CALLAWAY PLANT

EMERGENCY PLAN IMPLEMENTING PROCEDURE

EIP-ZZ-00212

PROTECTIVE ACTION RECOMMENDATIONS

RESP. DEPT. Emergency Preparedness PREPARED BY Richard Grundstrom

APPROVED BY [signature] DATE 2-1-84

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This procedure contains the following:

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DEFICIENCY LIST

Section	Deficiency Description	Constraints
Attachment 5	Subarea population and evacuation estimates are not available until February 1984	None

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PROTECTIVE ACTION RECOMMENDATIONS

1.0 PURPOSE AND SCOPE

The purpose of this procedure is to provide guidance and instruction for making protective action recommendations during a radiological accident at the Callaway Plant to those offsite agencies responsible for implementation of protective actions for the general public.

2.0 RESPONSIBILITIES

2.1 The Emergency Coordinator or Recovery Manager, upon transfer of responsibilities, is responsible for making protective action recommendations to the agencies responsible for implementing protective actions for the general public.

2.2 The Health Physics Coordinator (HPC) is responsible for providing information concerning radiological assessment to the Emergency Coordinator for use in making protective action recommendations.

2.3 The Radiological Assessment Coordinator (RAC) is responsible for providing information concerning radiological assessment to the Recovery Manager for use in making protective action recommendations.

2.4 The Technical Assessment Coordinator (TAC) is responsible for providing information concerning plant conditions to the Emergency Coordinator.

2.5 The Technical Support Coordinator is responsible for providing information concerning plant conditions to the Recovery Manager.

3.0 INITIATING CONDITIONS

3.1 An emergency requiring dose projections or assessment has been declared.

3.2 An emergency, in which plant conditions indicate that a core melt sequence is in progress, or projected.

3.3 At the discretion of the Emergency Coordinator/Recovery Manager.

4.0 PROCEDURE

The Emergency Coordinator/Recovery Manager shall make the necessary protective action recommendations to the offsite authorities following the appropriate guideline of this procedure.

4.1 Plume Exposure Pathway

Protective action recommendations can be derived by utilizing Attachment 1, Protective Action Decision Flow Chart.

4.1.1 Upon declaration of a GENERAL EMERGENCY an immediate protective action recommendation for shelter in the 2 mile radius and 5 miles downwind should be made. This recommendation should be modified upon evaluation of plant, radiological, and meteorological conditions, as appropriate.

4.1.2 Utilizing information on plant conditions, core status, and radiological status, determine the appropriate recommendation(s) by following the correct flow path on Attachment 1.

NOTE The Health Physics Coordinator, Radiological Assessment Coordinator, Technical Assessment Coordinator, or Technical Support Coordinator shall supply the Emergency Coordinator or Recovery Manager with the appropriate protective action recommendation utilizing Attachment 1, when directed or when conditions from the respective areas indicate a protective action recommendation should be made.

4.1.3 If an evacuation is recommended, recommend shelter for areas that cannot be evacuated before the plume arrive.

4.1.3.1 The Health Physics Coordinator/Radiological Assessment Coordinator can supply the necessary plume travel information utilizing the guidance of EIP-ZZ-01211, Initial and Intermediate Dose Assessment.

4.1.4 The projected whole body dose, thyroid dose, the affected area(s), and plume arrival time shall be supplied by the Health Physics Coordinator/Radiological Assessment Coordinator and recorded on Attachment 7, Protective Action Recommendations.

4.1.4.1 Upon obtaining projected whole body and thyroid doses for affected areas the Health Physics Coordinator/Radiological Assessment Coordinator shall advise the Emergency Coordinator/Recovery Manager on the appropriate protective action recommendation.

4.1.5 Record the appropriate recommendations on Attachment 7, Protective Action Recommendations and ensure that the Followup Notification Form and the Status Boards are updated.

4.2 Ingestion Exposure Pathway

Protective action recommendations for the Ingestion Exposure Pathway should be made for protecting the public from unnecessary exposure from this path. These recommendations should not have to be made during the initial phases of an accident. During the initial phase the primary concern should be from direct exposure to a passing plume and the inhalation of radioactive materials.

4.2.1 Protective action recommendations for the Ingestion Exposure Pathway should be made utilizing Attachment 2, Protective Action Decision Chart - Ingestion Exposure Pathway and initiated upon significant projected or measured contamination levels in the environment.

4.2.2 The Health Physics Coordinator/Radiological Assessment Coordinator should supply the contamination levels needed to make the appropriate recommendations and advise the Emergency Coordinator/Recovery Manager on the proper recommendation.

4.2.2.1 The Health Physics Coordinator/Radiological Assessment Coordinator shall obtain the needed information utilizing the guidance of EIP-ZZ-02211.

4.3 Notifications

The Emergency Coordinator/Recovery Manager shall ensure the appropriate notifications are made regarding protective action recommendations in accordance with EIP-ZZ-00201, Notifications.

4.3.1 Recommendations should be given directly to the Bureau of Radiological Health/SEMA, if they have activated their Forward Command Post in the EOF, utilizing the SEMA Additional Notification Form.

NOTE The protective action recommendations given to the local authorities should be first coordinated with SEMA if at all possible.

4.3.2 If the State's Forward Command Post is not activated ensure notifications are made in accordance with EIP-ZZ-00201, utilizing the SEMA Additional Notification Form.

5.0 FINAL CONDITIONS

5.1 Dose assessment and technical assessment have determined that the radiological release has stopped or diminished and there is not a potential for additional releases, and

5.2 All protective action recommendations have been made in accordance with this procedure.

6.0 RECORDS

6.1 QA RECORDS

6.1.1 Attachment 6, Protective Action Recommendations

7.0 REFERENCES

7.1 EPA 520/1-75-001, 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 Callaway Plant Radiological Emergency Response Plan (RERP)

| 7.4 U.S. Food and Drug Administration, Federal Register, Vol. 43, No. 242, Friday, December 15, 1978, Proposed Rules, 21 CFR Part 1090, Accidental Radioactive Contamination of Human Food and Animal Feeds

| 7.5 EIP-ZZ-01211, Initial and Intermediate Dose Assessment

| 7.6 EIP-ZZ-00201, Notifications

8.0 ATTACHMENTS

| 8.1 Attachment 1, Protective Action Desision Flow Chart

| 8.2 Attachment 2, Protective Action Decision Chart - Ingestion Exposure Pathway

| 8.3 Attachment 3, Emergency Protective Actions for the Ingestion Exposure Pathway

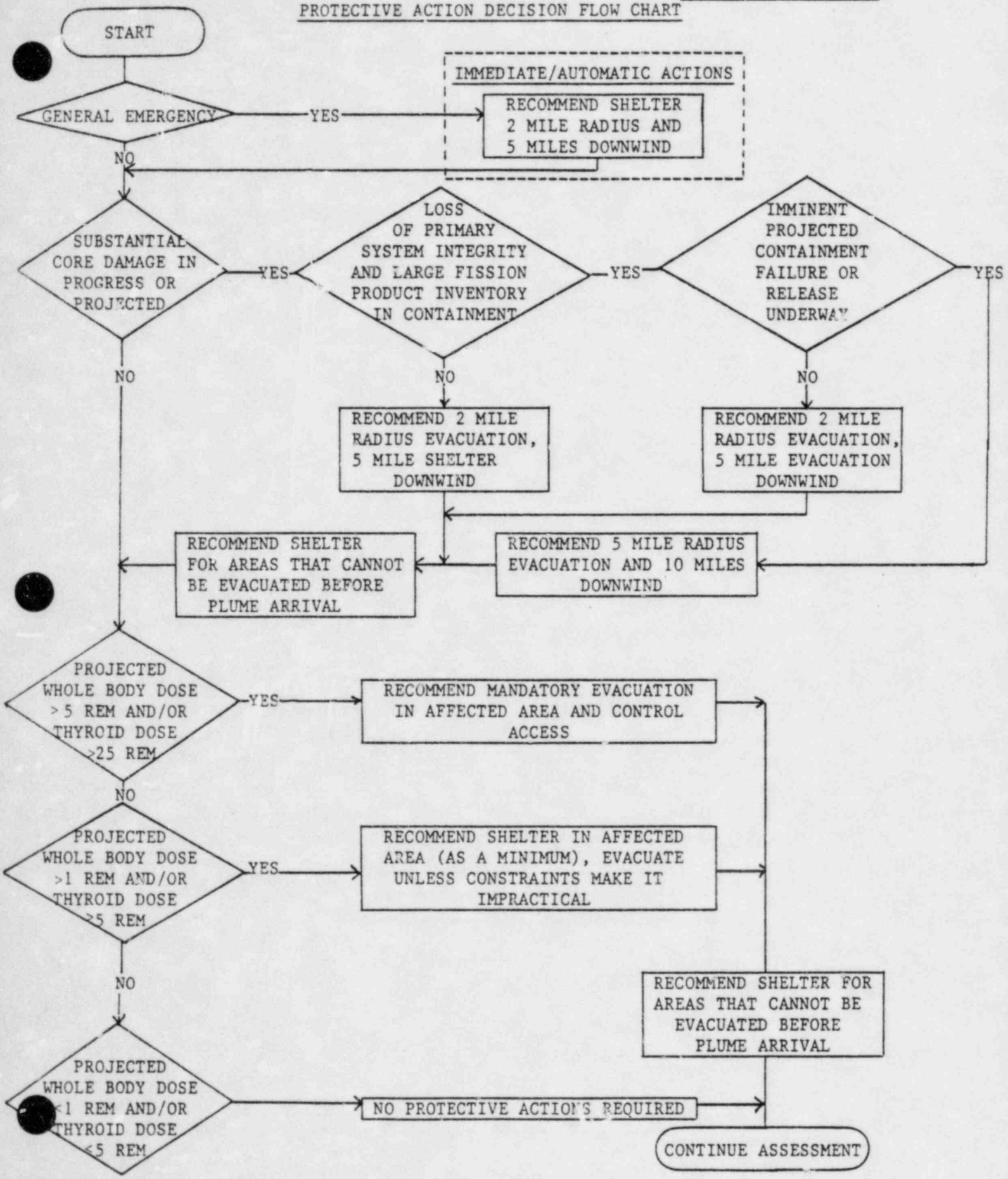
| 8.4 Attachment 4, Preventative Protective Actions for the Ingestion Exposure Pathway

| 8.5 Attachment 5, Sector-Subarea Matrix

| 8.6 Attachment 6, Plume Travel Time

| 8.7 Attachment 7, Protective Action Recommendations

PROTECTIVE ACTION DECISION FLOW CHART



PROTECTIVE ACTION DECISION CHART
INGESTION EXPOSURE PATHWAY

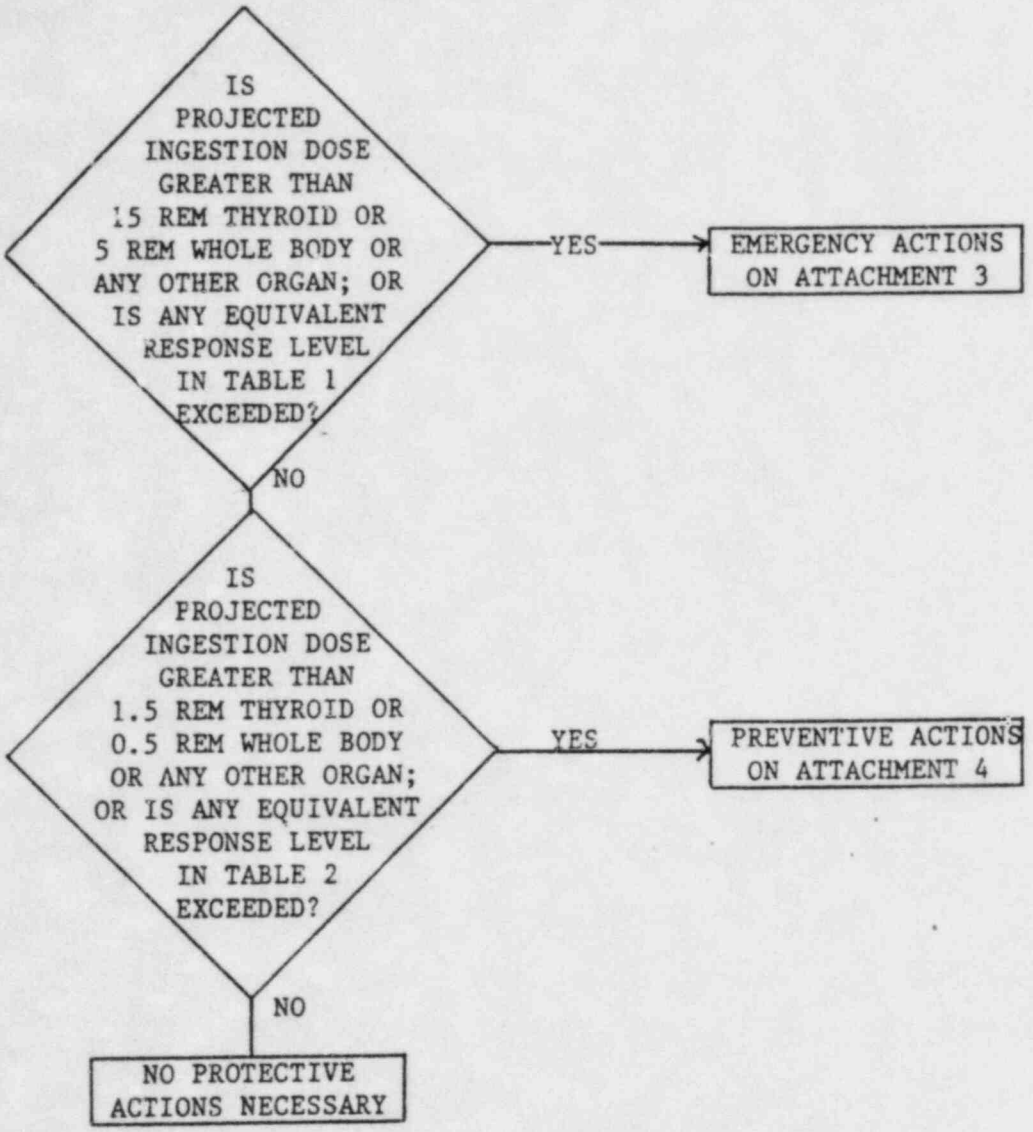


TABLE 1 - RESPONSE LEVELS FOR EMERGENCY PAG
(Infant Critical Population Segment)

	CRITICAL ORGAN	SURFACE CONTAMINATION (uCi/m^2)	MILK OR DRINKING WATER (uCi/l)	TOTAL INTAKE (uCi)	PASTURE GRASS (uCi/KG)
I-131	THYROID	1.4	0.12	0.9	2.7
Cs-137	WHOLE BODY	17	3.4	70	35
Sr-90	BONE	3.4	0.08	2.0	7.0
Sr-89	BONE	60	1.3	26	130

TABLE 2 - RESPONSE LEVELS FOR PREVENTIVE PAG

	CRITICAL ORGAN	SURFACE CONTAMINATION (uCi/m^2)	MILK OR DRINKING WATER (uCi/l)	TOTAL INTAKE (uCi)	PASTURE GRASS (uCi/KG)
I-131	THYROID	.14	.012	.09	.27
Cs-137	WHOLE BODY	1.7	.34	7.0	3.5
Sr-90	BONE	.34	.008	.20	.70
Sr-89	BONE	6.0	.13	2.6	13

EMERGENCY PROTECTIVE ACTION GUIDELINES FOR THE INGESTION EXPOSURE PATHWAY

Emergency action to be considered:

Isolate milk, drinking water or food containing radioactivity to prevent its introduction into commerce and determine whether condemnation or another dispostion is appropriate. Before taking this action, the following factors should be considered:

1. The availability of other possible protective actions.

2. Relative proportion of the total diet by weight represented by the item in question.

3. The importance of the particular food in nutrition and the availability of uncontaminated food or substitutes having the same nutritional properties.

4. The relative contribution of other foods and other radionuclides to the total projected dose.

5. The time and effort required to effect corrective action.

PREVENTATIVE PROTECTIVE ACTIONS FOR THE INGESTION EXPOSURE PATHWAY

Preventative actions to be considered:

1. For pasture:

   a. Removal of lactating dairy cows from contaminated pasturage and substitution of uncontaminated stored feed.

   b. Substitute source of uncontaminated water.

2. For milk:

   a. Withholding of contaminated milk from the market to allow radioactive decay of short-lived radionuclides. This may be achieved by storage of frozen fresh milk, frozen concentrated milk, or frozen concentrated milk products.

   b. Storage for prolonged times at reduced temperatures also is feasible provided ultrahigh temperature pasteurization techniques are employed for processing.

   c. Diversion of fluid milk for production of dry whole milk, nonfat dry milk, butter, or evaporated milk.

3. For fruits and vegetables:

   a. Washing, brushing, scrubbing, or peeling to remove surface contamination.

   b. Preservation by canning, freezing, and dehydration or storage to permit radioactive decay of short-lived radionuclides.

4. For grains:

   a. Milling

   b. Polishing

5. For other food products:

   a. Processing to remove surface contamination.

6. For meat and meat products:

   a. Consider on a case-by-case basis.

7. For animal feeds:

   a. Actions relative to animal feeds, other than pasture, should be carried out on a case-by-case basis.

   b. Increase noncontaminated mineral calcium to a maximum.

SECTOR - SUBAREA MATRIX

	AFFECTED SUBAREA AND EVACUATION TIME					
	0 - 2 MILES		2 - 5 MILES		5 - 10 MILES	
SECTOR	SUBAREA	EVACUATION TIME	SUBAREA	EVACUATION TIME	SUBAREA	EVACUATION TIME
A	C1		C3		C3, C10	
B	C1		C3		C3, C10, C11	
C	C1		C3, C4		C11, M1	
D	C1		C4		C4, C11, M1	
E	C1		C4, C5		C4, M1, M2	
F	C1		C4, C5		C4, M2, G1	
G	C1		C4, C5		C4, O1	
H	C1		C5		O1	
	C1		C5, C6		O1	
K	C1		C6		O1	
L	C1		C6		C7	
M	C1		C6		C6, C7	
N	C1		C2, C6		C6,C2,C8,C7	
P	C1		C2		C8, C9	
Q	C1		C2		C2, C8, C9	
R	C1		C2, C3		C10, C8	

SUBAREA POPULATION AND EVACUATION ESTIMATE

SUBAREA	POPULATION	EVACUATION ESTIMATE	SUBAREA	POPULATION	EVACUATION ESTIMATE
C1			C9		
C2			C10		
C3			C11		
C4			M1		
C5			M2		
C6			G1		
C7			O1		
C8					

PLUME ARRIVAL TIME

(Hours From Time Release Began)

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

PROTECTIVE ACTION RECOMMENDATIONS

DATE _____ TIME _____

	PROTECTIVE ACTION (Circle as Appropriate)	PLUME ARRIVAL TIME	PROJECTED DOSE WHOLE BODY	PROJECTED DOSE THYROID
EAB - 2 Miles	None/Evacuate/Shelter	_____	_____	_____
2 - 5 Miles	None/Evacuate/Shelter	_____	_____	_____
	All/Affected Sectors/Adjacent Sectors			
5 - 10 Miles	None/Evacuate/Shelter	_____	_____	_____
	All/Affected Sectors/Adjacent Sectors			
OTHER _____	None/Evacuate/Shelter	_____	_____	_____
	All/Affected Sectors/Adjacent Sectors			

Affected Sectors A B C D E F G H J K L M N P Q R

Adjacent Sectors A B C D E F G H J K L M N P Q R

NOTES: _____

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_____
Emergency Coordinator/Recovery Manager
(Signature)