10.2 Proceed to the designated survey area and perform a closed window dose rate survey of the area at 1 meter above the ground.

6.10.3 Record the sample TIME, SURVEY POINT (sample location) and SAMPLE TYPE on Form 5790-410-03.

6.10.4 Calculate ground deposition as follows:

$\mu Ci/m2 = 100 \times$ (CLOSED WINDOW mr/hr READING)

6.10.5 Record sample results on Form 5790-410-03 and report the results to the Field Team Communicator.

**6.11 Ground Deposition Samples - Snow/Dirt Survey**

6.11.1 Proceed to the designated survey area and select an area where the sample will be taken.

**NOTE: The selection should be based on an evaluation of current weather and ground cover conditions (high winds, rain, snow, etc.) such that the sampled area is representative of the ground cover surface. Sample the area where the deposition of contamination is most likely to occur.**

6.11.2 Obtain the aluminum scoop and a large plastic sample bag from the Emergency Kit.

6.11.3 Using the scoop, remove snow/dirt from a surface area of about 1000 $cm^2$ to a depth of about 1 centimeter (0.4 inches).

**NOTE: The area of the scoop is approximately 1,000$cm^2$. When removing surface snow to a depth of 1 centimeter the volume of the melted snow is approximately 100 CC of liquid. This assumes a 10:1 snow to water ratio.**

6.11.4 Place the sample material in a large zip-lock bag, seal and label.

6.11.5 Record the sample TIME, SURVEY POINT (sample location), and the SAMPLE TYPE on Form 5790-410-03.

## 6.12 Ground Deposition - Vegetation/Food Sampling

6.12.1 Proceed to the designated survey area and select the area where the sample will be taken.

6.12.2 Obtain scissors or trimming device and large zip-lock bag from the Emergency Kit.

**NOTE: The selection should be based on locating herbage eaten by grazing animals, since the herbage provides a key pathway to human exposure. Also, depending on season of year, plant fruit (strawberries, sweet corn, beans, wheat, oats, etc.) may be selected for sampling.**

6.12.3 Obtain enough vegetation/food to fill the zip-lock bag. This is about a 1/3 of a kilogram.

**NOTE: If the vegetation is grass an area of at least 1 $m^2$ of ground should be sampled. The vegetation should be cut at approximately .5 to 1 inch from the ground and should not be contaminated in the process by soil.**

6.12.4 Compress the air from the bag, seal and label bag.

6.12.5 Record the sample TIME, SURVEY POINT (sample location) and SURVEY TYPE on Form 5790-410-03.

6.12.6 Calculate the activity of the sample using the following method:

A. Flatten the bag and lay probe of a count rate meter with 2" pancake probe on the center of the bag.

B. Wrap bag around probe and note reading.

C. Calculate the activity using the following formula:

$$\mu Ci/kg = \frac{CPM - BKGD\ CPM}{1.32}$$

**NOTE: This calculation is based on I-131 and CS-137.**

6.12.7 Record the sample results on Form 5790-410-03 and report the results to the Field Team Communicator.

## 6.13 Off-Site Sample Courier Instructions

6.13.1 When dispatched from the OSC Coordinator, obtain an electronic dosimeter (either from the OSC or Access Control) and log onto Emergency RWP 902. Retain your TLD and dosimeter when departing the plant.

6.13.2 Obtain the keys for a plant vehicle and the keys to EVES building. Keys may be obtained from the Guard House or Nuclear Plant Helper Supervisor key cabinet.

6.13.3 Obtain one Sample Courier Kit (aluminum case), one portable mobile radio kit (Channel 2A) from the EVES Bldg.

6.13.4 Place the Sample Courier Kit in the vehicle and install the mobile radio and antenna.

6.13.5 Perform an operability check of the installed radio unit, prior to departing the EVES Building, by contacting the TSC (or EOF). Ensure the radio is selected to Channel 2A.

6.13.6 Proceed to the EOF Command Center, using the back (Receiving Area) personnel entrance, and contact the Radiation Protection Support Supervisor (RPSS) immediately upon arrival.

6.13.7 Standby in the EOF for assignments as directed by the RPSS.

6.13.8 When dispatched from the EOF to pick up samples:

A. Logout of the EOF (if necessary) with EOF Security (ensure you keep your dosimetry when departing the EOF).

B. Establish and maintain constant radio communication with the Field Team Communicator and follow the communicators instructions regarding travel routes, etc.

C. Rendezvous with Field Teams at designated locations for sample pickup.

D. Frequently check your dosimeter and notify the Field Team Communicator when exposure approaches administrative limits.

6.13.9 When picking up samples from the Field Team(s):

A. Obtain any special instructions for handling the sample(s) from the RPS (e.g. ALARA precautions, etc.).

B. Ensure the sample(s) are properly packaged (bagged) and labeled.

C. Confirm radiological conditions along your travel route(s) with the RPS and follow the RPS's instructions regarding the use of protective clothing (e.g. respiratory protection) that may be warranted.

**NOTE: Protective clothing is provided in the Sample Courier Kit.**

6.13.10 Transport the sample(s) promptly to the EOF Count Room for analysis. While enroute (to the EOF) contact the EOF Count Room (by radio) and inform the Count Room RPS you will be delivering samples.

6.13.11 Upon arrival at the EOF use the back (Receiving area) personnel entrance into the EOF Controlled Area (the posted Contaminated area in the EOF loading dock) and:

A. Notify the Count Room RPS samples have arrived.

B. Ensure the samples are properly re-bagged, re-labeled and surveyed (with a frisker or dose rate meter) prior to transfer out of the posted Contaminated Area into the EOF Count Room.

6.13.12 While at the EOF:

A. Check and report dosimeter readings to the RPSS.

B. Perform a whole body frisk (check) prior to proceeding back into the field (if immediately dispatched).

C. If remaining at the EOF, doff protective clothing (if applicable) and perform a whole body frisk when exiting the posted Contaminated Area (at the Step-Off-Pad).

D. Perform personnel decontamination (as necessary) under the direction of the Count Room RPS.

6.13.13 Upon completion of sample delivery notify the Field Team Communicator you are ready to be dispatched again.

6.13.14 If dispatched into the field again, obtain additional sampling supplies (e.g. sample bottles, filters, etc.) from the storage cabinet in the Receiving Area and deliver the supplies to the Field Teams (as requested).

6.13.15 When sample courier(s) are no longer required (or when relieved by the next shift) report to the RPSS for debriefing and next shift assignments.

## 6.14 Prairie Island Off-Site Field Team Driver Instructions

6.14.1 When dispatched by the OSC Coordinator, obtain an electronic dosimeter (either from the OSC or Access Control) and log onto Emergency RWP 902. Retain your TLD and electronic dosimeter when departing the plant.

6.14.2 Report to the EOF and check in with the Radiation Protection Support Supervisor (RPSS).

6.14.3 Serve as a driver for the Prairie Island Off-Site Survey Team RPS. The EOF Field Team Communicator will provide instruction on desired sample points.

6.14.4 Request advice from the RPS regarding procedures or special precautions which should be considered when approaching or searching for the plume.

6.14.5 Provide assistance to the RPS as requested.

## 7.0 FIGURES

FIGURE

### 7.1 Gross Iodine Activity Table

Using Count Rate Meter with 2 inch Pancake Probe and Silver Zeolite Absorber

Run Time 10 Minutes Volume 707500 cc Flow Rate 2.5 CFM
Probe eff. 0.10 Flow CF 1.0

NOTE: The µCi/cc activity assumes the above conditions.

| NCPM | µCi Iodine | µCi/cc | NCPM | µCi Iodine | µCi/cc | NCPM | µCi Iodine | µCi/cc |
|---|---|---|---|---|---|---|---|---|
| 100 | 4.3E-02 | 6.E-08 | 800 | 4.OE-01 | 6.E-07 | 6000 | 3.2E-00 | 5.E-06 |
| 120 | 5.3E-02 | 7.E-08 | 900 | 4.6E-01 | 7.E-07 | 7000 | 3.8E-00 | 5.E-06 |
| 140 | 6.0E-02 | 8.E-08 | 1000 | 5.OE-01 | 7.E-07 | 8000 | 4.5E-00 | 6.E-06 |
| 160 | 7.OE-02 | 1.E-07 | 1200 | 6.OE-01 | 8.E-07 | 9000 | 5.OE-00 | 7.E-06 |
| 180 | 9.OE-02 | 7.E-07 | 1400 | 7.OE-01 | 1.E-06 | 10000 | 5.6E-00 | 8.E-06 |
| 200 | 1.OE-01 | 1.E-07 | 1600 | 8.OE-01 | 1.E-06 | 12000 | 6.0E-00 | 8.E-06 |
| 220 | 1.2E-01 | 2.E-07 | 1800 | 9.OE-01 | 1.E-06 | 14000 | 7.5E-00 | 1.E-05 |
| 240 | 1.4E-01 | 2.E-07 | 2000 | 1.0E-00 | 1.E-06 | 16000 | 1.OE+01 | 1.E-05 |
| 260 | 1.5E-01 | 2.E-07 | 2200 | 1.1E-00 | 2.E-06 | 18000 | 1.3E+01 | 2.E-05 |
| 280 | 1.6E-01 | 2.E-07 | 2400 | 1.2E-00 | 2.E-06 | 20000 | 1.5E+01 | 2.E-05 |
| 300 | 1.7E-01 | 2.E-07 | 2600 | 1.4E-00 | 2.E-06 | 25000 | 2.5E+01 | 4.E-05 |
| 350 | 1.8E-01 | 3.E-07 | 2800 | 1.5E-00 | 2.E-06 | 30000 | 3.3E+01 | 5.E-05 |
| 400 | 2.0E-01 | 3.E-07 | 3000 | 1.6E-00 | 2.E-06 | 35000 | 5.OE+01 | 7.E-05 |
| 450 | 2.3E-01 | 3.E-07 | 3500 | 1.8E-00 | 3.E-06 | 40000 | 6.OE+01 | 8.E-05 |
| 500 | 2.6E-01 | 4.E-07 | 4000 | 2.1E-00 | 3.E-06 | 45000 | 1.OE+02 | 1.E-04 |
| 600 | 3.0E-01 | 4.E-07 | 4500 | 2.5E-00 | 4.E-06 | | | |
| 700 | 3.6E-01 | 5.E-07 | 5000 | 2.8E-00 | 4.E-06 | | | |

FIGURE

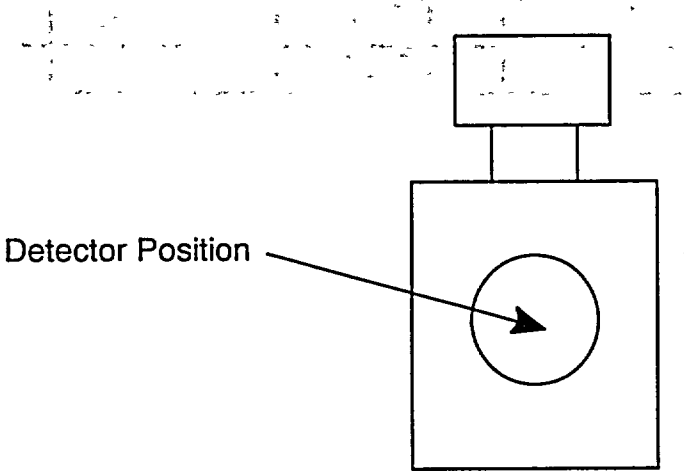
**7.2 Gas Chamber Table**
using Count Rate Meter with 2 inch Pancake Probe and 100 cc S.S. Gas Chamber

| NCPM | µCi/cc (Xe-133 equiv.) | NCPM | µCi/cc (Xe-133 equiv.) |
|---|---|---|---|
| 100 | 1.OE-05 | 2500 | 4.5E-04 |
| 150 | 1.5E-05 | 3000 | 5.5E-04 |
| 200 | 2.OE-05 | 3500 | 6.5E-04 |
| 250 | 2.5E-05 | 4000 | 8.OE-04 |
| 300 | 3.2E-05 | 4500 | 9.OE-04 |
| 350 | 4.OE-05 | 5000 | 1.1E-03 |
| 400 | 4.5E-05 | 5500 | 1.3E-03 |
| 450 | 5.1E-05 | 6000 | 1.5E-03 |
| 500 | 6.0E-05 | 8000 | 1.8E-03 |
| 600 | 7.5E-05 | 10000 | 2.5E-03 |
| 800 | 1.1E-04 | 12000 | 3.0E-03 |
| 1000 | 1.5E-04 | 14000 | 3.5E-03 |
| 1200 | 1.7E-04 | 16000 | 4.OE-03 |
| 1400 | 2.OE-04 | 18000 | 4.7E-03 |
| 1600 | 2.5E-04 | 20000 | 5.5E-03 |
| 1800 | 3.OE-04 | 25000 | 7.5E-03 |
| 2000 | 3.5E-04 | 30000 | 9.5E-03 |

FIGURE

**7.3 Gross Liquid Activity Table**
using Count Rate Meter with 2 inch Pancake Probe and 1000 ML Poly Bottle

| NCPM | µCi/ML |
|---|---|
| 100 | 1.5E-04 |
| 200 | 2.5E-04 |
| 300 | 3.5E-04 |
| 400 | 4.5E-04 |
| 500 | 5.5E-04 |
| 600 | 6.5E-04 |
| 700 | 7.5E-04 |
| 800 | 8.5E-05 |
| 900 | 9.5E-05 |
| 1000 | 1.0E-03 |
| 2000 | 1.8E-03 |
| 3000 | 2.6E-03 |
| 4000 | 3.4E-03 |
| 5000 | 4.1E-03 |
| 6000 | 4.8E-03 |
| 7000 | 5.5E-03 |
| 8000 | 6.2E-03 |
| 9000 | 6.9E-03 |
| 10000 | 7.6E-03 |



FIGURE

**7.4 Gross Particulate Activity Table**
using Count Rate Meter with 2 inch Pancake Probe

Run Time 10 Minutes
Flow Rate 2.5 CFM
Conversion 4.51E-07 μCi/dpm

Volume 707500 cc
Probe eff. 0.10

4" filter CF 0.3
Flow CF 1.0

NOTE: The μCi/cc activity assumes the above conditions.

| NCPM | μCi/cc | NCPM | μCi/cc | NCPM | μCi/cc |
|---|---|---|---|---|---|
| 100 | 2.E-09 | 900 | 2.E-08 | 6000 | 1.E-07 |
| 120 | 3.E-09 | 1000 | 2.E-08 | 7000 | 1.E-07 |
| 140 | 3.E-09 | 1200 | 3.E-08 | 8000 | 2.E-07 |
| 160 | 3.E-09 | 1400 | 3.E-08 | 9000 | 2.E-07 |
| 180 | 4.E-09 | 1600 | 3.E-08 | 10000 | 2.E-07 |
| 200 | 4.E-09 | 1800 | 4.E-08 | 12000 | 3.E-07 |
| 220 | 5.E-09 | 2000 | 4.E-08 | 14000 | 3.E-07 |
| 240 | 5.E-09 | 2200 | 5.E-08 | 16000 | 3.E-07 |
| 260 | 6.E-09 | 2400 | 5.E-08 | 18000 | 4.E-07 |
| 280 | 6.E-09 | 2600 | 6.E-08 | 20000 | 4.E-07 |
| 300 | 6.E-09 | 2800 | 6.E-08 | 25000 | 5.E-07 |
| 350 | 7.E-09 | 3000 | 6.E-08 | 30000 | 6.E-07 |
| 400 | 8.E-09 | 3500 | 7.E-08 | 35000 | 7.E-07 |
| 500 | 1.E-08 | 4000 | 8.E-08 | 40000 | 8.E-07 |
| 600 | 1.E-08 | 4500 | 1.E-07 | 45000 | 1.E-06 |
| 700 | 1.E-08 | 5000 | 1.E-07 | | |
| 800 | 2.E-08 | 5500 | 1.E-07 | | |

l/mab

FIGURE

**7.5 On-Site Liquid Sample Locations**

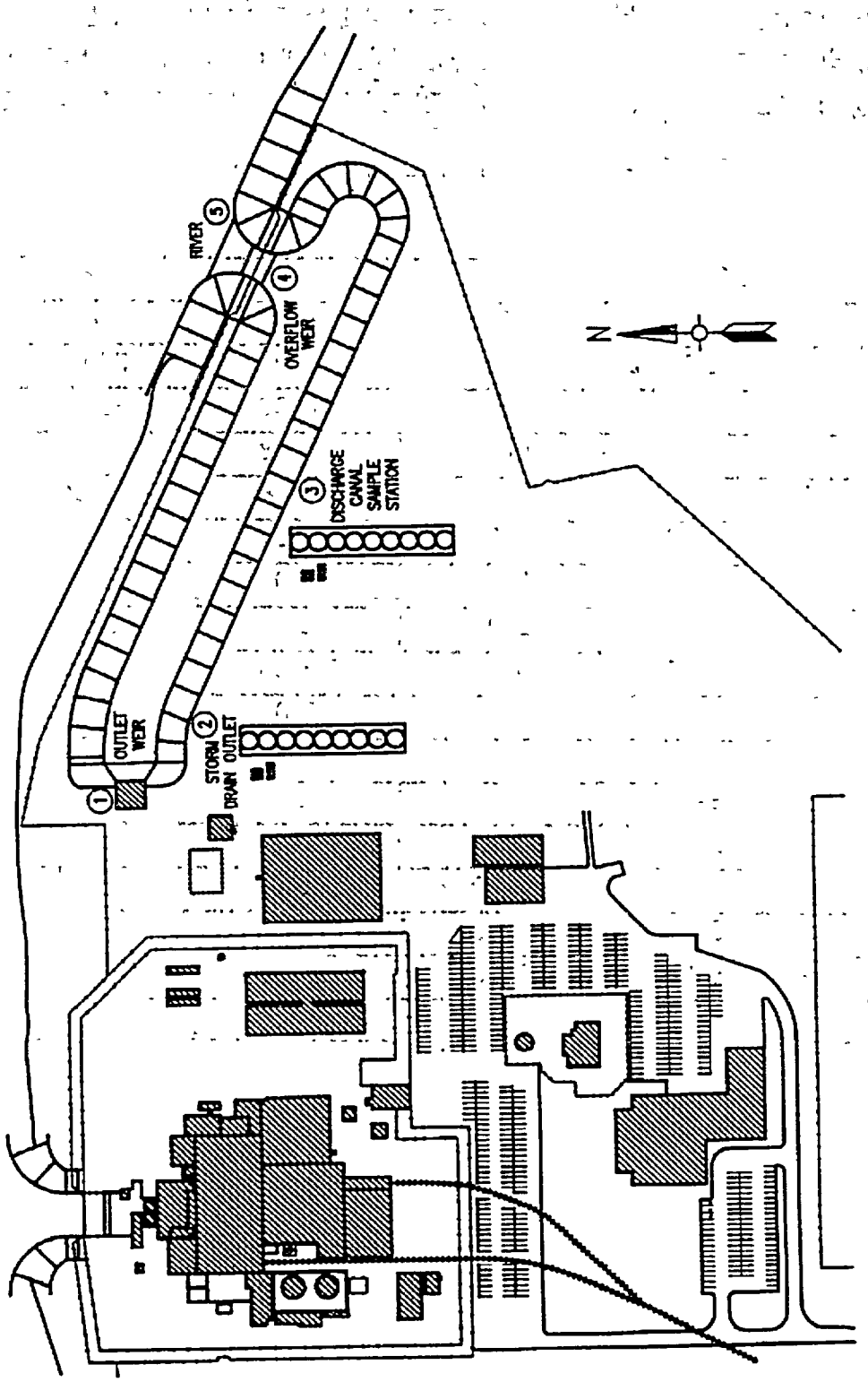



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FIGURE

**7.6 Forms Utilized in this Procedure**

1. 5790-410-02 OUT-OF-PLANT SURVEY CHECKLIST
2. 5790-410-01 EMERGENCY SAMPLE RESULTS LOG
3. 5790-410-03 GROUND DEPOSITION SAMPLE RESULTS LOG

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