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Monticello Nuclear Generating Plant
Operated by Nuclear Management Company, LLC

August 27, 2001

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.2-101	Classification of Emergencies	27
A.2-204	Offsite Protective Action Recommendations	14
A.2-408	Sample Coordination During Emergencies	6
A.2-602	Event Termination or Recovery	6
A.2-807	Off-Site Dose Assessment & Protective Action Recommendations	7

Please post changes in your copy of the Monticello Nuclear Generating Plant Emergency Plan Implementing Procedures. Superseded procedures should be destroyed.

This letter contains no new NRC commitments, nor does it modify any prior commitments.

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Document Type	Document Number	Revision	Title
NOTE: The documents listed below are new or revised			
1060	A.2-101	27	CLASSIFICATION OF EMERGENCIES
1060	A.2-204	14	OFFSITE PROTECTIVE ACTION RECOMMENDATIONS
1060	A.2-408	6	SAMPLE COORDINATION DURING EMERGENCIES
1060	A.2-602	6	EVENT TERMINATION OR RECOVERY
1060	A.2-807	7	OFF-SITE DOSE ASSESSMENT AND PROTECTIVE ACTION RECOMMENDATIONS

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By: Michael O'Connell	Reviewed By: Timothy J. O'Connor	
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1.0 PURPOSE

This procedure specifies conditions or groups of conditions that indicate an emergency exists and the actions to be taken by Operations personnel to verify and classify the type of emergency condition.

2.0 APPLICABILITY

2.1 An off-normal condition corresponding to one of the initiating events described in FIGURE 7.2 of this procedure is occurring or has occurred.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Emergency Director (TSC) is responsible for:

3.1.1 Direction of overall site emergency response IAW A.2-213 (RESPONSIBILITIES OF THE EMERGENCY DIRECTOR).

3.1.2 Emergency classification, declaration and notification IAW section 6.1.1.

3.1.3 Event termination or recovery IAW A.2-602 (EVENT TERMINATION OR RECOVERY).

3.2 The Duty Shift Manager (Interim Emergency Director) is responsible for the following until relieved by a designated Emergency Director:

3.2.1 Direction of overall site emergency response and assuming the responsibilities of Emergency Director.

3.2.2 Emergency classification, declaration and notification IAW section 6.1.2.

3.2.3 Implementing the EPIP which corresponds to the declared emergency.

3.2.4 Event termination or recovery IAW A.2-602 (EVENT TERMINATION OR RECOVERY).

3.3 The Duty Shift Supervisor and Control Room Operators are responsible for:

3.3.1 Immediate notification of the Duty Shift Manager of any events that may be classified as emergency conditions.

3.3.2 Verification of emergency condition indications.

3.3.3 Assisting with assessment and determination of emergency classification.

3.3.4 Taking immediate actions IAW plant procedures and directives to control the event and place the plant in a stable condition.

3.4 The Shift Emergency Communicator is responsible for:

3.4.1 The performance of emergency notifications and communications IAW plant procedures and directives.

4.0 DISCUSSION

4.1 Three distinct phases in the Emergency Classification, Declaration and Notification process

4.1.1 During the implementation of this procedure, the Emergency Director must consider the three distinct phases in the Emergency Classification, Declaration and Notification process.

A. **Classification:** The act of **assessing** the EALs to determine the appropriate classification which the ongoing events are categorized. This may take a reasonable length of time (5 to 15 minutes for most situations) depending upon the complexity of the situation. This 15 minute assessment period is consistent with the NRC Branch Position on Timeliness of Classification of Emergency Conditions, EPPOS No. 2.

B. **Declaration:** The act of formally **declaring** the classification based on the assessment of EALs. This is the point at which the classification time is set and the 10CFR50, App. E 15 minute off-site notification clock starts.

C. **Notification:** The act of **making the notification(s)** to the State, Wright and Sherburne Counties, NRC, etc.

4.2 Definitions

4.2.1 Emergency Condition - An occurrence, or combination of events and indications that fall into one of the following classifications:

A. Notification of Unusual Event (NUE)

Unusual events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

B. Alert

Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

C. Site Area Emergency

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near site boundary.

D. General Emergency

Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site.

4.2.2 Emergency Action Levels (EAL) - Numerical or qualitative values for the operational or radiological parameters, (radiological dose rates; water borne or surface deposited concentrations of radioactivity; specific instrument indications or changes in indications) used as thresholds for initiating procedures or actions to assess and verify plant conditions. EAL may require initiating specific emergency procedures as designated by a particular class of emergency.

4.2.3 Gap (Gap Release) - The radioactive material released from the fuel pellets during normal operation that is trapped in the fuel pin. If the pin fails (cladding fails), this material will be released from the gap into the reactor coolant.

4.3 Recognition

Attached to this procedure is FIGURE 7.2, EMERGENCY CLASSIFICATION GUIDELINES (1-30). These guidelines identify the four emergency classifications, the possible initiating event(s), emergency action levels for each classification, and, where applicable, specific instruments and indications to be used to detect and classify an emergency. The identified instruments and alarms are a representative listing of various instruments that may be used to verify an emergency condition. There are many process variables referred to in the guidelines.

The instruments, indications, or alarms listed for any particular event are not necessarily a complete list of all those that will show abnormal indications or be useful in classifying the event. There is typically more than one instrument or instrument channel that monitors a specific parameter. The redundant channels and coincident indicators should be used to verify the emergency condition.

The emergency action levels specified in the guidelines do not necessitate initiation of any particular phase of the emergency plan but rather signify a need for assessment and classification of conditions. In many cases, the proper classification will be immediately apparent from in-plant instrumentation. In others, further assessment is necessary to determine the applicable emergency classification.

The plant operating staff should consider the effect that combinations of initiating events have, that if taken individually would constitute a lower emergency classification but collectively may exceed the criteria for a higher classification.

4.4 Technical Specification Shutdown

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a one hour report under 10CFR50.72 (b) Non-emergency Events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications.

An immediate Notification of an Unusual Event is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. **Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.** Other required Technical Specification shutdowns that involve precursors to more serious events such as Physical or Radiological Hazards, Fission Product Barrier Degradation, or Equipment Malfunction requires an immediate Notification of an Unusual Event.

4.5 Rapidly Escalating and/or De-escalating Events

In the case of an event that rapidly escalates then de-escalates in emergency classification or is initiated at a higher emergency class then rapidly de-escalates, the initial off-site notifications ***SHALL*** indicate the current emergency classification. In addition to the current emergency class, the off-site authorities and NRC ***SHALL*** be informed of the highest emergency classification reached during the course of the event. This information should be included in the initial emergency notifications to the off-site authorities and NRC.

4.6 Late Discovery of a Classifiable Event or Condition

Late discovery of an event or condition which met the criteria for declaration of an emergency but no emergency had been declared and the basis for the emergency classification no longer exists at the time of discovery ***SHALL*** be reported to the NRC. This may be due to a rapidly concluded event or an oversight in the emergency classification made during the event or it may be determined during a post-event review. NRC notification (or an NRC update if the event was previously reported but misclassified) within one hour of the discovery of the undeclared (or misclassified) event ***SHALL*** be the reporting format (see 4AWI-04.08.02). Notification of state and local emergency response organizations ***SHALL*** also be considered. An actual declaration of the event is not necessary.

5.0 PRECAUTIONS

5.1 There are many indications of an emergency condition that may occur either individually, in group events or sequentially. The operator must be careful not to rely on any one indication as being absolutely indicative of an emergency condition. Although the operator should believe indications and take action based on those indications, they ***SHALL*** attempt to verify indications by checking secondary or coincident indicators. Continued surveillance and assessment of plant conditions is necessary to ensure that the emergency classification is appropriately revised as conditions change, or as more definitive information is obtained.

6.0 INSTRUCTIONS

6.1 Emergency Classification, Declaration, and Notification

6.1.1 Emergency Director (TSC) Instructions:

A. Refer to A.2-213 (RESPONSIBILITIES OF THE EMERGENCY DIRECTOR) section 6.11 (Emergency Classification Changes).

6.1.2 Duty Shift Manager (Interim Emergency Director) Instructions:

A. **Classification** - When informed of plant parameters, radiological release levels or events which indicate that an emergency classification may be appropriate, evaluate the emergency classification.

1. Confirm that the indications have been verified using redundant or coincident indications.

2. Refer to FIGURE 7.1 (LIST OF INITIATING CONDITIONS) and identify any guidelines applicable to the initiating condition.

3. Locate the applicable guideline in FIGURE 7.2 (EMERGENCY CLASSIFICATION GUIDELINES).

4. If multiple events and/or indications are involved, classify the emergency based on the event (or indication) that results in the highest (most conservative) emergency classification.

5. Consider the effect that combinations of events have; that, if taken individually, would constitute a lower emergency classification but collectively may exceed the criteria for a higher classification.

6. Summon the Shift Emergency Communicator(s) to the Control Room via the Site PA system (Access #305).

B. **Declaration** - Declare the emergency class.

1. Announce the emergency classification in the Control Room.

C. **Notification** - IAW the appropriate Emergency Classification Checklist and Emergency Call-List (included in each emergency classification folder), notify the SEC to make the required notifications (i.e., State & Locals: 15 min., NRC: 1 hr., etc....)

1. Review the completed form(s) and sign the form(s) in the space provided.

D. Implement the EPIP which corresponds to the declared emergency classification and complete the appropriate emergency classification checklist.

6.2 Event Termination or Recovery

6.2.1 Perform Event Termination or Recovery in accordance with A.2-602 (EVENT TERMINATION OR RECOVERY).

7.0 FIGURES

FIGURE

7.1 List of Initiating Conditions

7.2 Emergency Classification Guidelines

GUIDELINE 1

Radioactive Effluent

UNUSUAL EVENT

RADIOLOGICAL EFFLUENT OFF-SITE DOSE CALCULATION MANUAL (ODCM) LIMITS EXCEEDED

EALS

1a. Discharge Canal Monitor exceeds 20 CPS indicated by annunciator DISCHARGE CANAL HI RADIATION (4-A-22) and recorder C-02-17.358, and Shift Manager's judgement is the increase is due to release of radioactive byproduct materials from the plant.

OR

1b. Unmonitored liquid release to river which exceeds ODCM-02.01 limits.

OR

1c. Stack Effluent Monitor (Channel A or B) exceeds 90,000 μCi/Sec indicated by annunciator STACK EFFLUENT HI HI RADIATION (C-259-A-1) and RECORDERS RR-7858A and RR-7858B on C-257/C-258 and computer point STACK NOBLE GAS RELEASE RATE ALARM (PRM011).

OR

1d. Reactor Building Vent Effluent Monitor (Channel A or B) exceeds 4,500 uCi/sec indicated by annunciator RBV EFFLUENT HI HI RADIATION (C-259-A-2) and RECORDERS RR-7859A and RR-7859B on C-257/C-258.

OR

1e. Unmonitored gaseous release to the atmosphere which is estimated or suspected to exceed ODCM limits (4,500 μCi/Sec).

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 1

Radioactive Effluent - Cont'd

ALERT

RADIOLOGICAL EFFLUENTS GREATER THAN 10 TIMES OFF-SITE DOSE CALCULATION MANUAL (ODCM) LIMITS

EALs

1a. Discharge Canal Monitor exceeds 200 CPS.

OR

1b. Unmonitored liquid release to river which is 10 times ODCM-02.01 limits.

OR

1c. Stack Effluent Monitor (Ch A or B) exceeds 9.0E + 5 μCi/Sec.

OR

1d. Reactor Building Vent Effluent Monitor (Ch A or B) exceeds 4.5E+4 μCi/Sec.

OR

1e. Unmonitored gaseous release to the atmosphere which is estimated or expected to exceed 10 times ODCM-03.01 limits (4.5E+4 μCi/Sec).

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 1

Radioactive Effluent - Cont'd

SITE AREA EMERGENCY

EFFLUENT MONITORS DETECT LEVELS CORRESPONDING TO GREATER THAN 50 Mrem/Hr FOR 1/2 HOUR OR GREATER THAN 500 Mrem/Hr (Whole Body) For 2 MINUTES (Or Five Times These Levels For Thyroid) AT THE SITE BOUNDARY FOR ADVERSE METEOROLOGY. THESE DOSE RATES ARE PROJECTED BASED ON OTHER PLANT PARAMETERS (e.g., Radiation Level In Containment With Leak Rate Appropriate For Existing Containment Pressure) OR ARE MEASURED IN THE ENVIRONS, OR EPA PROTECTIVE ACTION GUIDELINES ARE PROJECTED TO BE EXCEEDED OUTSIDE THE SITE BOUNDARY.

EALs

1a. Stack Effluent Monitor (Ch A or B) exceeds 5.7E+6 μCi/Sec for 30 minutes.
OR

1b. Stack Effluent Monitor (Ch A or B) exceeds 5.7E+7 μCi/Sec 2 minutes.
OR

1c. Stack release rate of radioiodines exceeds 5.7E+3 μCi/Sec for 30 minutes.
OR

1d. Stack release rate of radioiodines exceeds 5.7E+4 μCi/Sec for 2 minutes.
OR

1e. RB Vent Effluent Monitor (Ch A or B) exceeds 2.1E+6 μCi/Sec for 30 minutes.
OR

1f. RB Vent Effluent Monitor (Ch A or B) exceeds 2.1E+7 μCi/Sec for 2 minutes.
OR

1g. RB Vent release rate of radioiodines exceeds 3600 μCi/Sec for 30 minutes.
OR

1h. RB Vent release rate of radioiodines exceeds 3.6E+4 μCi/Sec for 2 minutes.
OR

1i. Whole body doses (TEDE) greater than 1000 mrem or thyroid doses (CDE) of greater than 5000 mrem are projected beyond the site boundary.
OR

1j. Containment Radiation Monitor reading indicates above the 0.01% curve when plotted versus time after shutdown IAW A.2-208 (CORE DAMAGE ASSESSMENT) section 6.2 and associated FIGURE 7.1.
OR

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 1

Radioactive Effluent - Cont'd

SITE AREA EMERGENCY (Cont'd)

1k. Measured Whole Body dose rates at the site boundary or beyond exceed 50 mrem/hr for 30 minutes or 500 mrem/hr for 2 minutes.

OR

1l. Radioiodine concentrations measured at the site boundary or beyond exceed 7.0E-8 μCi/CC for 30 minutes or 7.0E-7 μCi/CC for 2 minutes.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 2

In-Plant Radiation Levels

UNUSUAL EVENT

Not Applicable

ALERT

SEVERE DEGRADATION IN CONTROL OF RADIOACTIVE MATERIALS

EAL

1a. Increase by a factor of 1000 in plant radiation levels as indicated by Area Radiation Monitoring System:

NOTE: EALs shown as FULL SCALE indicate that an increase by a factor of 1000 is beyond the range of the particular monitor. In these cases, a full scale reading combined with the Shift Manager's concurrence, *SHALL* meet the criteria for the ALERT classification. Reading in mrem/hr except as noted.

PANEL	DESCRIPTION	NORMAL	EAL
C-11	A-1 1027 RB NE Low	10	Full scale
C-11	A-2 1027 RB N High	5	5000
C-11	A-3 1027 RB W Stairway	1	1000
C-11	A-4 1001 Source Storage	20	Full scale
C-11	A-5 Fuel Pool Skimmer Tk Area	20	Full scale
C-11	A-6 1001' Decon Area	3	Full scale
C-11	A-7 985' Sample Hood	5	Full scale
C-11	A-8 Rx Cleanup System Access	0.25	250
C-11	A-9 962 RB East	0.8	800
C-11	A-10 East CRD HCU	3	Full scale
C-11	A-11 West CRD HCU	3	Full scale
C-11	A-12 TIP Drive Area	2	Full scale
C-11	A-13 TIP Cubicle	30	Full scale
C-11	A-14 HPCI Turbine Area	2	Full scale
C-11	A-15 Rx Bldg Drain Tk Area	25	Full scale
C-11	A-16 RCIC Pump Area	1	1000
C-11	A-17 East CS and RHR Area	20	Full scale

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 2

In-Plant Radiation Levels - Cont'd

ALERT - Cont'd

PANEL	DESCRIPTION	NORMAL	EAL
C-11	A-18 West CS and RHR Area	8	Full scale
C-11	A-19 Hot Chemistry Lab	.25	250
C-11	A-20 Control Room Low Range	0.02	20
C-11	A-21 Control Room High Range	3	3000
C-11	B-1 Turbine Operating Floor	90	Full scale
C-11	B-2 Turbine Front Standard	70	Full scale
C-11	B-3 Cond Demin Operating Area	3	1000
C-11	B-4 Mechanical Vacuum Pump Rm	9	Full scale
C-11	B-5 Feedwater Pump Area	1	1000
C-11	C-1 Radwaste Control Room	0.2	200
C-11	C-2 Sample Tank Area	3	Full scale
C-11	C-3 Conveyer Operating Area	0.2	200
C-11	D-1 Hot Machine Shop	0.2	200
C-252	E-1 Recombiner Instrument Room	1	Full scale
C-252	E-2 Recombiner Pump Room	3	Full scale
C-252	F-1 Off-gas Storage Foyer	0.3	100
C-11	F-2 Off-gas Storage Foyer High Range	<100	1000
C-257/C-258	Containment Rad Monitor	3-5 Rem/hr	50 Rem/hr

OR

1b. Direct measurement of radiation levels corresponding to an increase by a factor of 1000.

SITE AREA EMERGENCY

Not applicable

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 3

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7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 4

Reactor Coolant Leak

UNUSUAL EVENT

PRIMARY SYSTEM LEAK RATE EXCEEDS TECHNICAL SPECIFICATIONS

NOTE: Under this GUIDELINE an Unusual Event should be declared when the leak rate is confirmed to be in excess of the corresponding EAL value (i.e. 5 GPM unidentified leakage, 20 GPM identified leakage or 2 GPM increase in unidentified leak rate in 24 hrs).

EALs

1a. Unidentified leakage exceeds 5 GPM as indicated by computer point, FLOOR DRAIN SUMP RATE OF CHANGE (PCT509), or calculated from indicator LR-7409 on Panel C-04 in the Control Room.

OR

1b. Identified leakage exceeds 20 GPM as indicated by computer point, EQUIPMENT DRAIN SUMP RATE OF CHANGE (PCT508), or calculated from indicator LR-7409 on Panel C-04 in the Control Room.

OR

1c. Unidentified leakage rate increases 2 GPM within any 24 hour period as determined from Test 0381 (CONTAINMENT COOLANT LEAKAGE LOG).

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 4

Reactor Coolant Leak - Cont'd

ALERT

PRIMARY COOLANT LEAK RATE GREATER THAN 50 GPM

NOTE: Failure of a SRV to close should not be classified using Guideline 4. The failure of a SRV to close should be classified using Guideline 7 (Safety Relief Valve Failure).

EAL

1a. Total leakage exceeds 50 GPM as indicated by computer point, FLOOR DRAIN SUMP RATE OF CHANGE (PCT509) and computer point, EQUIPMENT DRAIN SUMP RATE OF CHANGE (PCT508) or as calculated from indicator LR-7409 on Panel C-04 in the Control Room.

OR

NOTE: Unisolable - The leak is NOT isolable from the Control Room OR an attempt for isolation from the Control Room has been made and was unsuccessful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification, this Initiating Condition is not applicable.

1b. Unisolable primary system leakage outside the drywell as indicated by area temperatures or ARM levels ≥ maximum safe values in at least one area.

OR

1c. Shift Manager's judgement.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 4

Reactor Coolant Leak - Cont'd

SITE AREA EMERGENCY

KNOWN LOSS OF COOLANT ACCIDENT GREATER THAN MAKEUP CAPACITY

EAL

1a. Total leakage exceeds 50 GPM as indicated by computer point, FLOOR DRAIN SUMP RATE OF CHANGE (PCT509) and computer point, EQUIPMENT DRAIN SUMP RATE OF CHANGE (PCT508) or as calculated from indicator LR-7409 on Panel C-04 in the Control Room.

OR

NOTE: **Unisolable - The leak is NOT isolable from the Control Room OR an attempt for isolation from the Control Room has been made and was unsuccessful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification, this Initiating Condition is not applicable.**

1b. Unisolable primary system leakage outside the drywell as indicated by area temperatures or ARM levels ≥ maximum safe values in at least one area.

AND

2. Reactor water level decreasing below 1 foot above active fuel (-114inches) indicated by FUEL ZONE LEVEL INDICATOR (LI-2-3-91A/B).

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 5

Main Steam Line Break

UNUSUAL EVENT

Not applicable

ALERT

MAIN STEAM LINE BREAK WITH MSIV MALFUNCTION CAUSING LEAKAGE TO SECONDARY CONTAINMENT

EALS

1. Shift Manager's judgement that MSIV is malfunctioning or continuing steam flow with evidence that the steam line break is outside primary containment (e.g. visual observation, radiation or temperature). I

AND

2a. Annunciators MAIN STEAM LINE HIGH FLOW A/B ALARM (5-A-25/26) and RX WATER LEVEL HI/LO ALARM (5-B-24).

OR

2b. Annunciator MAIN STEAM TUNNEL HIGH TEMPERATURE A/B ALARM (5-A-17/18)

OR

2c. Annunciator MAIN STEAM LINE LEAKAGE ALARM (5-B-32).

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 5

Main Steam Line Break - Cont'd

SITE AREA EMERGENCY

MAIN STEAM LINE BREAK WITH FAILURE OF MSIVs TO ISOLATE THE LEAK AND CAUSING LEAKAGE OUTSIDE SECONDARY CONTAINMENT

EALs

1. Shift Manager or Emergency Director's judgement that MSIV is malfunctioning or continuing steam flow with evidence that steam line break is outside primary containment.

AND

2a. Annunciators MAIN STEAM LINE FLOW A/B ALARM (5-A-25/26) and RX WATER LEVEL HI/LO ALARM (5-B-24).
OR

2b. Annunciator MAIN STEAM TUNNEL HIGH TEMPERATURE ALARM (5-A-17/18).
OR

2c. Annunciator MAIN STEAM LINE LEAKAGE ALARM (5-B-32).

AND

3a. Annunciator TURBINE BUILDING HIGH RADIATION ALARM (4-A-21).
OR

3b. High airborne radioactivity levels in the Turbine Building indicated by Continuous Air Monitors (CAMs) or direct measurement.
OR

3c. Visual observation that blow-out panels between the Steam Chase and Turbine Building have been ruptured.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 6

Fuel Cladding Degradation

UNUSUAL EVENT

FUEL DAMAGE INDICATION

EALs

1a. Off-gas Pretreatment Monitor exceeds 20,000 (2×10^4) mrem/hr as indicated on Recorder C-02-17.152.

OR

1b. Off-gas Pretreatment Monitor increases by 4,000 mrem/hr within 30 minutes at steady power as indicated by Recorder C-02-17.152.

OR

1c. Reactor coolant I-131 dose equivalent exceeds 5 μCi/gram as determined by sample and analysis.

ALERT

SEVERE LOSS OF FUEL CLADDING INDICATED BY HIGH OFF-GAS AT AIR EJECTOR MONITOR (greater than 5 Ci/ Sec corresponding to 16 isotopes decayed 30 minutes) **OR** VERY HIGH COOLANT ACTIVITY SAMPLE (e.g., >300 μCi/gm I-131 dose equivalent).

EALs

1a. Off-gas Pretreatment Monitor exceeds 200,000 (2×10^5) mrem/hr indicated on Recorder C-02-17.152.

OR

NOTE: Resin intrusion or excessive hydrogen injection rates may cause high radiation without fuel cladding damage.

1b. Main Steam Line Monitor indicates 6000 mrem/hr due to high radiation.

OR

1c. Reactor coolant >300 μCi/gm I-131 dose equivalent as determined by sample and analysis.

OR

1d. Containment Radiation Monitor reading exceeds the Containment Monitor Response to Contained Source Curve (FIGURE 7.3).

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 6

Fuel Cladding Degradation - Cont'd

SITE AREA EMERGENCY

DEGRADED CORE WITH POSSIBLE LOSS OF COOLABLE GEOMETRY

EALs

1. More than 1/3 of core uncovered as indicated by reactor water level below -174 inches.

AND

2. Containment Radiation Monitor reading exceeds the Containment Monitor Response to Containment Source Curve (Figure 7.3).

AND

3a. Reactor coolant >3,000 μCi/gm I-131 dose equivalent as determined by sampling and analysis.

OR

3b. Inability to insert control rods fully.

OR

3c. Inability to position SRMs or IRMs within core.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 7

Safety Relief Valve Failure

UNUSUAL EVENT

FAILURE OF A SAFETY RELIEF VALVE TO CLOSE FOLLOWING REDUCTION OF APPLICABLE PRESSURE

EALs

1a. Annunciator AUTO BLOWDOWN RELIEF VALVE LEAKAGE (3-A-09).

OR

1b. Annunciator SRV OPEN ALARM (5-A-46).

ALERT

Not applicable

SITE AREA EMERGENCY

Not Applicable

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 8

Intentionally Blank

GUIDELINE 9

Intentionally Blank

GUIDELINE 10

Intentionally Blank

GUIDELINE 11

Intentionally Blank

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 12

Reactor Protection System Failure

UNUSUAL EVENT

Not applicable

ALERT

FAILURE OF THE REACTOR PROTECTION SYSTEM TO INITIATE AND COMPLETE A SCRAM WHICH BRINGS THE REACTOR SUBCRITICAL

EALs

1. Valid Scram Signal.

AND

2. Neutron count rate indicates reactor critical.

SITE AREA EMERGENCY

TRANSIENT REQUIRING OPERATION OF SHUTDOWN SYSTEMS WITH FAILURE TO SCRAM (continued power operation but no core damage immediately evident)

NOTE: Refer to Guideline 6 for Fuel Cladding Degradation determination.

EALs

1. Failure to bring reactor subcritical with control rods.

AND

2. Failure of the Standby Liquid Control System.

AND

3. Shift Manager or Emergency Director's judgement that a transient is in progress.

AND

4. No indication of core damage (if core damage is indicated, declare a GENERAL EMERGENCY).

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 13

Loss of Plant Shutdown or Shutdown Cooling Capability

UNUSUAL EVENT

As specified in Guideline 29.

ALERT

COMPLETE LOSS OF ABILITY TO ACHIEVE OR MAINTAIN PLANT COLD SHUTDOWN

EALs

1a. Loss of core cooling capabilities needed to achieve plant cold shutdown.

OR

1b. Loss of core cooling capabilities required to maintain the Reactor Coolant Temperature < (less than) 212°F.

AND

2. Shift Manager's judgement that the plant cannot reach or maintain cold shutdown.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 13

Loss of Plant Shutdown or Shutdown Cooling Capability - Cont'd

SITE AREA EMERGENCY

COMPLETE LOSS OF ABILITY TO ACHIEVE OR MAINTAIN HOT SHUTDOWN

EALs

1. Inability to SCRAM and inoperable Standby Liquid Control System.

AND

2a. Loss of all Safety Relief Valve capability.

OR

2b. Inoperable RHR System.

OR

2c. Inoperable RHR heat sink.

AND

3a. Loss of main condenser cooling.

OR

3b. No makeup capability from either HPCI or RCIC Systems.

AND/OR

4. Shift Manager or Emergency Director's judgement that plant cannot reach or maintain hot shutdown.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 14

Loss of Instrumentation

UNUSUAL EVENT

INDICATIONS OR ALARMS ON PROCESS OR EFFLUENT PARAMETERS NOT FUNCTIONAL IN THE CONTROL ROOM TO AN EXTENT REQUIRING PLANT SHUTDOWN

ALERT

LOSS OF MOST OR ALL ANNUNCIATORS WHILE OPERATING ABOVE COLD SHUTDOWN AND PLANT IN STABLE CONDITION.

EALs

1. Unplanned loss of most or all of annunciators on panels C-03, C-04, C-05, C-08.

AND

2. Shift Manager's judgement that annunciators are non-functional.

AND

3. Loss of plant computer alarm display, alarm typer and SPDS display.

SITE AREA EMERGENCY

LOSS OF MOST OR ALL ANNUNCIATORS AND PLANT TRANSIENT INITIATED OR IN PROGRESS

EALs

1. Unplanned loss of most or all of annunciators on panels C-03, C-04, C-05, C-08.

AND

2. Shift Manager or Emergency Director's judgement that annunciators are non-functional.

AND

3. Loss of plant computer alarm display, alarm typer and SPDS display.

AND

4. Shift Manager or Emergency Director's judgement that a transient has been initiated or is in progress.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 14

Loss of Instrumentation - Cont'd

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 15

Control Room Evacuation

UNUSUAL EVENT

Not applicable

ALERT

EVACUATION OF THE CONTROL ROOM IS REQUIRED OR ANTICIPATED AND CONTROL OF SHUTDOWN SYSTEMS HAVE BEEN ESTABLISHED AT LOCAL STATIONS. (If local control has not been established in 15 minutes, go to SITE AREA EMERGENCY)

EAL

1. As determined by Shift Manager.

SITE AREA EMERGENCY

EVACUATION OF CONTROL ROOM AND CONTROL OF SHUTDOWN SYSTEMS NOT ESTABLISHED FROM LOCAL STATIONS IN 15 MINUTES

EAL

1. As determined by Shift Manager or Emergency Director.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 16

Toxic/Flammable Gases

UNUSUAL EVENT

NEAR OR ON-SITE TOXIC OR FLAMMABLE GAS RELEASE

EAL

1a. Widespread toxic or flammable gaseous hazard being experienced or projected on-site (out side of plant) leading to the evacuation or sheltering of personnel outside the plant.

OR

1b. Receipt of recommendation by Local, County, or State Officials to evacuate personnel from the site based on an off-site hazardous or flammable gaseous release event.

ALERT

ENTRY INTO FACILITY ENVIRONS OF UNCONTROLLED TOXIC OR FLAMMABLE GASES

EAL

1a. Toxic gaseous concentrations being measured or projected within a large area of the plant at the breathing zone greater than:

a. 50 ppm Ammonia
b. 10 ppm Chlorine
c. 5 ppm Vinyl Chloride
d. 2000 ppm Butadiene
e. 50 ppm Ethylene Dichloride
f. 500 ppm Gasoline
g. 2100 ppm Propane
h. 2000 ppm L.P.G.
i. IDLH for any toxic gas

NOTE: IDLH = Immediately Dangerous to Life or Health. IDLH Reference: NIOSH Pocket Guide to Chemical Hazards.

OR

1b. Flammable gas concentrations being measured within the plant at a distance of greater than 10 feet from the source exceeding the lower explosive limit.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 16

Toxic/Flammable Gases - Cont'd

SITE AREA EMERGENCY

ENTRY OF UNCONTROLLED FLAMMABLE GASES INTO VITAL AREAS OR ENTRY OF UNCONTROLLED TOXIC GASES INTO VITAL AREAS WHERE LACK OF ACCESS TO THE AREA CONSTITUTES A SAFETY PROBLEM AND THE PLANT IS **NOT** IN COLD SHUTDOWN

EALs

1a. Toxic gaseous concentrations being measured or projected within a major portion of a vital area of the plant at the breathing zone greater than or equal to the following such that further access to the vital area is being prevented at a time when it is needed.

a. 50 ppm Ammonia
b. 10 ppm Chlorine
c. 5 ppm Vinyl Chloride
d. 2000 ppm Butadiene
e. 50 ppm Ethylene Dichloride
f. 500 ppm Gasoline
g. 2100 ppm Propane
h. 2000 ppm L.P.G.
i. IDLH for any toxic gas

NOTE: IDLH = Immediately Dangerous to Life or Health. IDLH Reference: NIOSH Pocket Guide to Chemical Hazards.

OR

1b. Flammable gas concentrations being measured or projected within a major portion of a vital area of the plant from an unisolable source exceeding the lower explosive limit such that further access to the vital area is being prevented at a time when it is needed.

AND

2. Plant **IS NOT** in cold shutdown.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

l/saw

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 17

Security Compromise

UNUSUAL EVENT

SECURITY THREAT OR ATTEMPTED ENTRY OR ATTEMPTED SABOTAGE

EAL

1a. Security determines the threat to be credible and the Shift Manager determines the threat would have an adverse impact on the safe operation or shutdown capability of the plant.

OR

1b. Security discovers an unauthorized attempted entry by force or stealth (secret) into the protected area.

OR

1c. Security confirms that an act of attempted sabotage did occur to vital plant equipment or security equipment.

ALERT

ON-GOING SECURITY COMPROMISE

EAL

1a. Security Safeguards Contingency event that results in unauthorized personnel commandeering an area within the protected area, but not controlling shutdown capability or any vital areas.

OR

1b. Bomb device discovered within plant protected area and outside of any vital area.

SITE AREA EMERGENCY

IMMINENT LOSS OF PHYSICAL CONTROL OF THE PLANT

EAL

1a. Physical attack on the plant involving imminent occupancy of the Control Room, auxiliary shutdown panels, and any other vital areas.

OR

1b. Bomb device discovered within a vital area.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 17

Security Compromise (Cont.)

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 18

Loss of AC Power

UNUSUAL EVENT

LOSS OF OFF-SITE POWER OR LOSS OF ON-SITE AC POWER CAPABILITY

EALs

1a. Verified zero voltage on bus voltage meters or breaker indicators for Bus 11, Bus 12, Bus 13, Bus 14, and 1AR transformer on Panel C-08.

OR

1b. Loss of 11 and 12 Emergency Diesel Generators when they are required to be operable by Technical Specifications and inoperability is not due to surveillance testing.

ALERT

LOSS OF OFF-SITE POWER AND LOSS OF ALL ON-SITE AC POWER (STATION BLACKOUT) (see Site Area Emergency for extended loss)

EALs

1. Verified zero voltage on bus voltage meters or breaker indicators for Bus 11, Bus 12, Bus 13, Bus 14, Bus 15, Bus 16, and 1AR transformer on Panel C-08.

AND

2. Loss of 11 and 12 Emergency Diesel Generators when they are required to be operable by Technical Specifications.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 18

Loss of AC Power - Cont'd

SITE AREA EMERGENCY

LOSS OF OFF-SITE POWER AND LOSS OF ALL ON-SITE AC POWER FOR MORE THAN 15 MINUTES

EALs

1. Verified zero voltage on bus voltage meters or breaker indicators for Bus 11, Bus 12, Bus 13, Bus 14, Bus 15, Bus 16 and 1AR transformer on Panel C-08.

AND

2. Loss of 11 and 12 Emergency Diesel Generators when they are required to be operable by Technical Specifications.

AND

3. Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both off-site and on-site AC power.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 19

Loss of DC Power

UNUSUAL EVENT

Not applicable

ALERT

LOSS OF ALL VITAL DC POWER (see Site Area Emergency for extended loss)

EALs

1. Loss of both 125 VDC power sources and loss of both 250 VDC power sources as indicated by annunciators:

   DIV. I 250V DC HI-LO VOLTAGE (8-A-20); **and**
   DIV. II 125 & 250V DC TROUBLE (20-B-09); **and**
   NO. 12 125V DC BUS VOLTAGE HIGH/LOW (8-B-13); **and**
   NO. 11 125V DC BUS VOLTAGE HIGH/LOW (8-C-14)

AND

2. Shift Manager's judgement that all vital DC power is lost or degraded voltages are measured at battery terminals.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 19

Loss of DC Power - Cont'd

SITE AREA EMERGENCY

LOSS OF ALL VITAL ON-SITE DC POWER FOR MORE THAN 15 MINUTES

EALs

1. Loss of both 125 VDC power sources and loss of both 250 VDC power sources as indicated by annunciators:

   DIV. I 250V DC HI-LO VOLTAGE (8-A-20); **and**
   DIV. II 125 & 250 VDC TROUBLE (20-B-09); **and**
   NO. 12 125 VDC BUS VOLTAGE HIGH/LOW (8-B-13); **and**
   NO. 11 125 VDC BUS VOLTAGE HIGH/LOW (8-C-14)

AND

2. Shift Manager or Emergency Director's judgement that all vital DC power is lost or degraded voltages are measured at battery terminals. I

AND

3. 15 minute time lapse.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 20

Tornado or Sustained Winds

UNUSUAL EVENT

TORNADO ON-SITE

EALs

1a. Tornado observed to touch down within the site boundary.

OR

1b. Sustained winds above 75 MPH for greater than 10 minutes at the site.

ALERT

TORNADO STRIKING THE FACILITY

EALs

1a. Tornado strikes a vital plant structure.

OR

1b. Sustained winds above 90 MPH for greater than 10 minutes at the site.

SITE AREA EMERGENCY

SUSTAINED WINDS OR TORNADO IN EXCESS OF DESIGN LEVELS

EALs

1a. Tornado causes damage to vital plant equipment or plant structures.

OR

1b. Sustained winds above 100 MPH for greater than 10 minutes at the site.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 21

River Water Hi/Lo

UNUSUAL EVENT

RIVER WATER LEVEL IN EXCESS OF 918 FEET OR RIVER FLOW BELOW 240 CFS (approximately 902.4 FT river level)

ALERT

RIVER WATER LEVEL BETWEEN 921 AND 930 FEET OR RIVER WATER LEVEL BELOW 900.5 FT

SITE AREA EMERGENCY

RIVER WATER LEVEL EXCEEDS 930 FT OR RIVER WATER LEVEL BELOW 899 FT OR FLOOD OR LOW WATER CAUSES DAMAGE TO VITAL EQUIPMENT

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 22

Earthquake

UNUSUAL EVENT

ANY EARTHQUAKE FELT IN-PLANT OR DETECTED ON STATION SEISMIC INSTRUMENTATION AND SUBSEQUENTLY CONFIRMED BY ONE OR MORE OFF-SITE SOURCES

EALs

1a. Annunciator EARTHQUAKE ALARM (6-C-8).

OR

1b. Shift Manager's judgement.

ALERT

CONFIRMED EARTHQUAKE GREATER THAN OBE LEVELS

EAL

1. Annunciator OPERATIONAL BASIS EARTHQUAKE ALARM (6-C-13).

SITE AREA EMERGENCY

CONFIRMED EARTHQUAKE GREATER THAN DBE LEVELS AND PLANT NOT IN COLD SHUTDOWN

EALs

1. Annunciator DESIGN BASIS EARTHQUAKE ALARM (6-C-18).

AND

2. Plant not in cold shutdown.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 23

Fire

UNUSUAL EVENT

FIRE WITHIN THE PLANT LASTING MORE THAN 10 MINUTES AFTER INITIATION OF FIRE FIGHTING

EAL

1. Shift Manager determination based on report from the Fire Brigade Leader after initial use of extinguishing equipment.

ALERT

FIRE POTENTIALLY AFFECTING SAFETY SYSTEM

EALs

1. Observation that fire could affect a safety system.

AND

2. Shift Manager's judgement.

SITE AREA EMERGENCY

FIRE COMPROMISING THE FUNCTIONS OF A SAFETY SYSTEM

EALs

1. Observation of fire that affects safety systems or functions.

AND

2. Shift Manager or Emergency Director's judgement.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 24

Explosion

UNUSUAL EVENT

NEAR OR ON-SITE EXPLOSION

EALs

1. Visual observation or notification received.

AND

2. Shift Manager's judgement.

ALERT

KNOWN EXPLOSION DAMAGE TO THE FACILITY AFFECTING PLANT OPERATIONS

EALs

1. Visually observed evidence of an explosion directly affecting plant safe operation.

AND

2. Shift Manager's judgement.

SITE AREA EMERGENCY

SEVERE DAMAGE TO SAFE SHUTDOWN EQUIPMENT FROM MISSILES OR EXPLOSION

EALs

1. Plant **not** in cold shutdown.

AND

2. Shift Manager or Emergency Director's judgement.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 25

Aircraft and Missiles

UNUSUAL EVENT

AIRCRAFT CRASH ON-SITE OR SUSPICIOUS AIRCRAFT ACTIVITY OVER THE FACILITY

EAL

1. Visual observation or notification is received.

ALERT

AIRCRAFT CRASH ON THE FACILITY OR MISSILE IMPACT ON FACILITY

EAL

1. Visual observation.

SITE AREA EMERGENCY

AIRCRAFT CRASH AFFECTING VITAL STRUCTURES BY IMPACT OR FIRE, OR SEVERE DAMAGE TO SAFE SHUTDOWN EQUIPMENT FROM MISSILES OR EXPLOSION

EAL

1. As determined by Shift Manager or Emergency Director with plant **not** in cold shutdown.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 26

Miscellaneous

UNUSUAL EVENT

TRAIN DERAILMENT ON-SITE

OR

TURBINE ROTATING COMPONENT FAILURE CAUSING RAPID PLANT SHUTDOWN

EALs

1a. Visual observation.

OR

1b. Shift Manager's judgement.

ALERT

TURBINE FAILURE CAUSING CASING PENETRATION

EALs

1a. Visual observation

OR

1b. Shift Manager's judgement.

SITE AREA EMERGENCY

Not applicable

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 27

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7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 28

General Emergency - All GUIDELINES

A. **EFFLUENT MONITORS DETECT LEVELS CORRESPONDING TO 1 REM/HR (whole body) or 5 REM/HR (thyroid) AT THE SITE BOUNDARY UNDER ACTUAL METEOROLOGICAL CONDITIONS. DOSE RATES ARE PROJECTED BASED ON OTHER PLANT PARAMETERS** (e.g., radiation levels in containment with leak rate appropriate for existing containment pressure with some confirmation from effluent monitors) **OR ARE MEASURED IN THE ENVIRONS.**

EALs

1a. Stack Effluent Monitor (Ch A or B) exceeds 2.4E+8 μCi/Sec.

OR

1b. RB Vent Effluent Monitor (Ch A or B) exceeds 9.3E+7 μCi/Sec.

OR

1c. Stack radioiodine release rate, as determined by sampling and analysis, exceeds 1.95E+5 μCi/Sec.

OR

1d. RB Vent radioiodine release rate, as determined by sampling and analysis, exceeds 2.0E+5 μCi/Sec.

OR

1e. Release rate projection based on Containment Radiation Monitor or Containment Sampling exceeds any of the values in 1a, 1b, 1c, or 1d above.

OR

1f. Dose rates of 1000 mrem /hr (whole body) are measured at the site boundary or beyond.

OR

1g. Radioiodine concentrations measured at the site boundary or beyond exceed 7.0E-6 μCi/CC.

OR

1h. Dose projection calculations, based on actual or expected meteorological conditions and source term, indicates dose rates equal to or exceeding 1000 mrem/hr (whole body) or 5000 mrem/hr (thyroid) at the site boundary or beyond.

OR

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 28

General Emergency - All GUIDELINES - Cont'd

B. LOSS OF 2 OF 3 FISSION PRODUCT BARRIERS WITH A POTENTIAL LOSS OF 3RD BARRIER

CLAD/COOLANT BOUNDARY FAILURE, POTENTIAL CONTAINMENT LOSS

EALs

NOTE: Failure of MSIVs to isolate constitutes a loss of both primary coolant boundary and containment. When this is combined with cladding failure, all three barriers have been lost.

1. Evidence of Fuel Cladding Degradation per Guideline 6, Alert or Site Area Emergency level.

AND

2. Failure of primary coolant boundary as evidenced by:

   - High Drywell pressure; **or**
   - High Drywell temperature; **or**
   - Failure of MSIVs to isolate; **or**
   - Safety Relief Valve stuck open; **or**
   - GAP activity in primary containment atmosphere; **or**
   - Failure of Scram Discharge Volume valves to isolate

AND

3. Potential loss of containment as evidenced by:

   - Containment temperature or pressure approaching design limits (281°F and 56 PSIG) and increasing; **or**
   - Loss of containment cooling; **or**
   - Failure of Scram Discharge Volume valves to isolate; **or**
   - Shift Manager or Emergency Director's judgement that loss of containment is likely.

OR

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 28

General Emergency - All GUIDELINES - Cont'd

C. LOSS OF 2 OF 3 FISSION PRODUCT BARRIERS WITH A POTENTIAL LOSS OF 3RD BARRIER

CLAD/CONTAINMENT FAILURE, POTENTIAL COOLANT BOUNDARY LOSS

NOTE: In either of the following situations loss of containment should be judged to be likely:

- **Small or large LOCA with failure of ECCS to perform, or**
- **Loss of requisite decay heat removal systems (RHR and other heat sinks) following shutdown.**

EALs

1. Evidence of Fuel Cladding Degradation per Guideline 6, Alert or Site Area Emergency level.

AND

2a. Failure of containment as evidenced by **all** containment penetrations required for isolation not valved off or closed.

OR

2b. Shift Manager or Emergency Director's judgement that containment has failed.

AND

3. Potential loss of primary coolant boundary as evidenced by reactor pressure near design limits (1210 psig measured in the steam dome @ 575°F) and increasing **or** loss of all ECCS.

OR

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 28

General Emergency - All GUIDELINES - Cont'd

D. LOSS OF 2 OF 3 FISSION PRODUCT BARRIERS WITH A POTENTIAL LOSS OF 3RD BARRIER

CONTAINMENT/COOLANT BOUNDARY FAILURE, POTENTIAL CLAD FAILURE

EALs

NOTE: Failure of MSIVs to isolate constitutes a loss of both primary coolant boundary and containment. When this is combined with cladding failure, all three barriers have been lost.

1a. Failure of containment as evidenced by **all** containment penetrations required for isolation not valved off or closed.

OR

1b. Shift Manager or Emergency Director's judgement that containment has failed.

AND

2. Failure of primary coolant boundary as evidenced by:

- High Drywell pressure; **or**
- High Drywell temperature; **or**
- Failure of MSIVs to isolate; **or**
- Safety Relief Valve stuck open; **or**
- GAP activity in primary containment atmosphere; **or**
- Failure of Scram Discharge Volume valves to isolate

AND

3a. Potential loss of cladding as evidenced by loss of all ECCS

OR

3b. Reactor water level < TAF (-126") and decreasing.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 28

General Emergency - All GUIDELINES - Cont'd

E. LOSS OF PHYSICAL CONTROL OF THE PLANT

F. OTHER PLANT CONDITIONS EXIST, FROM WHATEVER SOURCE, THAT MAKE RELEASE OF LARGE AMOUNTS OF RADIOACTIVITY IN A SHORT TIME PERIOD POSSIBLE (e.g. any core melt situation, see example BWR sequences).

EXAMPLE BWR SEQUENCES

1. Transient (e.g., loss of off-site power) plus failure of requisite core shutdown systems (e.g., scram or standby liquid control system). Could lead to core melt in several hours with containment failure likely. More severe consequences if pump trip does not function.

2. Small or large LOCAs with failure of ECCS to perform, leading to core degradation or melt in minutes to hours. Loss of containment integrity may be imminent.

3. Small or large LOCA occurs and containment performance is unsuccessful affecting longer term success of the ECCS. Could lead to core degradation or melt in several hours without containment boundary.

4. Shutdown occurs but requisite decay heat removal systems (e.g., RHR) or non-safety systems heat removal means are rendered unavailable. Core degradation or melt could occur in about ten hours with subsequent containment failure.

G. ANY MAJOR INTERNAL OR EXTERNAL EVENTS (E.G., FIRES, EARTHQUAKES, SUBSTANTIALLY BEYOND DESIGN BASIS) WHICH COULD CAUSE MASSIVE COMMON DAMAGE TO PLANT SYSTEMS RESULTING IN ANY OF THE ABOVE (A-F).

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 29

Other Plant Conditions

UNUSUAL EVENT

NOTE: For plant conditions which require plant shutdown under Technical Specifications, the Unusual Event *SHALL* be declared no later than the time at which the LCO-specified action statement time period elapses. The Unusual Event may be declared earlier at the discretion of the Shift Manager or Emergency Director.

PLANT CONDITIONS EXIST REQUIRING SHUTDOWN UNDER TECHNICAL SPECIFICATION REQUIREMENTS **AND** INABILITY TO REACH REQUIRED OPERATING MODE WITHIN TECHNICAL SPECIFICATION TIME LIMITS.

OR

PLANT CONDITIONS EXIST THAT WARRANT INCREASE AWARENESS ON THE PART OF PLANT OPERATING STAFF OR STATE AND/OR LOCAL OFF-SITE AUTHORITIES.

OR

OTHER CONDITIONS EXIST WHICH IN THE JUDGEMENT OF THE SHIFT MANAGER OR EMERGENCY DIRECTOR INDICATE A POTENTIAL DEGRADATION OF THE LEVEL OF SAFETY OF THE PLANT.

ALERT

PLANT CONDITIONS EXIST THAT WARRANT PRECAUTIONARY ACTIVATION OF THE TECHNICAL SUPPORT CENTER AND PLACEMENT OF THE EMERGENCY OPERATIONS FACILITY AND OTHER KEY EMERGENCY PERSONNEL ON STANDBY

SITE AREA EMERGENCY

OTHER PLANT CONDITIONS EXIST THAT WARRANT ACTIVATION OF THE EMERGENCY RESPONSE CENTERS AND MONITORING TEAMS

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.2 Emergency Classification Guidelines - Cont'd

GUIDELINE 30

Major Damage to Spent Fuel

UNUSUAL EVENT

Not applicable

ALERT

FUEL DAMAGE ACCIDENT WITH RELEASE OF RADIOACTIVITY TO CONTAINMENT

EALs

1. Dropping, bumping or otherwise rough handling of a spent bundle or individual fuel rods.

AND

2. Annunciator FUEL POOL RADIATION MONITOR CH A or B (5-A-1 or 5-A-2) exceeds 50 mrem/hr.

SITE AREA EMERGENCY

MAJOR DAMAGE TO SPENT FUEL IN CONTAINMENT (e.g., large object damages fuel or water loss below fuel level)

EALs

1a. Decrease in fuel pool level below 36'9" indicated by LS-2787, SPENT FUEL POOL LEVEL HI/LO ALARM on Panel C-65.

OR

1b. Dropping a heavy object onto spent fuel confirmed by direct observation.

AND

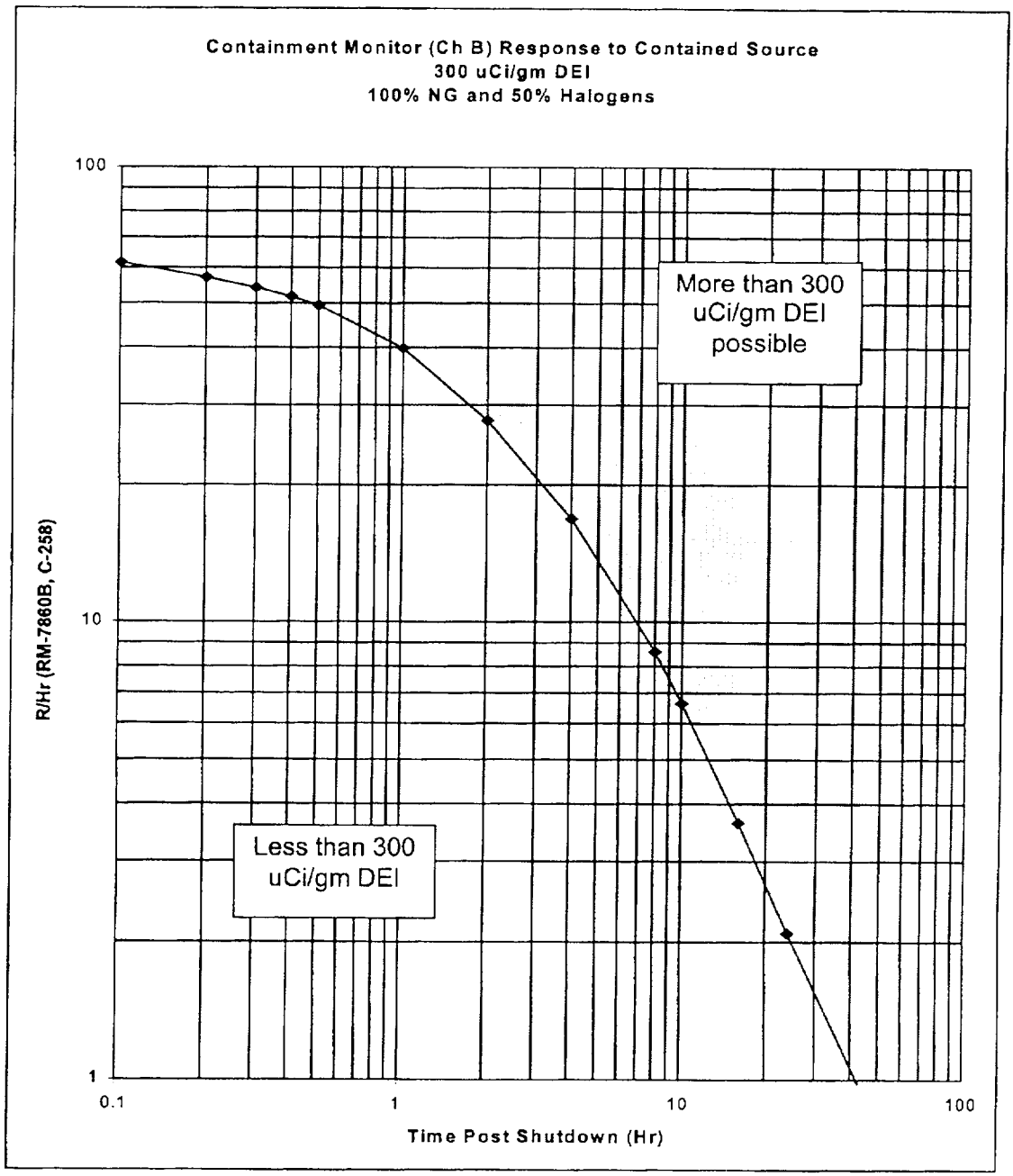
2. Annunciator FUEL POOL RADIATION MONITOR CH A or B (5-A-1 or 5-A-2) exceeds 50 mrem/hr.

GENERAL EMERGENCY

As specified in GUIDELINE 28.

7.3 Containment Monitor Response To Contained Source Curve

Containment Monitor Response To Contained Source
300 uCi/gm DEI
100% NG and 50% Halogens



l/saw

Basis for Containment Monitor Response Curve

Containment radiation monitoring is accomplished with two detectors. Each is located near one of the 28" recirc suction lines. The A Containment Monitor (azimuth 180°) response is complicated by its proximity to the steam lines which exit the drywell directly below it. Therefore, the B channel geometry (azimuth 0°) was used to generate the response curve.

The purpose of the response curve is to show the minimum Containment Monitor response to a fuel clad degradation condition indicated by a coolant concentration of 300 uCi/gm DEI.

Assumptions:

- The only radiation source is an 18-foot vertical section of the 28" diameter "A" Recirc suction line (933' to 951' level).
- The source is totally contained, i.e., no significant airborne radioactive material.
- Noble gases would be present in proportion to the radioiodine concentration (300 uCi/gm DEI), assuming that for each fuel rod with cladding damage, 100% of the noble gases and 50% of the radioiodines are released to the coolant.

Givens:

- The detector is located 110 inches horizontally from the outer diameter of the A Recirc suction line. Distance used in calculation is 124 inches from detector to center of source.
- The detector is located at 944' level.
- Shielding consists of 1" of steel (pipe wall).

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By: [signature]	Reviewed By: Timothy LaPlant	
OC Review Req'd: YES	OC Meeting Number: 2281F	Date: 8/16/01
Approved By: [signature]		Date: 8/16/01

FOR ADMINISTRATIVE USE ONLY

This revision incorporates Volume F Memos: ~~01-2836~~ None

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ARMS: A.2-204	Doc Type: 1060	Admin Initials: [initials]		Date: 8/29/01

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1.0 PURPOSE

The purpose of this procedure is to provide instructions and guidelines to the Emergency Director (ED) and Radiological Emergency Coordinator (REC) for the formulation of off-site protective action recommendations for the general public during the early phase of an emergency.

2.0 APPLICABILITY

2.1 An emergency condition corresponding to an Unusual Event classification or higher has been declared at the MNGP, and

2.2 A release of radioactive material has occurred, is occurring, or is likely to occur.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Emergency Director (Duty Shift Manager or designated Emergency Director) is responsible for:

3.1.1 Implementation of this procedure if the REC position is not staffed.

3.1.2 Directing off-site communications with State and Local authorities and Federal agencies (before turnover to the EOF).

3.1.3 Approving off-site Protective Action Recommendations (PARs) to State and/or County authorities (prior to turnover of this responsibility to the Emergency Manager).

3.2 The Radiological Emergency Coordinator is responsible for:

3.2.1 Implementation of this procedure.

3.2.2 Making off-site Protective Action Recommendations (PARs) to State and/or County authorities (prior to turnover of this responsibility to the Radiation Protection Support Supervisor).

4.0 DISCUSSION

4.1 For definitions related to PARs, see Figure 7.1

4.2 For general discussion of PAR, see Figure 7.2

5.0 PRECAUTIONS

5.1 Declaration of a General Emergency requires immediate Protective Action Recommendations (PARs) to off-site agencies. Under these circumstances, NO dose projections are required for formulating the initial offsite protective action recommendation.

5.2 Implementation of protective actions for off-site areas is the responsibility of the State of Minnesota. If it is determined by the Emergency Director that immediate protective actions are required, and the State EOC is not activated, the recommendation should be made directly to the local authorities (i.e., Wright and Sherburne Counties). Upon activation of the State EOC all off-site protective action recommendations should be made to the State.

5.3 The protective actions outlined in this procedure are limited to actions for minimizing the exposure of the public to external and internal radiation exposure from plume passage, inhalation of the radioactive plume and from internal exposure from drinking water during the early phase of an emergency. Other protective actions for minimizing public exposure via the ingestion pathway will be determined and implemented by the State.

5.4 The transmission of Off-site Protective action Recommendations to the State EOC (State Duty Officer and Counties if the State EOC is not activated) ***SHALL*** be completed within 15 minutes of the PAR authorization.

6.0 INSTRUCTIONS

CAUTION

No dose projections are required when making initial PAR during GENERAL EMERGENCY CONDITIONS.

6.1 Initial PARs for General Emergency Classification

6.1.1 Initiate Form 5790-102-02 (MONTICELLO EMERGENCY NOTIFICATION REPORT FORM).

A. Complete Section 1.4 recommending an evacuation of a 2 mile radius and 5 miles downwind and advise the remainder of the plume EPZ to go indoors to monitor EAS broadcasts.

B. Determine which geopolitical subareas are affected by referring to the Sector-Subarea Conversion Table on Form 5790-102-02.

C. Ensure completion of Parts 1.0 and 2.0 of Form 5790-102-02 and submit the completed form to the ED for approval.

6.1.2 Ensure transmission of the recommendations, via telephone and telecopy, to the State EOC (State Duty Officer, Wright and Sherburne Counties if the State EOC is not activated) IAW EPIP A.2-501 (COMMUNICATIONS DURING AN EMERGENCY).

6.1.3 Approximately 30 minutes after making the recommendation, contact the State Planning Chief or State Duty Officer if State EOC is not activated to determine what protective actions are actually being implemented. Continue to track the status of the protective action until completely implemented and indicate the completion status on the Radiation Protection Status Board.

6.1.4 Update the Emergency Director and TSC personnel (if activated and staffed) on the status of off-site Protective Action implementation.

6.1.5 After making initial Protective Action Recommendations (at the General Emergency Class) continually assess plant conditions and off-site dose projection results. Make subsequent off-site protective action recommendations based on projected off-site doses using the Protective Action Guidelines (PAGs) listed in FIGURE 7.3.

6.2 PARS for Sherco Plant

NOTE: To safely shutdown the Sherco Plant requires 8 hours after the unit(s) are tripped.

6.2.1 Throughout the event the REC (or Assistant REC) should review off-site projected doses and affected Sectors (Subareas) to determine if the Sherco Plant is or will be in the affected area.

NOTE: The Sherco Plant is located in the 5N subarea.

6.2.2 Formulate protective action recommendations for the Sherco Plant as follows:

A. Recommendations based on Projected Dose (whole body):

1. > 500 mrem (TEDE) - recommend evacuation of non-essential personnel from the Sherco site and shelter essential plant personnel during plant operation.

2. > 1 Rem (TEDE) - recommend shutdown of the Sherco Plant(s). Immediate evacuation of non-essential personnel and sheltering of essential personnel during normal plant shutdown.

3. > 5 Rem (TEDE) - recommend immediate evacuation of non-essential personnel and sheltering of essential personnel during emergency plant shutdown. Evacuate all personnel immediately after plant shutdown.

B. Recommendations based on General Emergency:

1. If evacuation is implemented (in 5N) recommend evacuation of all non-essential personnel and sheltering of essential Sherco personnel. Recommend immediate initiation of plant shutdown.

6.2.3 If protective actions are required for the Sherco Plant, discuss the recommendations with the Emergency Director (and HQEC Manager (HM) at the HQEC if activated).

NOTE: The HQEC Manager will implement the required protective actions for Sherco personnel through established channels.

6.2.4 Monitor the progress of protective action implementation (at Sherco) to determine when they are completed.

6.2.5 Indicate any PARs recommended (and implemented) for the Sherco Plant on the RP Status Board in the TSC.

6.2.6 Advise the Emergency Director if conditions change (e.g., significant increase in release rate) which could change the protective action recommendations for the Sherco Plant.

6.3 Off-site PARs Based on Projected Doses

CAUTION

Do not delay recommending off-site protective actions while waiting for off-site monitoring results to verify the accuracy of the dose projection model.
Do not delay recommending off-site protective actions while trying to resolve questionable data (MIDAS Data or Field Team Data).

6.3.1 Continuously review dose projection data (4 day integrated maximum TEDE and Thyroid CDE) on Form 5790-102-03 (EMERGENCY NOTIFICATION FOLLOW-UP MESSAGE) and compare with the Protective Action Guidelines in Figure 7.3. If an updated PAR, based on dose projections is required, proceed to Step 6.3.2. Continuously review meteorological data (wind direction and wind speed) on Form 5790-102-03 (EMERGENCY NOTIFICATION FOLLOW-UP MESSAGE) and determine the affected sectors. If an updated PAR, based on meteorological data is required, proceed to Step 6.3.2.

6.3.2 Initiate Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) and complete the airborne release section.

6.3.3 Using current meteorological data (i.e., wind direction and wind speed), determine the affected Sectors, Geopolitical Subareas (using page 2 of Form 5790-204-01), population centers within the affected area and estimated plume arrival time in those areas.

6.3.4 Based on plant conditions, estimate the duration of the existing release or potential release.

6.3.5 Using available weather forecast data, evaluate the potential for wind direction and wind speed changes during the estimated duration of the release (and after). Determine what effect potential wind direction and wind speed changes would have on the affected areas identified in 6.3.3.

NOTE: Weather forecast information may be obtained from the National Weather Service. Refer to the Monticello and Prairie Island Emergency Preparedness Telephone Directory for telephone numbers.

NOTE: If data used in the determination of the PAR is/was questionable, attempt to verify the data. DO NOT delay the issuance of the PAR. If after verification of questionable data a PAR revision is necessary, complete section 6.3 of this procedure.

6.3.6 If based on dose projections or field team data a PAR beyond the 10 mile EPZ is necessary, immediately contact the State Planning Chief to inform them of this condition. Document the PAR recommendation in the comments section of Form 5790-204-01 and attach a copy of the supporting Follow-up Message.

6.3.7 Indicate the recommendations on page 3 of Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST). Indicate the recommendation in terms of Sectors and Subareas by completing and circling the applicable information as follows:

A. Identify the affected keyhole by selecting a 360° out to 2 or 5 miles. Determine the affected Sectors by including both Sectors on either side of the downwind Sector (two Sectors on either side should be included if the downwind direction is on a Sector line). Record the 3 (or 4) affected Sectors on page 3 of the Monticello PAR Checklist.

B. Identify the affected geopolitical subareas using the Sector-Subarea Conversion Chart (page 2 of Form 5790-204-01) and circle the affected subareas on the PAR Checklist.

6.3.8 Submit the completed page 3 of Form 5790--204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) to the Emergency Director for approval. Review and discuss the recommendations with the Emergency Director as necessary.

NOTE: Prior to activation of the State EOC, protective action recommendations should be made directly to the State Duty Officer and Wright and Sherburne Counties (EOCs if activated). The State Duty Officer will coordinate the EAS message and PANs activation with counties. Once the State EOC is activated, all protective action recommendations *SHALL* be made directly to the State authorities.

6.3.9 The Emergency Director (or REC) should direct an Emergency Communicator to transmit the approved Monticello Off-Site Protective Action Recommendation Checklist, to the State EOC (Wright and Sherburne County EOCs only if the State EOC is not yet activated) IAW EPIP A.2-501 (COMMUNICATIONS DURING AN EMERGENCY).

6.3.10 When notified by the Emergency Communicator that the transmittal of the protective action recommendation has been made to the State Planning Chief (if State EOC is activated) or the State Duty Officer, Wright County and Sherburne County (if State EOC is not activated), contact either the State Planning Chief or the State Duty Officer, Wright County and Sherburne County. Discuss the recommendations and explain the basis of the recommendations.

6.3.11 Approximately 30 minutes after making the recommendation, contact the State Planning Chief or State Duty Officer prior to State EOC activation, to determine what protective actions are actually being implemented. Continue to track the status of the protective action until completely implemented and indicate the completion status on the Radiation Protection Status Board.

6.3.12 If, as a result of continuing assessment, dose projection results or meteorological conditions change significantly, re-evaluate the previously implemented protective actions and, if necessary, update the protective actions by issuing another recommendation.

6.4 Protective Action Recommendation for Liquid Releases

6.4.1 Initiate Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) and complete the Liquid Release Section.

6.4.2 Obtain the isotopic analyses of liquid samples taken at the Discharge Canal or release point.

NOTE: During a liquid release, samples may be taken at the discharge structure, mid-canal sample station, canal out-fall to the river, or as near the source of the release as possible. To ensure samples are representative of the material being released to the river, the Canal Sample Station is the preferred sampling location.

6.4.3 Determine the present Discharge Canal flow rate and river flow rate at the plant (refer to the applicable plant computer point for flow rates).

6.4.4 Determine the river flow rate at either the Coon Rapids Dam or the Minneapolis-St. Paul water intakes by contacting the Minneapolis Water Department (refer to the Monticello and Prairie Island Nuclear Emergency Telephone Directory for telephone numbers).

6.4.5 Using the curve RIVER FLOW vs TIME curve (FIGURE 7.5) estimate the time of release arrival at the Minneapolis-St. Paul water intakes based on current, actual river flow (if actual river flow is not available, use the monthly average river flow in FIGURE 7.5).

6.4.6 Using the MIDAS User Manual Procedures access the MIDAS liquid release model. Enter the isotopic and other applicable release data.

6.4.7 Using the MIDAS Liquid Release Dose Assessment printout, formulate off-site protective action recommendations IAW the guidelines in FIGURE 7.6.

6.4.8 Indicate the recommendations on page 3 of Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) and submit the completed form for Emergency Director approval.

6.4.9 Transmit the recommendations to the State Planning Chief (State EOC if activated) IAW EPIP A.2-501 (COMMUNICATIONS DURING AN EMERGENCY).

6.4.10 Contact the State Planning Chief (in the State EOC if activated) to explain the basis for the recommendations.

6.4.11 Approximately 30 minutes after making the recommendation, contact the State Planning Chief to determine what protective actions are actually being implemented. Continue to track the status of the protective action until completely implemented.

7.0 FIGURES

FIGURE

7.1 Definitions Related to Protective Actions Recommendations

1. Affected Area is any area where radiation emanating from a plume, or from material deposited from the plume, can be detected using field instruments (also known as the footprint).

2. Cloudshine is radiation from radioactive materials in an airborne plume.

3. Committed Dose Equivalent (CDE) refers to the dose received over the 50 year period following an intake of radioactive materials.

4. Committed Effective Dose Equivalent (CEDE) is the sum of the products of the weighted factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissue.

5. Dose equivalent means the product of the absorbed dose in tissue, quality factors, and all other necessary modifying factors at the location of interest.

6. Effective dose equivalent (EDE) is the sum of the product of the absorbed dose in tissue, quality factors, and all other necessary modifying factors at the location of interest.

NOTE: Deep Dose Equivalent (DDE) is considered equivalent to EDE if the exposure is uniform.

7. Emergency Planning Zone (EPZ) is a defined area which facilitates emergency planning by State and local authorities to ensure that prompt and effective actions are taken to protect the public in the event of a radioactive release from the plant. The EPZ is defined for two areas:

   A. Plume Exposure Pathway (10 Mile EPZ) is the 10 mile, 360° radius around the plant in which the primary concern is short-term exposure from the plume. The principal sources of exposure in this area are 1) whole body external exposure to gamma radiation from the plume and deposited material from the plume, and 2) internal exposure from inhaled material from the plume.

   B. Ingestion Exposure Pathway (50 Mile EPZ) is a 50 mile, 360° radius around the plant in which the principal exposure would be from ingestion of contaminated water or foodstuffs (such as milk or fresh vegetables).

8. Evacuation is the removal of people from an area to avoid or reduce high-level, short term exposure, from a plume or from deposited activity.

9. Geopolitical Subareas are subarea within the 10 Mile EPZ that are defined by predetermined geographic and/or political boundaries.

10. Groundshine is radiation exposure caused by radioactive materials deposited on the ground.

11. Ingestion Pathway Projected Dose is the projected CEDE (ICRP-30) from consuming contaminated foodstuffs.

12. Keyhole Area an area within the 10 Mile EPZ defined by a 360° radius out to a specified distance of 2 or 5 miles and continuing in the downwind direction in 3 or 4 Sectors.

13. Plume Projected Dose refers to future calculated doses from plume submersion, plume shine, plume inhalation and 4 days of ground deposition exposure.

14. Protective Action is an action taken to avoid or reduce a projected dose.

15. Protective Action Guide (PAG) refers to a dose (or commensurate dose rate) which warrants protective actions.

16. Public Alert and Notification System (PANS) is the system used to alert the public within the 10 Mile EPZ of an emergency condition at the plant. Once alerted, the public would turn to local commercial media broadcast messages for specific protective action instructions. The PANS consists of the following systems:

    A. Fixed sirens for 100% coverage throughout the 5 mile EPZ and in population centers between 5 and 10 miles.

    B. Local law enforcement emergency vehicles with sirens and public address capability driving route alerting in the 5 to 10 mile areas not covered by fixed sirens.

    C. National Oceanic and Atmospheric Administration (NOAA) alert radios in institutional, educational, and commercial facilities.

    D. The Emergency Alert System (EAS) which accesses local television and radio stations.

17. Recovery is the process of reducing radiation exposure rates and concentration of radioactive material in the environment to levels acceptable for unconditional occupancy.

18. Relocation Projected Dose is the projected effective committed dose from 1 year of exposure to radioactive material deposited as fallout from a plume, including whole body exposure to gamma radiation (groundshine), and internal dose from inhalation of resuspended material, but excluding internal dose from consuming contaminated foodstuffs.

19. Return refers to people permanently reoccupying their normal residence within an area that was evacuated during the emergency condition.

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20. Re-entry refers to temporary entry into a restricted (evacuated) area under controlled conditions.

21. Secondary Evacuation refers to relocating people from areas to avoid or reduce relocation projected dose.

22. Sector is one of 16, 22.5° sectors around the plant which compose the 10 Mile EPZ.

23. Sheltering provides radiation protection from an airborne plume and/or deposited radioactive materials. Sheltering also ensures effective public notification, via media, should the need for evacuation occur.

24. Total Effective Dose Equivalent (TEDE) is the sum of external EDE and CEDE.

FIGURE

7.2 Discussion of Protective Action Recommendation

The following is a discussion of the various Protective Action Recommendations (PARs) that could be made to off-site authorities. The Protective Action Guidelines (PAGs) listed are derived from EPA guidelines (EPA 400).

A. NO PROTECTIVE ACTIONS

The recommendation for no protective actions is self-explanatory and is appropriate when projected plume doses do not exceed 1000 mrem (TEDE) or 5000 mrem (CDE) thyroid dose. For liquid releases, no protective actions are warranted if the concentration in raw river water at outflow of discharge canal is less than the concentration listed in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2 (ODCM-04.01, Table 1).

B. EVACUATION

Evacuation is the movement of a population out of an area in order to reduce or eliminate direct or indirect radiation exposure. Timely evacuation of the population is the most effective protective action.

Initial PARs for a General Emergency involving loss of physical control or core damage are based on NRC Response Technical Manual RTM-93, Vol 1, Rev. 3, Section I. Immediate evacuation of the general public is justified without dose projection.

EPA 400 indicates that evacuation of the general public will usually be justified when the projected dose to an individual is greater or equal to 1000 mrem TEDE (or 5000 Thyroid CDE). At these dose levels, the risk avoided due to the radiation exposure is usually much greater than the risk from evacuation itself.

Using the projected dose criteria stated above, Monticello Nuclear Generating Plant (MNGP) should recommend evacuation to the State. In turn, they will independently assess and implement protective actions based on our recommendation, their independent assessment, and current off-site evacuation constraints.

C. CLOSURE OF WATER INTAKES

Water Intakes PAG: Concentration in raw river water exceeds the value listed in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2 (ODCM-04.01, Table 1).

Closure of the water intakes is an appropriate recommendation in the case of a liquid release to the river which is expected to result in river water concentrations exceeding the MPC limits for unrestricted areas.

FIGURE

7.2 Discussion of Protective Action Recommendation (Cont'd)

D. SECONDARY EVACUATION

Relocation PAG (in mrem): 2000 (TEDE)

To avoid social and family disruption and the complexity of implementing separate PAGs for individual members of the population, the relocation PAG may be applied for all members of the population. While the relocation PAG is based on projected doses to adults, infant relocation projected doses are not more than two times higher than the adult projected dose.

Based on EPA 400 PAGs, MNGP should recommend relocation of the general public from affected areas not previously evacuated when the projected dose is greater or equal to 2000 mrem CEDE from exposure or intake during the first year. This projected dose includes doses from external radiation, and inhalation of resuspended materials.

E. RETURN

Return is allowed at levels below the secondary evaluation PAG (2000 mrem TEDE).

The decision to return segments of the public from previously evacuated areas will be determined by appropriate off-site agencies. Various cautions and dose reduction techniques will be assessed and, if necessary, communicated to the people upon their return.

FIGURE

7.2 Discussion of Protective Action Recommendations (Cont'd)

F. DESIGNATION OF THE AFFECTED PROTECTIVE ACTION AREA

The designation of the affected protective action area depends on the nature and extent of the incident and existing meteorological conditions. The area will be described by designating an affected keyhole shaped area and the affected geopolitical subareas within the EPZ.

a Affected Keyhole Area

The affected keyhole area should resemble a keyhole consisting of a 360° area surrounding the plant out to a distance of 2 or 5 miles and continuing in the downwind direction out to a distance determined by the PAGs. The affected downwind portion of the keyhole should include 1 sector on either side of the affected sector (i.e., total of 3 sectors). If the downwind direction is on a sector line then 2 sectors on each side of the affected sector should be included (i.e., total of 4 sectors).

b Affected Geopolitical Subareas

Geopolitical subareas are subareas of the 10 mile EPZ defined by predetermined geographic and/or political boundaries. The affected geopolitical subareas are defined by any and all subareas that intersect the affected keyhole area.

FIGURE

7.2 Discussion of Protective Action Recommendations (Cont'd)

G. (EXPOSURE PATHWAYS, Incident Phases, and Protective Actions

POTENTIAL EXPOSURE PATHWAYS AND INCIDENT PHASES		PROTECTIVE ACTIONS
1. External radiation from facility	EARLY	Sheltering Evacuation Control of access
2. External radiation from plume	EARLY	Sheltering Evacuation Control of access
3. Inhalation of activity in plume	EARLY	Sheltering Administration of stable iodine Evacuation Control of access
4. Contamination of skin and clothes	INTERMEDIATE	Sheltering Evacuation Decontamination of persons
5. External radiation from ground deposition of activity	LATE	Evacuation Relocation Decontamination of land and property
6. Ingestion of contaminated food and water	LATE	Food and water controls
7. Inhalation of resuspended activity	LATE	Relocation Decontamination of land and property

NOTE 1: **Based on EPA 400-R-92-001, May 1992**

NOTE 2: **The use of stored animal feed and uncontaminated water to limit the uptake of radionuclides by domestic animals in food chain can be applicable to any of the phases.**

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FIGURE

7.3 Protective Action Guidelines (PAGs)

	PAG VALUES[1]	RECOMMENDED PROTECTIVE ACTIONS	COMMENTS
WHOLE BODY[2] (TEDE) PROJECTED DOSE	Less than <1 REM (TEDE)	None required	The State may choose to implement sheltering at their discretion. No recommendations are required from MNGP.
	Greater than ≥1 REM (TEDE)	Recommend evacuation of the general public.	The State may chose to implement sheltering of the general public up to 5 REM (TEDE) or special population groups up to 10 REM (TEDE) if immediate evacuation is not practicable due to off-site constraints. No sheltering recommendations are required from MNGP.
THYROID[3] (CDE) PROJECTED DOSE	Less than <5 REM (CDE)	None required	The State may choose to implement sheltering at their discretion. No recommendations are required from MNGP.
	Greater than ≥5 REM (CDE)	Recommend evacuation of the general public.	The State may choose to implement sheltering of the general public if immediate evacuation is not practicable due to off-site constraints. No sheltering recommendations are required from MNGP.

FIGURE

7.3 Protective Action Guidelines (PAGs) (Cont'd)

	PAG VALUES[1]	RECOMMENDED PROTECTIVE ACTIONS	COMMENTS
SKIN[4] (CDE) PROJECTED DOSE	Less than <50 REM (CDE)	None required	The State may choose to implement simple personal protective actions (washing). No recommendations are required from MNGP.
	Greater than ≥50 REM (CDE)	Recommend evacuation of the general public	The State may choose to implement sheltering of the general public or simple personal protective actions if immediate evacuation is not practicable.

NOTE 1: Protective Action Guides are based on EPA 400-R-92-001, May 1992.
NOTE 2: TEDE = Total Effective Dose Equivalent; is the sum of the effective dose equivalent from exposure to external source and the Committed Effective Dose Equivalent incurred from all significant inhalation pathways during the Early Phase.
NOTE 3: CDE = Committed Dose Equivalent to the Thyroid from radioiodine.
NOTE 4: Committed Dose Equivalent to the skin from exposure to beta radiation from radioiodines and particulates.

FIGURE

7.4 Emergency Worker Exposure Limits

EXPOSURE LIMIT[1]	EMERGENCY ACTIVITY[1]	COMMENTS
5 REM (TEDE)[(2)(3)]	All emergency activities	This dose limit applies when a lower dose is not practicable through application of ALARA practices.
10 REM (TEDE)[(2)(3)]	Protection of valuable property	This dose limit applies when a lower dose is not practicable through application of ALARA practices.
≥ 25 REM (TEDE)[(2)(3)]	Life saving or protection of large populations	Doses in excess of 25 REM should be on a voluntary basis to persons fully aware of the risks involved.

NOTE 1: Dose limits for emergency workers and activities are based on EPA 400-92-001, May 1992.

NOTE 2: Sum of external effective dose equivalent and committed effective dose equivalent to non-pregnant adults from external exposure and intake during the duration of an emergency.

NOTE 3: Exposure to the lens of the eye should be limited to 3 times the value listed and doses to the skin and/or extremities should be limited to 10 times the value listed.

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FIGURE

7.5 Transport Time and Monthly Average Flowrates

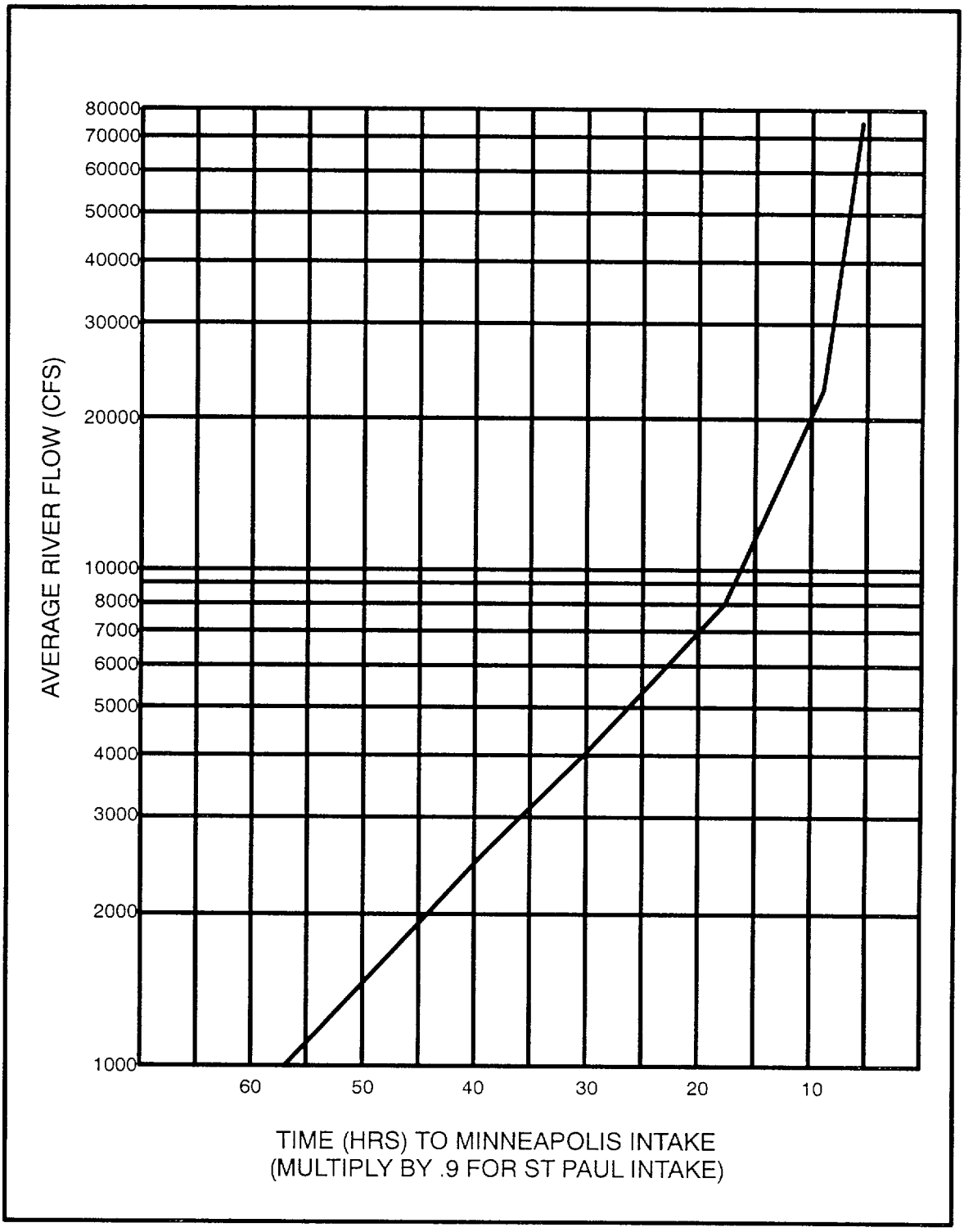

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FIGURE

7.5 Transport Time and Monthly Average Flowrates (Cont'd)

MONTH	AVG RIVER FLOWRATE (CFS)
JANUARY	4663
FEBRUARY	4579
MARCH	6336
APRIL	10890
MAY	10157
JUNE	7369
JULY	5352
AUGUST	3506
SEPTEMBER	3334
OCTOBER	5690
NOVEMBER	5438
DECEMBER	4555

FIGURE

7.6 Liquid Release Protective Action Criteria

A. PROTECTIVE ACTION BASED ON PROJECTED INTERNAL DOSE

A. Concentration in Raw River: < Value listed in 10CFR20, Appendix B. - No protective action required.

B. Concentration in Raw River: > Value listed in 10CFR20, Appendix B. - Recommend closure of water intakes.

C. Projected Internal (Drinking) Dose:

≤ 250 mrem - No protective action required.

> 250 mrem - Preventive protective actions are necessary.

> 1000 mrem - Emergency protective actions are necessary.

B. PROTECTIVE ACTION BASED ON PROJECTED EXTERNAL DOSE

A. Projected Total External Doses

≤250 mrem - No protective action required.

>250 mrem - Preventive protective actions are necessary.

>1000 mrem - Emergency protective actions are necessary.

NOTE: Obtain total external projected dose by calculating the swimming, boating and standing projected doses using the following time assumptions for shoreline activities.

Swimming - 3 hrs/day
Boating - 1 hrs/day
Standing - 6 hrs/day

RECOMMENDED PREVENTIVE PROTECTIVE ACTIONS

A. Close Raw Water Intakes
B. Restrict Intake of Drinking Water, and Foodstuffs obtained from River.
C. Restrict swimming and boating on River.
D. Restrict access to River.
E. Restrict use of River for irrigation and industry.

RECOMMENDED EMERGENCY PROTECTIVE ACTIONS

A. Close Raw Water Intakes
B. Condemn drinking water obtained from river.
C. Condemn affected foodstuffs (milk or meat from animals consuming contaminated water or foodstuffs).
D. Prevent access to river.
E. Condemn use of river for irrigation and industry.
F. Substitute uncontaminated water and foodstuffs for contaminated water and foodstuffs.
G. Condemn water usage from river.

Reference: Minnesota Department of Health, Dose Assessment Manual: Part 2, Liquid Releases.

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FIGURE

7.7 Forms Utilized in Procedure

	NUMBER	TITLE
1.	5790-102-02	MONTICELLO EMERGENCY NOTIFICATION REPORT FORM
2.	5790-204-01	MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST

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EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By: Michael O'Neill	Reviewed By: Timothy J. Obrist	
ALARA Coord Review By: K Swanson		
OC Review Req'd: YES	OC Meeting Number: 2281F	Date: 8/16/01
Approved By: R L Depso		Date: 8/16/01

FOR ADMINISTRATIVE USE ONLY

This revision incorporates Volume F Memos: None

3087 (DOCUMENT CHANGE, HOLD, AND COMMENT FORM) incorporated: 01-2839

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ARMS: A.2-408	Doc Type: 1060	Admin Initials:		Date: 8/31/01

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1.0 PURPOSE

1.1 The purpose of this procedure is to provide instructions for chemistry sample priority, coordination, tracking, and storing of samples taken during an emergency. This procedure also provides guidance on the types of samples to be taken, sample labeling instructions, sample control, and provides instructions for shipping and disposal of radioactive samples.

2.0 APPLICABILITY

2.1 An emergency (Alert or higher classification) has been declared at Monticello Nuclear Generating Plant which involves abnormal or elevated radiological conditions which preclude use of normal sampling methods.

2.2 Plant process sampling and analysis is required to assess the extent or severity of the event.

3.0 ORGANIZATION AND RESPONSIBILITIES

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

3.1.1 Overall coordination of the Radiation Protection and Chemistry Group activities.

3.2 The Chemistry Section Leader (CSL) is responsible for:

3.2.1 Overall direction for PASS sampling and analysis.

3.2.2 Determining sample priorities with the REC.

3.2.3 Implementation of this procedure (in cooperation with the CC).

3.3 The Chemistry Coordinator is responsible for:

3.3.1 Coordination of Chemistry Group activities in the Chemistry Lab.

3.3.2 Implementation of this procedure (in cooperation with the CSL).

3.3.3 Coordination of sample logging, identification and documentation.

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

3.4.1 Coordination of the Radiation Protection and Chemistry Group activities in the EOF.

3.4.2 Determining sample priorities in the EOF.

3.5 The Radiation Protection Specialists (Rad Prot Spec) are responsible for:

3.5.1 Sample collection and analysis.

3.5.2 Coordination of sample logging, identification and documentation.

4.0 DISCUSSION

This procedure was written due to the large quantity of samples anticipated during an emergency. The procedure uses matrixes (FIGURE 7.1 - 7.5) for the establishment of a sample coordination plan. This plan should: (1) ensure the proper priorities are placed on sample and analysis of systems or effluents, (2) ensure the proper transmission and handling of samples, (3) ensure the samples are processed consistent with their assigned priorities, (4) provide for tracking samples by means of documentation, and (5) provide for shipping of samples for off-site analysis.

The guidance in this procedure assigns the highest priorities to sampling and analysis of systems or effluents which may directly affect public health and safety. Lower priorities are assigned to the sampling of systems or effluents which may aid in assessing the extent or degree of an event. The lowest priorities are assigned to the sampling of systems or effluents not affected by the event.

Sample frequencies will be dependent on the situation and available resources and should be established such that current sample results and information are readily available for decision making and trending.

5.0 PRECAUTIONS

5.1 The samples listed below cannot be obtained when valid isolation conditions shown are in effect, without operator action to reset isolation valves.

5.1.1 GROUP 1 ISOLATION	INITIATING CONDITION
Reactor Recirc Sample	Rx press. < 840 PSIG while in run mode
	Steam flow > 140% of rated
	Main steam line area high temperature 195 F
	Reactor low low water level -48"

5.1.2	GROUP 2 ISOLATION	INITIATING CONDITION
	Drywell Cam Sample PASS Drywell and Torus Sample	Fuel pool radiation monitor ≥ 50 mRem/HR Reactor Building plenum monitor ≥ 26 mREM/HR Drywell high pressure 2 PSIG Reactor low water level +9"
5.1.3	GROUP 2 ISOLATION	INITIATING CONDITION
	Drywell Floor Drain Sump Sample Drywell Equip. Drn Sump Sample	Drywell high pressure 2 PSIG Reactor low water level +9"
5.1.4	GROUP 3 ISOLATION	INITIATING CONDITION
	Reactor Water Cleanup Inlet Reactor Water Cleanup A Outlet Reactor Water Cleanup B Outlet Reactor Recirc Sample	Drywell high pressure 2 PSIG Reactor low water level +9" Standby liquid control system initiated

6.0 INSTRUCTIONS

6.1 In-Plant Sampling Priorities

6.1.1 The CSL should assess current plant conditions and determine which of the following sample and analysis matrixes apply:

A. Actual High Gaseous Radioactive Effluents Samples Matrix (FIGURE 7.1).

B. Actual High Liquid Radioactive Effluents Samples Matrix (FIGURE 7.2).

C. Potential High Gaseous Radioactive Effluents Samples Matrix (FIGURE 7.3).

D. Potential Core Damage with Containment Integrity Samples Matrix (FIGURE 7.4)

E. Recovery Phase Samples Matrix (FIGURE 7.5).

NOTE: These matrixes include sampling priorities and sample analysis guidance for plant conditions or events.

6.1.2 The CSL should determine the sampling priorities and recommended analysis as indicated on the respective matrix.

NOTE: In each of the matrixes (FIGURE 7.1 - 7.5), sample priorities are assigned on a scale of 1-6 (some are 1-4). Samples indicated with a 1 are the highest priority and may directly affect public health and safety; those assigned a 4 or 6 are the lowest priority and are generally assigned to sampling of systems or effluents not affected by the eve

6.1.3 The CSL should review the recommended sample priorities with the REC to confirm proper sampling priorities.

NOTE: The REC/CSL may request samples in addition to those specified in the matrixes.

6.1.4 Determine an adequate sampling frequency which will provide sufficient information for decision making in a timely manner. This should be based on available resources and the current situation.

6.1.5 The Chemistry Coordinator should coordinate obtaining the desired samples as directed by the CSL.

6.1.6 The Chemistry Coordinator should initiate Form 5790-408-1 (EMERGENCY CHEMISTRY SAMPLE LOG).

6.1.7 The Chemistry Coordinator should assign a sequential sample number using FIGURE 7.6, Guidelines for Assignment of Sample Identification Numbers.

6.1.8 The Chemistry Coordinator should log the requested sample and sample number on Form 5790-408-1.

6.1.9 The Chemistry Coordinator should fill out Form 5790-408-1 as sample information and results become available.

6.2 In-Plant Analysis Priority

6.2.1 The Chemistry Coordinator should assign an analysis priority number to each sample IAW the guidance in FIGURE 7.7, Guidelines for Assignment of Sample Analysis Priori

6.2.2 The Chemistry Coordinator should ensure that all sample and analysis data is properly logged on page 1 of the Emergency Sample Log and that the log is updated and completed as required.

6.3 In-Plant Sample Storage

6.3.1 The Chemistry Coordinator should ensure that all samples are handled and stored in a manner consistent with ALARA considerations.

6.3.2 When samples are not being analyzed, they should be stored either behind lead bricks in the Hot Lab Hood or in the lead shielded storage area behind the Hot Lab.

6.4 Environmental Sample Labeling

6.4.1 All samples or sample storage bags should be labeled with:

A. Sample Number from Emergency Chemistry Sample Log (FORM 5790-408-1)

B. Sample Date and Time

C. Sample Location

D. Sample Description

6.5 Environmental Sample Analysis Priority

6.5.1 Count samples in the order that they arrive from the field teams unless otherwise specified by the Radiation Protection Support Supervisor (RPSS).

6.6 Environmental Sample Storage

6.6.1 The EOF Radiation Protection Specialist should store all samples in the cabinets provided in the EOF receiving area such that they are readily available for future analysis.

6.7 Shipping and Disposal of Samples

6.7.1 IF samples are to be sent off-site for analysis,
THEN contact radwaste shipping personnel to ship the samples.

6.7.2 When samples are no longer needed, they should be stored using proper radiological and chemical control measures.

7.0 FIGURES

FIGURE

7.1 Actual High Gaseous Radioactive Effluents

CONDITIONS

Gaseous radioactive effluents have exceeded plant ODCM Limits

PARAMETER	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
PRIORITY	4	(NOTE 1) 2	(NOTE 1) 1	3	N/A

RADIOCHEM ANALYSIS	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Isotopic	X				
Iodine Charcoal		X	X	X	
Particulate		X	X	X	

CHEMICAL ANALYSIS	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Conductivity	X				
pH	X				
Chloride	X				
H2/O2	X			X	
Boron (NOTE 2)	X				

NOTE 1: Sample the Reactor Building vents first if vent release rate is higher than Stack release rate.

NOTE 2: Perform a boron analysis only if the Standby Liquid Control System has been initiated.

FIGURE

7.2 Actual High Liquid Radioactive Effluents

CONDITIONS

Liquid radioactive effluents have exceeded plant ODCM Limits

PARAMETER	PRIMARY COOLANT	RETENT POND	TBNWS (Note 1)	SERVICE WATER (Note 1)	DISCHARGE CANAL
PRIORITY	4	5	3	2	1

RADIOCHEM ANALYSIS	PRIMARY COOLANT	RETENT POND	TBNWS	SERVICE WATER	DISCHARGE CANAL
Isotopic	X	X	X	X	X
Iodine Charcoal					
Particulate					

Conductivity					
pH					
Chloride					
H2/O2					
Boron					

NOTE: Sample TBNWS first if count rate is elevated higher than service water count rate.

FIGURE

7.3 Potential High Gaseous Radioactive Effluents

CONDITIONS

Gaseous radioactive effluents have not yet exceeded ODCM limits although events are occurring or have occurred which make the potential for off-site releases exceeding ODCM limits high.

PARAMETER	PRIMARY COOLANT	RX BLDG VENT (Note 2)	OFF-GAS STACK (Note 2)	PRIMARY CONTAINMENT	DISCHARGE CANAL
PRIORITY	2	4	3	1	N/A

RADIOCHEM ANALYSIS	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Isotopic	X				
Iodine Charcoal		X	X	X	
Particulate		X	X	X	

CHEMICAL ANALYSIS	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Conductivity	X				
pH	X				
Chloride	X				
H2/O2	X			X	
Boron (NOTE 1)	X				

NOTE 1: Perform a boron analysis only if the Standby Liquid Control System has been initiated.

NOTE 2: Sample the Reactor Building vents first if vent release rate is higher than stack release rate.

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FIGURE

7.4 Potential Core Damage with Containment Integrity

CONDITIONS

Possible core damage has or is occurring and the primary coolant and primary containment barriers remain intact.

PARAMETER	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
PRIORITY	1	4	3	2	N/A

RADIOCHEM ANALYSIS	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Isotopic	X				
Iodine Charcoal		X	X	X	
Particulate		X	X	X	

CHEMICAL ANALYSIS	PRIMARY COOLANT	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Conductivity	X				
pH	X				
Chloride	X				
H2/O2	X			X	
Boron (NOTE 1)	X				

NOTE 1: Perform a boron analysis only if the Standby Liquid Control System has been initiated.

FIGURE

7.5 Recovery Phase

CONDITIONS

The plant is stabilized and liquid or gaseous radioactive effluents are less than plant ODCM Limits and the plant is in the recovery phase.

PARAMETER	PRIMARY COOLANT	DW SUMP	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
PRIORITY	1	3	5	4	2	6

RADIOCHEM ANALYSIS	PRIMARY COOLANT	DW SUMP	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Isotopic	X	X				X
Iodine Charcoal			X	X	X	
Particulate			X	X	X	

CHEMICAL ANALYSIS	PRIMARY COOLANT	DW SUMP	RX BLDG VENT	OFF-GAS STACK	PRIMARY CONTAINMENT	DISCHARGE CANAL
Conductivity	X	X				
pH	X	X				
Chloride	X					
H2/O2	X				X	
Boron (NOTE 1)	X					

NOTE 1: Perform a boron analysis only if the Standby Liquid Control System has been initiated.

FIGURE

7.6 Guidelines for Assignment of Sample Identification Numbers

The following prefixes ***SHALL*** be used along with a sequential number to identify each post-accident sample:

PREFIX	DESCRIPTION
R	Rx Water
RHR	Residual Heat Removal
PC	Primary Containment
SC	Secondary Containment
S	Stack
V	Vent
EC	Environmental Smear
EV	Environmental Vegetation
EF	Environmental Food
ED	Environmental Dirt
ES	Environmental Snow
EA	Environmental Air Sample
EL	Environmental Liquid

For example the first reactor water iodine sample obtained would be identified as "R-1". The following Rx water sample would be identified as "R-2". If the next sample obtained was a vent particulate it would be identified as "V-1" if it were the first vent sample obtained.

FIGURE

7.7 Guidelines for Assignment of Sample Analysis Priority*

PRIORITY	EXAMPLE
1	a. Samples in support of accident mitigation operations or affecting personnel safety
	b. Post accident assessment
2	a. Post accident surveillance
	b. Samples in support of recovery operations
3	a. Routine surveillance

*The Radiological Emergency Coordinator or the Chemistry Section Leader may assign analysis priority numbers as conditions dictate; however, the Chemistry Coordinator should follow these guidelines if the priority has not already been assigned.

FIGURE

7.8 Forms Utilized in this Procedure

5790-408-1 Emergency Chemistry Sample Log

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EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By: Michael C. Hubbell	Reviewed By: Timothy LaPlant	
ALARA Coord Review By: N. Stevenson		
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1.0 PURPOSE

The purpose of this procedure is to provide instructions for the termination of an Unusual Event or Alert or the transition to the Recovery Phase from a Site Area or General Emergency. The procedure specifies the criteria for termination of the Emergency Phase and guidance for the Emergency Director and TSC Group Leaders on on-site Recovery planning.

2.0 APPLICABILITY

2.1 An Unusual Event or Alert has been declared and conditions indicate the immediate Emergency Phase may be terminated, or

2.2 A Site Area or General Emergency has been declared and conditions indicate the immediate Emergency Phase is over and the transition to the Recovery Phase may be made.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Emergency Director (Duty Shift Manager until relieved) is responsible for:

3.1.1 Implementation of this procedure.

3.1.2 The decision to terminate an Alert (when the Emergency Manager position is not yet staffed).

3.1.3 Assisting the Emergency Manager in the decision to terminate the event or enter the Recovery Phase.

3.1.4 Participation in the turnover of overall management from the Emergency Response Organization to the Site (Recovery) Organization.

3.2 The Recovery Manager is responsible for:

3.2.1 Overall direction and coordination of on-site recovery activities.

3.2.2 Coordination of site recovery activities with Xcel departments and off-site agencies and organizations.

3.3 The TSC Group Leaders are responsible for:

3.3.1 The development of short and long term recovery action item lists which identify corrective and/or recovery actions necessary to return the plant and site to a normal operation or shutdown status.

3.4 The site Managers, General Superintendents, Superintendents and Supervisors are responsible for:

3.4.1 Coordination of on-site recovery activities under the direction of the Recovery Manager and NMC Generation Management.

3.5 The Plant Scheduling Department is responsible for:

3.5.1 Development of outage and maintenance schedules which support the Recovery action item lists.

4.0 DISCUSSION

This procedure provides guidance and instructions for the termination of an Emergency classification (NUE or Alert) or the transition from the Site Area or General Emergency classification to Recovery.

For an Alert classification the close-out of the event will usually involve the termination of the emergency class and dissolution of the MNGP and off-site Emergency Response Organization. Any necessary follow-up activities would be limited to in-plant or on-site areas and coordinated and managed by the site organization. In some cases, Recovery may be appropriate for the close-out of an Alert classification if substantial damage has occurred to plant structures or equipment. Conversely, in some cases, a Site Area Emergency may be terminated if no significant damage has occurred to the plant systems or structures. The Emergency Manager and Emergency Director should make this determination based on the extent of damage and other considerations.

Generally, for the Site Area and General Emergency classifications the proper close-out of the event involves the establishment of a Recovery organization (under the direction of a Recovery Manager) and the transition to the Recovery Phase. During Recovery, overall management of recovery activities is the responsibility of the Recovery Manager.

5.0 PRECAUTIONS

5.1 The termination of an emergency classification or the transition to Recovery should be closely coordinated with the State and local authorities and federal agencies.

6.0 INSTRUCTIONS

6.1 Termination of an Unusual Event or Alert

NOTE: If substantial damage has occurred to plant systems, equipment, or if significant radiological releases or contamination have occurred on-site, Recovery may be appropriate versus termination.

6.1.1 Assess plant and environmental conditions. When all of the following criteria are met, consider termination of the emergency classification.

A. The plant is in a stable condition with at least one fission product barrier intact, and

B. No radioactive releases are being made to the environment in excess of plant Off-site Dose Calculation Manual limits.

C. The potential for future degradation of plant conditions is small.

6.1.2 When the criteria for termination are met, terminate the Unusual Event or Alert.

A. Termination of an Unusual Event classification may be performed by the Shift Manager.

B. Termination of an Alert classification ***SHALL*** be performed by the Emergency Director if the EOF is not activated.

C. Once the EOF is activated and responsible for off-site communications, the Emergency Manager ***SHALL*** terminate the Alert classification.

6.1.3 Notify the Sr NRC Resident Inspector and/or NRC Headquarters upon termination of the event.

6.1.4 Upon termination of the emergency make the following announcement over the plant PA system. Additional comments may be added as necessary to update plant personnel.

"ATTENTION PLANT PERSONNEL. THE (SPECIFY EMERGENCY CLASS) IS TERMINATED. SECURE THE EMERGENCY RESPONSE CENTERS AND RESUME NORMAL DUTIES".

6.1.5 If the plant is still responsible for off-site communications, direct the SEC to compose a new Form 5790-102-02 (EMERGENCY NOTIFICATION REPORT FORM) for the change in classification (termination). Submit the form for ED approval and transmit the notification.

$ 6.1.6 Ensure all individuals who were notified of the event are notified of the termination.

6.1.7 If significant damage has occurred to plant systems or equipment, and the plant will remain shutdown for an extended period of time, initiate outage planning IAW plant Scheduling Department procedures.

6.1.8 Direct the Support Group Leader/EOF Coordinator to collect all emergency related forms, checklists and documentation generated during the event and forward to Plant Emergency Preparedness for review and analysis.

6.1.9 The development and submittal of follow-up reports to the NRC should be coordinated through the plant Operations Committee IAW existing plant administrative procedures.

6.2 Transition to the Recovery Phase

6.2.1 When plant conditions are stable, significant radioactive releases are terminated, and the immediate emergency has been mitigated, direct the TSC Group Leaders to assess conditions in their respective areas and identify short and long term recovery items. Use Form 5790-602-01 (RECOVERY ACTION ITEM FORM).

6.2.2 Direct the Support Group Leader to collect Form 5790-602-01 (RECOVERY ACTION ITEMS) from the TSC Group Leaders.

6.2.3 Continue to assess plant and environmental conditions. When all of the following criteria are met, transition to the Recovery Phase should be considered:

A. The plant is in a stable condition with at least one fission product barrier intact, and

B. No radioactive releases are being made to the environment in excess of plant Off-site Dose Calculation Manual limits, and

C. The potential for future degradation of plant conditions is small, and

D. NRC Headquarters (or the Director of Site Operations of the on-site response team) concurs with the transition to Recovery.

6.2.4 When the criteria for Recovery is met, contact the Emergency Manager and discuss the conditions. If the Emergency Manager concurs that the conditions for transition to Recovery are met, request the EM discuss the proposed transition with the NRC.

NOTE: If the NRC Incident Response Team has not been mobilized or has not arrived, the proposal to enter the Recovery Phase should be discussed with the NRC Headquarters. If the NRC Incident Response Team is on-site, the EM and ED should meet with the Director of Site Operations to discuss the transition to Recovery.

6.2.5 If the NRC concurs that transition to Recovery is appropriate, obtain completed Forms 5790-602-01 (RECOVERY ACTION ITEMS) from the Support Group leader. Briefly review the lists with the TSC Group Leaders to ensure all items have been addressed.

6.2.6 If the plant is still responsible for off-site communications, direct the SEC to compose a new Form 5790-102-02 (EMERGENCY NOTIFICATION REPORT FORM) for the change in classification (recovery). Submit the form for ED approval and transmit the notification IAW EPIP A.2-501 (COMMUNICATIONS DURING AN EMERGENCY).

$ 6.2.7 Ensure all individuals who were notified of the event are notified of the transition to the recovery phase.

6.2.8 Upon completion of the review in the TSC, contact the Emergency Manager and arrange a meeting with the Emergency Manager and Recovery Manager to discuss the Form 5790-602-01 (RECOVERY ACTION ITEMS) and the transition to Recovery.

6.2.9 When the transition to Recovery is made, make the following announcement over the plant PA system:

"ATTENTION ALL PLANT PERSONNEL. THE (SPECIFY THE EMERGENCY CLASS) IS TERMINATED. THE PLANT IS IN RECOVERY. THE EMERGENCY RESPONSE ORGANIZATION IS DISSOLVED AND A RECOVERY ORGANIZATION IS BEING ESTABLISHED. SECURE ALL EMERGENCY RESPONSE CENTER."

6.2.10 If significant damage has occurred to plant systems or equipment, and the plant will remain shutdown for an extended period of time, initiate outage planning IAW plant Scheduling Department procedures.

6.2.11 Direct the Support Group Leader/EOF Coordinator to collect all emergency checklists, documentation, and records generated during the event and forward to Plant Emergency Preparedness for review and analysis.

6.2.12 The development and submittal of follow-up reports to the NRC should be coordinated through the plant Operations Committee IAW existing plant administrative procedures.

6.2.13 Assist the Recovery Manager with the formation of the Recovery Organization and other administrative recovery details.

EMERGENCY PLAN IMPLEMENTING PROCEDURE - TABLE OF CONTENTS

Prepared By: Michael O'Neill	Reviewed By: Timothy LaBlanc	
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1.0 PURPOSE

This procedure provides instructions and guidance for the conduct of off-site dose assessment and formulation of off-site Protective Action Recommendations at the Monticello EOF.

Steps in this procedure satisfy commitment M90125A.

2.0 APPLICABILITY

2.1 An Alert has been declared at the Monticello plant and,

2.2 The EOF has been activated, staffed and has assumed the responsibility for off-site communication, dose assessment and Field Team coordination.

3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 The Emergency Manager is responsible for:

3.1.1 The approval of off-site Protection Action Recommendations prior to their transmittal to the State (or local) authorities.

3.2 The Radiological Protection Support Supervisor is responsible for:

3.2.1 Implementation of this procedure.

3.2.2 Overall direction and coordination of EOF Rad Prot Support group activities including off-site dose projections, dose assessment, and the formulation of off-site protective action recommendations.

$ 3.2.3 Making recommendations regarding off-site Protective Actions to the Emergency Manager and discussing the basis for off-site Protective Action Recommendations with the State Planning Chief and NRC.

3.3 The Assistant RPSS is responsible for:

3.3.1 Assisting the RPSS with the coordination of EOF Radiation Protection Support Group activities including dose projections, assessment and Field Team direction.

3.4 The MIDAS Operator is responsible for:

3.4.1 The conduct of off-site dose projections using the MIDAS (or backup) methods including the generation of periodic Emergency Notification Follow-up Messages for transmittal to the State.

3.5 The Field Team Coordinator is responsible for:

3.5.1 Direction and coordination of Monticello and Prairie Island Field Teams under the supervision of the RPSS (or Assistant RPSS).

3.6 The Field Team Communicator is responsible for:

3.6.1 The coordination of Monticello and Prairie Island Field Teams via radio under the direction of the Field Team Coordinator.

4.0 DISCUSSION

4.1 Summary

Dose assessment refers to the integrated process of dose projection, collection of field measurements and meteorological data, comparison of projected data to field data, and consideration of plant status to develop a working knowledge of the current and near-term radiological environment resulting from a radioactive release.

The radiological forecast developed in the dose assessment process provides the input for making appropriate recommendations to protect the health and safety of the public.

The responsibility for dose assessment is initially assigned to the TSC. The Radiological Emergency Coordinator (REC) formulates protective action recommendations which are forwarded to State or County officials through the Emergency Director. After the EOF is activated, the Emergency Manager is responsible for dose assessment. At the decision of the Emergency Manager, the dose assessment function transfers from the TSC to the EOF.

The decision to transfer dose assessment responsibilities from the TSC to the EOF will be based on the emergency situation, the EOF equipment status and staffing of the Radiation Protection Support Group. The transfer is implemented by informing the TSC, directing the RPSS to assume the responsibility and closely coordinating the transfer with the REC.

4.2 For definitions related to PARs, see Figure 7.1

4.3 For general discussion of PARs, see Figure 7.2

5.0 PRECAUTIONS

5.1 Declaration of a General Emergency requires immediate initial protective action recommendations (PARs) to off-site agencies. Under these circumstances, NO dose projections are required for formulating the initial off-site protection action recommendation.

5.2 Implementation of protective actions for off-site areas is the responsibility of the State of Minnesota. If it is determined by the Emergency Manager that immediate protective actions are required, and the State EOC is not activated, the recommendation ***SHALL*** be made directly to the local authorities (i.e., Wright and Sherburne Counties). Upon activation of the State EOC all off-site protective action recommendations ***SHALL*** be made to the State.

5.3 The protective actions outlined in this procedure are limited to actions for minimizing the exposure of the public to external and internal radiation exposure from plume passage, inhalation of the radioactive plume and from internal exposure from drinking water during the early phase of an emergency. Other protective actions for minimizing public exposure via the ingestion pathway will be determined and implemented by the State.

5.4 Exposures of Field Team personnel should be in accordance with administrative control levels. They should have proper dosimetry, which is frequently checked, 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 EPIP A.2-401). All exposures should be maintained ALARA.

5.5 Monticello Field Teams should not be recalled from field monitoring until Prairie Island teams have relieved them in the field.

5.6 The transmission of Off-site Protective Action Recommendations to the State EOC (State Duty Officer and Counties if the State EOC is not activated) ***SHALL*** be completed within 15 minutes of the PAR authorization.

6.0 INSTRUCTIONS

CAUTION

No dose projections are required when making initial PAR during GENERAL EMERGENCY CONDITIONS.

6.1 Initial PARs for General Emergency Classification

6.1.1 Initiate Form 5790-102-02 (MONTICELLO EMERGENCY NOTIFICATION REPORT FORM).

A. Complete Section 1.4 recommending an evacuation of a 2 mile radius and 5 miles downwind and advise the remainder of the plume EPZ to go indoors to monitor EAS broadcasts.

B. Determine which geopolitical subareas are affected by referring to the Sector-Subarea Conversion Table on Form 5790-102-02.

C. Ensure completion of Parts 1.0 and 2.0 of Form 5790-102-02 and submit the completed form to the EM for approval.

6.1.2 Ensure transmission of the recommendations, via telephone and telecopy, to the State EOC (State Duty Officer, Wright and Sherburne Counties if the State EOC is not activated) IAW EPIP A.2-803 (EMERGENCY COMMUNICATIONS AT THE EOF).

6.1.3 Approximately 30 minutes after making the recommendation, contact the State Planning Chief or State Duty Officer if State EOC is not activated to determine what protective actions are actually being implemented. Continue to track the status of the protective action until completely implemented and indicate the completion status on the Radiation Protection Status Board.

6.1.4 Update the Emergency Manager and EOF personnel (if activated and staffed) on the status of off-site Protective Action implementation.

6.1.5 After making initial Protective Action Recommendations (at the General Emergency Class) continually assess plant conditions and off-site dose projection results. Make subsequent off-site protective action recommendations based on projected off-site doses using the Protective Action Guidelines (PAGs) listed in FIGURE 7.3.

6.2 PARS for Sherco Plant

NOTE: To safely shutdown the Sherco Plant requires 8 hours after the unit(s) are tripped.

6.2.1 Throughout the event the RPSS (or Assistant RPSS) should review off-site projected doses and affected Sectors (Subareas) to determine if the Sherco Plant is or will be in the affected area.

NOTE: The Sherco Plant is located in the 5N subarea.

6.2.2 Formulate protective action recommendations for the Sherco Plant as follows:

A. Recommendations based on Projected Dose (whole body):

1. > 500 mrem (TEDE) - recommend evacuation of non-essential personnel from the Sherco site and shelter essential plant personnel during plant operation.

2. > 1 Rem (TEDE) - recommend shutdown of the Sherco Plant(s). Immediate evacuation of non-essential personnel and sheltering of essential personnel during normal plant shutdown.

3. > 5 Rem (TEDE) - recommend immediate evacuation of non-essential personnel and sheltering of essential personnel during emergency plant shutdown. Evacuate all personnel immediately after plant shutdown.

B. Recommendations based on General Emergency:

1. If evacuation is implemented (in 5N) recommend evacuation of all non-essential personnel and sheltering of essential Sherco personnel. Recommend immediate initiation of plant shutdown.

6.2.3 If protective actions are required for the Sherco Plant, discuss the recommendations with the Emergency Manager (and HQEC Manager (HM) at the HQEC if activated).

NOTE: Generation management will implement the required protective actions for Sherco personnel through established management channels.

6.2.4 Monitor the progress of protective action implementation (at Sherco) to determine when they are completed.

6.2.5 Indicate any PARs recommended (and implemented) for the Sherco Plant on the RP Status Board in the TSC.

6.2.6 Advise the Emergency Manager if conditions change (e.g., significant increase in release rate) which could change the protective action recommendations for the Sherco Plant.

6.3 Off-site PARs Based on Projected Doses

CAUTION

Do not delay recommending off-site protective actions while waiting for off-site monitoring results to verify the accuracy of the dose projection model.
Do not delay recommending off-site protective actions while trying to resolve questionable data (MIDAS Data or Field Team Data).

6.3.1 Continuously review dose projection data (4 day integrated maximum TEDE and Thyroid CDE) on Form 5790-102-03 (EMERGENCY NOTIFICATION FOLLOW-UP MESSAGE) and compare with the Portective Action Guidelines in Figure 7.3. If an updated PAR, based on dose projections is required, proceed to Step 6.3.2. Continuously review meteorological data (wind direction and wind speed) on Form 5790-102-03 (EMERGENCY NOTIFICATION FOLLOW-UP MESSAGE) and determine the affected sectors. If an updated PAR, based on meteorological data is required, proceed to Step 6.3.2.

6.3.2 Initiate Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) and complete the airborne release section.

6.3.3 Using current meteorological data (i.e., wind direction and wind speed), determine the affected Sectors, Geopolitical Subareas (using page 2 of Form 5790-204-01), population centers within the affected area and estimated plume arrival time in those areas.

6.3.4 Based on plant conditions, estimate the duration of the existing release or potential release.

6.3.5 Using available weather forecast data, evaluate the potential for wind direction and wind speed changes during the estimated duration of the release (and after). Determine what effect potential wind direction and wind speed changes would have on the affected areas identified in 6.3.3.

NOTE: Weather forecast information may be obtained from the National Weather Service. Refer to the Monticello and Prairie Island Nuclear Emergency Preparedness Telephone Directory for telephone numbers.

NOTE: If data used in the determination of the PAR is/or was questionable, attempt to verify the data. DO NOT delay the issuance of the PAR. If after verification of questionable data a PAR revision is necessary, complete section 6.3 of this procedure.

6.3.6 If based on dose projections or field team data a PAR beyond the 10 mile EPZ is necessary, immediately contact the State Planning Chief to inform them of this condition and document in comments section of Form 5790-204-01. Attach a copy of the supporting Follow-up Message to Form 5790-204-01.

6.3.7 Indicate the recommendations on page 3 of Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST). Indicate the recommendation in terms of Sectors and Subareas by completing and circling the applicable information as follows:

A. Identify the affected keyhole by selecting a 360° out to 2 or 5 miles. Determine the affected Sectors by including both Sectors on either side of the downwind Sector (two Sectors on either side should be included if the downwind direction is on a Sector line). Record the 3 (or 4) affected Sectors on page 3 of the Monticello PAR Checklist.

B. Identify the affected geopolitical subareas using the Sector-Subarea Conversion Chart (page 2 of Form 5790-204-01) and circle the affected subareas on the PAR Checklist.

6.3.8 Submit the completed page 3 of Form 5790--204-01 (MONTICELLO PROTECTIVE ACTION RECOMMENDATION CHECKLIST) to the Emergency Manager for approval. Review and discuss the recommendations with the Emergency Manager as necessary.

NOTE: Prior to activation of the State EOC, protective action recommendations should be made directly to the State Duty Officer and Wright and Sherburne Counties (EOCs if activated). The State Duty Officer will coordinate the EAS message and PANs activation with counties. Once the State EOC is activated, all protective action recommendations *SHALL* be made directly to the State authorities.

6.3.9 The Emergency Manager (or RPSS) should direct an Emergency Communicator to transmit the approved Off-Site Protective Action Recommendation Checklist, to the State EOC (Wright and Sherburne County EOCs only if the State EOC is not yet activated) IAW EPIP A.2-803 (EMERGENCY COMMUNICATIONS AT THE EOF).

6.3.10 When notified by the Emergency Communicator that the transmittal of the protective action recommendation has been made to the State Planning Chief (if State EOC is activated) or the State Duty Officer, Wright County and Sherburne County (if State EOC is not activated) contact either the State Planning Chief or the State Duty Officer, Wright County and Sherburne County. Discuss the recommendations and explain the basis of the recommendations.

6.3.11 Approximately 30 minutes after making the recommendation, contact the State Planning Chief or State Duty Officer prior to State EOC activation, to determine what protective actions are actually being implemented. Continue to track the status of the protective action until completely implemented and indicate the completion status on the Radiation Protection Status Board.

6.3.12 If, as a result of continuing assessment, dose projection results or meteorological conditions change significantly, re-evaluate the previously implemented protective actions and, if necessary, update the protective actions by issuing another recommendation.

6.4 **Protective Action Recommendation for Liquid Releases**

6.4.1 Initiate Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) and complete the Liquid Release Section.

6.4.2 Obtain the isotopic analyses of liquid samples taken at the Discharge Canal or release point.

NOTE: During a liquid release, samples may be taken at the discharge structure, mid-canal sample station, canal out-fall to the river, or as near the source of the release as possible. To ensure samples are representative of the material being released to the river, the Canal Sample Station is the preferred sampling location.

6.4.3 Determine the present Discharge Canal flow rate and river flow rate at the plant (refer to the applicable plant computer point for flow rates).

6.4.4 Determine the river flow rate at either the Coon Rapids Dam or the Minneapolis-St. Paul water intakes by contacting the Minneapolis Water Department (refer to the Monticello and Prairie Island Nuclear Emergency Preparedness Telephone Directory for telephone numbers).

6.4.5 Using the curve RIVER FLOW vs TIME curve (FIGURE 7.5) estimate the time of release arrival at the Minneapolis-St. Paul water intakes based on current, actual river flow (if actual river flow is not available, use the monthly average river flow in FIGURE 7.5).

6.4.6 Using the MIDAS User Manual Procedures access the MIDAS liquid release model. Enter the isotopic and other applicable release data.

6.4.7 Using the MIDAS Liquid Release Dose Assessment printout, formulate off-site protective action recommendations IAW the guidelines in FIGURE 7.6.

6.4.8 Indicate the recommendations on page 3 of Form 5790-204-01 (MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST) and submit the completed form for Emergency Manager approval.

6.4.9 Transmit the recommendations to the State Planning Chief (State EOC if activated) IAW EPIP A.2-803 (EMERGENCY COMMUNICATION AT THE EOF)

6.4.10 Contact the State Planning Chief (in the State EOC if activated) to explain the basis for the recommendations.

6.4.11 Approximately 30 minutes after making the recommendation, contact the State Planning Chief to determine what protective actions are actually being implemented. Continue to track the status of the protective action until completely implemented.

6.5 Ground Deposition Assessment

6.5.1 Perform ground deposition projections as follows:

NOTE: The purpose of this step is to obtain a rough estimate of ground deposition. If estimates of curies released are not available, proceed with Field Team deployment.

A. Determine the number of microcuries of iodine and particulate material (i.e., not noble gases) that were released.

B. Refer to FIGURE 7.7 to calculate the projected ground deposition. Using the guidance in FIGURE 7.7 develop a footprint, or map of the area, that could have ground contamination levels above 1 uCi/m^2.

C. Record Field Team ground deposition survey results on Form 5790-410-03 (GROUND DEPOSITION SAMPLE RESULTS LOG).

6.5.2 As exposure rate data is obtained, calculate relocation projected doses using the conversion factor of 5000 mrem per mR/hr (i.e., 5000 mrem relocation projected dose per 1 mR/hr initial gamma exposure rate 1 meter above the ground).

NOTE: This conversion factor may be conservative. The factor depends on the isotopic distribution and decay time of the ground deposition. With actual isotopic data, a better conversion factor can be calculated using the data in FIGURE 7.8.

6.5.3 As smear samples are analyzed and isotopic data is obtained use FIGURE 7.8 to refine the relocation projected doses.

6.5.4 Plot the relocation projected doses on a map. (Consider using a dedicated map to avoid confusion).

6.5.5 Determine the appropriate protective action recommendations IAW FIGURE 7.9.

6.6 Return Dose Assessment

6.6.1 As soon as resources allow, obtain dose rate surveys and smear samples (per EPIP A.2-410) in evacuated areas that are believed to be outside the footprint.

6.6.2 As the priority for return to evacuated areas within the known footprint increases (per the States recommendation), obtain dose rate surveys and smear samples within the affected (evacuated) areas IAW A.2-410.

6.6.3 Use FIGURE 7.8 and calculate relocation projected doses based on known (measured) ground deposition.

6.6.4 Plot the relocation projected doses on a map.

6.6.5 Refer to FIGURE 7.9 and develop Protective Action Recommendations regarding return to evacuated areas as appropriate.

6.6.6 Indicate the recommendation on Form 5790-204-01 (OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST).

A. Submit the completed form to the Emergency/Recovery Manager for approval and processing.

6.7 General Instructions for Field Team Deployment

6.7.1 Identify the team(s) as Monticello Field Team 1 and 2 and direct the team(s) to establish and maintain radio communication with the Field Team Communicator in the EOF.

6.7.2 When the Prairie Island Field Teams arrive identify the PI teams as Field Team 3 and 4.

6.7.3 Determine the starting point of the survey based on the release point, source term, magnitude of the release, wind direction, and dose projection data (if available).

6.7.4 Dispatch the team(s) to the selected survey/sample points to conduct surveys/sampling IAW EPIP A.2-410.

6.7.5 Direct the team(s) to transmit survey/sample results (by radio) to the Field Team Communicator in the EOF.

6.7.6 Direct the Field Team Communicator to record survey results on Form 5790-202-01 (OFF-SITE SURVEY RESULTS DATA LOG) or Form 5790-410-03 (GROUND DEPOSITION SAMPLE RESULTS LOG).

6.7.7 Direct the Field Team Communicator to periodically update the team(s) on plant conditions, emergency classification changes, protective actions and meteorological information as it becomes available.

6.7.8 Direct the team to check personal dosimetry and request relief if their exposure approaches administrative limits.

6.7.9 Direct the team(s) in the use of protective measures (including Anti-C clothing, respiratory protection and exposure control) IAW the following guidelines:

A. Direct protective clothing and respirator (with GMR-I canisters) use if:

1. Substantial airborne activity and ground contamination is suspected or observed and the affected sectors have been evacuated; or

2. A General Emergency has been declared and measured dose rates are more than 100 mrem/hr True Beta.

B. Direct the implementation of ALARA exposure control measures as follows:

1. Field Teams should not linger in areas greater than 100 mrem/hr;

2. Field Teams should not proceed into areas projected to be greater than 1000 mrem/hr unless directed by the REC;

3. Field Teams should not proceed into areas projected to be greater than 10,000 mrem/hr.

6.7.10 Based on initial survey results request backup surveys or confirmatory sampling as necessary.

6.7.11 Upon completion of Field Team survey operations, direct the team(s) to report to the Emergency Operations Facility for exposure processing, de-briefing and re-assignment.

6.8 Field Team Deployment During Airborne Releases

NOTE: For events that do not involve a radioactive release off-site monitoring is required to confirm that a release (above normal limits) is not occurring.

6.8.1 Dispatch the Field Teams in the downwind direction to conduct a search for the plume IAW EPIP A.2-410.

CAUTION

Do not allow the Field Team(s) to sit idle. Teams should traverse the projected path of the plume in downwind affected sectors rather than remain in one location awaiting plume arrival.

6.8.2 When the plume is located (positive meter deflection) instruct the team(s) to perform dose rate surveys IAW EPIP A.2-410.

6.8.3 Based on the results of the dose rate survey(s) determine if the team is in the plume (positive beta reading) or if the plume is elevated (gamma only).

6.8.4 When the plume is encountered (i.e., positive beta reading) direct the team(s) to obtain airborne particulate, gaseous and Iodine airborne, and ground deposition samples. Instruct the team to analyze the samples (in low background area) and transmit the field analysis results to the EOF.

6.8.5 Upon completion of the field analysis direct the team to retain the samples or deliver them to the EOF Count Room for further analysis.

NOTE: A sample courier may be used to transport samples from the team(s) to the applicable Count Room.

6.8.6 Direct the Field Team Communicator to record all survey results on Form 5790-202-01 (OFF-SITE SURVEY RESULTS DATA SHEET) or Form 5790-410-03 (GROUND DEPOSITION SAMPLE RESULTS LOG).

6.8.7 Track and plot the movement of the plume on the Radiological Survey Point map as follows:

A. Using current meteorological conditions (wind speed, direction, etc.) project the path of the plume;

B. Using available MIDAS data (GAMMA & THYROID PROJECTED DOSE REPORT and PROJECTED DOSE SUMMARY REPORT) project the location of the leading edge and trailing edge (if "puff" release) of the plume;

C. Using the team(s), locate the leading edge of the plume;

D. Using the field team(s), locate the lateral boundaries (sides) of the plume;

E. Using the team(s), verify that upwind ("backdoor") areas near the site are not affected by the release;

F. For "puff" releases, direct the team(s) to locate the trailing edge of the plume;

6.8.8 Compare off-site monitoring results for consistency with State survey results as applicable. Reconcile inconsistencies in data and/or re-survey areas of concern as necessary.

6.8.9 Determine the centerline dose rate by directing a team to traverse through the plume, while monitoring enroute.

NOTE: This survey should be coordinated with the MIDAS dose projection run in an attempt to verify the projection by comparing survey results to the projection data.

6.8.10 Compare off-site survey results with dose projections for consistency. Reconcile major inconsistencies in data and/or re-survey areas of concern as necessary.

NOTE: A factor of < 100 is appropriate to use as the reasonable deviation when comparing model vs. actual field data.

6.8.11 Direct the Field Team Communicator to periodically update the team(s) on plant conditions, emergency classification changes, protective actions and meteorological information as it becomes available.

6.9 Field Team Deployment for Ground Deposition Assessment

6.9.1 Deploy Field Teams to obtain ambient dose rates and collect samples (IAW A.2-410) in areas that are not evacuated, but within the footprint.

6.9.2 Concentrate first on areas suspected of having the highest deposition.

6.9.3 Priority should be given to initially performing dose rate surveys, with more detailed smear surveys to follow. Target areas with dose rates above 0.2 mrem/hr or direct frisker readings above 20,000 CPM for collection of smear samples.

6.9.4 Enough dose rate surveys/smear samples should be obtained to have confidence that "hot spots" have not been overlooked. Ten survey points per square mile is suggested as a minimum in areas where roads will allow this to be practical.

6.9.5 Ensure that areas not within the projected footprint are surveyed sufficiently to verify that the affected area has been identified completely.

6.9.6 Plot the Field Team results on a map. Compare them to the ground deposition projections, and direct follow-up surveys as appropriate to ensure the affected area is identified.

6.10 Dose Assessment and Field Team Deployment for Ingestion Pathway

6.10.1 Contact the EOC of each affected State and see if they have sample collection needs of particular priority that MNGP could satisfy.

NOTE: MNGP survey teams have the capability of performing dose rate, smear, liquid, soil/snow and air sampling and analysis. If there is a need for more sophisticated environmental samples, contact Teledyne and implement the letter of agreement. Once notified, Teledyne will dispatch a team to the affected site. They will also make their laboratories available for use should we need to send samples for analysis.

6.10.2 Direct the Field Teams to obtain samples according to the State(s) needs or to collect samples to confirm the results of the State(s) survey team.

6.10.3 Ingestion pathway dose projections should not be performed. Instead concentrate available resources on the collection, analysis, and transmittal of results to the States of smear, liquid, soil and/or snow samples.

6.10.4 Ingestion pathway protective actions will be determined by the State of Minnesota.

7.0 FIGURES

FIGURE

7.1 Definitions Related to Protective Actions Recommendations

1. Affected Area is any area where radiation emanating from a plume, or from material deposited from the plume, can be detected using field instruments (also known as the footprint).

2. Cloudshine is radiation from radioactive materials in an airborne plume.

3. Committed Dose Equivalent (CDE) refers to the dose received over the 50 year period following an intake of radioactive materials.

4. Committed Effective Dose Equivalent (CEDE) is the sum of the products of the weighted factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissue.

5. Dose equivalent means the product of the absorbed dose in tissue, quality factors, and all other necessary modifying factors at the location of interest.

6. Effective dose equivalent (EDE) is the sum of the product of the absorbed dose in tissue, quality factors, and all other necessary modifying factors at the location of interest.

NOTE: Deep Dose Equivalent (DDE) is considered equivalent to EDE if the exposure is uniform.

7. Emergency Planning Zone (EPZ) is a defined area which facilitates emergency planning by State and local authorities to ensure that prompt and effective actions are taken to protect the public in the event of a radioactive release from the plant. The EPZ is defined for two areas:

   A. Plume Exposure Pathway (10 Mile EPZ) is the 10 mile, 360° radius around the plant in which the primary concern is short-term exposure from the plume. The principal sources of exposure in this area are 1) whole body external exposure to gamma radiation from the plume and deposited material from the plume, and 2) internal exposure from inhaled material from the plume.

   B. Ingestion Exposure Pathway (50 Mile EPZ) is a 50 mile, 360° radius around the plant in which the principal exposure would be from ingestion of contaminated water or foodstuffs (such as milk or fresh vegetables).

8. Evacuation is the removal of people from an area to avoid or reduce high-level, short term exposure, from a plume or from deposited activity.

9. Geopolitical Subareas are subarea within the 10 Mile EPZ that are defined by predetermined geographic and/or political boundaries.

10. Groundshine is radiation exposure caused by radioactive materials deposited on the ground.

11. Ingestion Pathway Projected Dose is the projected CEDE (ICRP-30) from consuming contaminated foodstuffs.

12. Keyhole Area an area within the 10 Mile EPZ defined by a 360° radius out to a specified distance of 2 or 5 miles and continuing in the downwind direction in 3 or 4 Sectors.

13. Plume Projected Dose refers to future calculated doses from plume submersion, plume shine, plume inhalation and 4 days of ground deposition exposure.

14. Protective Action is an action taken to avoid or reduce a projected dose.

15. Protective Action Guide (PAG) refers to a dose (or commensurate dose rate) which warrants protective actions.

16. Public Alert and Notification System (PANS) is the system used to alert the public within the 10 Mile EPZ of an emergency condition at the plant. Once alerted, the public would turn to local commercial media broadcast messages for specific protective action instructions. The PANS consists of the following systems:

    A. Fixed sirens for 100% coverage throughout the 5 mile EPZ and in population centers between 5 and 10 miles.

    B. Local law enforcement emergency vehicles with sirens and public address capability driving route alerting in the 5 to 10 mile areas not covered by fixed sirens.

    C. National Oceanic and Atmospheric Administration (NOAA) alert radios in institutional, educational, and commercial facilities.

    D. The Emergency Alert System (EAS) which accesses local television and radio stations.

17. Recovery is the process of reducing radiation exposure rates and concentration of radioactive material in the environment to levels acceptable for unconditional occupancy.

18. Relocation Projected Dose is the projected effective committed dose from 1 year of exposure to radioactive material deposited as fallout from a plume, including whole body exposure to gamma radiation (groundshine), and internal dose from inhalation of resuspended material, but excluding internal dose from consuming contaminated foodstuffs.

19. Return refers to people permanently reoccupying their normal residence within an area that was evacuated during the emergency condition.

20. Re-entry refers to temporary entry into a restricted (evacuated) area under controlled conditions.

21. Secondary Evacuation refers to relocating people from areas to avoid or reduce relocation projected dose.

22. Sector is one of 16, 22.5° sectors around the plant which compose the 10 Mile EPZ.

23. Sheltering provides radiation protection from an airborne plume and/or deposited radioactive materials. Sheltering also ensures effective public notification, via media, should the need for evacuation occur.

24. Total Effective Dose Equivalent (TEDE) is the sum of external EDE and CEDE.

FIGURE

7.2 Discussion of Protective Action Recommendations

The following is a discussion of the various Protective Action Recommendations (PARs) that could be made to off-site authorities. The Protective Action Guidelines (PAGs) listed are derived from EPA guidelines (EPA 400).

1. NO PROTECTIVE ACTIONS

   The recommendation for no protective actions is self-explanatory and is appropriate when projected plume doses do not exceed 1000 mrem (TEDE) or 5000 mrem (CDE) thyroid dose. For liquid releases, no protective actions are warranted if the concentration in raw river water at outflow of discharge canal is less than the concentration listed in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2 (ODCM-04.01, Table 1).

2. EVACUATION

   Evacuation is the movement of a population out of an area in order to reduce or eliminate direct or indirect radiation exposure. Timely evacuation of the population is the most effective protective action.

   Initial PARs for a General Emergency involving loss of physical control or core damage are based on NRC Response Technical Manual RTM-93, Vol 1, Rev. 3, Section I. Immediate evacuation of the general public is justified without dose projection.

   EPA 400 indicates that evacuation of the general public will usually be justified when the projected dose to an individual is greater or equal to 1000 mrem TEDE (or 5000 Thyroid CDE). At these dose levels, the risk avoided due to the radiation exposure is usually much greater than the risk from evacuation itself.

   Using the projected dose criteria stated above, MNGP should recommend evacuation to the State. In turn, they will independently assess and implement protective actions based on our recommendation, their independent assessment, and current off-site evacuation constraints.

3. CLOSURE OF WATER INTAKES

   Water Intakes PAG: Concentration in raw river water exceeds the value listed in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2 (ODCM-04.01, Table 1).

   Closure of the water intakes is an appropriate recommendation in the case of a liquid release to the river which is expected to result in river water concentrations exceeding the MPC for unrestricted areas.

FIGURE

Discussion of Protective Action Recommendations (Cont'd)

4. SECONDARY EVACUATION

Relocation PAG (in mrem): 2000 (TEDE)

To avoid social and family disruption and the complexity of implementing separate PAGs for individual members of the population, the relocation PAG may be applied for all members of the population. While the relocation PAG is based on projected doses to adults, infant relocation projected doses are not more than two times higher than the adult projected dose.

Based on EPA 400 PAGs, MNGP should recommend relocation of general public from affected areas not previously evacuated when the projected dose is greater or equal to 2000 mrem TEDE from exposure or intake during the first year.

This projected dose includes doses from external radiation, and inhalation of resuspended materials.

5. RETURN

Return is allowed at levels below the secondary evacuation PAG (2000 mrem TEDE).

The decision to return segments of the public from previously evacuated areas will be determined by appropriate off-site agencies. Various cautions and dose reduction techniques will be assessed and, if necessary, communicated to the people upon their return.

6. DESIGNATION OF THE AFFECTED PROTECTIVE ACTION AREA

The designation of the affected protective action area depends on the nature and extent of the incident and existing meteorological conditions. The area will be described by designating an affected keyhole shaped area and the affected geopolitical subareas within the EPZ.

a Affected Keyhole Area

The affected keyhole area should resemble a keyhole consisting of a 360° area surrounding the plant out to a distance of 2 or 5 miles and continuing in the downwind direction out to a distance determined by the PAGs. The affected downwind portion of the keyhole should include 1 sector on either side of the affected sector (i.e., total of 3 sectors). If the downwind direction is on a sector line then 2 sectors on each side of the affected sector should be included (i.e., total of 4 sectors).

b Affected Geopolitical Subareas

Geopolitical subareas are subareas of the 10 mile EPZ defined by predetermined geographic and/or political boundaries. The affected geopolitical subareas are defined by any and all subareas that intersect the affected keyhole area.

FIGURE

Discussion of Protective Action Recommendations (Cont'd)

8. (EXPOSURE PATHWAYS, Incident Phases, and Protective Actions

POTENTIAL EXPOSURE PATHWAYS AND INCIDENT PHASES		PROTECTIVE ACTIONS
1. External radiation from facility	EARLY	Sheltering Evacuation Control of access
2. External radiation from plume	EARLY	Sheltering Evacuation Control of access
3. Inhalation of activity in plume	EARLY	Sheltering Administration of stable iodine Evacuation Control of access
4. Contamination of skin and clothes	INTERMEDIATE	Sheltering Evacuation Decontamination of persons
5. External radiation from ground deposition of activity	LATE	Evacuation Relocation Decontamination of land and property
6. Ingestion of contaminated food and water	LATE	Food and water controls
7. Inhalation of resuspended activity	LATE	Relocation Decontamination of land and property

NOTE:
1. **Based on EPA 400-R-92-001, May 1992**
2. **The use of stored animal feed and uncontaminated water to limit the uptake of radionuclides by domestic animals in food chain can be applicable to any of the phases.**

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FIGURE

7.3 Protective Action Guidelines (PAGs)

	PAG VALUES[1]	RECOMMENDED PROTECTIVE ACTIONS	COMMENTS
WHOLE BODY[2] (TEDE) PROJECTED DOSE	Less than <1 REM (TEDE)	None required	The State may choose to implement sheltering at their discretion. No recommendations are required from MNGP.
	Greater than ≥1 REM (TEDE)	Recommend evacuation of the general public.	The State may chose to implement sheltering of the general public up to 5 REM (TEDE) or special population groups up to 10 REM (TEDE) if immediate evacuation is not practicable due to off-site constraints. No sheltering recommendations are required from MNGP.
THYROID[3] (CDE) PROJECTED DOSE	Less than <5 REM (CDE)	None required	The State may choose to implement sheltering at their discretion. No recommendations are required from MNGP.
	Greater than ≥5 REM (CDE)	Recommend evacuation of the general public.	The State may choose to implement sheltering of the general public if immediate evacuation is not practicable due to off-site constraints. No sheltering recommendations are required from MNGP.

FIGURE

Protective Action Guidelines (PAGs) (Cont'd)

	PAG VALUES[1]	RECOMMENDED PROTECTIVE ACTIONS	COMMENTS
SKIN[4] (CDE) PROJECTED DOSE	Less than <50 REM (CDE)	None required	The State may choose to implement simple personal protective actions (washing). No recommendations are required from MNGP.
	Greater than ≥50 REM (CDE)	Recommend evacuation of the general public.	The State may choose to implement sheltering of the general public or simple personal protective actions if immediate evacuation is not practicable.

NOTE 1: Protective Action Guides are based on EPA 400-R-92-001, May 1992.
NOTE 2: TEDE = Total Effective Dose Equivalent; is the sum of the Effective Dose Equivalent from exposure to external source and the Committed Effective Dose Equivalent incurred from all significant inhalation pathways during the Early Phase.
NOTE 3: CDE = Committed Dose Equivalent to the Thyroid from radioiodine.
NOTE 4: Committed Dose Equivalent to the skin from exposure to beta radiation from radioiodines and particulates.

FIGURE

7.4 Emergency Worker Exposure Limits

EXPOSURE LIMIT[1]	EMERGENCY ACTIVITY[1]	COMMENTS
5 REM (TEDE)[(2)(3)]	All emergency activities	This dose limit applies when a lower dose is not practicable through application of ALARA practices.
10 REM (TEDE)[(2)(3)]	Protection of valuable property	This dose limit applies when a lower dose is not practicable through application of ALARA practices.
≥ 25 REM (TEDE)[(2)(3)]	Life saving or protection of large populations	Doses in excess of 25 REM should be on a voluntary basis to persons fully aware of the risks involved.

NOTE 1: Dose limits for emergency workers and activities are based on EPA 400-92-001, May 1992.

NOTE 2: Sum of external effective dose equivalent and committed effective dose equivalent to non-pregnant adults from external exposure and intake during the duration of an emergency.

NOTE 3: Exposure to the lens of the eye should be limited to 3 times the value listed and doses to the skin and/or extremities should be limited to 10 times the value listed.

FIGURE

7.5 Transport Time and Monthly Average Flowrates

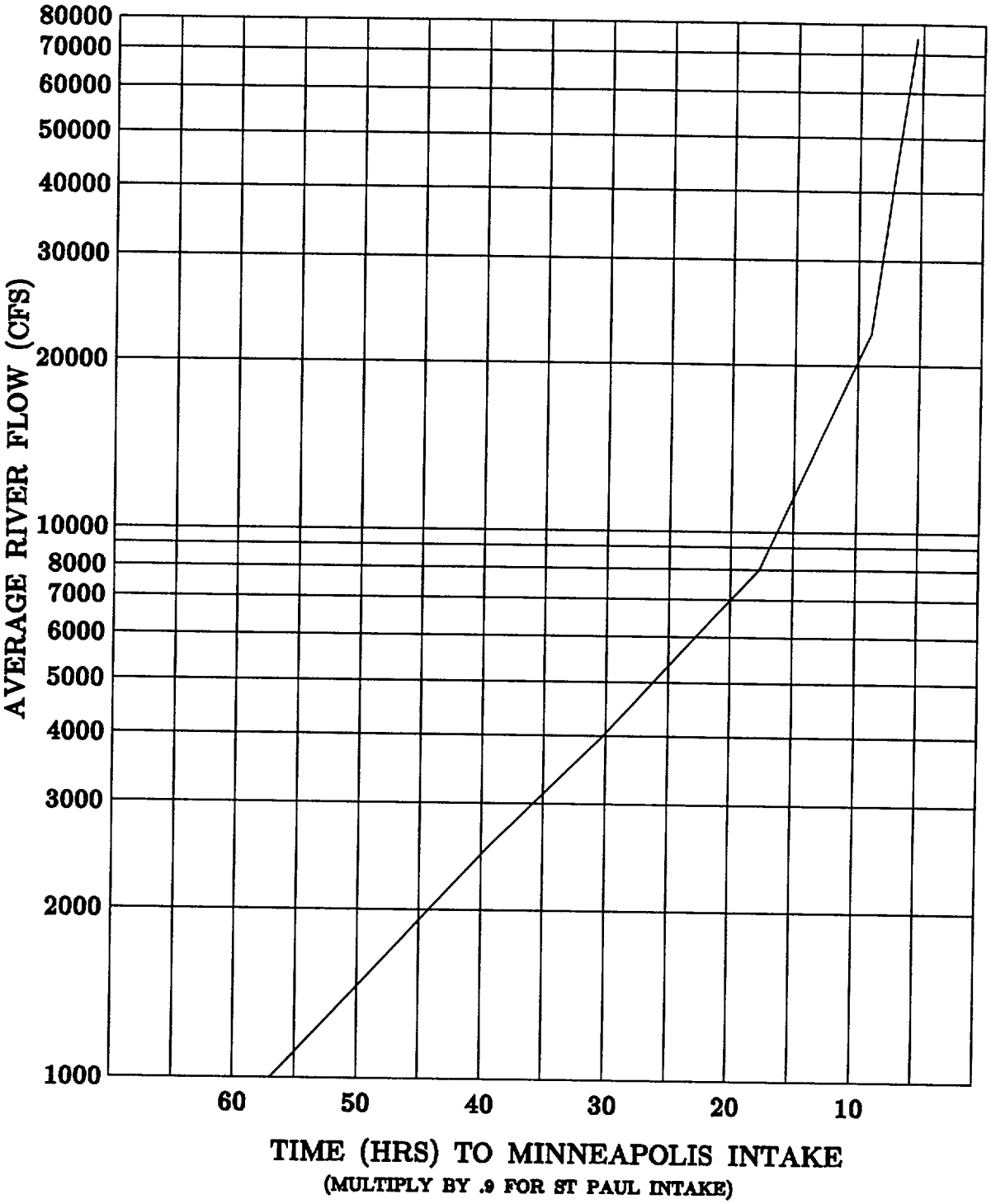

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FIGURE

Transport Time and Monthly Average Flowrates (Cont'd)

MONTH	AVG. RIVER FLOWRATE (CFS)
JANUARY	4663
FEBRUARY	4579
MARCH	6336
APRIL	10890
MAY	10157
JUNE	7369
JULY	5352
AUGUST	3506
SEPTEMBER	3334
OCTOBER	5690
NOVEMBER	5438
DECEMBER	4555

FIGURE

7.6 Liquid Release Protective Action Criteria

1. PROTECTIVE ACTION BASED ON PROJECTED INTERNAL DOSE
   a MPC Ratio in Raw River: < 1 MPC - No protective action required.
   b MPC Ratio in Raw River: > 1 MPC - Recommend closure of water intakes.
   c Projected Internal (Drinking) Dose:
   < 250 mrem - No protective action required.
   > 250 mrem - Implement preventive protective actions.
   > 1000 mrem - Implement emergency protective actions.
2. PROTECTIVE ACTION BASED ON PROJECTED EXTERNAL DOSE
   a Projected Total External Dose
   < 250 mrem - No protective action required.
   > 250 mrem - Preventive protection actions are necessary.
   > 1000 mrem - Emergency protective actions are necessary.

NOTE: Obtain total external projected dose by calculating the swimming, boating and standing projected doses using the following time assumptions for shoreline activities.

Swimming - 3 hrs/day
Boating - 1 hrs/day
Standing - 6 hrs/day

RECOMMENDED PREVENTIVE PROTECTIVE ACTIONS

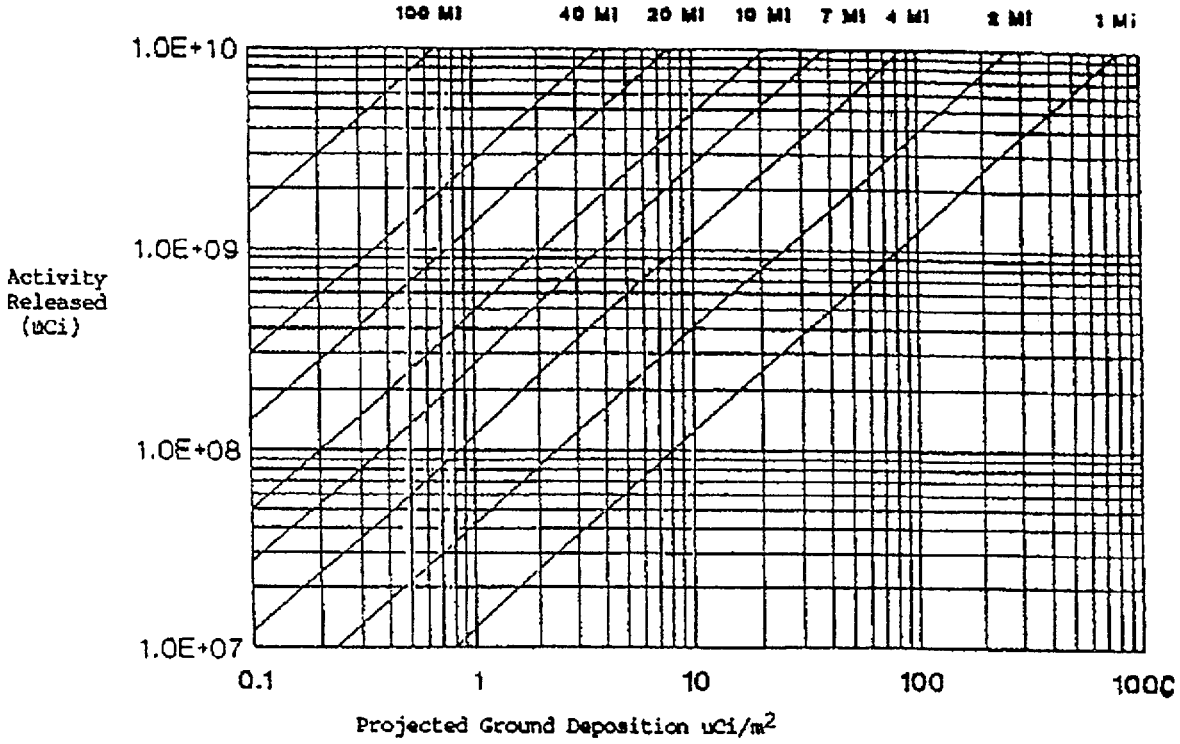
1. Close Raw Water Intakes
2. Restrict Intake of Drinking Water, and Foodstuffs obtained from river.
3. Restrict swimming and boating on river.
4. Restrict access to river.
5. Restrict use of river for irrigation and industry.

RECOMMENDED EMERGENCY PROTECTIVE ACTIONS

1. Close raw water intakes.
2. Condemn drinking water obtained from river.
3. Condemn affected foodstuffs (milk or meat from animals consuming contaminated water or foodstuffs)
4. Prevent access to river.
5. Condemn use of river for irrigation and industry.
6. Substitute uncontaminated water and foodstuffs for contaminated water and foodstuffs.
7. Condemn water usage from river.

FIGURE

7.7 Ground Deposition Modeling



The ground deposition graph was calculated using relations in R.G. 1.109 & R.G. 1.111. The following assumptions pertain to the graph:

1. Unstable (A,B,C) Pasqill stability class. This results in the highest depositions for elevated releases. For ground level releases, the stability class has little effect on calculated deposition rates. For a stable stability class, actual ground deposition could be zero out of many miles from the plant.
2. Elevated (100 meter) release height. For ground level releases, deposition rates will be slightly higher out to 20 miles, and somewhat less beyond 20 miles.

FIGURE

Ground Deposition Modeling (Cont'd)

3. The plume is deposited uniformly within half-width of a sector arc (about 11 degrees), for constant wind directions. Actual plume widths for unstable stability classes are significantly wider than this. This assumption causes the projected area ground contamination to be at least as high as the highest (centerline) actual deposition that would occur under stable conditions for deposition IAW a normal distribution with distance from the centerline.

NOTE: If several wind shifts occurred during the release, determine the approximate number of sectors into which the plume deposited material for each release period of interest. Divide this value by 0.5 and divide the result into the ground depositions predicted by the graph, to obtain an estimate of the degree the deposition was "diluted". For example, if the plume was spread out over 2 sectors, the ground deposition values obtained from the graph should be divided by 4. Once ground contamination as a function of distance has been estimated, use MIDAS (plume model) to help predict footprint actual width.

4. Wind speeds and stability classes vary often. The Van der Hoven study concludes there is a 50/50 chance of a significant wind shift within 2-4 hours at any given location. Therefore, the plume could be spread out more than the graph assumes and alter the resulting deposition. Rain showers could increase deposition greatly.

FIGURE

7.8 Secondary Evacuation Dose Projection

Isotope	Ground shine Dose (mrem per uCi/m^2)	Inhalation Dose (mrem per uCi/m^2)	Relocation Projected Dose (mrem per uCi/m^2)	Initial Exp. Rate (mr/hr per uCi/m^2)	Relocation Projected Dose per Initial Exp. Rate (mrem per mr/hr)
Sr-90	----------	11	11	----------	----------
Zr-95	34	----------	34	0.0162	2100
Ru-103	7.4	----------	7.4	0.0055	1300
Ru-106	14	1.4	15	0.0023	6700
I-131	1.3	----------	1.3	0.0047	280
Cs-134	118	----------	118	0.0183	6400
Cs-137	52	----------	52	0.0072	7200
Ba-140	11	----------	11	0.0279	390
Ce-144	3.3	1.4	4.7	0.0023	2000

NOTES:

1. Ground shine is the whole body dose (1 meter above the ground) received after a 1-year exposure to unit ground contamination (uCi/m^2) as measured at the beginning of the exposure period.
2. Inhalation is the committed effective dose (i.e., corresponding whole body dose) received from the inhalation for 1 year of resuspended unit ground contamination (uCi/m^2) as measured at the beginning of the exposure period. A re-suspension rate of 1E-6/meter is assumed.
3. The Relocation Projected Dose per Initial Exposure Rate column is the total committed effective dose that would be received after a 1-year exposure to contamination that caused an initial unit exposure rate (mr/hr, i.e., gamma only) at 1 meter above the ground. (The effective mrem per mr/hr for a mixture would be equal to a weighted average of the values in this column, which is computed by multiplying the value in this column times the ratio of the individual isotope to the total.)
4. The projected doses pertain to adults. Infant projected doses are not more than two times higher than the adult doses (other than for iodine which does not contribute greatly to overall dose for infants or adults).
5. Doses could be significantly lowered due to shielding from homes, decontamination, etc.

FIGURE

Secondary Evacuation Dose Projection (Cont'd)

6. Elimination of the source term due to weathering as well as radioactive decay is assumed.
7. The doses listed include the dose from radioactive daughters.

SECONDARY EVACUATION DOSE ASSESSMENT

Isotope	Smear (DPM)	Direct Frisk (CPM)	Ground Contam (uCi/m^2)	Reloc Dose (mrem)	Initial Doses Rate (mrem/hr)
Ru-106	130,000	29,000	67	1000	0.15
Cs-134	17,000	3,700	8.5	1000	0.16
I-131	1,500,000	330,000	770	1000	3.6

Rules of Thumb

1. The most restrictive nuclide in terms of projected relocation dose per measured initial dose rate is Cs-137 (about 7000 mrem per mrem/hr). Cesium-134 is the most restrictive nuclide in terms of projected relocation dose per unit contamination (about 120 mrem per $\mu Ci/m^2$).
2. Assuming a 10% smear collection efficiency, 10% counter efficiency, and 20 cm^2 area "seen" by the probe for a direct risk, the following relationships were developed:
   a Direct frisk $\mu Ci/m^2 = \frac{\text{net CPM}}{400}$

   Where net CPM is frisker count rate about 1" from surface in question.

   b Smear $\mu Ci/m^2 = \frac{\text{smear net CPM}}{200}$

   Where smear net CPM is frisker count rate of 100 cm^2 smear from a smooth surface.
3. Based on assumed radiological characteristics of releases from fuel melt accidents, gamma exposure rates in areas where the projected relocation dose is in the range of 1-5 Rems would be between about 2 and 10 mrem/hr during the first few days after shutdown following an SST-2 accident severity type. Ground deposition values in the range of 200-800 $\mu Ci/m^2$ could also be expected.

FIGURE

7.9 Relocation Protective Action Guidelines

Relocation Projected Dose (TEDE)	Recommended Actions
2000 mrem	Relocate General Public

COMMENTS:

1. To avoid social and family disruption and the complexity of implementing separate PAGs for individual members of the population, the relocation PAG may be applied for all members of the population. While the relocation PAG is based on projected doses to adults, infant relocation projected doses are not more than two times higher than adult projected doses.
2. Return is allowed at levels below the PAG.

FIGURE

7.10 Forms Utilized in Procedure

	NUMBER	TITLE
1.	5790-102-2	MONTICELLO EMERGENCY NOTIFICATION REPORT FORM
2.	5790-102-3	EMERGENCY NOTIFICATION FOLLOW-UP MESSAGE
3.	5790-204-1	MONTICELLO OFF-SITE PROTECTIVE ACTION RECOMMENDATION CHECKLIST
4.	5790-202-1	OFF-SITE SURVEY RESULTS DATA LOG
5.	5790-410-3	GROUND DEPOSITION SAMPLE RESULTS LOG