

DATE: 02/28/02
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ARDC8801

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CALLAWAY PLANT
EMERGENCY PLAN IMPLEMENTING PROCEDURE
EIP-ZZ-00212
PROTECTIVE ACTION RECOMMENDATIONS

RESPONSIBLE DEPARTMENT EMERGENCY PREPAREDNESS

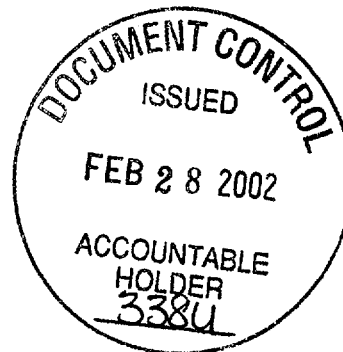
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DATE ISSUED 2-28-02



This procedure contains the following:

Pages	<u>1</u>	through	<u>7</u>
Attachments	<u>1</u>	through	<u>3</u>
Tables	<u> </u>	through	<u> </u>
Figures	<u> </u>	through	<u> </u>
Appendices	<u> </u>	through	<u> </u>
Checkoff Lists	<u> </u>	through	<u> </u>

This procedure has 0 checkoff list(s) maintained in the mainframe computer.

Conversion of commitments to TRS reference/hidden text completed by Revision Number:

Non-T/S Commitments 017

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PROTECTIVE ACTION RECOMMENDATIONS

1 PURPOSE AND SCOPE

1.1 PURPOSE

This procedure provides guidance in making protective action recommendations to the State and 10 mile Emergency Planning Zone (EPZ) counties for protecting members of the general public.

1.2 SCOPE

This procedure outlines protective action recommendations based on plant conditions and radiological dose projections.

2 DEFINITIONS

2.1 Initial Phase - the early stages of a radiological emergency which is characterized by the actual or possible presence of a plume within 10 miles of the plant. The initial phase is also called the "early phase" or the "plume phase" and is primarily concerned with protecting the public from the direct effects of the plume (i.e., exposure to and inhalation of airborne radioactive materials).

2.2 Ingestion Exposure Phase - similar to the Intermediate Phase of a radiological emergency except that the primary concern is protecting the public from ingestion of radioactive materials which may have been introduced into the food chain or public water supplies by deposition from the passing plume. Because both are based on deposition from the plume, the Intermediate Phase and the Ingestion Exposure Phase can occur concurrently.

2.3 Intermediate Phase - the stage of a radiological emergency which follows the Initial Phase. It is characterized by dissipation of the airborne plume and deposition of radioactive materials and is primarily concerned with protecting the public from the long-term effects of the deposited materials. Because protective actions may involve relocation of some members of the population, this phase is sometimes called the "relocation phase". The Intermediate Phase and the Ingestion Exposure Phase of a radiological emergency can occur concurrently.

- 2.4 Relocation - the long-term removal of members of the population from areas where plume deposition results in chronic exposures over a 1, 2, or 50-year period which exceeds the Environmental Protection Agency (EPA) protective action guide (PAG) values. Relocation is a protective action for the public which may be recommended by the state Department of Health (DOH) during the Intermediate Phase of a radiological emergency.

3 RESPONSIBILITIES

3.1 CONTROL ROOM

3.1.1 EMERGENCY COORDINATOR

Prior to the arrival of the Recovery Manager, in the EOF, the Emergency Coordinator has responsibility of evaluating plant conditions and/or dose assessment and making protective action recommendations to the State and local authorities.
(COMN 3954)

3.1.2 RADCHEM TECHNICIAN (TECHNICAL SUPPORT)

The Radchem Technician (TS) will report to the Control Room and supply dose projection information to the EC, until the Dose Assessment Coordinator arrives in the EOF. (COMN 3412)

3.1.3 CONTROL ROOM STAFF

The Control Room Staff will monitor plant conditions and assist in making protective action recommendations, until the Technical Assessment Coordinator (TSC) or the Protective Measures Coordinator (EOF), arrive at their respective facility.

3.2 TECHNICAL SUPPORT CENTER

3.2.1 TECHNICAL ASSESSMENT COORDINATOR

The Technical Assessment Coordinator will provide the Emergency Coordinator, in the absence of the Recovery Manager, with plant assessment information and assistance for making protective action recommendations until the Protective Measures Coordinator arrives at the EOF.

3.3 EMERGENCY OPERATIONS FACILITY

3.3.1 RECOVERY MANAGER

The Recovery Manager is responsible for approving protective action recommendations to the State and local authorities.
(COMN 3954)

3.3.2 PROTECTIVE MEASURES COORDINATOR

The Protective Measures Coordinator is responsible for evaluating the information received from the Plant Assessment Coordinator and the Dose Assessment Coordinator and making a protective action recommendation to the Recovery Manager.

3.3.3 PLANT ASSESSMENT COORDINATOR

The Plant Assessment Coordinator is responsible for informing the Protective Measures Coordinator of needed protective action recommendations due to plant conditions.

3.3.4 DOSE ASSESSMENT COORDINATOR

The Dose Assessment Coordinator is responsible for informing the Protective Measures Coordinator of needed protective action recommendations due to dose assessment projections.

4 INITIATING CONDITIONS

4.1 A General Emergency has been declared.

5 PROCEDURE

5.1 INITIAL (PLUME) PHASE PROTECTIVE ACTION RECOMMENDATIONS

5.1.1 Evaluate plant parameters and determine the appropriate protective action recommendations based on plant conditions using Attachment 1.

5.1.1.1 Immediate Protective Action Recommendations (COMN 3954)

Upon declaration of a General Emergency the initial protective action recommendation, as a minimum, SHALL be to evacuate a 2 mile radius around the plant and 5 miles downwind of the plant in affected sectors. This recommendation SHALL be made immediately to the offsite authorities in accordance with EIP-ZZ-00201, Notifications.

NOTE: The preferred Protective Action is to **Evacuate**. **Sheltering** should only be considered for the following situations:

- Travel conditions that would present an extreme hazard, or
- for controlled releases from containment if there is assurance that the release is short term and the area near the plant cannot be evacuated before the plume arrives.

The initial protective action recommendation ensures that the public receives protection from possible hazards until a more formal assessment and protective action recommendation can be made.

5.1.1.2 Subsequent Protective Action Recommendations

Subsequent protective action recommendations are made based on plant conditions (taking into account core and containment conditions) and/or dose assessment.

NOTE: Protective Action Recommendations should only be upgraded, never downgraded to a lesser Protective Action Recommendation.

5.1.2 If dose calculations project doses beyond 5 miles that exceed protective action recommendations for evacuation (1 Rem TEDE, 5 Rem CDE Thyroid), or if plant conditions dictate, upgrade protective action recommendations to evacuate a 5 mile radius around the plant and 10 miles downwind of the plant in affected sectors. CARS 200106229

- 5.1.3 If dose calculations project doses beyond 10 miles that exceed protective action recommendations for evacuation (1 Rem TEDE, 5 Rem CDE Thyroid), inform the EC/RM. Additionally, inform the State Emergency Management Agency (SEMA) and the Department of Health (DOH) and assist them in actions necessary to protect the public beyond the 10 mile Emergency Planning Zone. **CARS 199900240**
- 5.1.4 If affected sectors change based on meteorological conditions and weather forecasts, the protective actions should be modified accordingly and offsite authorities should be properly notified.
- 5.1.5 Weather forecasts **MUST** be updated periodically.
- 5.1.6 For short duration releases, (2 hours or less), sheltering of the public may be recommended for sectors that cannot be evacuated prior to plume arrival.
- 5.1.7 Attachment 2, Plume Arrival Time, may be used to determine plume arrival time.
- 5.1.8 Attachment 3, Evacuation Times and Population Densities, provides population estimates and evacuation time estimates.
- 5.2 **NOTIFICATIONS**
- 5.2.1 The Emergency Coordinator/Recovery Manager **MUST** ensure that appropriate notifications are made regarding protective action recommendations in accordance with **EIP-ZZ-00201**, Notifications.
- 5.2.2 Protective action recommendations should be coordinated with the Department of Health (DOH) and SEMA, if possible, when their Forward Command Post in the EOF is staffed.

<p><u>NOTE:</u></p>	<p>Notifications that initiate or change Protective Action Recommendations should be completed with the same urgency as initial notifications (i.e. within 15 minutes of PAR declaration or change).</p>
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5.3 INTERMEDIATE (RELOCATION) AND INGESTION
EXPOSURE PHASES

Additional protective actions may be required during the Intermediate and Ingestion Exposure phases of an event which results in a release of radioactive material into the environment. Recommendations for these relocation and ingestion pathway protective actions are made by the Department of Health (DOH).

6 FINAL CONDITIONS

- 6.1 Additional offsite protective action recommendations should no longer be required once the requirements for Plant Recovery have been met and Plant Recovery has been declared in accordance with **EIP-ZZ-00260**, Event Closeout/Plant Recovery.

<p><u>NOTE:</u> Offsite authorities may decide to continue previously implemented offsite protective actions until more information becomes available.</p>
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7 REFERENCES

- 7.1 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents
- 7.2 NUREG 0654/FEMA-REP-1, Criteria for Preparation of and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 7.3 NUREG 0654/FEMA-REP-1, Rev.1, Supp.3 Criteria for Preparation of and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants
- 7.4 **EIP-ZZ-00101**, Classification of Emergencies
- 7.5 **EIP-ZZ-00102**, Emergency Implementing Actions
- 7.6 **EIP-ZZ-00201**, Notifications
- 7.7 **EIP-ZZ-01211**, Management Action Guides For Nuclear Emergencies (MAGNEM)

8 RECORDS

None

The flowchart, titled "EALs for a Loss of Coolant Accident (LOCA)", outlines the decision-making process for Emergency Action Levels (EALs) following a LOCA. It begins with a "START" oval leading to a decision diamond: "General Emergency has been declared?".

- If **No**, the path leads to a box: "Protective actions are not necessary. Continue to evaluate EALs.", which then loops back to the "START" oval.
- If **Yes**, the path leads to a box: "On Initial Notification, recommend, as a minimum, Evacuation 2 miles around and 5 miles downwind in the affected sectors. (SEE NOTE 2, ATT. 1 pg 2 of 2)". This leads to a box labeled "SUBSEQUENT PARS".

From "SUBSEQUENT PARS", the flowchart branches based on several criteria:

- CHARMs > 300 R/hr (100 R/hr sprays on)**:
 - If **Yes**, it leads to "Group 2 Containment Loss Indicator EAL 1.a".
 - If **No**, it leads to a decision: "Meet the entry requirements for FR-C.1?".
 - If **Yes**, it leads to "Group 2 Containment Loss Indicator EAL 1.b".
 - If **No**, it leads to a decision: "Containment H₂ > 6%".
 - If **Yes**, it leads to "VESSEL MELT THROUGH (See Note 1 Att. 1 pg 2 of 2)".
 - If **No**, it leads to "Group 2 Containment Loss Indicator EAL 1.b".
- Is the projected dose at any location > 1 Rem TEDE or > 5 Rem Thyroid?**:
 - If **Yes**, it leads to "For short duration releases (hrs), sheltering may be recommended for areas that cannot be evacuated prior to plume arrival. (SEE NOTE 2 Att. 1 pg 2 of 2)". This leads to a box: "Upgrade PARS as appropriate. (SEE NOTES 3,4,5 ATT. 1 pg 2 of 2)", which then loops back to "SUBSEQUENT PARS".
 - If **No**, it leads to a decision: "Has a Dose Calc been performed?".
 - If **Yes**, it leads to "Recommend Evacuation 5 miles around and 10 miles downwind in the affected sectors".
 - If **No**, it leads to a decision: "Containment H₂ > 2%".
 - If **Yes**, it leads to "VESSEL MELT THROUGH (See Note 1 Att. 1 pg 2 of 2)".
 - If **No**, it leads to a decision: "CHARMs > 1E+6 R/hr (4E+5 R/hr sprays on)".
 - If **Yes**, it leads to "VESSEL MELT THROUGH (See Note 1 Att. 1 pg 2 of 2)".
 - If **No**, it leads to a decision: "Containment H₂ > 2%".
 - If **Yes**, it leads to "VESSEL MELT THROUGH (See Note 1 Att. 1 pg 2 of 2)".
 - If **No**, it leads to a decision: "CHARMs > 30,000 R/hr (> 10,000 R/hr sprays on)".
 - If **Yes**, it leads to "SEVERE CORE DAMAGE (See Note 1 Att.1 page 2 of 2)".
 - If **No**, it leads to a decision: "Core exit thermocouples > 2,000 deg F".
 - If **Yes**, it leads to "SEVERE CORE DAMAGE (See Note 1 Att.1 page 2 of 2)".
 - If **No**, it leads to "Aux/Fuel Bldg Emergency Exhaust filter train(s) operating?".
 - If **Yes**, it leads to "Recommend Evacuation 5 miles around and 10 miles downwind in the affected sectors".
 - If **No**, it leads to "Group 2 Containment Loss Indicator EAL 1.b".

The flowchart includes several "Group 2 Containment Loss Indicator" boxes with specific criteria:

 - EAL 1.a**: a) A rapid unexplained loss of CTMT pressure following an initial increase in pressure.
 - EAL 2**: Incomplete CTMT isolation allowing a direct release to the environment following a valid CTMT isolation signal (CISA, CISB, CPIS).
 - EAL 3**: SG Release with Primary-Secondary Leakage and:
 - a) Pri-to-sec leakage greater than Tech Spec allowable.
 - b) Any of the following:
 - The leaking SG pressure is decreasing in an uncontrolled manner or completely depressurized.
 - Manual use of the leaking SG PORV for cooldown.
 - The leaking SG is supplying the TDAFW turbine.
 - EAL 4 or 5**:
 - Meet the entry requirements for FRZ.1, Red Path Summary for CTMT.
 - Containment Pressure:
 - a) H₂ concentration in containment > 4%.
 - b) Less than 1 full train of CTMT spray and CTMT cooling fans, with CTMT pressure greater than 27 psig.
 - EAL 1.b**: b) CTMT pressure or sump level not increasing with a LOCA.

The flowchart concludes with a box: "Recommend Evacuation 5 miles around and 10 miles downwind in the affected sectors", which leads back to the "START" oval.

PAR FLOWCHART NOTES

<u>NOTE</u>	<u>DESCRIPTION</u>
1	Notify Dose Assessment to use "SEVERE CORE DAMAGE" calculations.
2	<p>The preferred Protective Action is to Evacuate.</p> <p>Sheltering should only be considered for the following situations:</p> <ul style="list-style-type: none"> a) Travel conditions that would present an extreme hazard, or b) For controlled releases from containment if there is assurance that the release is short term and the area near the plant cannot be evacuated before the plume arrives.
3	If dose calculation project doses beyond 5 miles that exceed protective action recommendation for evacuation (1 Rem TEDE, 5 Rem CDE Thyroid), upgrade protective action recommendations to evacuated a 5 mile radius around the plant and 10 miles downwind of the plant in affected sectors.
4	If dose calculation project doses beyond 10 miles that exceed protective action recommendation for evacuation (1 Rem TEDE, 5 Rem CDE Thyroid), inform the EC/RM. Additionally, inform the State Emergency Management Agency (SEMA) and the Department of Health (DOH) and assist them in action necessary to protect the public beyond the 10 mile Emergency Planning Zone.
5	If affected sectors change based on meteorological conditions and weather forecasts, the protective actions should be modified accordingly and offsite authorities should be properly notified.

PLUME ARRIVAL TIME

WIND SPEED (m/s)	DISTANCE (Miles)												
	EAB	1	2	3	4	5	6	7	8	9	10	12	15
0.5	0.7	0.9	1.8	2.7	3.6	4.5	5.5	6.4	7.3	8.2	9.1	11.0	13.6
1.0	0.3	0.4	0.9	1.3	1.7	2.2	2.7	3.6	3.6	4.0	4.4	5.3	6.7
2.0	0.2	0.2	0.4	0.7	0.9	1.1	1.3	1.8	1.8	2.0	2.2	2.7	3.3
4.0	0.1	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.7
6.0	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.9	1.1
8.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8
10.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.7
12.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.6
14.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5
16.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4
18.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
20.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
30.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2

NOTE

Times in above table are in hours and tenths of hours.

EVACUATION TIMES AND POPULATION DENSITIES

SECTOR	0 - 2 MILES		2 - 5 MILES		5 - 10 MILES	
	AFFECTED SUBAREA	EVACUATION (2) TIME	AFFECTED SUBAREA	EVACUATION (2) TIME	AFFECTED SUBAREA	EVACUATION (2) TIME
A	C1	3:30	C3	3:25	C3, C10	3:25
B	C1	3:30	C3	3:25	C3, C10, C11	3:25
C	C1	3:30	C3, C4	3:25	C11, M1	3:15
D	C1	3:30	C3	3:25	C4, C11, M1	3:25
E	C1	3:30	C4, C5	3:25	C4, M1, M2	3:25
F	C1	3:30	C4, C5	3:25	C4, M2, G1	3:25
G	C1	3:30	C4, C5	3:25	C4, 01	3:25
H	C1	3:30	C5	3:15	01	3:09
J	C1	3:30	C5, C6	3:27	01	3:09
K	C1	3:30	C6	3:27	01	3:09
L	C1	3:30	C6	3:27	C7	3:09
M	C1	3:30	C6	3:27	C6, C7	3:25
N	C1	3:30	C2, C6	3:27	C6, C2, C8, C7	3:25
P	C1	3:30	C2	3:25	C8, C9	3:07
Q	C1	3:30	C2	3:25	C2, C8, C9	3:25
R	C1	3:30	C2, C3	3:25	C10, C8	3:13

SUBAREA POPULATION AND EVACUATION ESTIMATE

SUBAREA	(1) POPULATION	(2) EVACUATION ESTIMATE	SUBAREA	(1) POPULATION	(2) EVACUATION ESTIMATE
C1	318	3:30	C9	10188	2:57
C2	521	3:25	C10	399	3:13
C3	778	3:25	C11	235	3:15
C4	406	3:25	M1	158	3:03
C5	127	3:15	M2	494	3:09
C6	365	3:27	G1	173	2:51
C7	1121	3:09	01	903	3:09
C8	1696	3:07			

1. Includes permanent and transient population
2. Maximum Time Estimates (in Hours:Minutes) for evacuation of population during most critical time period. Includes time for; a) Receiving Notification, b) Leaving Place of Work, c) Work to Home Travel, d) Preparing for Evacuating Home, and e) Travel Out of EPZ.