



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

APR 30 2004

10 CFR 50,
Appendix E
Section V

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of)	Docket Nos.	50-259	50-390
Tennessee Valley Authority)		50-260	50-391
			50-296	50-327
				50-328

TVA CENTRAL EMERGENCY CONTROL CENTER (CECC) - EMERGENCY PLAN
IMPLEMENTING PROCEDURE (EPIP) REVISIONS

In accordance with the requirements of 10 CFR Part 50, Appendix E, Section V, enclosed are copies of the Effective Page Listing and revisions to CECC EIPs.

PROCEDURE		EFFECTIVE DATE
EPIP	EPL	4/27/04
EPIP-17	Rev. 18	4/27/04
EPIP-23	Rev. 20	4/27/04

If you have any questions, please contact Terry Knuettel at (423) 751-6673.

Sincerely,

Mark J. Burzynski
 Mark J. Burzynski
 Manager
 Nuclear Licensing

Enclosures

AD-15

U.S. Nuclear Regulatory Commission

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TENNESSEE VALLEY AUTHORITY
CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN
IMPLEMENTING PROCEDURES
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This list of effective pages must be retained with the CECC-EIPs.

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CECC-EPIP-17
CENTRAL EMERGENCY CONTROL CENTER
METEOROLOGIST PROCEDURES

REVISION LOG

Rev. No.	Date	Revised Pages
0	3/22/88	All (Formerly IP-14. Changed from IPD to EPIP)
1	7/8/88	Page 1
2	11/18/88	1, 2, App. C P. 1, App. E pp. 1-2
3	7/02/90	All (Formerly EPIP-11)
4	5/21/91	Pages 1-5, App. G, Pg. 1, App. H, Pg. 4, App. J, Pg. 1, App. L, Pg. 1
5	5/15/92	1, 2, 4; App. A, pg. 1; App. B, Pg. 1, App. G, Pg. 1 revised; new coversheet and rev. log added; all pages issued.
6	05/17/93	Pgs. 2, 4, 5; App. C, pg. 1; App. F deleted; App. G, pg.1; App. H, pg. 4; App. M, pg. 1. All pages issued to maintain revision level.
7	06/22/94	Pgs. 4-5; App. E; App. G; App. H, pgs. 1, 2, 4; App. J; App. K; and App. L. All pages issued.
8	6/27/95	Pgs. 4-6; App. C, pgs. 2-3; App. D; App. G, pgs. 1, 3-5; App. H; App. I; App. J; App. K; and App. L
9	5/30/96	All pages revised; annual review; minor editorial changes, App. K made more detailed; all pages issued.
10	4/7/97	Annual review, editorial changes, remove distribution requirements for forms. All pages issued.
11	6/9/98 6/4/98 RR	Annual review, add SIM control responsibilities, editorial changes, update, add Internet source of met. data. All pages issued.
12	10/6/98	Update references for SIMS meteorological activities. All pages issued.
13	5/20/99	Annual review, editorial changes. Delete App. N because it contains duplicated information. All pages issued.
14	9/8/00	Annual review. Editorial changes. All pages issued.
15	10/2/00	Editorial changes and corrections. All pages issued.
16	3/30/01	Annual review. Editorial changes. All pages issued.

CECC-EPIP-17
CENTRAL EMERGENCY CONTROL CENTER
METEOROLOGIST PROCEDURES

<u>Rev. No.</u>	<u>Date</u>	<u>REVISION LOG (Continued)</u> <u>Revised Pages</u>
<u>17</u>	<u>6/13/02</u>	<u>Annual review. Editorial changes and updates. All pages issued.</u>
<u>18</u>	<u>4/27/04</u>	<u>Annual review.</u>

CENTRAL EMERGENCY CONTROL CENTER METEOROLOGIST PROCEDURES

1.0 PURPOSE

These procedures are designed to direct the activities of the Meteorologist during a radiological emergency to provide a timely response, consistent and accurate meteorological information, and atmospheric transport and dispersion advice.

2.0 SCOPE

These procedures cover anticipated requirements for meteorological support during emergency conditions. Additional actions to be taken prior and subsequent to an emergency or drill or to routinely maintain response capabilities are not covered.

3.0 REFERENCES

- 3.1 User's Manual for the Meteorological Data Display Programs.
- 3.2 User's Manual for the Historical Meteorological Data Base Program.
- 3.3 User's Manual for the Meteorological Information Form Program.
- 3.4 User's Manual for the Meteorological Data Print Program.
- * 3.5 Browns Ferry Nuclear Plant Nowcast Manual, October 2001.
- * 3.6 Sequoyah Nuclear Plant Nowcast Manual, October 2001.
- * 3.7 Watts Bar Nuclear Plant Nowcast Manual, October 2001.
- 3.8 Weather Information Service User Manual (if supplied by current service).

4.0 ABBREVIATIONS AND DEFINITIONS

- CECC - Central Emergency Control Center
- BRED - Back-calculation RED
- DA - Dose Assessment
- EDS - Environmental Data Station (at each nuclear plant site)
- FRED - Forecast RED
- FSC - Field Support Coordinator
- ICS - Integrated Computer System
- IS - Information System
- NWS - National Weather Service
- RAC - Radiological Assessment Coordinator
- RED - Radiological Emergency Dose Code
- REND - Radiological Emergency Notification Directory
- RMCC - Radiological Monitoring Control Center
- SIM - Senior Instrument Mechanic (at the EDS)
- TSC - Technical Support Center (at each nuclear plant site)
- WIS - Weather Information Service--a service to provide access to NWS information.

*Revision

5.0 RESPONSIBILITIES

- 5.1 The Meteorologist is responsible for receiving and reviewing EDS real-time meteorological data, for preparing forecast information, for disseminating the appropriate meteorological information to the CECC, TSC, and the State staff, and for providing atmospheric dispersion and transport advice to the CECC staff. He is also responsible for application of backup procedures for replacement of unavailable or invalid meteorological data.

6.0 PROCEDURE REQUIREMENTS

6.1 Notification

- * 6.1.1 The Meteorologist is notified by the automated paging system or by the Dose Assessor or designee.
 - * 6.1.2 Report to the CECC and obtain a briefing from the RAD Assessment Coordinator. If notified in Muscle Shoals, support may be provided remotely to the CECC until another Meteorologist reports to the CECC.
 - * 6.1.3 Document in the Meteorologist notebook the notification time, time of arrival at the CECC or Muscle Shoals office, and the current emergency situation.
 - * 6.1.4 Upon notification of an Alert or higher, notify a backup Meteorologist of CECC activation, the nature of the emergency, and whether additional support is needed. If additional support is needed, the backup meteorologist may provide or arrange for the additional support. This includes scheduling shift coverage, and contacting other meteorologists.
 - 6.1.5 Ensure that the SIMs for the affected plant (Appendix M) have been contacted.
- ### 6.2 Forecast Support
- 6.2.1 The NWS may be contacted for input on forecast conditions (see section L.1 of the REND for phone numbers).
 - 6.2.2 An example of the forecast information format prepared by the Meteorologist is provided in appendix A.
 - 6.2.3 Persistence (assuming future conditions will be the same as the current conditions) is the basis for forecasts. The Meteorologist modifies the persistence values when site and synoptic factors dictate a change is more reliable than persistence.
 - 6.2.4 The Meteorologist provides an initial forecast for one and two hours in the future within 30 minutes of time of arrival at the CECC. The initial forecast will usually be included on the second 15-minute meteorological forecast form.
 - 6.2.5 Hourly thereafter, the Meteorologist provides an updated and expanded forecast for 1, 2, 4, 6, and 8 hours in the future and an outlook for 9 to 24 hours in the future.

*Revision

6.3 Meteorologist Actions

- 6.3.1 Assess the situation and respond as required. Unusual circumstances may dictate deviation from the prescribed procedures. Enter all times as plant local time (i.e., Central for Browns Ferry and Eastern for Sequoyah and Watts Bar).
- 6.3.2 Log on to the CECC IS terminal (see the User's Manuals for References 3.1, 3.2, or 3.4). Obtain enough meteorological data to familiarize yourself with current conditions and trends. Log off the program. See section 6.4 in the event of equipment problems.
- 6.3.3 Log on to the CECC IS to access the latest meteorological information needed and to generate the Meteorological Information form (see Reference 3.3). Remain logged on to this program. See section 6.4 in the event of equipment problems.
- 6.3.4 Review the data for accuracy (see Reference 3.1 for a description of the data validation criteria). If a data problem is detected, initiate corrective action as appropriate.
- * Data collection problem at EDS: Contact the SIM so that corrective actions can be initiated.
- * Data transmission problem: Contact Computer Support.
- 6.3.5 Inform DA that the meteorological data are acceptable for use in RED/FRED/BRED (if being used) or estimate values from the nowcast manual, as appropriate (see sections 6.4.3 and 6.4.4).
- 6.3.6 For BFN, obtain the release point flow rate, as appropriate, from the ICS, the TSC, or DA, for input to the Meteorological Information Form program.
- 6.3.7 For BFN, provide the correct exit velocity to DA if different from the assumed exit velocity.
- 6.3.8 Print the Meteorological Information form (Appendix B) at the appropriate sites (typically the State and the TSC).
- 6.3.9 Enter the most recent 15-minute data on the meteorological data update board in the Radiological Assessment area of the CECC (generate the first 15-minute data as soon as possible).
- 6.3.10 Remove the form from the CECC-Radiological Assessment Area-MET Printer, and provide it to the clerical staff for distribution.
- *
*
*
- 6.3.11 Provide transport and dispersion advice and assistance, as appropriate. Advise the Radiological Assessment area of any significant changes in meteorological conditions. Significant changes are defined as:
- * • two or more wind direction sectors,
 - * • a factor of two or more for wind speeds,
 - * • or two or more stability classes.
- 6.3.11.1 Compare information from the Meteorological Information Form program with dose assessment model output (e.g., state update forms and plume plots) for consistency. Inform DA if any inconsistency is identified.

*Revision

- 6.3.11.2 If a manual dose assessment method is being used, provide DA with the written release mode, plume rise, and observation time every 15 minutes, as appropriate.
- 6.3.11.3 Advise the appropriate CECC staff of any unusual meteorological uncertainties or conditions, or of significant changes that could affect transport and dispersion (e.g., if RED/FRED/BRED is being used and mixing heights differ significantly from the 600 m assumed by RED/FRED/BRED, as determined using the procedure in Appendix C).
- 6.3.11.4 Provide any input to the appropriate CECC staff that would be useful in protective action decisions (e.g., terrain effects), in monitoring team placement (e.g., plume position), or severe weather. (See CECC-EPIP-9, Appendix B for distance to estimated plume maximum for Stack releases).
- 6.3.12 If manual plume plots are needed, plot 15-minute vector sequence trajectories on the appropriate site map according to the procedures in Appendix D. Provide the site map to DA hourly. Appendix E can be used if desired to document up to four hours of trajectory information.
- 6.3.13 Follow steps 6.3.4 through 6.3.12 for every ensuing 15-minute period.
- 6.3.14 Prepare forecast information using the meteorological information form program, and include it on the form. Prepare a 1- and 2-hour forecast within 30 minutes of reporting to the CECC and a 1-, 2-, 4-, 6-, and 8-hour forecast and a 9 to 24 hour outlook, once an hour thereafter.
- 6.3.15 If time permits, extract raw data and transport and dispersion information from the Meteorological Information Form program output and fill out Appendix F. Review the completed Appendix F for synoptic and diurnal reasonableness and consistency between 15-minute and hourly observations.
- 6.3.16 Access NWS information periodically from the WIS or Internet and review it to keep abreast of the synoptic situation. Determine the synoptic category using the plant nowcast manual (Reference 3.5, 3.6, 3.7) and document in the notebook.
- 6.3.17 Respond to State and TVA staff questions concerning meteorological information, as soon as time permits. Verify State and TSC receipt of meteorological information forms hourly.
- 6.3.18 Document all decisions, recommendations, pertinent communications and significant emergency status changes in the Meteorologist notebook.
- 6.3.19 Appendix G contains a set of information and conversion sheets for reference by the Meteorologist. The release mode and sensor height selection methodologies are summarized in tables 1 and 2 of Appendix H. All release points at SQN and WBN are treated as ground level.
- 6.4 Backup Procedures
- 6.4.1 The CECC IS is the primary source for meteorological data and for completion of the Meteorological Information Form. If the IS is malfunctioning, alternative procedures should be followed to obtain the necessary information. These steps are discussed in the following.

* If the computer or terminal is not working, request assistance from the CECC Computer
* Support personnel (see CECC duty position).

*Revision

- 6.4.2 Some of the backup sources may require more than fifteen minutes to complete. If so, nowcast the data, as described in step 6.4.3, while steps are initiated to obtain data from the backup sources.

Backup sources of real-time meteorological data are shown in the following list in order of preference.

1. **RED/FRED** automatically accesses the meteorological data, if available. Obtain data from DA.
2. Use the **ICS** to obtain the meteorological data. Enter the data on Appendix I. Make necessary unit conversion.
3. Use the personal computer to access the web page or **Chattanooga Remote Access** computer to obtain the meteorological data according to Reference 3.9. Enter the data on Appendix I. Make necessary unit and time conversions.
- * 4. Request the SIM, who is on standby to report to the **EDS**, if habitable (use Appendix N Call-In Sheet). Coordinate with Environs Assessor. Obtain the data directly from the SIM. Enter the data on Appendix I. Make necessary unit and time conversions.
5. Request the RAC call the TSC Communicator and arrange to have data read to you from a TSC or control room display. Enter the data on Appendix I. Make any necessary unit conversion.

- 6.4.3 If meteorological data are not available from the CECC IS or the backup sources listed in section 6.4.2, or if the data are determined to be invalid, use the appropriate procedures in the nowcast manual (see References 3.5-3.7) to estimate the needed values. Use Appendix J when nowcasting.

- 6.4.4 If nowcasting data, inform DA that the data are nowcasts and give the associated confidence levels.

- 6.4.5 If the Meteorological Information Form program is not available, complete Appendix F and the Meteorological Information form (Appendix B) manually using the information and conversion sheets in Appendix G.

6.5 Shift Relief

The shift change checklist (Appendix K) will be completed by the Meteorologist reporting for relief. Additional Meteorologists are called in as needed.

6.6 Emergency Termination

- 6.6.1 Check that the Meteorologist's notebook entries are complete.

- 6.6.2 Notify any backup Meteorologists that are on standby.

- * 6.6.3 Ensure notification of all SIMs that are on duty or standby.

- 6.6.4 Log off the CECC IS terminals.

*Revision

7.0 METEOROLOGIST CHECKLIST

7.1 A task checklist is provided in Appendix L for reference by the Meteorologist.

APPENDIX A Page 1 of 1

TIME: 17-OCT-91 13:12 (EASTERN)

FORECAST DATA FOR METEOROLOGICAL INFORMATION PROGRAM

FORECAST METEOROLOGICAL DATA

TIME	WIND DIRECTION AND SPEED (M/S)			STABILITY	PRECIPITATION (RATE CATEGORY)
	U	I	L	CLASS U-I/I-L	
1300	187./ 3.3	192./ 3.3	186./ 3.0	D / C	NONE
1400	187./ 3.3	192./ 3.3	186./ 3.0	D / C	NONE
1500	187./ 3.3	192./ 3.3	186./ 3.0	D / C	NONE
1700	187./ 3.3	192./ 3.3	186./ 3.0	D / C	NONE
1900	187./ 3.3	192./ 3.3	186./ 3.0	D / C	NONE
2100	187./ 3.3	192./ 3.3	186./ 3.0	E / D	NONE

APPENDIX B Page 1 of 1
METEOROLOGICAL INFORMATION

A. Date: _____ Person transmitting data: _____

Release Mode: _____

B. Observed Data^a (15-minute average):

<u>Time</u>	<u>Wind Direction (Deg./Sector)</u>	<u>Plume Direction (Deg./Sector)</u>	<u>Wind Speed (mi/h)(m/s)</u>	<u>Stability Class</u>	<u>Precip. (mm)</u>
_____	_____	_____	_____	_____	_____

C. Observed Data^a (1-hour average):

<u>Time</u>	<u>Wind Direction (Deg./Sector)</u>	<u>Plume Direction (Deg./Sector)</u>	<u>Wind Speed (mi/h)(m/s)</u>	<u>Stability Class</u>	<u>Precip. (mm)</u>
_____	_____	_____	_____	_____	_____

D. Forecast Data:

<u>Valid Time</u>	<u>Wind Direction (Deg./Sector)</u>	<u>Plume Direction (Deg./Sector)</u>	<u>Wind Speed (mi/h)(m/s)</u>	<u>Stability Class</u>	<u>Precip.</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Outlook (9-24 hours):

E. Comments:

^a Conditions for period ending at indicated time (plant local time).

^b Time for which forecast is made (plant local time).

^c Light rain (LR), moderate rain (MR), and heavy rain (HR): hourly value for LR, $0.3 \text{ mm} \leq LR \leq 2.5 \text{ mm}$; for MR, $2.8 \text{ mm} \leq MR \leq 7.6 \text{ mm}$; and for HR, $HR > 7.6 \text{ mm}$.

APPENDIX C Page 1 of 3
PROCEDURE FOR INTERPRETING RED/FRED RESULTS FOR MIXING
HEIGHTS SIGNIFICANTLY DIFFERENT FROM 600 m

This procedure details identification of lofting, trapping, and high mixing height meteorological conditions during which the actual mixing height is significantly different from the 600 m assumed by RED/FRED. It also gives guidance for advice to be provided to DA during such conditions if RED/FRED is being used.

I. **Identification**

Examine the I-L, U-I, and U-L stability classes to determine if one of the following three conditions is occurring:

A. Lofting is defined in this procedure to occur when the following are satisfied:

1. Elevated (ST or EV) release
2. $I-L > 0.5 \text{ }^{\circ}\text{C}/100 \text{ m}$
3. U-I is at least one stability class less stable than the concurrent I-L (e.g., U-I = E and I-L = F)

If these are met, go to II.A for action instructions.

B. Trapping is defined in this procedure to occur when the following are satisfied:

1. Either an elevated or ground-level release
2. I-L is A, B, or C
3. U-I is E, F, or G
4. For an elevated release, either (1) U-L = E, F, or G and the effective stack height is <70 m or (2) U-L = A, B, C, or D and the effective stack height is <100 m.

If these are met, go to II.B for action instructions.

APPENDIX C Page 2 of 3

C. High mixing height is defined in this procedure to occur when the following are satisfied:

1. Either an elevated (ST or EV) or ground-level release
2. In March through August
3. For an elevated release, U-I is A or B
4. For a ground-level release, I-L is A or B and the concurrent U-I is A, B, C, or D

If these are met, go to II.C for action instructions.

II. Actions

A. Lofting

While this condition persists, do the following:

1. Substitute the I-L stability class for U-I in RED/FRED.
2. Advise Dose Assessment that lofting is occurring and that a different, more stable stability class is being used in RED/FRED to better estimate the dispersion.

APPENDIX C Page 3 of 3

B. Trapping

While this condition persists, ground-level concentration adjustment factors (AF) will be identified. These factors will apply to the distance traveled (DT) by the portion of the plume emitted since onset of trapping. The mixing height is determined to be nearer 50m or 100m depending on whether U-L is E, F, or G or A, B, C, or D, respectively.

1. Use the following decision table to obtain the AF and DT:

<u>U-L</u>	<u>I-L</u>	<u>DT (mi)</u>	<u>AF</u>
E, F, or G	A or B	1-10	12
E, F, or G	C	<4	5
E, F, or G	C	>4	12
A, B, C, or D	A or B	1-10	6
D	C	<4	3
D	C	>4	6

2. Advise DA that trapping is occurring and that the ground-level concentrations from RED/FRED would be underestimated by a factor of AF for the applicable DT range.

C. High mixing height

While this condition persists, ground-level concentration adjustment factors (AF) will be identified. These factors will apply to the distance traveled (DT) by the portion of the plume emitted since onset of this condition.

1. Use the following decision table to obtain the AF and DT:

<u>U-I or I-L</u>	<u>DT (mi)</u>	<u>AF</u>
A	1-10	3
B	>6	3
C	<6	1 (no adjustment)

2. Advise DA that a high mixing height is present and that the ground concentrations from RED/FRED would be overestimated by a factor of AF for the applicable DT range.

APPENDIX D Page 1 of 1
PROCEDURE FOR MANUALLY PERFORMING PLUME CENTERLINE POSITION ANALYSIS

This procedure details steps to be followed in performing plume centerline position analyses. The method used involves adding each succeeding plume transport vector to the tail of the previous one. This method provides a reasonable means of locating the current plume centerline position for both continuous and puff releases. A light table is stored in the CECC.

Plume centerline position analyses should be carried out, using 15-minute meteorological data (beginning with the observation that most closely represents the time of release), on either the 10-mile or 50-mile site map. For ease in plotting plume centerline positions, a large acetate sheet should be taped to the light box.

1. Ensure that the correct observations and the correct scales are used.
2. About 5-6 inches from the corner or edge of the light box toward which the wind is blowing, draw a small N-S/E-W cross on the acetate. Lay the protractor over the cross and mark the plume direction. Draw the plume transport vector to the proper length, with its base at the cross. Label the vector with the time of observation and the plume direction (degrees).
3. Trace the plume centerline position onto the site map. Label with the plume direction (degrees) and observation time.
4. For the next observation, lay the protractor over the most recent cross and mark the wind direction.
5. Draw the vector to the appropriate length with the head at the tail of the previous vector (the cross). Draw a new cross at the tail of the new vector. Label the vector with the plume direction (degrees) and the observation time.
6. Repeat steps 3 through 5.
7. When the vectors reach the edge of the acetate sheet, trace the last few vectors onto a new acetate sheet. Replace the original sheet with the new one and proceed as before.

APPENDIX F Page 1 of 1

REPORT OF RAW METEOROLOGICAL DATA AND CONVERSIONS FOR RADIOLOGICAL EMERGENCY

Date _____ Nuclear Plant _____ Preparer _____

RAW DATA 15-Minute Observation								TRANSPORTATION AND DISPERSION INFORMATION			
Time ^a	Level ^b	dd (deg)	ff (m/s) (Arth)	ff (m/s) (vect)	TT (°C)	$\Delta T/\Delta Z^b$ (°C/100m)	Stab	Release Mode ^c	Plume Rise(m)	Plume dir (deg/sect)	Travel 15 min ^d (mi)
14	U	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	I	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	L	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
29	U	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	I	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	L	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
44	U	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	I	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	L	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
59	U	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	I	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
	L	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Hourly Observation											
Time ^e	Level ^b	dd (deg)	ff (m/s) (Arth)	ff (m/s) (vect)	TT (°C)	$\Delta T/\Delta Z^b$ (°C/100m)	Stab			Plume dir (deg/sect)	1 hr ^f (mi)
00	U	_____	_____	_____	_____	_____	_____			_____	_____
	I	_____	_____	_____	_____	_____	_____			_____	_____
	L	_____	_____	_____	_____	_____	_____			_____	_____

Sol Rad _____ Rnf (mm) _____

^aObserved data are 15-minute averages ending at the time indicated.

^bCircle the appropriate level and layer for the release mode for each 15 minutes.

^cGround Vent (GV), Elevated Vent (EV), or Stack (ST).

^dEquals vector wind speed (m/s) x 0.559 mi-s/m.

^eObserved data are 1-hour averages ending at the time indicated.

^fEquals vector wind speed (m/s) x 2.236 mi-s/m.

APPENDIX G Page 1 of 5
INFORMATION AND CONVERSION SHEETS
INSTRUCTION SHEET FOR DETERMINING
RELEASE MODE AND MEASUREMENT
LEVELS AND LAYERS

Plant	Release Point	ff level for pr	Critical ff	Stability Layer for pr	Release Mode	ff and dd Levels	Stability Layer
BFN	Stack	U	N.A.	U-I	ST	U	U-I
BFN	Reactor Bldg. Vents	I	≤2.5 m/s >2.5 m/s	U-I N.A.	EV GV	U or I I	U-I I-L
BFN	All Other Vents	N.A.	N.A.	N.A.	GV	I	I-L
SQN	All Vents	N.A.	N.A.	N.A.	GV	I	I-L
WBN	All Vents	N.A.	N.A.	N.A.	GV	I	I-L

*When an elevated release is assumed, the tower wind level nearest the effective plume height *(including non-buoyant plume rise) will be used.

ff denotes wind speed
dd denotes wind direction
pr denotes plume rise

ST denotes Stack
EV denotes Elevated Vent
GV denotes Ground Vent

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APPENDIX G Page 3 of 5
WIND SECTOR AND PLUME SECTOR VERSUS WIND DIRECTION

<u>Wind Direction (degrees)</u>	<u>Wind Direction (Sector)</u>	<u>Plume Sector</u>
349 to 11	N	S
12 to 33	NNE	SSW
34 to 56	NE	SW
57 to 78	ENE	WSW
79 to 101	E	W
102 to 123	ESE	WNW
124 to 146	SE	NW
147 to 168	SSE	NNW
169 to 191	S	N
192 to 213	SSW	NNE
214 to 236	SW	NE
237 to 258	WSW	ENE
259 to 281	W	E
282 to 303	WNW	ESE
304 to 326	NW	SE
327 to 348	NNW	SSE

**APPENDIX G Page 4 of 5
INSTRUCTION SHEET FOR SPECIAL RADIOLOGICAL EMERGENCY
METEOROLOGICAL FORECAST**

Pasquill Stability Index

Pasquill Categories

Temperature Change with Height (C/100m)

A	$\Delta T/\Delta Z \leq -1.9$
B	$-1.9 < \Delta T/\Delta Z \leq -1.7$
C	$-1.7 < \Delta T/\Delta Z \leq -1.5$
D	$-1.5 < \Delta T/\Delta Z \leq -0.5$
E	$-0.5 < \Delta T/\Delta Z \leq 1.5$
F	$1.5 < \Delta T/\Delta Z \leq 4.0$
G	$4.0 < \Delta T/\Delta Z$

Sensor Heights (Meters)

	Browns Ferry			Sequoyah			Watts Bar		
	<u>U</u>	<u>I</u>	<u>L</u>	<u>U</u>	<u>I</u>	<u>L</u>	<u>U</u>	<u>I</u>	<u>L</u>
* Wind Direction and Speed	90.3	45.7	10.4	91.4	46.6	9.7	91.5	46.4	9.7
Temperature	89.6	45.3	10.0	90.8	46.0	9.3	91.2	45.6	9.5

Class Limits

Precipitation None, LR (0.3 - 2.5 mm/hr),
 MR (2.8 - 7.6 mm/hr),
 HR (>7.6 mm/hr)

Comments

Used to qualify precipitation as follows: Continuous (Intensity changes gradually, if at all); Intermittent (Intensity changes gradually, if at all, but precipitation stops and starts at least once per hour); Showery (Precipitation changes intensity or starts and stops abruptly). Other comments and qualifiers may be added as necessary.

Comments pertaining to wind direction variability and assessments of forecast confidence will be especially valuable.

*Revision

APPENDIX G Page 5 of 5

<u>To Obtain</u>	<u>Multiply</u>	<u>By</u>
meters/sec	miles/hr	0.447
miles/hr	meters/sec	2.237
miles/hr	knots	1.151
knots	miles/hr	0.869
meters	feet	0.3048
feet	meters	3.2808
hours	years	8,760
seconds	hours	3,600
seconds	day	86,400
seconds	year	31,536,000
kilometers	miles	1.61
miles	kilometers	0.62
inches	millimeters	0.039
millimeters	inches	25.4

APPENDIX H Page 1 of 1

TABLE 1

RELEASE MODE CLASSIFICATION METHODOLOGY

<u>Height of release point (H)</u>	<u>Degree of entrainment</u>	<u>Release Mode</u>
$H > 2 \text{ MBH}^a$	Not applicable	Elevated (Stack)
$\text{MBH} \leq H \leq 2 \text{ MBH}$	$w/u^b \geq 5.0$	Elevated (Vent)
$\text{MBH} \leq H \leq 2 \text{ MBH}$	$w/u < 5.0$	Ground level
$H < 2 \text{ MBH}$	Not applicable	Ground level

^aMBH is the maximum adjacent building height.

^bw is the effluent exit velocity and u is the ambient arithmetic wind speed.

TABLE 2

SENSOR HEIGHT SELECTION METHODOLOGY

<u>Release Mode</u>	<u>Vector Wind Direction^b</u>	<u>Vector Wind Speed</u>	<u>Arithmetic Wind Speed</u>	<u>Stability Layer</u>
Ground	I	I	I	I-L
Elevated ^a	U or I	U or I	U or I	U-I

^aWhen an elevated release is assumed, the tower wind level nearest the effective plume height (including nonbuoyant plume rise) will be used.

^bU, I, and L represent the upper, intermediate, and lower tower measurement levels, respectively.

**APPENDIX I Page 1 of 1
RAW METEOROLOGICAL DATA FROM A BACKUP SOURCE**

Date _____ Source of Data _____ Preparer _____

		Raw Data 15-Minute Observation			Converted Data		
Time ^a	Level	Wind Direction (deg)	Wind Speed (mph)	Temperature (°F)	Wind Direction (deg)	Wind ^c Speed (m/s)	$\Delta T/\Delta Z^d$ (°c/100m)
_____	Upper	_____	_____	_____	_____	_____	U-L _____
	Mid	_____	_____	_____	_____	_____	U-I _____
	Lower	_____	_____	_____	_____	_____	I-L _____
_____	Upper	_____	_____	_____	_____	_____	U-L _____
	Mid	_____	_____	_____	_____	_____	U-I _____
	Lower	_____	_____	_____	_____	_____	I-L _____
_____	Upper	_____	_____	_____	_____	_____	U-L _____
	Mid	_____	_____	_____	_____	_____	U-I _____
	Lower	_____	_____	_____	_____	_____	I-L _____
_____	Upper	_____	_____	_____	_____	_____	U-L _____
	Mid	_____	_____	_____	_____	_____	U-I _____
	Lower	_____	_____	_____	_____	_____	I-L _____

		Hourly Observation					
Time ^b	Level	Wind Direction (deg)	Wind Speed (mph)	Temperature (°F)	Wind Direction (deg)	Wind ^c Speed (m/s)	$\Delta T/\Delta Z^d$ (°c/100m)
_____	Upper	_____	_____	_____	_____	_____	U-L _____
	Mid	_____	_____	_____	_____	_____	U-I _____
	Lower	_____	_____	_____	_____	_____	I-L _____
		Rainfall (in) _____			Rainfall (mm) ^e _____		

^a Observed data are 15-minute averages ending at the time indicated.
^b Observed data are 1-hour averages ending at the time indicated.
^c Equals wind speed (mph) x 0.4470.
^d Equals temperature difference (higher-lower in °F) x 55.5556 ÷ sensor height difference (higher-lower in m).
^e Equals rainfall (in.) x 25.40.

**APPENDIX J Page 1 of 1
WORKSHEET FOR NOWCASTING OF METEOROLOGICAL DATA**

Date _____ Nuclear Plant _____ Initials _____

Parameters and Measurement Levels or Layers Needed^a:

1. _____ 2. _____ 3. _____ 4. _____

Observation Time _____

Nowcast Information

Work Space

1. Missing Parameter^a
Table/Column No. Used:
Nowcast Value:
Confidence Level:

2. Missing Parameter^a
Table/Column No. Used:
Nowcast Value:
Confidence Level:

3. Missing Parameter^a
Table/Column No. Used:
Nowcast Value:
Confidence Level:

4. Missing Parameter^a
Table/Column No. Used:
Nowcast Value:
Confidence Level:

Comments: _____

^aUse ΔT for stability layer, ff for wind speed, dd for wind direction, and U, I, and L for upper, intermediate, and lower, respectively.

**APPENDIX K Page 1 of 1
SHIFT CHANGE CHECKLIST - METEOROLOGIST**

Use checklist for: 1) Changing shifts within the CECC.
2) Transferring meteorological support from Muscle Shoals.

Outgoing staff: _____ Incoming staff: _____

Date: _____

	Completed (Initials)
INCOMING: Record arrival time and initials in Meteorologist log	_____
Receive briefing from Meteorologist:	
- Dose assessment method(s) in use. (FRED, BRED, etc.)	_____
- Exit velocity (Current value? Is ICS being used?)	_____
- Mixing height conditions (lofting, trapping, high mixing ht.)	_____
- Transport/dispersion (plume rise, plume position, etc.)	_____
- Trajectory support (Are manual plume plots being used?)	_____
- Data/Equipment problems (Are Nowcasts being used?)	_____
*- Data dissemination (METINF, fax, etc.)	_____
- Field support status (field teams, EDS support)	_____
- Other items	_____
Receive briefing from Radiological Assessment Coordinator	_____
Review Meteorologist log (If transferring support from Muscle Shoals have Muscle *Shoals Meteorologist verbally summarize log items)	_____
Review latest forms: - EPIP-17, Appendix B (METINF form)	_____
- EPIP-17, Appendix F (Raw Data form)	_____
- EPIP-17, Appendix J (NOWCAST form)	_____
- Dose assessment model outputs	_____
- Environs data forms	_____
Review synoptic situation and latest forecasts:	
- Last 12 hours of meteorological data (ARP, HMD, etc.)	_____
- Latest weather information service (WIS) and Internet data	_____
* (if older than 1 hour, access WIS and Internet)	
- Forecasts issued by CECC Meteorologist (METINF printout)	_____
Review special contacts (State, TSC, etc.)	_____
Notify special contacts of telephone number changes (if necessary)	_____
Enter name on CECC staff status board (erase prior name)	_____
Notify Radiological Assessment Coordinator of staff change	_____
OUTGOING: Record departure time and initials in Meteorologist log	_____
TIME CHANGE/TRANSFER COMPLETED: _____ INITIALS: _____ / _____	_____

*Revision

APPENDIX L Page 1 of 1
METEOROLOGIST CHECKLIST

Date _____

Initial Actions

Completed (Initials)

1. _____ Notify backup Meteorologist.
2. _____ Pick up identification badge and calculator.
3. _____ Enter name on CECC staff status board.
4. _____ Obtain briefing.
5. _____ Ascertain what dose assessment method(s) is (are) being used.
6. _____ Complete initial notebook entry.
7. _____ Confirm SIM activation. (If required)

Continuing Actions

1. _____ Access WIS/review synoptic situation.
2. _____ Determine synoptic category from nowcast manual.
3. _____ Prepare forecast information.
4. _____ Provide most recent 15-minute data.
5. _____ If elevated release, check exit velocity.
6. _____ Review mixing height conditions.
7. _____ Advise on transport/dispersion considerations.
8. _____ Review model output and plume plots.
9. _____ Advise CECC staff on severe or unusual weather conditions.
10. _____ Relay pertinent information to the SIMs. (If required)
11. _____ Verify state receipt of meteorological forms.
12. _____ Verify TSC receipt of meteorological forms.
13. _____ Prepare plume centerline plot (if needed).

Termination Actions

1. _____ Check that the Meteorologist's notebook entries are complete.
2. _____ Notify backup Meteorologist.
3. _____ Confirm notification of all SIMs that are on duty or standby.
4. _____ Log off the CECC IS terminals.

Entire Page Revised

**APPENDIX M Page 1 of 3
SENIOR INSTRUMENT MECHANIC (SIM) ACTIVITIES**

1.0 PURPOSE

This Appendix is designed to direct the SIMs in support of the CECC by providing meteorological data for use in protecting the public health.

2.0 SCOPE

This Appendix covers anticipated requirements of the SIMs in support of the CECC during a radiological emergency at TVA nuclear plants. This Appendix also covers actions that may be taken subsequent to an emergency.

3.0 REFERENCES

- 3.1 EPFS-2 Control Room Notification
- 3.2 EPFS-3 Servicing of Meteorological Equipment at Environmental Data Stations
- 3.3 EPFS-4 Environmental Data Station Meteorological Sensor Exchange
- 3.4 EPFS-6 Calibration of Environmental Data Station Data Logger and Sonic Channels

4.0 ABBREVIATIONS AND DEFINITIONS

EA	-	Environs Assessment
Field Coordinator	-	The member of the CECC staff responsible for directing the near site emergency radiological monitoring personnel in accordance with the directions issued by EA. (TVAN personnel)
REND	-	Radiological Emergency Notification Directory
EDS	-	Environmental Data Station
TVAN	-	TVA Nuclear

5.0 RESPONSIBILITIES

5.1 The Meteorologist is responsible for the following:

- 5.1.1 Providing technical advice to EA on matters related to the operation and maintenance of the EDS and associated meteorological monitoring systems.

**APPENDIX M Page 3 of 3
SENIOR INSTRUMENT MECHANIC (SIM) ACTIVITIES**

- 6.2.2 Upon being notified that an emergency condition exists and being directed to report for duty, the SIM reports to appropriate SIM Field Office to obtain TLDs, dosimeters and other required equipment.
 - 6.2.2.1 Establishes communication with the EA for instruction for entry into the EDS.
 - 6.2.2.2 Upon arrival at the EDS, notifies the Meteorologist that he is in position.
 - 6.2.2.3 Maintains the data collection system at the EDS in an operable status.
 - 6.2.2.4 If directed by the Meteorologist, reports meteorological data using the "Raw Data" portion of Appendix F to the Meteorologist at the CECC as often as needed.
 - 6.2.2.5 If unable to maintain telephone contact with the Meteorologist or EA, the SIM shall immediately leave the area and go to a location where either radio or telephone contact can again be made in order to receive further instructions.
 - 6.2.2.6 If the EDS is evacuated, reports to a location determined by the EA.
 - 6.2.2.7 If there is uncertainty about the habitability of the EDS, EA will arrange for RADCON to check out the site.

7.0 SAFETY

Safety is the most important consideration in emergency response. Personnel are cautioned to exercise great care in approaching and working near any areas which are suspected of having been (or could become) exposed to radiological contamination or radiation.

- 7.1 The Meteorologist, in consultation with EA, will ensure that SIMs are briefed on the following:
 - 7.1.1 The potential radiation hazards involved before they are asked to enter a potentially contaminated area.
 - 7.1.2 The possible need for decontamination following completion of sampling in a potentially contaminated area. Decontamination will be performed, as necessary, by qualified RADCON personnel.
- 7.2 The type of release(s) which occur during a radiological emergency (i.e., water, air, water and air) will determine what type of protective equipment is required by field personnel. The Meteorologist will consult with EA to obtain the needed determinations. In all cases if there is the possibility of radioactive exposure to personnel, RADCON will be assigned to accompany personnel.

Tennessee Valley Authority CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN IMPLEMENTING PROCEDURES	Title RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS	CECC EPIP-23 REV. 20
		Effective Date: 4-27-04

WRITTEN BY: Thomas F. Allin Signature REVIEWED BY: David Pond Signature 4/14/04 Date
 PLAN EFFECTIVENESS DETERMINATION: Thomas F. Allin Signature 4/14/04 Date

CONCURRENCES

Concurrence Signature	Date
<input type="checkbox"/> Manager, EP Program Planning and Implementation <u>David Pond</u>	<u>4/14/04</u>
<input type="checkbox"/> Manager, Emergency Preparedness <u>BK Marks</u>	<u>4/20/04</u>
<input type="checkbox"/> Manager, Radiological and Chemistry Services <u>Chandon -</u>	<u>4/23/04</u>
<input type="checkbox"/>	_____

APPROVAL

APPROVED BY: <u>J. M. [Signature]</u> Signature	Engineering & Technical Services Title Organization	<u>4/26/04</u> Date
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CECC-EPIP-23
RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS

Rev. No.	Date	REVISION LOG	Revised Pages
0	12/12/88	All	
1	4/26/89	3	
2	10/26/89	App. A	
3	6/20/90	All (formerly EPIP-21) (Former EPIP-23 transferred to EPIP-13)	
4	9/14/90	Pg. 4 (only)	
5	5/21/91	Pages 1 - 19	
6	02/22/93	Pgs. 1-17 revised. Pages 20-23 added. All pages issued.	
7	11/30/93	Pages 3, 15, and 20; all pages issued.	
8	06/23/94	Pgs. 5-7; All pages issued.	
9	6/27/95	Pgs. 3-6, 11-15, 17, and 18	
10	1/3/96	Procedure issued in new format which includes, in some cases, altering of the order of statements, editorial changes, and adding boxes and shading to highlight statements. Changed accident to incident in title and through the EPIP. Added definition of transportation incident, revised references section, updated EDO checklist. Added notification of the Senior Nuclear Executive and affected site VP to the CECC Dir. checklist, added WBN phone numbers, changed Appendices to Attachments. All pages issued.	
11	5/30/96	Pgs. 2, 4, 6, 8, Att. E; Att. F; annual review, minor changes for clarification, revised to provide flexibility for selection of optional equipment needed by field teams; all pages issued.	
12	4/7/97	Annual review, editorial and organizational updates. All pages issued.	
13	5/8/97	Page 18 revised to support new air sampling equipment. All pages issued.	
14	3/11/98	Annual review. Pages 2, 4, and 5 revised to add instructions to get equipment from plants and consideration for use of still camera and satellite phone, update Corporate Communications titles. Page 15 revised to remove full-face respirators w/HEPA-charcoal filters from equipment list. All pages issued.	
15	7/7/98	Update Transportation Equipment list, pages 14 & 15. All pages issued.	
16	6/15/00	Annual review. Editorial changes, update area codes, new packaging for KI, add flash lights to inventory list.	
17	8/23/01	Update EDO checklist and SQN SM telephone number. All pages issued.	

CECC-EPIP-23
RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS

REVISION LOG

<u>Rev. No.</u>	<u>Date</u>	<u>Revised Pages</u>
<u>18</u>	<u>6/13/02</u>	<u>Annual review. Add references to REPTRACK, update telephone numbers, editorial changes. All pages issued.</u>
<u>19</u>	<u>10/09/03</u>	<u>Annual review. Add equipment inventory retention criteria, editorial changes. All pages issued.</u>
<u>20</u>	<u>4/27/04</u>	<u>Annual review.</u>

RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS

1.0 PURPOSE

This procedure provides guidance to TVA personnel under the control of the CECC for response to transportation incidents involving radioactive materials. A transportation incident includes vehicle incidents, leaking containers, or other abnormal situations that could attract attention or require assistance.

2.0 SCOPE

This procedure is applicable to transportation incidents involving radioactive materials to which TVA is requested to respond, including those situations which do not include shipments involving TVA materials or facilities.

3.0 REFERENCES

- 3.1 "Carrier and Shipper Responsibilities and Emergency Response Procedures for Highway Transportation Accidents Involving Truckload Quantities of Radioactive Materials," ANSI N14.27, 1986.
- 3.2 "Emergency Response Guidebook," Department of Transportation.

4.0 RESPONSIBILITIES

4.1 CECC Director

Upon notification of a transportation incident, evaluate the need to staff the CECC and provide overall coordination of the response to the incident. Perform actions per **Attachment B** and review section 6.0.

NOTE: If an on scene responder requests immediate information concerning the shipment or how to respond to the incident, the information must be provided within 15 minutes from the time the call is received. Additional information is contained in **Attachment B** of this procedure.

4.2 CECC Emergency Preparedness Staff

- 4.2.1 The Manager, EP Program Planning and Implementation Section, or designee, ensures equipment and materials are available and maintained in accordance with section 5.0.
- 4.2.2 Upon notification, the EP Emergency Duty Officer (EDO) shall perform actions per **Attachment A**.

4.3 Radiological Assessment Manager (RAM)

Upon notification, perform actions per **Attachment C** and review section 6.0.

4.4 Environs Assessor (EA)

Upon activation, perform actions per **Attachment D** and review section 6.0.

4.5 Field Coordinator (FC)

Upon activation, perform actions per **Attachment D** and review section 6.0.

NOTE: The EA may assume the functions of the FC.

4.6 Monitoring Team

- 4.6.1 If using a site sampling team vehicle for response to the incident scene, the inventory per CECC EPIP-9 should be sufficient. Obtain additional dosimetry for any persons in addition to the standard 2-person sampling team crew.

If not using a sampling team vehicle for response to the incident scene, gather equipment per **Attachment E**. Consider Health Physics equipment needs applicable to the emergency and obtain those items from plant inventory (i.e., hand held and extended reach survey instruments, air samplers, and respirators).

- 4.6.2 Consider the need for video camera, still camera, and portable communications (radio, cellular phone or satellite phone).
- 4.6.3 Prior to arrival at the incident scene, review expected actions per **Attachment F** and review section 6.0.
- 4.6.4 Upon arrival at the incident scene, perform actions per **Attachment F** and CECC instructions. Utilize applicable CECC EPIP-9 instructions and data forms for radiological monitoring. Complete **Attachment G** as an incident area survey map.

4.7 Dose Assessment

Upon activation for a transportation incident response, perform actions per instructions of the Radiological Assessment Manager.

4.8 Corporate Communications

- 4.8.1 Upon notification of a transportation incident, the Nuclear Information Duty Officer shall inform the Site Communications Consultant or the Media Relations Duty Officer of the incident.
- 4.8.2 The Site Communications Consultant or Media Relations Duty Officer has the responsibility to establish contact with the CECC Director for coordination and to open a conduit to obtain information concerning the incident.

5.0 OPERATIONAL READINESS OF ENVIRONMENTAL MONITORING EQUIPMENT

5.1 Emergency Environmental Monitoring Vehicles

Emergency Preparedness has vehicles and equipment available for response to a transportation incident. Inspections, inventories, and locations are provided in CECC EPIP-9 and -23.

5.2 Transportation Incident Kit

5.2.1 A response kit for situations requiring the use of transportation other than the vehicles referenced in section 5.1, is located at the Central Emergency Control Center (CECC).

5.2.2 The contents of the kit are listed in **Attachment E**. As a minimum, inspections shall be performed by the assigned organization each calendar quarter or after use to ensure operational readiness is maintained.

5.2.3 Completed checklists shall receive a supervisory review prior to placement in the EP test file.

5.2.4 Inspection checklists shall be retained for a minimum period of three years.

6.0 GENERAL OPERATIONS FOR ENVIRONMENTAL MONITORING TEAMS

6.1 Radiological and Physical Hazard Precautions

6.1.1 Perform applicable radiological monitoring practices upon the approach to an incident area, during on-scene operations, and prior to leaving controlled areas.

6.1.2 Be attentive to potential changing conditions (i.e., onset of release due to fire, addition of runoff due to fire-prevention measures, movement of vehicle or container, deterioration of containers due to contact with spilled chemicals, or meteorological conditions).

6.1.3 Remain cognizant of individual doses and take action to limit doses ALARA, below individual routine exposure limits. Any decisions to embark on emergency operations which would result in exposures in excess of limits in 10 CFR 20 should be done in consultation with the CECC Radiological Assessment Manager.

6.1.4 Assume airborne radioactivity exists until there is direct evidence to the contrary and use appropriate respiratory protection equipment, based on known or suspected airborne hazards.

CAUTION!: Because some shipments may contain materials that present toxic hazards that exceed radiological hazards, the team shall not enter a plume from a fire. Shipments of radioiodines with significant activity are common for medical purposes. Consider the use of KI if airborne radioiodine is suspected (and actual levels are unknown) and exposure rates greater of 25 mrem/hr are encountered.

- 6.1.5 Shipments may also involve other hazardous materials (toxics, corrosives, flammables or reactives). Be attentive to contact with materials (either directly or from residues on radiological samples) and to the limitations of your personal protective clothing and equipment.

NOTE: Material information may be listed on shipping papers. Refer to the DOT Emergency Response Manual for specific protective action recommendations if placard or chemical ID information is known. Otherwise, team members shall observe radiological protective actions described in CECC EPIP-9 and as noted on the bottom of exposure rate and air activity data forms.

6.2 Communications for Environmental Monitoring Teams

- 6.2.1 If available, the Emergency Environs Monitoring radio is the primary means of communication if the incident location is within the system coverage.
- 6.2.2 If the radio system is not available, utilize best available alternate means (cellular or satellite telephone).

NOTE: Additional radio system information and CECC telephone numbers are provided in CECC EPIP-9.

6.3 Incident Scene Activities

The monitoring team shall follow instructions from the CECC and in accordance with **Attachment F**. Deviations from exact compliance may be necessary in consideration of specific circumstances of the incident; however, personnel safety shall not be compromised.

7.0 LIST OF ATTACHMENTS

- Attachment A: EP Emergency Duty Officer (EDO) Checklist
- Attachment B: CECC Director Checklist
- Attachment C: CECC RAM Checklist
- Attachment D: CECC Environs Assessor and Field Coordinator Checklist
- Attachment E: Transportation Incident Equipment
- Attachment F: Incident Scene Activities (Environmental Monitoring Team)
- Attachment G: Incident Area Survey Form
- Attachment H: On Scene Incident Report
- Attachment I: Fitness for Duty Program Administration - TVAN Call-In Sheet

EP Emergency Duty Officer Checklist

1. Perform the following notifications:

Time/Init.

_____/_____
Confirm the CECC Director has been notified by the Operations Duty Specialist.
Specialist (Name: _____ Number: _____)

_____/_____
Notify the Manager, EP Program Planning and Implementation Section
or designee.

_____/_____
Notify the EP Program Manager responsible for EP emergency radiological
monitoring equipment and vehicles or designee.

_____/_____
Notify the Manager, EP State and Local Programs Section or designee.

*
*

2. Establish initial operation of the CECC if it is to be utilized.

3. Assist any response team members in obtaining EP equipment and vehicles.

NOTE: The transportation incident kit assigned to the CECC may be located in the CECC.
If a vehicle is not currently available in Chattanooga, refer to EPIP-9, for other vehicle
locations. A Portable radio, camera, film, and camcorders may also be available in the EP
Staff storage area.

Radiological monitoring equipment, supplies, and Potassium Iodide tablets may also be
available in the CECC area.

**4. The issuance of a cellular or satellite phone to the CECC management team should
be considered.**

*Revision

Attachment B Page 1 of 6

CECC DIRECTOR CHECKLIST

1. Obtain a completed:

- "Transportation Incident Checklist" (CECC EPIP-22, Attachment A)
- ODS Radioactive Material Shipment Notification form (from the Operations Duty Specialist if it was faxed by the shipper.)

NOTE: If an on scene responder requests immediate information concerning the shipment or how to respond to the incident, then refer to pages 3, 4, 5, and 6 of this attachment. Requested information shall be provided within 15 minutes from the time that it is initially requested.

2. Consult with the on duty CECC Radiological Assessment Manager and Nuclear Information Duty Officer to determine the necessary levels of staffing for the CECC. Inform the ODS to notify selected staff and utilize Attachment I, "Fitness for Duty Program Administration" for documentation.

3. If determined necessary, begin preparations to dispatch a CECC Management team from the CECC consisting of management representatives from Emergency Preparedness, Radiological Control, and Communications to the incident site.

4. Consult with the on duty CECC Radiological Assessment Manager and determine if an environmental monitoring team should be dispatched.

NOTE: The Radiological Assessment Manager is responsible for providing input, selecting response team members, and arranging transportation.

5. Consult with the on duty Radiological Assessment Manager and Nuclear Information Duty Officer to determine if the CECC Management Team should be released to proceed to the incident location.

* 6. Update the Senior Nuclear Executive of the incident.

7. Notify the affected site Vice President of the incident

*Revision

CECC DIRECTOR CHECKLIST

8. Notify the following: (These notifications may be delegated.)

NOTE: These notifications shall be made for all vehicle accident situations and are optional for other minor incidents as deemed appropriate.

Time/Init. (Refer to the TVA REND)

* _____ / _____ NRC Operations Center may require notification based on 10 CFR 20.2202
* "Notification Requirements." (Confer with Radioactive Material Specialist).
*
*

* _____ / _____ U.S. Department of Transportation, National Response Center, may require
* notification based on 49 CFR 171.15, "Immediate Notice of Certain
* Hazardous Material Incidents." (Confer with Radioactive Material Specialist).

_____ / _____ State contact for incident location

_____ / _____ Department of Energy (for information only)

_____ / _____ American Nuclear Insurers (ANI)

_____ / _____ TVA Nuclear Insurance Carrier Contact (if requested by ANI)

(Refer to the current CECC Reprack Roster.)

_____ / _____ Nuclear Information Duty Officer (Reprack Roster)

- 9. Evaluate the appropriate level of TVA resources to commit and provide overall coordination of those resources.
- 10. Ensure that Federal, State, and local agencies are kept informed, as appropriate, of TVA activities and coordinate TVA's efforts with those agencies.
- 11. Review with the Radiological Assessment Manager any on site and offsite consequences and assess the adequacy and need for measures for the protection of the public.
- 12. Make recommendations to State and local agencies on protective measures for the public.
- 13. Maintain accurate records of decisions made and actions started and completed.

*Revision

CECC DIRECTOR CHECKLIST

INFORMATION FOR ON SCENE RESPONDERS

- 14. Ensure Public Information needs are addressed.
- 15. Ensure appropriate recovery actions are taken.

NOTE: Information requested by authorities for immediate action shall be provided within 15 minutes

Information About Shipments

- a. If you are requested to provide information concerning the shipment, refer to the ODS RADIOACTIVE MATERIAL SHIPMENT FORM which was telecopied to the ODS when the shipment left the TVA facility. Provide any information on the form which may be requested by the on scene responder and tell this individual of any precautions that may be indicated on the form.

Information About Emergency Response

- b. If you are requested to provide information concerning Emergency Response, then provide any pertinent information contained in **pages 4, 5 and 6 of this Attachment.**

Where To Get Assistance

- c. If you are requested to provide information which you have no knowledge of or is not available to you, contact the Shift Manager or the RADCON Lab at the affected plant

* for assistance at the telephone numbers listed below.
* (These contacts may also be used for support if the shipment originated at another
* location.)

SQN SM	423-843-7860
SQN RADCON Lab	423-843-7865
BFN SM	256-729-7860
BFN RADCON Lab	256-729-7865
WBN SM	423-365-7860
WBN RADCON Lab	423-365-7865

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*Revision

CECC DIRECTOR CHECKLIST

INFORMATION FOR ON SCENE RESPONDERS

EMERGENCY RESPONSE INFORMATION

NOTE: A copy of this information is included with the shipping papers sent with the shipment.

Immediate Hazards to Health

- a. External radiation from unshielded radioactive material.
- b. Internal radiation from inhalation, ingestion, or skin absorption.
- c. Radioactive material; degree of hazard will vary greatly, depending on type and quantity of radioactive material.
- d. Runoff from fire control or dilution water may cause the spread of radioactive contamination.

Risks of Fire and Explosion

- a. The primary potential for fire or explosion is from leaking fuel from the motor vehicle.
- b. Some of the packaged materials may burn, but none of them readily ignites.
- c. Radioactive oil (if present in a package) has a potential for fire.

Immediate Precautions To Be Taken

- a. Keep unnecessary people as far from the transport vehicle as practicable.
- b. Notify State or local police that an incident has occurred involving radioactive material.
- c. Isolate hazard area and deny entry.
- d. Detain uninjured persons and equipment exposed to radioactive material until arrival or instruction of Radiation Authority.
- e. Delay clean-up until arrival or instruction of the Radiological Authority with jurisdiction.
- f. Do not move damaged containers.

CECC DIRECTOR CHECKLIST

INFORMATION FOR ON SCENE RESPONDERS

EMERGENCY RESPONSE INFORMATION

Immediate Methods of Handling Fires

- a. Keep everyone at least 150 feet upwind and minimize breathing any of the smoke or fumes from the fire. Greater distances may be necessary if advised by Radiation Authority.
- b. Notify the fire department of the fire and inform them that the transport vehicle is carrying radioactive material.
- c. Self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing will provide limited protection.
- d. If advised by the Radiation Authority, move undamaged containers out of fire zone.
- e. Small Fires: Dry chemical, CO₂, Halon, water spray, or standard foam.
- f. Large Fires: Water spray, fog (flooding amounts).
- g. For massive fire in cargo area, use unmanned hose holder or monitor nozzles.
- h. Fight fire from maximum distance. Stay away from ends of tanks.
- i. If water pollution occurs, notify the appropriate authorities.

Immediate Methods for Handling Spills or Leaks in the Absence of Fire

- a. Establish the restricted area and keep people outside of the area and on the upwind side (if possible).
- b. Enter the spill area only to aid injured persons; limit entry to the shortest possible time.
- c. Unless authorized by the Radiation Authority, do not touch damaged containers or spilled material.
- d. Damage to outer container may not affect primary inner container.
- e. Small Liquid Spills: Take up with sand, earth or other noncombustible absorbent material.
- f. Large Spills: Dike far ahead of liquid spill for later disposal.

Attachment B Page 6 of 6

CECC DIRECTOR CHECKLIST

INFORMATION FOR ON SCENE RESPONDERS

EMERGENCY RESPONSE INFORMATION

Preliminary First Aid Measures

- a. Call emergency medical care if there are any suspected injuries.
- b. Advise medical care personnel that injured persons may be contaminated with radioactive material.
- c. Remove injured persons from any possible contaminated areas (unless the injuries are of a severe nature that would make movement inadvisable).
- d. If not affecting injury, remove and isolate contaminated clothing and shoes; wrap victim in blanket before transporting.
- e. If not injured, detain persons and equipment exposed to radioactive material until arrival or instruction of Radiation Authority.

Attachment C Page 1 of 1

CECC RAM CHECKLIST

- 1. Review incident information. (Refer to CECC EPIP-22, Attachment A completed by the Operations Duty Specialist and any radioactive material shipping papers that may have been telecopied to the ODS.)
- 2. Advise the CECC Director as to the level of staffing required to support the TVA response.
- * 3. Establish contact with Radioactive Material Specialist.
- * 4. Select and activate appropriate CECC Radiological staff and Response Team members. Refer to REND for notification listings. Ensure Attachment I is utilized for any call outs

NOTE: A Response Team should be dispatched if radioactive materials require re-packaging. In these events, a radioactive material specialist should accompany the Response Team for technical assistance. Personnel selected for entry into radiological incident areas for field monitoring duties shall be Emergency Environs Sampling Team qualified in accordance with CECC EPIP-9

The following is provided to assist in notifications: (use as appropriate)

Environs Assessor: _____ Contacted: _____

Field Coordinator: _____ Contacted: _____

Radioactive Material Specialist: _____ Contacted: _____

Response Team Member: _____ Contacted: _____

Response Team Member: _____ Contacted: _____

Dose Assessor: _____ Contacted: _____

Meteorologist: _____ Contacted: _____

Mode of Transportation: _____ Means of Contact: _____

- * 5. Coordinate TVA's radiological assessment activities and keep the CECC Director advised of the status of the TVA response efforts and of radiological assessments.
- * 6. Ensure personnel are briefed on known or anticipated conditions and that they are informed of the agency requesting TVA assistance.
- * 7. Ensure that all immediate notifications are made as required in the TVAN Radioactive Material Shipment Manual.
- * 8. Ensure recovery actions are completed, equipment is returned to an in-service status, and that personnel dosimetry/dose assessment needs are performed.

*Revision

Attachment D Page 1 of 1

CECC ENVIRONS ASSESSOR AND FIELD COORDINATOR CHECKLIST

Environs Assessor

1. If the shipment originated from a TVA nuclear site, obtain a copy of the shipping papers that would have been telecopied to the ODS.
2. Provide support for field team preparation and dispatch. Ensure equipment and staff needs are completed.
3. In coordination with the RAM, determine response-specific exposure limits and Remaining Allowable Doses for field team personnel and inform them of same.

NOTE: Cross reference exposure control, protective action levels and dose logs with CECC EPIP-9.

4. Confirm Response Team personnel eligibility for expected actions in field response (refer to personnel requirements in CECC EPIP-9).
5. Determine means of communication to be used by the Response Team (operate CECC base radio console as applicable).
6. Review field monitoring instructions per CECC EPIP-9 which apply to the response.
7. Maintain a log of Response Team actions and incoming information reported by the Response Team.

Field Coordinator

1. Ensure that departure preparations are complete and in accordance with any special instructions from the RAM.
2. Accompany Response Team members to the incident location and supervise TVA personnel at the incident scene per section 6.0 and Attachment F.
3. Track TVA personnel exposures on scene.
4. Unless instructed otherwise by the RAM, serve as the primary TVA interface with on scene authorities and ensure the CECC is kept informed of operations.
5. Ensure necessary surveys are performed and documented.
6. Ensure recovery actions are completed and any TVA equipment used is returned to service following operations.

Attachment E Page 1 of 2

TRANSPORTATION INCIDENT EQUIPMENT

Transportation Incident Kit Booklet			
	Qty	Item	Remarks
	1	CECC EPIP-23 (Controlled copy)	Rev:
	5	CECC EPIP-23 Attachment G (working copy)	Rev:
	1	CECC EPIP-9 (Controlled copy)	Rev:
	5	CECC EPIP-9 Shift Information Sheet and Team Dose Tracking Log (working copy)	Rev:
	5	CECC EPIP-9 Emergency Authorization (working copy)	Rev:
	10	CECC EPIP-9 Field Team Measurement Log (working copy)	Rev:

General Kit Contents			
	Qty	Item	Remarks
	3	TLDs (list expiration date)	Date:
	3	Direct reading dosimeters (0-200 mrem range)	
	1	Dosimeter charger with battery	
	1	Package KI (list expiration)	Date:
	1	Calculator	
	3	Mechanical pencils and pens (each)	
	1	US Atlas	
	1	Logbook	
	1	DOT Emergency Response Guidebook	Year:

Attachment E Page 2 of 2

TRANSPORTATION INCIDENT EQUIPMENT

General Kit Contents			
	Qty	Item	Remarks
	1	Roll 2-inch Radiation Symbol warning tape	
	12	Radioactive Material ID tags	
	6	Radiation/Contamination Area warning signs	
	400 ft.	Yellow and magenta ribbon or rope	
	10	Large yellow plastic bags	
	10	Small yellow plastic bags	
	10	Zip-lock sample bags (approx. 6" and 10")	
	20	Adhesive sample bag labels	
	5	Plastic liquid sample containers (min. 500 ml)	
	5	Charcoal air sampler cartridges	
	5	Silver Zeolite air sampler cartridges	
	1	Air sampler head (for Radeco H 809V)	
	10	Air sampler prefilters	
	10	Plastic petri dishes	
	1	Pair tweezers	
	100	Smears with folders	
	6	Disposable coveralls (anti-contamination)	
	6	Canvas hoods (anti-contamination)	
	6	Skull caps	
	6 pr.	Pair of rubber overshoes	
	6 pr.	Yellow plastic booties	
	12 pr.	Rubber gloves (anti-contamination)	
	12 pr.	Glove liners	
	1 pr.	Work gloves (leather/canvas)	
	12 pr.	Latex gloves (surgeon's type)	
	1	Roll of 2-inch duct tape	
	1	Can spray paint (for area marking)	
	2	Flash lights w/batteries	

Stored location of kit and equipment: _____

Additional comments: _____

Inspected by: _____ Date: _____

Supervisory Review: _____ Date: _____

Attachment F Page 1 of 5

INCIDENT SCENE ACTIVITIES
(Environmental Monitoring Team)

1.0 Actions Immediately Upon Arrival

- 1.1 Each TVA person entering radiation exposure fields shall wear a TLD badge, and a 200 mrem direct reading dosimeter. Record data on CECC EPIP-9 Dose Log.
- 1.2 Place a radiation survey meter in the ON position on a lower range scale to monitor any increase in background as you approach the area.
- 1.3 Locate the senior authority at the incident site, identify yourself, and indicate that you are responding at the request of _____ (i.e., the State Division of Radiological Health, Emergency Management Agency, etc.).
- 1.4 Obtain a briefing from the senior authority on the physical hazards present (chemical, fire, electrical, etc.).
- 1.5 As necessary, report Attachment H information to the CECC as soon as possible, preferable before proceeding to the following steps.
- 1.6 If requested by the on scene authority, proceed with the remainder of guidance in this attachment.

NOTE: TVA's obligation is to provide radiological support to the on scene local authorities. The local and state authorities have jurisdiction in the emergency response effort even if a TVA vehicle or shipment is involved in the incident.

2.0 Establishment of Area Control

- 2.1 Request the on scene authority to have people move back from the incident. Nonessential persons and onlookers should be moved a safe distance away, but be aware that some may already be contaminated if the source has been breached.

Recommend an attempt to identify these persons (i.e., obtain name, address, phone numbers, etc.) and as necessary, isolate these persons for the purpose of performing a contamination survey prior to release. (This may also apply to first responders.)

NOTE: Persons suspected of contamination concerns should immediately be advised not to eat, drink, or smoke until surveyed.

Attachment F Page 2 of 5

INCIDENT SCENE ACTIVITIES
(Environmental Monitoring Team)

- 2.2 Advise fire and rescue personnel to stay upwind or crosswind from the location of the source, if possible. Firefighting and rescue efforts should not be interrupted.

CAUTION!: The life-threatening hazards associated with a vehicle fire and the potential for explosions far outweigh the radiological hazards in almost any case.
DO NOT ENTER A PLUME FROM A FIRE!

- 2.3 If fire fighting efforts are in progress, determine the path of the water runoff and, if possible, advise on the containment and control of runoff.

NOTE: This applies during rainfall as well. Always assume that the source container has failed until confirmed intact.

- 2.4 If rescue of injured persons is still in progress, offer to survey the patient to assist in any notifications to receiving hospitals.
- 2.5 Establish a control area using radiation warning rope and signs using guidance from the DOT Emergency Response Guidebook and from best available information. (The initial posted area may be reduced in size as later survey results indicate.)
- 2.6 If radioactive material has spilled, consider plans to cover/contain the material to reduce its spread. The use of plastic sheeting, plastic bags, or fire department salvage or rescue covers may be used to prevent dispersion by wind, etc.

3.0 Survey of the Incident Scene

- 3.1 Don appropriate personal protective clothing or equipment in preparation for entry into the incident area. Remember to assume that the area may already have been contaminated and that airborne hazards exist, **UNTIL INFORMATION IS KNOWN TO THE CONTRARY.**
- 3.2 If a fire prevents surveying the area for the foreseeable future, analysis of a sample of the runoff water may indicate whether the source container has been breached. After best available analysis, double bag the sample to prevent leakage until a more detailed analysis can be obtained.

CAUTION!: Be attentive to the possibility of chemical contaminants in the runoff. Collect samples only if safe to do so and if the container is able to withstand contact with the liquid.

Attachment F Page 3 of 5

INCIDENT SCENE ACTIVITIES
(Environmental Monitoring Team)

- 3.3 If fire and/or smoke is present, and an electrical source is available, attempt to obtain an air sample using the following procedure:
- 3.3.1 Prepare the air sampler cartridge using a charcoal cartridge (use silver zeolite if Iodine 131 is suspected) and particulate prefilter.
 - 3.3.2 Secure (tape) the extension cord connection with the air sampler plug. While still in a safe area, briefly start the air sampler to adjust the flow rate to 60 liters per minute (2 cfm), then terminate the sample by depressing the STOP key and prepare the sampler to start with the next depression of the START key.
 - 3.3.3 Request that a firefighter in appropriate protective clothing and respiratory protection place the sampler in the plume and depress the START key.

CAUTION! Be attentive to electrical hazards from water runoff.

- 3.3.4 Run the sample for 5 minutes unless instructed otherwise. Stop the air sampler by disconnection of the extension cord with the power source.
- 3.3.5 If a sampling van is present, analyze the cartridge and prefilter according to EPIP-9.

If the sampling van is not available, survey the sample using the Bicon Surveyor 50 for a gross indication of the presence or absence of radioactivity.

CAUTION! Consider the possibility of the presence of Radon (recount after 30 minutes). Also handle the samples using tweezers and gloves.

- 3.4 If the on scene authority has declared the area to be free of other physical hazards (fire, chemical, electrical, etc.), one person should prepare to make an entry to the control area to perform radiological monitoring. This should be done only with the permission of the on-scene authority. The other person should remain in the clean area to coordinate communications with the on scene incident command and CECC.
- 3.5 Establish some means of communications with the person performing the entry into the controlled area. Approach the vehicle (or source) from an upwind direction. The Gieger-Mueller Survey Meter (GMSM) should be adequate to obtain exposure rates.

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INCIDENT SCENE ACTIVITIES
(Environmental Monitoring Team)

NOTE: Allowable DOT radiation limits range on a package ranges from less than 1 mrem/hr up to 1000 mrem/hr, depending on package type and method of transport. Consult the shipping papers (if available) for the expected dose rates on the package and vehicle exterior. Additional advice may be available from a TVA Radioactive Material specialist.

- 3.6 After exposure rates have been determined and recorded, perform a contamination survey. All radioactive material outside its container should be considered transferable contamination, and smear surveys will also be made. Any object that shows detectable contamination above background shall be considered contaminated no matter how small the amount of activity.

NOTE: Consider the type of isotope emission when selecting the type of detection instrument. DOT contamination limits allow up to 2200 dpm/100 cm² beta-gamma and 220 dpm/100 cm² alpha (transferable) on a package. Consult the shipping papers (if available) for vehicle and package contamination measurements.

- 3.7 The person outside the area should attempt to draw and complete a survey map (**Attachment G**).
- 3.8 Keep the CECC informed of the survey results.
- 3.9 If the source container has failed, or if its condition is not known, frisk personnel at the site. Recommend that anyone found to be contaminated above BG levels be evaluated by local RAD Health Authorities. Because TVA has no legal authority at the site, TVA personnel cannot make decisions on releasing contaminated persons.
- 3.10 Advise the on scene authority on the packaging or control of equipment until surveys can be performed (after personnel needs have been addressed).
- 3.11 Consult with emergency responders to determine the priority of equipment which need to be surveyed for return to service.
- 4.0 Additional Services for Transportation Incidents**
- 4.1 Decontamination of persons and equipment (even TVA equipment) is the responsibility of State authorities. If requested to assist, contact the CECC for authorization. It may be possible to provide coveralls for contaminated persons, but keep enough to be able to perform your field monitoring duties.

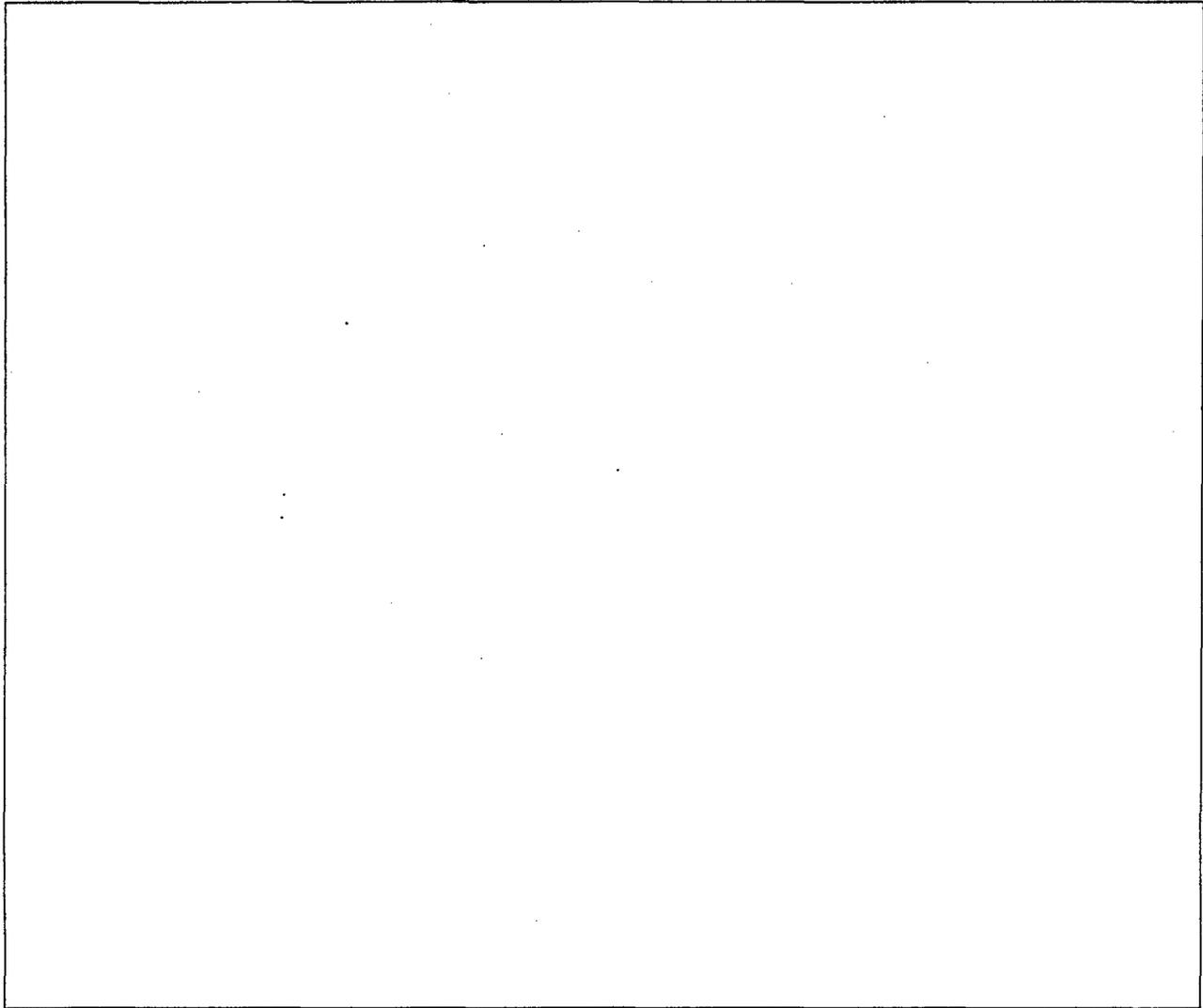
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INCIDENT SCENE ACTIVITIES
(Environmental Monitoring Team)

- 4.2 As applicable, inform the on scene authority at the scene that persons injured and sent to hospitals in the area may be contaminated. If requested by State officials, assistance may be provided at a medical facility if authorization is provided by the CECC.
- 4.3 Support the coordination of arrangements for the disposal of radwaste.
- 4.4 The team may support clean-up efforts at the scene as requested by the State until no longer needed or until instructed to depart by the CECC. Consult with the CECC before departing the area.

Attachment G Page 1 of 2

INCIDENT SURVEY FORM



All exposure rate readings in mrem/hr. (contact/30 cm/1 meter).
All contamination levels in dpm/100 cm².

SMEAR SURVEYS		
1.	8.	15.
2.	9.	16.
3.	10.	17.
4.	11.	18.
5.	12.	19.
6.	13.	20.
7.	14.	21.

CONTINUED ON BACK

Attachment H Page 1 of 1

ONSCENE INCIDENT REPORT

1. Location of incident _____

2. Radioisotopes involved

3. Activity of isotopes

4. Markings: LSA ____, SCO Radioactive ____

5. Description of packages: _____

6. Physical and chemical forms: _____

7. Package identification (specify type A or B, etc.) _____

8. Shipper, carrier, and destination: _____

9. Injuries and receiving hospitals. _____

10. Release(s) of shipment contents to environment: _____

11. Other hazardous materials present (ID numbers, etc): _____

12. Incident description and present status, terrain (including downwind and downslope farms and residential areas). _____

13. Weather conditions. _____

14. Authorities at the scene. _____

15. Phone number (if not using van radio). _____

16. Results of surveys. (Report using CECC EPIP-9 data forms)

NOTE: Much of this information can be found on the shipping papers. If lost or destroyed in the incident, the driver may be able to help. If all else fails, markings on the vehicle may enable CECC personnel to contact the carrier for information.

