CALLAWAY PLANT

EMERGENCY PLAN IMPLEMENTING PROCEDURE

EIP-ZZ-00211

FIELD MONITORING ACTIVITIES and ASSESSMENT

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This procedure contains the following:

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DEFICIENCY LIST

Section	Deficiency Description	Constraints
Attachment 1	Justification for Stability Class determination using wind deviation not available.	None

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COORDINATION OF FIELD MONITORING ACTIVITIES

1.0 PURPOSE

The purpose of this procedure is to provide guidance in directing field monitoring activities and utilizing field information to determine the offsite doses.

2.0 RESPONSIBILITIES

2.1 The Health Physics Coordinator (HPC) is responsible for ensuring Field Monitoring Teams are formed by the Radiological Controls Coordinator, providing Dose Assessment results to the Emergency Coordinator for making Protective Action Recommendations, and providing direction to the Dose Assessment Coordinator.

2.2 The Radiological Assessment Coordinator (RAC) is responsible for ensuring Field Monitoring Teams and the Field Team Communicator are requested through the Health Physics Coordinator, providing Dose Assessment Results to the Recovery Manager for making protective action recommendations, and providing direction to the Dose Assessment Coordinator.

2.3 The Dose Assessment Coordinator (DAC) is responsible for directing Field Monitoring Activities, performing dose assessment based upon field results, and updating the Health Physics Coordinator/Radiological Assessment Coordinator on off site doses. The Dose Assessment Coordinator shall ensure that dose projections are updated as needed, based on changes in radiological and meteorological data.

3.0 INITIATING CONDITIONS

3.1 This procedure will be initiated at any time Field Monitoring Teams are to be formed and/or dispatched.

4.0 PROCEDURE

4.1 Forming Field Monitoring Teams

4.1.1 The Radiological Controls Coordinator should assign RadChem Technician(s) to Field Monitoring Team(s) upon activation of the On-Site Emergency Organization.

4.1.2 The initial team(s) formed shall be instructed to initiate EIP-ZZ-00223 and to standby in the EOF parking lot for further instructions.

4.1.3 The Health Physics Coordinator shall direct the Radiological Controls Coordinator to form Field Monitoring Teams, per EIP-ZZ-00220, Emergency Team Formation, when teams are needed, and request a RadChem Technician to fill the position of Field Team Communicator.

4.2 Directing Field Monitoring Activities

4.2.1 The Dose Assessment Coordinator shall direct Field Monitoring Team activities, via a Field Team Communicator. The Dose Assessment Coordinator shall:

4.2.1.1 Ensure the implementation of EIP-ZZ-00223, Field Monitoring.

4.2.1.2 Instruct the Field Team Communicator to establish contact with the Field Monitoring Teams and provide the following information:

4.2.1.2.1 Affected sector(s) and locations to be sampled. Specific sampling locations are designated in EIP-ZZ-00223, Field Monitoring.

NOTE The initial sampling location should be that sampling location at the EAB nearest to the plume centerline, in order to verify the emergency classification. Subsequent locations should be chosen based on factors such as topographical features and wind direction changes, in order to locate the plume centerline (highest concentration).

4.2.1.2.2 The type of measurements to be taken (e.g. dose rate, count rate, I-131 analysis, etc.).

4.2.1.2.3 The type of samples to collect (e.g. air, iodine, water, vegetation, etc.).

4.2.1.2.4 Instruction to don protective clothing and respiratory protection when radiological conditions warrant such actions.

4.2.1.2.5 Locations and individual to which samples shall be delivered.

NOTE Samples shall normally be taken to the EOF Laboratory for storage and further analysis if necessary.

4.2.1.2.6 Debriefing instructions when Field Monitoring Activities are complete.

4.3 Plume Tracking

To determine the plume dimensions the Dose Assessment Coordinator shall instruct the Field Monitoring Teams to report any increase in count rate or dose rate on survey instrumentation during transit.

4.3.1 To find the plume centerline and plume edges Field Monitoring Teams should be instructed to drive through the suspected plume location observing the survey instruments, noting the changes in readings and locations.

4.3.2 Sampling locations specified in EIP-ZZ-00223 can be modified based upon suspected or actual plume location.

4.3.2.1 Air particulate sample, iodine sample, noble gas sample, ground level survey and area dose rates should be taken at the plume centerline.

4.3.3 Teams should zig-zag through the suspected plume to monitor any changes in the plume centerline or edges.

4.4 Dose Assessment

4.4.1 The Dose Assessment Coordinator shall update dose assessment based upon field monitoring data.

4.4.2 Enter field monitoring sampling data on Attachment 2, Dose Assessment Worksheet, or if an isotopic analysis was performed enter isotopic concentrations on Attachment 3, Dose Rate Calculation Worksheet.

NOTE The data used to perform this dose assessment should be from the plume centerline.

4.4.3 Determine the stability class using the Delta-T on Attachment 2 and circle the entire column (Delta-T to the last Xu/Q value).

4.4.3.1 If Delta-T is not available the stability class can be determined utilizing the wind deviation from the secondary meteorological tower and Attachment 1, Stability Class Determination. Circle the entire column under the appropriate stability class on Attachment 2.

4.4.4 Select the correct survey location Xu/Q for the location at which the measurements or sample was taken. This can be obtained from the Xu/Q values on Attachment 2 or from Attachment 1 if the survey location/distance is not given on Attachment 2.

4.4.5 Enter the correct survey location Xu/Q, whole body dose rate, and I-131 concentration on Attachment 2.

4.4.6 Enter the correct Dose Equivalent Factor.

4.4.7 Perform the calculation as indicated on Attachment 2.

4.4.8 If an isotopic analysis was performed on a noble gas sample and/or an iodine cartridge perform the calculations on Attachment 3.

4.4.8.1 Transfer the calculated whole body dose rate from Attachment 3 to Attachment 2 and perform the calculations on Attachment 2, utilizing Steps 4.4.2 through 4.4.6.

4.4.8.2 Transfer the calculated Thyroid Dose Rate from Attachment 3 to the I-131 concentration on Attachment 2. Perform the calculations indicated EXCLUDING the Dose Equivalent Factor and Thyroid Dose Factor.

4.4.9 Compare the dose rates and cumulative dose to the Protective Action Guidelines and Emergency Action Levels, using Attachment 4, Protective Action Recommandations and Emergency Action Levels, as guidance, to determine if any change in Emergency Action Levels or Protective Action Recommendation is required.

4.4.10 Inform the Health Physics Coordinator or Radiological Assessment Coordinator if any change in Emergency Action Levels or Protective Action Recommendations required.

4.4.11 Update the status boards based upon Field Monitoring Data. Ensure any changes on status boards are relayed to the TSC or EOF as appropriate to keep status boards consistent.

5.0 FINAL CONDITIONS

5.1 All Field Monitoring Teams have reported for debriefing.

5.2 All dose assessment based on Field Monitoring Data is completed.

6.0 QA RECORDS

6.1 Completed Dose Assessment Worksheet, Attachment 2.

6.2 Completed Dose Rate Calculation Worksheet, Attachment 3.

7.0 REFERENCES

7.1 EIP-ZZ-00223, Field Monitoring

7.2 EIP-ZZ-01211, Initial Dose Assessment

7.3 EIP-ZZ-02211, Intermediate Phase and subsequent Dose Assessment

8.0 ATTACHMENTS

8.1 Attachment 1, Stability Class Determination

8.2 Attachment 2, Dose Assessment Worksheet

8.3 Attachment 3, Dose Rate Calculation Worksheet

*DETERMINATION OF PASQUILL STABILITY CLASS USING WIND DEVIATION

STABILITY CLASS	WIND DEVIATION - SIGMA THETA (DEGREES)
A - Extremely Unstable	SIGMA THETA ≥ 22.5
B - Moderately Unstable	22.5 > SIGMA THETA ≥ 17.5
C - Slightly Unstable	17.5 > SIGMA THETA ≥ 12.5
D - Neutral	12.5 > SIGMA THETA ≥ 7.5
E - Slightly Stable	7.5 > SIGMA THETA ≥ 3.8
F - Moderately Stable	3.8 > SIGMA THETA ≥ 2.1
G - Extremely Stable	2.1 > SIGMA THETA

$\frac{\bar{X}u}{Q}$ VALUES S-m/s m^3

STABILITY CLASS

DISTANCE	A	B	C	D	E	F	G
EAB	2.0 E-6	1.2 E-5	3.2 E-5	1.1 E-4	2.1 E-4	5.0 E-4	1.1 E-3
1 Mile	1.1 E-6	7.2 E-6	2.1 E-5	8.1 E-5	1.4 E-4	3.4 E-4	8.6 E-4
2 Miles	5.4 E-7	9.0 E-7	5.9 E-6	2.3 E-5	4.0 E-5	1.1 E-4	2.7 E-4
3 Miles	4.0 E-7	5.0 E-7	2.8 E-6	1.2 E-5	2.4 E-5	5.9 E-5	1.4 E-4
4 Miles	3.2 E-7	4.0 E-7	1.8 E-6	8.1 E-6	1.5 E-5	4.0 E-5	1.0 E-4
5 Miles	2.5 E-7	3.2 E-7	1.3 E-6	5.9 E-6	1.3 E-5	3.2 E-5	8.1 E-5
6 Miles	2.1 E-7	2.7 E-7	9.9 E-7	4.4 E-6	9.9 E-6	2.4 E-5	6.3 E-5
7 Miles	1.9 E-7	2.3 E-7	8.1 E-7	3.7 E-6	8.6 E-6	2.2 E-5	5.4 E-5
8 Miles	1.8 E-7	2.1 E-7	6.3 E-7	3.3 E-6	7.2 E-6	1.9 E-5	4.5 E-5
9 Miles	1.7 E-7	2.1 E-7	5.4 E-7	2.7 E-6	6.8 E-6	1.6 E-5	4.2 E-5
10 Miles	1.6 E-7	1.9 E-7	4.5 E-7	2.2 E-6	5.4 E-6	1.4 E-5	3.7 E-5
12 Miles	1.2 E-7	1.4 E-7	3.1 E-7	1.9 E-6	4.3 E-6	1.2 E-5	2.9 E-5
15 Miles	1.1 E-7	1.3 E-7	2.2 E-7	1.2 E-6	3.1 E-6	8.6 E-6	2.2 E-5

To obtain X/Q, divide above by the windspeed in m/s.

TIME_____ PROJECTION NO. _____

DOSE ASSESSMENT FROM RELEASE RATE

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METEOROLOGICAL DATA

Wind Direction _____° From Windspeed (10m) = _____m/sec (u)

Delta T (90m - 10m) _____°C/80m

Delta T (60m - 10m) _____°C/50m x (1.6) = _____°C/80m

Delta T in °C/80m [circle appropriate column]

-1.50	-1.50 to -1.35	-1.35 to -1.20	-1.20 to -0.40	-0.40 to 1.20	1.20 to 3.20	3.20

SAMPLE DATA

Time of Sample _____
Survey Location _____
Measured Dose Rate _____mR/hr
I-131 Concentration _____uCi/cc

Dose Equivalent Factor
1.6 . 0 to 40 hours from reactor shutdown
or .
1 . After 40 hours from reactor shutdown

Stability Class

	A	B	C	D Xu/Q	E	F	G	Survey Location Xu/Q	Survey Location Dose Rate (mR/hr)	Survey Location I-131 Concentration (uCi/cc)	Dose Equivalent Factor	Child Thyroid Dose Factor (mRem-cc/uCi-hr)	Dose Rate Thyroid (mR/hr)	Dose Rate Whole Body (mR/hr)	Release Duration (hrs)	Projected Dose Thyroid (mR)	Projected Dose Whole Body (mr)
EAB	2.0E-6	1.1E-5	3.2E-5	1.1E-4	2.1E-4	4.9E-4	1.4E-3	+ _____ x _____ (NG)					=	_____ x	_____ =		_____ @ EAB
										_____ (I) x	_____ x	1.9E9	= _____ @ EAB	x	_____ =	_____ @ EAB	
Distance 2 mi	5.4E-7	9.0E-7	5.9E-6	2.3E-5	4.0E-5	1.1E-4	2.7E-4	+ _____ x _____ (NG)					=	_____ x	_____ =		_____ @ 2 mi
										_____ (I) x	_____ x	1.9E9	= _____ @ 2 mi	x	_____ =	_____ @ 2 mi	
5 mi	2.5E-7	3.2E-7	1.3E-6	5.9E-6	1.3E-5	3.2E-5	8.1E-5	+ _____ x _____ (NG)					=	_____ x	_____ =		_____ @ 5 mi
										_____ (I) x	_____ x	1.9E9	= _____ @ 5 mi	x	_____ =	_____ @ 5 mi	
10 mi	1.6E-7	1.9E-7	4.5E-6	8.6E-7	5.4E-6	1.4E-5	3.7E-5	+ _____ x _____ (NG)					=	_____ x	_____ =		_____ @ 10 mi
										_____ (I) x	_____ x	1.9E9	= _____ @ 10 mi	x	_____ =	_____ @ 10 mi	

Completed By _____ Date _____

TIME _____

DATE _____

Proced. No. EIP-ZZ-00211

Rev. 0

DOSE RATE CALCULATION WORKSHEET

SAMPLE ID _____

SAMPLE LOCATION _____

TIME SAMPLE TAKEN _____

	CONCENTRATION (uCi/cc)	x	WHOLE BODY DOSE FACTOR (mRem-cc/uCi-Hr)	=	WHOLE BODY DOSE RATE (mRem/Hr)
KR-83M			8.62 E0		
KR-85M			1.33 E5		
KR-85			1.83 E3		
KR-87			6.75 E3		
KR-88			1.67 E6		
KR-89			1.89 E6		
Xe-131m			1.04 E4		
Xe-133m			2.86 E4		
Xe-133			3.35 E4		
Xe-135m			3.45 E5		
Xe-135			2.06 E5		
Xe-137			1.62 E5		
Xe-138			1.01 E6		
CALCULATED WHOLE BODY DOSE RATE (mRem/Hr)				=	

	CONCENTRATION (uCi/cc)	x	CHILD THYROID DOSE FACTOR (mRem-cc/uCi-Hr)	=	CHILD THYROID DOSE RATE (mRem/Hr)
I-131			1.85 E9		
I-132			2.21 E7		
I-133			4.39 E8		
I-134			5.78 E6		
I-135			9.03 E7		
CALCULATED CHILD THYROID DOSE RATE (mRem/hr)				=	

PERFORMED BY: _____

DOSE RATE @ EAB		PROJECTED DOSE TO POPULATION		E.A.L.	PROTECTIVE ACTION RECOMMENDATIONS
WHOLE BODY (mR/hr)	THYROID (mR/hr)	WHOLE BODY mR	THYROID mR	EIP-ZZ-00101	EIP-ZZ-00212
0.05	0.25			6.A. (UE)	
0.5	2.5			6.B. (A)	
50	250			6.C. (SE)	
500	2500			6.C. (SE)	
		1,000	5,000	6.F. (SE)	Shelter 2 mile
1000	5000			6.D. (GE)	Radius, 5 miles downwind
		1,000 to 5,000	5,000 to 25,000		Shelter, evacuate if practical
		>5,000	>25,000		Mandatory evacuation

NOTE: This attachment to be used as a guide only.
Refer to appropriate procedures for additional clarification.