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

July 13, 2000

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 EPIPs.

PROCEDURE		EFFECTIVE DATE
EPIP	EPL	7/10/00
EPIP-7	Rev. 24	7/10/00
EPIP-13	Rev. 8	7/10/00
EPIP-18	Rev. 8	7/10/00
EPIP-19	Rev. 10	7/10/00
EPIP-22	Rev. 16	7/10/00

The enclosed information is being sent by certified mail. The signed receipt signifies that you have received this information and will be taken as verification that the NRC copies of the plan have been updated, and the superseded material has been destroyed.

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

Sincerely,

Mark J. Burzynski

Mark J. Burzynski
Manager
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DOCUMENT RELEASE AND FILING INSTRUCTIONS

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Prepared By: Gail White
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☒ QA Records/Documents
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Date

Contact: Ext.

Acceptance:
Janice E. Pogue 07/11/2000
Signature Date

TENNESSEE VALLEY AUTHORITY
CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN
IMPLEMENTING PROCEDURES
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CECC EPIP Coversheet

Tennessee Valley Authority CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN IMPLEMENTING PROCEDURES	Title CECC RADIOLOGICAL ASSESSMENT STAFF PROCEDURE FOR ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY	CECC EPIP-7 REV. 24 Effective Date: 7/10/00

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CECC-EPIP-7
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WRITTEN BY: Thomas E. Adkins *Signature* REVIEWED BY: B K Marlow *Signature* 7/7/00 *Date*

PLAN EFFECTIVENESS DETERMINATION: Thomas E. Adkins *Signature* 7/3/00 *Date*

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Concurrence Signature	Date
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☐ Manager, Emergency Preparedness R J Little	7/7/00
☐ Manager, Radiological and Chemistry Services Chandhan -	7/7/00
☐	

APPROVAL

APPROVED BY J. A. BAILEY *Signature* Vice President *Title* EoTS *Organization* 7/8/00 *Date*

CECC-EPIP-7
CECC RADIOLOGICAL ASSESSMENT STAFF
PROCEDURE FOR ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY
REVISION LOG

Rev. No.	Date	Revised Pages
0	3/22/88	All (Changed from IPD to EPIP)
1	7/8/88	Page 1, Apps. F & H
2	11/18/88	1,2,5,6,8, App. E p. 2
3	4/26/89	All
4	9/19/89	All
5	10/26/89	2-3, App. D, App. F
6	7/2/90	2, 4, 6-8, App. A (pg. 1), App. C (1 pg.), App. E (pg. 1), App. J (added)
7	9/14/90	Pg. 6; App. D, Pg. 1
8	5/21/91	Page 7 of 8, App. A, Pg. 1, App. C, Pg. 1, App. D, Pg. 1, App. E, Pg. 2, App. G, Pg. 1, App. I, Pg. 1 (Appendix H deleted)
9	10/17/91	Pg. 7; App. A, pg. 1; App. F, Pg. 1
10	12/23/92	Coversheet and Rev. Log; App. E, pg. 1
11	05/13/93	2, 4-8; App. D, pg. 1; App. E, pg. 1; App. G, pg. 1. All pages issued to maintain rev. level.
12	11/30/93	Page 8; App. A, pgs. 1-2; App. F, pgs. 1 & 2; App. I deleted by this revision.
13	04/19/94	Pgs. 4 & 5; App. A; App. D; App. G; and App. I
14	6/26/95	Pgs. 7; App. C, p. 1; App. D, p.1; App. F, p.2
15	11/01/95	Revise PAR Diagram. All pages issued.
16	5/30/96	Reformat procedure; editorial changes; remove Form from Appendix F; revise PAR Form in Appendix I; add TSC Information Form to Appendix J; add Appendix K for Fitness-For-Duty Form (old Appendix J); all pages issued.
17	10/30/96	Revise PAR Diagram; redesignate Appendixes F through K to F through I; add reference to Appendixes F & G of CECC-EPIP-9. All pages issued.
18	4/7/97	Annual review, editorial changes, change data services reference to field staff, remove reference to quarterly dose limits. All pages issued.
19	6/9/98 ~~6/4/98~~ *RR*	Annual review, editorial changes, organization title changes. All pages issued.
20	10/6/98	Update position titles to reflect current organizations. All pages issued.

CECC-EPIP-7
CECC RADIOLOGICAL ASSESSMENT STAFF
PROCEDURE FOR ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY
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Rev. No.	Date	Revised Pages
21	2-22-99	PAR diagram revised. All pages issued.
22	5/1/99	PAR diagram revised. All pages issued.
23	7/16/99	Page 15, PAR form revised to remove hypothetical bounding option as it was redundant. All pages issued.
24	7/10/00	Annual review and self-assessment items. All pages issued.

CECC RADIOLOGICAL ASSESSMENT STAFF PROCEDURE FOR ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY

1.0 PURPOSE

This procedure provides instructions for a consistent, accurate, and timely response by the Radiological Assessment Manager (RAM) and staff in the event of an accident. This procedure identifies the necessary information which is provided to the CECC Director to ensure that prompt, accurate, protective action recommendations for the public can be made by the CECC to appropriate State authorities.

2.0 SCOPE

This procedure covers the actions of the RAM and staff during an Alert, Site Area Emergency, and General Emergency.

3.0 REFERENCES

3.1 Radiological Emergency Plan

4.0 ABBREVIATIONS AND DEFINITIONS

CECC	- Central Emergency Control Center
DA	- Dose Assessment
EA	- Environs Assessment
EDS	- Environmental Data Station
ODS	- Operations Duty Specialist
RAC	- Radiological Assessment Coordinator
RAM	- Radiological Assessment Manager
REND	- Radiological Emergency Notification Directory
RMCC	- Radiological Monitoring Control Center
FSAR	- Final Safety Analysis Report
TLD	- Thermoluminescent dosimeter
TSC	- Technical Support Center
TVAN	- Tennessee Valley Authority Nuclear

5.0 RESPONSIBILITIES

NOTE: Appendix H will be used to document fitness for duty when an individual is called and requested *to respond to an emergency outside of normal work hours and from a non-duty status.

5.1 Radiological Assessment Manager

The RAM is notified of Alert or higher classification emergencies through the automated paging system which is activated by the ODS. If this system is not operable, the ODS will call the RAM. The RAM reports to the CECC. The RAM is responsible for notifying the members of the CECC Radiological Assessment Staff (i.e., Boardwriter, Rad Assessment Coordinator) that are not activated via the paging system.

The RAM is responsible for committing the support efforts of TVAN to the affected plant to deal with radiological aspects of the emergency. If TVAN cannot fulfill the needs of the affected plant, the RAM has the authority to seek help from other organizations within TVA. The RAM shall provide the CECC Director with periodic summaries of information needed for overall radiological accident assessment. He shall also provide the State with periodic updates of radiological information.

5.2 Radiological Assessment Coordinator

The RAC is responsible for supervising and coordinating the activities of the Radiological Assessment Staff, serves as the interface between the RAM and the staff, and for providing protective action recommendations to the RAM (see Appendix A). He is the primary contact between the Radiological Assessment Staff and the TSC for exchange of technical information (See Appendix G). He is the primary contact/interface between the TSC and the CECC for coordinating the emergency in-plant RADCON response. He obtains additional RADCON resources which may be required. This position is not activated via the automated paging system. The RAM will fulfill the duties of the RAC until the position is staffed.

5.3 Dose Assessment

Dose Assessment (DA) is responsible for the dose assessment activities of the CECC and for providing protective action recommendations to the RAM (see Appendix A) in the absence of the RAC. DA should activate additional staff members to fill the dose assessment positions in a *timely manner, if warranted. DA shall ensure that communication occurs between the State staff and the DA staff for the exchange of technical information.

*Revision

DA is responsible for providing a preliminary assessment concerning any new releases as soon as possible to the RAM. As necessary, DA shall ensure that all appropriate notifications are made of event termination.

5.4 Environs Assessment

Environs Assessment (EA) supports the CECC by assessing offsite radiological conditions in close coordination with the State (through the Field Coordinator) and providing environmental monitoring results to the RAM for use in formulating protective action recommendations. EA draws upon available technical expertise to approximate the location, dimensions, and radiological characteristics of the plume. EA directs the efforts of TVA's emergency radiological monitoring personnel in the collection of field data in a safe and expeditious manner and coordinates analysis of environmental samples with laboratory supervision. EA coordinates the results of environmental assessments with DA. All other TVA radiological monitoring personnel are subordinate to EA and are responsible for following and implementing EA's directives. EA assists the State as requested to clarify technical assessments of offsite radiological conditions. EA provides technical support as requested for planning and reentry/recovery operations.

5.5 Field Coordinator

The TVA Field Coordinator is responsible for directing TVA emergency radiological monitoring personnel in the field in accordance with the instructions of EA. He coordinates the activities of TVA field personnel with the State in an effort to optimize the collection, analyses, and transfer of field data to State officials and the CECC. He maintains dose records and provides protective action direction for field personnel. He will provide Radiological Control (RADCON) support to field operations utilizing the sampling van teams and their equipment. The duties of the Field Coordinator may be assumed by EA.

6.0 PROCEDURES/REQUIREMENTS

6.1 Radiological Assessment Manager

*NOTE: A checklist is provided in Appendix C.

6.1.1 Initial Actions

6.1.1.1 Review the emergency condition with the CECC Director and make a determination as to proper staffing of the Radiological Assessment staff, taking into consideration,

(1) Potential or actual need for offsite dose or environmental assessment, and

(2) Potential or actual need for inplant RADCON support.

6.1.1.2 Activate a RAC to coordinate radiological assessment activities, if sufficient personnel are available.

*Revision

6.1.1.3 Ensure that the DA and EA have established appropriate staffing levels to perform radiological monitoring and dose assessment.

*6.1.1.4 Ensure that communications have been established with the TSC RADCON Manager or Radiochemistry Supervisor.

6.1.1.5 Determine if technical support personnel are required and, if so, notify the appropriate personnel.

6.1.1.6 Verify that radiological information is being transmitted to the CECC.

6.1.1.7 Verify that the RAC is receiving timely accident assessment reports and this information is promptly distributed.

6.1.2 General Operations

6.1.2.1 The RAM and the Plant Assessment Manager shall discuss all protective action recommendations to ensure that radiological and plant conditions are properly coordinated. *(Appendices A & F)

6.1.2.2 Ensure that accident assessment information is provided to the CECC Director on a frequent basis. These assessments shall provide summary information as well as appropriate recommended protective actions for the public.

*6.1.2.3 Ensure that radiological information is provided hourly to the State radiological health authority.

*6.1.2.4 Assess actual and projected releases to determine if doses result that would exceed any Emergency Action Level (EAL) limits. If EAL limits are exceeded report to the CECC Director for transmittal of the information to the SED.

*6.1.2.5 If available NP personnel and equipment are not enough to cope with the emergency, contact the designated representative of other TVA organizations, as necessary, to supply adequate resources to recover from radiological aspects of the accident. Log the organizations called for assistance. Descriptions of emergency services and contacts are available in the REND.

*6.1.2.6 Provide technical assistance to discuss the radiological aspects of protective action recommendations with appropriate State contacts as directed by the CECC Director.

*6.1.2.7 Should the accident be expected to last for an extended period, the RAM originates a schedule *for relief. He also directs his staff to prepare a schedule for their relief to ensure that *necessary Radiological Assessment staff is available for the duration of the emergency.

*6.1.2.8 Authorize emergency dose limits for offsite personnel.

*6.1.2.9 The RAM and staff support the CECC Director as required for carrying out recovery efforts from the accident.

*6.1.2.10 Upon termination of the emergency, the RAM and staff shall make themselves available for review of the accident.

*6.1.2.11 The RAM checklist is provided in Appendix C for quick reference by the RAM.

*Revision

6.2 Radiological Assessment Coordinator

NOTE: A checklist is provided in Appendix D.

6.2.1 Initial Actions

6.2.1.1 Upon arrival at the CECC, become familiar with plant conditions and radiological assessment activities.

6.2.1.2 Brief the RAM when prepared to assume responsibility for coordinating radiological assessment activities.

6.2.1.3 Brief the RAM on the status of dose assessment staffing preparations.

6.2.1.4 Contact the TSC of the affected plant and coordinate receipt of data from the TSC and transmission of CECC data to the TSC.

6.2.2 General Operations

6.2.2.1 Supervise and coordinate the activities of the staff and keep the RAM informed on staff activities.

6.2.2.2 Provide protective action recommendations to the RAM (Appendix F) based on dose assessments or field measurements.

6.2.2.3 Ensure that data generated by the Radiological Assessment Staff (Appendix G) are transmitted to the TSC routinely.

6.2.2.4 Assist, as needed, the staff and the TSC in obtaining special or nonroutine data.

6.2.2.5 Assist in obtaining additional RADCON resources (manpower, equipment, supplies, and vendor services) which may be required.

6.2.2.6 Serve as the primary contact/interface between the TSC and the CECC for coordinating the emergency in-plant RADCON response.

6.2.2.7 Provide or assist in obtaining such support as needed for continuing operations of the staff.

6.2.2.8 Provide other assistance as directed by the RAM.

6.3 Dose Assessment

NOTE: Checklists are provided in CECC EPIP-8.

Dose assessors provide draft protective action recommendations for protection of the public.

6.3.1 Initial Actions

*6.3.1.1 When warranted, activate or place on standby additional Dose Assessment staff.
*
*

6.3.1.2 Upon arrival at the CECC, initial notifications and assessments shall be recorded as described in CECC EPIP-8.

6.3.1.3 Brief the RAC (or RAM, as appropriate) on the status of dose assessment staffing preparations.

6.3.2 General Operations

6.3.2.1 Perform functions as described in CECC EPIP-8.

6.3.2.2 Ensure that shift changes occur as described in CECC EPIP-8.

6.3.2.3 Provide other assistance as requested by the RAC.

6.4 Environs Assessment

6.4.1 Initial Actions

NOTE: A checklist, which includes turnover from TSC, is provided in Appendix E.

6.4.1.1 When conditions warrant, activate the Field Coordinators, and activate or direct a Field Coordinator to activate field monitoring personnel using the REND. The screening van is activated by notifying the laboratory supervisor to dispatch the screening van.

6.4.1.2 Activate the EP Field Support Staff.

6.4.1.3 Establish and maintain an environs assessment log. Record key events, notifications, etc. Field data need not be recorded in the log.

6.4.1.4 Obtain and record the field data collected by the plant team from the TSC and assume coordination of field operations if appropriate per Appendix E.

6.4.1.5 Brief the RAC (or RAM, as appropriate) on the status of environs assessment staffing preparations.

6.4.1.6 Ensure that field data are transferred to the State until the Field Coordinator is operating at the RMCC.

*Revision

6.4.2 General Operations

6.4.2.1 If a senior instrument mechanic is requested for the EDS, notify the TSC that the request has been made.

6.4.2.2 Provide instructions to the Field Coordinator as necessary to maintain field operations. If conditions warrant, EA may assume the responsibilities of the Field Coordinator. If appropriate for the emergency situation, request permission from the RAM for field team personnel to exceed annual dose limits. Keep the Field Coordinator advised on matters related to radioiodine offsite and any need for potassium iodide to be administered to field personnel. Authorization for emergency doses and KI use should be indicated on the authorization form contained in EPIP-9, Appendix E. The RAM should advise the CECC Director of any dose extension or KI administration and recommend that the SED be informed.

6.4.2.3 Provide emergency classification, plant status, release data, projected doses, and protective actions for the public (recommended or implemented) to the Field Coordinator for transfer to the field teams. This action should not interfere with the flow of operational information.

*6.4.2.4 Coordinate the transportation of teams as needed. Resources are listed in the REND.
*

6.4.2.5 Receives field data from Field Coordinator via facsimile or by transcribing from radio transmissions. The data are recorded on a form similar to CECC-EPIP-9, Appendix I. An effort shall be made to keep I-131 concentrations associated with general exposure rate measurements for a given place and time.

6.4.2.6 As necessary, EA shall ensure special local monitoring of groundwater is conducted in the event of a liquid radioactive release (BFN Final Safety Analysis Report requirement).

6.4.2.7 EA shall arrange for relief for EA personnel and the Field Coordinator. Shift turnovers are to be performed.

6.4.2.8 Provide technical assistance and field monitoring as requested by the State during the recovery phase for planning and operations.

6.4.2.9 Provide other assistance as requested by the RAC.

6.5 Field Coordinator Activities

6.5.1 Initial Actions

6.5.1.1 Refer to CECC-EPIP-9 for additional instructions.

*Revision

6.5.1.2 Upon arrival at the RMCC, establish radio and telephone communications with the CECC. Establish and maintain a Field Coordinator's log, including such information as key events and requests.

*6.5.1.3 Assume coordination of field staff as directed by EA.
*

6.5.2 General Operations

6.5.2.1 Coordinate TVA's field operations with State field operations management in an effort to minimize duplication of effort and optimize efficiency in field monitoring. The Field Coordinator will follow the directives of EA, who is responsible for TVA's overall monitoring effort.

6.5.2.2 Define individual team priorities as needed to acquire field data requested by Environs Assessor. The Field Coordinator may alter field team practices and procedures provided that the changes do not alter protective action requirements, or techniques and methods of sampling, sample analysis, or direct surveys.

*6.5.2.3 Monitor and maintain individual exposures and provide instructions as necessary to keep below 10 CFR 20 limits. No team member is permitted to exceed 5 rem TEDE without emergency dose authorization of the RAM. Exceeding 10 rem TEDE, and greater than 25 rem TEDE, both require additional authorizations at each level by the RAM. Refer to CECC EPIP-9 for additional instructions on implementation of emergency dose levels.

6.5.2.4 Record all field data per CECC-EPIP-9. Provide the appropriate copy to the State and the other to the facsimile operator for transmission.

6.5.2.5 Arrange for maintenance of field operations as needed, including resupply of vans, relief personnel, replacement vehicles and equipment, food for teams, etc. Brief the relief teams at the RMCC and provide them with TLDs and KI. Coordinate these activities with EA.

6.5.2.6 Respond to other requests from EA and coordinate with EA TVA's response to requests received from the State.

*Revision

APPENDIX A

NOTES

1. IF Conditions Are not known, Then Answer No.
2. CONTINUE ASSESSMENT. Modify protective actions based on available plant and field monitoring information. Locate and evacuate additional localized hot spots.

BFN ONLY

3. When Dose Assessment Projections OR Actual Measured Exposures are not known, a stack release rate of ≥ 1.3 E+11 µCi/sec noble gas can be utilized to meet the condition of 1 REM/hr External Dose at the site boundary.

TABLE 1
RADIOACTIVITY RELEASE DOSE

TYPE	LIMIT
Measured	3.9 E-6 µCi/cc of Iodine-131
	1 REM/hr External Dose
Projected	1REM TEDE
	5 REM Thyroid CDE

WBN TABLE 2 - Severe Core Damage
INDICATIONS

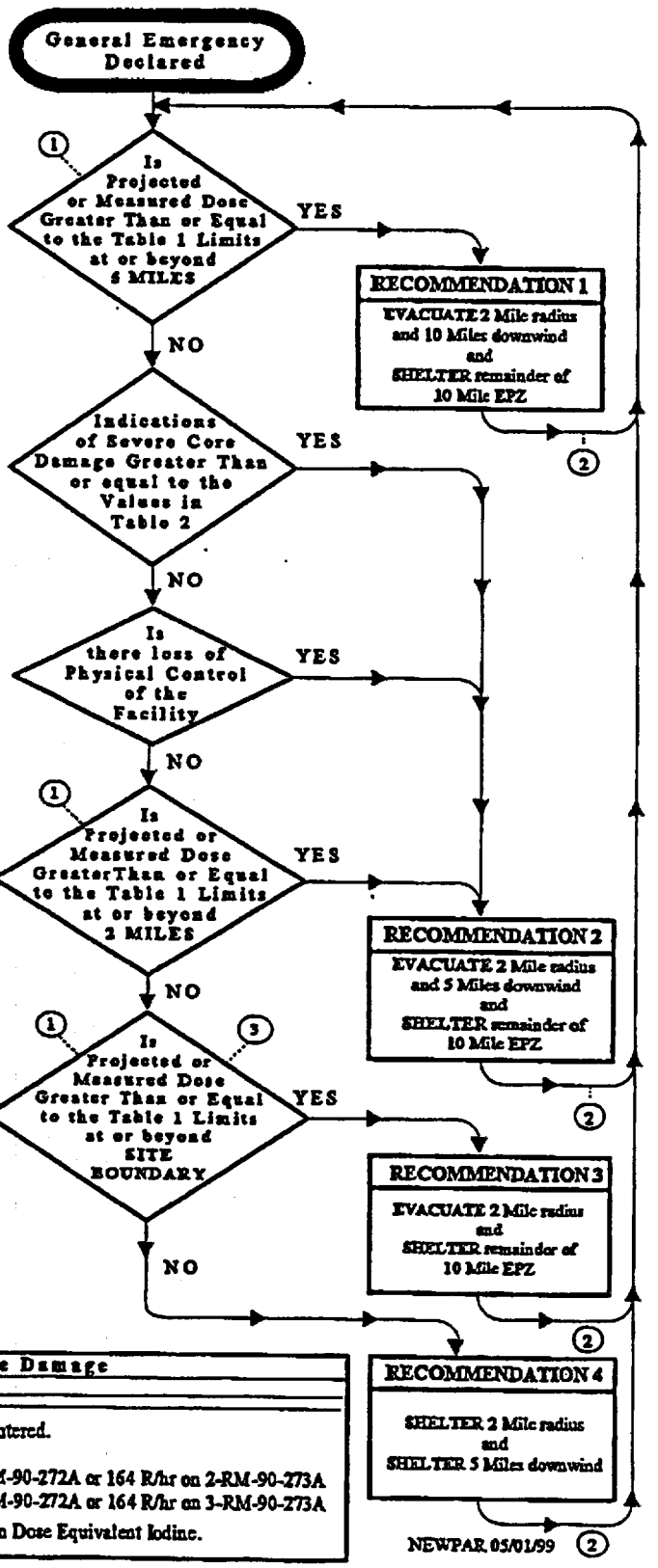
1. Containment radiation monitor reading on 1-RE-90-271 and 272 equal to or greater than 9.0 E+1 R/hr (90 R/hr). or Containment radiation monitor reading on 1-RE-90-273 and 274 equal to or greater than 7.0 E+1 R/hr (70 R/hr).
2. Reactor Coolant Activity of ≥ 300 µCi/gm Dose Equivalent Iodine-131.
3. Inadequate core cooling as indicated by "red" path from core cooling status tree.
4. Core exit TCs greater than 1200 F

SQN TABLE 2- Severe Core Damage
INDICATIONS

1. Containment radiation monitor reading on RM-90-271 and 272 equal to or greater than 2.8 E+1 REM/hr (28 REM/hr). or Containment radiation monitor reading on RM-90-273 and 274 equal to or greater than 2.9 E+1 REM/hr (29 REM/hr).
2. Reactor Coolant Activity of ≥ 300 µCi/gm Dose Equivalent Iodine-131.
3. Inadequate core cooling as indicated by "red" or "orange" path from core cooling status tree.

BFN TABLE 2 - Severe Core Damage
INDICATIONS

1. Severe Accident Management Guidelines have been entered.
2. Unit 2 - Drywell Radiation Exceeds 345 R/hr on 2-RM-90-272A or 164 R/hr on 2-RM-90-273A
   Unit 3 - Drywell Radiation Exceeds 106 R/hr on 3-RM-90-272A or 164 R/hr on 3-RM-90-273A
3. Equilibrium Reactor Coolant Activity of ≥ 300 µCi/gm Dose Equivalent Iodine.



APPENDIX B Page 1 of 1

RADIOLOGICAL ASSESSMENT MANAGER'S DATA FORM

THIS APPENDIX DELETED IN REVISION 24

APPENDIX C Page 1 of 1
RADIOLOGICAL ASSESSMENT MANAGER'S CHECKLIST

INITIAL ACTIONS Date: _____

Time/Initials

*__/__ Notify the CECC Director of Radiological Assessment Staff activation status. Activate a RAC and a Boardwriter.

__/__ Assess the need for additional technical support and take appropriate actions.

*__/__ Establish communications with the TSC RADCON Supervisor or Radiochemistry Supervisor to determine radiological status of the plant and to determine if any releases are ongoing or have occurred.

*__/__ Establish contact with the state.

*__/__ Verify that radiological data are being transmitted to the CECC.

__/__ Verify that the Radiological Assessment Coordinator is receiving accident assessment reports and that the information is being distributed.

__/__ Obtain RADCON Technical Advisors as necessary.

__/__ Evaluate preparations for collection of environmental TLD's.

GENERAL OPERATIONS

1. Log key events and major actions taken.

2. Coordinate protective action recommendations with the Plant Assessment Manager.

*3. Monitor actual or projected doses for EAL trigger points and notify the CECC Director if a EAL condition is met.

*4. Provide accident assessment information to the CECC Director and the State Communicator at least hourly.

*5. Arrange for additional RADCON support resources with other TVA organizations. Log all contacts.

*6. Periodically provide for technical discussions with the State as needed.

*7. Remind the site that additional technical support may be available through the CECC. Coordinate with the Plant Assessment Manager and the Site Emergency Director.

*8. Ensure that Radiological Assessment Staff relief personnel are scheduled and notified. Coordinate transportation arrangements as needed.

*9. Ensure that radiological data posted on CECC Radiological status boards is accurate and up-to-date.

*Revision

APPENDIX D Page 1 of 1

RADIOLOGICAL ASSESSMENT COORDINATOR'S CHECKLIST

INITIAL ACTIONS Date:_____

Time/Initials

___/___ On arrival, become familiar with emergency status, plant conditions, and CECC activities.

___/___ Inform the Radiological Assessment Manager when prepared to assume responsibility for coordinating staff operations.

___/___ Contact the TSC and coordinate receipt of data from the plant and transmissions to the plant from the CECC (Appendix G).

GENERAL OPERATIONS

1. Log key events and major actions taken.
2. Supervise and coordinate the activities of the Radiological Assessment Staff.
3. Provide protective action recommendations to the RAM based on dose assessments or field measurements.

*4. Periodically advise the Radiological Assessment Manager of staff activities.

5. Ensure that data generated by the Radiological Assessment Staff are transmitted to the TSC routinely.
6. If needed, assist the staff and/or TSC in obtaining special or nonroutine data.
7. As directed, assist in obtaining additional resources (manpower, equipment, supplies, vendor services).

*Revision

APPENDIX E Page 1 of 2
ENVIRONS ASSESSMENT INITIAL CHECKLIST

INITIAL ACTIONS Date:_____

Time/Initials

__/__ If warranted, activate the Field Coordinator, and activate or direct the Field Coordinator to activate offsite field monitoring personnel or screening van using the REND (teams must be dispatched for Site Area Emergency or higher).

__/__ Activate the EP Field Support Staff (see REND, under the tab, Field Staff).

__/__ *Establish contact with the TSC and notify if a Senior Instrument Mechanic (SIM) has been *activated for EDS from the EP Field Support Staff.

__/__ Brief the Radiological Assessment Coordinator and Radiological Assessment Manager on the status as activities.

__/__ Test radio communications to determine the repeater to be used and set correct time on radio console.

FIELD TEAM TURNOVER FROM SITE

__/__ Determine location and status of all field teams from the site.

__/__ Identify all field team members.

__/__ Request the site to notify the teams when command and control has been assumed by the CECC.

__/__ Assume control of all Field Staff.

__/__ Verify that field data are being transmitted to the State until RMCC is staffed and operating.

*__/__ As appropriate, transfer coordination of field activities to the Field Coordinator at the RMCC. Notify all field teams of any transfer of command and control.

*Revision

APPENDIX E Page 2 of 2
ENVIRONS ASSESSMENT INITIAL CHECKLIST

GENERAL OPERATIONS

1. Log notifications, instructions received and given, emergency classifications, and key events in an environs assessment log.

2. Remain aware of offsite conditions in order to provide decisions regarding KI for teams.

3. Request permission for individual field team members to exceed annual dose limits, if warranted for continued operations.

4. Periodically provide field teams with emergency classification, plant status, release data, projected doses, meteorological data, and/or protective action recommendations for the public, provided this does not interfere with field operations or communications.

5. Ensure CECC is informed of data received from RMCC or transcribed from radio on Appendix I of CECC-EPIP-9. Keep related exposure rates and airborne concentrations together on the form.

6. As necessary, ensure that in the event of any unusual release of radioactive liquid which could contaminate groundwater at the site, special local monitoring is conducted to ensure that the use of local groundwater will not result in undue hazards to any person (BFN FSAR requirement).

7. When directed by the Radiological Assessment Manager, arrange for relief personnel for Environs Assessment, and the Field Coordinator.

APPENDIX F Page 1 of 1

Radiological Assessment's

Protective Action Recommendation

(for CECC internal communications only)

Recommendation:

√	PAR #	Action
	1	Evacuate 2 mile radius and 10 miles downwind and Shelter remainder of 10 mile EPZ
	2	Evacuate 2 mile radius and 5 miles downwind and Shelter remainder of 10 mile EPZ
	3	Evacuate 2 mile radius and Shelter remainder of 10 mile EPZ
	4	Shelter 2 mile radius and Shelter 5 miles downwind

Affected Sectors:

Evacuation	
Shelter	

Basis:

	Actual or Measured readings
	FRED dose projection on anticipated plant conditions
	BRED dose projection based on Field Team survey data

Comments: _____

_____

_____

	Concurrence	Time/Date
Dose Assessor		
RAC		
RAM		

APPENDIX G Page 1 of 1
TSC INFORMATION FORM

Approved:

Date/Time: _____

I. DOSE ASSESSMENT INFORMATION
As dose assessments are performed, they are automatically transmitted to TSC. At least hourly, verify last dose assessment was received.

Time of Last Dose Code Run: Date: _____ Time _____

II. PLUME PLOTS
Whenever a dose assessment is performed, the plume position plot is also transmitted to site by telecopy. This is not automatically performed. At least hourly, verify last plot was received.

Time of Last Plume Plot: Date: _____ Time _____

III. FIELD DATA
As Field Data is received, transmit hard copy to TSC. At least hourly, verify data is being received.

Time of Last Field Data: Date: _____ Time _____

IV. METEOROLOGICAL DATA (Including Met Forecasts)
Met Data is automatically transmitted to the TSC. At least hourly, verify data is being received.

Time of last Met Data: Date: _____ Time _____
Time of last Met Forecast: Date: _____ Time _____

V. TVA RECOMMENDED PROTECTIVE ACTIONS
When TVA makes a recommendation, transmit to the TSC. At least hourly, verify TSC is knowledgeable of last recommended protective actions.

Protective Action Recommendation of: Date: _____ Time _____
Description:

VI. PROTECTIVE ACTIONS TAKEN BY STATE
When State takes a protective action, transmit to the TSC. At least hourly, verify TSC is knowledgeable of last protective actions taken.

Protective Actions Taken as of: Date: _____ Time _____
Description:

APPENDIX H Page 1 of 1

FITNESS FOR DUTY PROGRAM ADMINISTRATION

TVA NUCLEAR
CALL-IN SHEET

Person Calling: _____ Date: _____

Name	Time Called	Time Needed to Report	Alcohol 5 Hrs. Prior to Report (Y/N)	Fit for Duty (Y/N)	Duty Official Comments

CECC EPIP Coversheet

Tennessee Valley Authority CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN IMPLEMENTING PROCEDURES	Title TERMINATION AND RECOVERY	CECC EPIP-13 REV. 8 Effective Date: 7/10/00

3844050204
CHAT CECC EPIP
CECC-EPIP-13
071000 8

WRITTEN BY: Thomas E. Aldrin (Signature) REVIEWED BY: B K Markee (Signature) 7/7/00 (Date)

PLAN EFFECTIVENESS DETERMINATION: Thomas E. Aldrin (Signature) 7/5/00 (Date)

CONCURRENCES

Concurrence Signature	Date
☐ Manager, EP Program Planning and Implementation B K Markee	7/7/00
☐ Manager, Emergency Preparedness R D Kitts	7/7/00
☐ Manager, Radiological and Chemistry Services Chandler	7/7/00
☐	

APPROVAL

APPROVED BY: J. A. Bailey for MB (Signature) Vice President, EOTS (Title / Organization) 7/8/00 (Date)

CECC-EPIP-13

TERMINATION AND RECOVERY

REVISION LOG

Rev. No.	Date	Revised Pages
0	3/22/88	All (Formerly IP-16; changed from IPD to EPIP)
1	7/8/88	Page 1
2	12/12/88	All
3	7/13/89	All
4	6/20/90	All--*formerly EPIP-23 (former EPIP-13 transferred to EPIP-14)
5	5/15/92	Pgs. 2 & 3 revised. New coversheet and rev. log added. All pages issued.
6	9/27/95	All pages revised.
7	10/30/96	Pg. 3 remove reference to Appendix C. Procedure put in new format. All pages issued.
8	7/10/00	Annual review and self-assessment items. All pages issued.

1.0 PURPOSE

This procedure gives guidance on terminating an incident for which onsite and offsite emergency centers were activated by the Site Emergency Director and transition from the Emergency Response Organization to the Recovery organization if necessary. It identifies the required actions, responsibilities, and interfaces for reentering evacuated onsite areas. It identifies the interface with the state to provide onsite recovery information as well as offsite recovery reentry information.

2.0 SCOPE

This procedure describes the criteria for termination of a REP event which required activation of onsite and offsite emergency centers and actions for reentry and recovery activities required to restore the plant to normal operating condition and to provide assistance to state and local organizations.

3.0 REFERENCE

3.1 NP Radiological Emergency Plan

3.2 CECC EPIP

4.0 ABBREVIATIONS

WARL - Western Area Radiological Laboratory.
NP - Nuclear Power.
LRC - Local Recovery Center.
CECC - Central Emergency Control Center.
SED - Site Emergency Director.

5.0 RESPONSIBILITIES

5.1 The Senior Vice President, NP Operations, or his designee will direct the overall recovery effort. If expected to be a long-term process, he may establish a recovery organization to be responsible for continuous direction and control of the recovery operation. This organizational structure would be contingent upon the emergency situation and required actions for recovery. Staffing of the CECC may remain in whole or in part as necessary. The LRC is also available to provide additional office space near the site to support the recovery operation.

*5.2 The CECC Director is responsible for coordinating with the Site Emergency Director in determining when to enter the recovery phase. Once that decision has been made, the CECC Director will notify the Senior Vice President, NP Operations, or his designee. He will ensure all the activities are performed as identified in Appendix A, "CECC Director Checklist." The CECC Director will obtain a description of any deviations to plant technical specifications necessary to restore the plant and how these deviations shall be controlled (procedurally), along with an estimate of the time such deviation shall be required to be in effect.

*Revision

*5.3 The CECC Public Information Manager acts as an interface between TVA and the news media. He assists the Senior Vice President, NP Operations, CECC Director, or their designees in drafting news releases concerning progress of the recovery operation. He coordinates all news releases with TVA management and State and Federal officials as required. He coordinates all press briefings and interviews concerning the incident.

5.4 Radiological Assessment Manager (RAM) provides radiological support as contained in Appendix B, "Radiological Assessment Manager Checklist".

5.4.1 The RAM shall provide to the CECC Director an estimate of radioactive materials, either gaseous or liquid, which may be released to the environment during recovery operations and the impact of such releases on the population in the vicinity of the plant.

5.4.2 He shall provide the CECC Director a description of the radiation exposure and contamination control measures to be employed during the recovery including the disposition of radioactive and contaminated waste generated during the emergency or postulated to be generated during recovery operations.

5.4.3 He shall also interface with the state to provide onsite plant information as well as offsite assistance as needed.

5.5 The Vice President, Engineering and Technical Services, will provide required technical support to the site.

5.6 The Manager, Nuclear Fuels, will provide needed technical services to the site. Technical services available include fuel management and core analysis, core performance, nuclear fuel control and accountability, and startup support.

6.0 PROCEDURES

6.1 Termination

The decision to terminate an incident for which onsite and offsite emergency centers have been activated will be made by the Site Emergency Director after consultation with the plant technical and operations staffs and coordinated with the CECC Director. Proposals for termination of an emergency and entry into recovery will be coordinated with the State and NRC, if appropriate, through the CECC. This decision will be based upon a comprehensive review of plant system parameters. These shall include, but not be limited to, the following:

6.1.1 Stability of the reactor shutdown condition, i.e., successful progress toward a cold shutdown condition.

6.1.2 Integrity of the reactor containment building.

*Revision

6.1.3 Operability of engineered safety systems and decontamination facilities.

6.1.4 The availability and operability of a heat sink.

6.1.5 The integrity of power supplies and electrical equipment.

6.1.6 The operability and integrity of instrumentation including radiation monitoring equipment (also including portable equipment assigned during the emergency.)

6.1.7 Availability of trained personnel and support services.

6.1.8 The State's needs in coping with the offsite situation.

6.2 Recovery

The decision to enter the recovery phase will be made by the SED with concurrence from the CECC Director. The Senior Vice President, NP Operations, or his designee, will direct the overall recovery effort and the plant manager is responsible for inplant recovery operations. All major post-incident recovery measures shall be performed in accordance with written procedures. Procedures must be developed when not available before a recovery activity can be performed.

Recovery/Reentry Operations

6.2.1 A sequence of events before and during the emergency will be documented for review and evaluation.

6.2.2 Valve alignments, system alignments, and other pertinent information will be gathered and assessed for current plant configuration.

6.2.3 A recovery plan will be developed with all procedures required to implement the plan and make assignments to carry out the plan.

6.2.4 Establish organization to carry out plan.

6.2.5 Reentry team personnel exposures in excess of TVA limits must be approved by the Radiological Assessment Manager and Plant Manager.

6.2.6 The reentry teams will be organized for the purpose of locating and marking the radiation areas to facilitate recovery in a safe manner.

6.2.7 The designated manager responsible for onsite recovery efforts will ensure teams are organized with appropriate supervisors, crafts, and safety personnel for each specific operation.

7.0 LOCAL RECOVERY CENTER (LRC)

7.1 The purpose of the LRC is to provide a nearsite facility for TVA recovery management as well as NRC emergency response personnel and other emergency and/or recovery personnel.

7.2 The LRC provides adequate space for TVA and others who may locate there to support the site should additional office space near the site become necessary during the recovery phase.

7.3 The LRC will provide space for NRC personnel. Adequate supplies, communications, and data necessary for them to carry out appropriate functions is available.

8.0 ENVIRONMENTAL SAMPLE COLLECTION AND ANALYSIS

8.1 The TVA emergency field monitoring vans will be used to collect appropriate samples. This sample collection will be coordinated with the State. Samples will be divided and delivered to the State and the appropriate TVA laboratory.

8.2 Western Area Radiological Laboratory (WARL) staffs the EP screening van for screening and analyzing environmental samples near the site. Final analysis of samples will be performed at the WARL. Information concerning the samples will be provided to the State and the RAM.

APPENDIX A Page 1 of 1

CECC DIRECTOR'S TERMINATION/RECOVERY CHECKLIST

		Time/Initials	Remarks
1.	Determine when to initiate recovery/reentry operations.	/	
2.	Coordinate the termination of the event or establishing the Recovery Organization with the SED and the State.	/	
3.	Ensure the NRC is notified when terminating the event or establishing Recovery Organization	/	
4.	Ensure that the detailed sequence of events around the emergency is reconstructed.	/	
5.	Ensure that there is reconstruction of the operations activities during the events (i.e., system alignments, valves, pumps).	/	
6.	Ensure that a recovery organization is established and direction and control are provided.	/	
7.	Coordinate assessment of current conditions and planned recovery activities for potential Tech. Spec. impact.	/	
8.	Ensure that a Recovery Plan including procedures for special operations is prepared.	/	
9.	Ensure authorization as appropriate for reentry personnel exposures in excess of 10 CFR 20 limits.	/	
10.	Authorize funds and the utilization of manpower and equipment for recovery operations.	/	
11.	As appropriate, assess offsite effects and keep the NRC and State informed.	/	

APPENDIX B Page 1 of 1

RADIOLOGICAL ASSESSMENT MANAGER CHECKLIST

		Time/Initials	Remarks
1.	Ensure that personnel entries into radiological areas utilize *the HIS-20 system.	_____/_____	
2.	Ensure that personnel exposure in excess of 10 CFR 20 limits are authorized by the plant manager or site emergency director.	_____/_____	
3.	Ensure that standard procedures for processing, sampling, or controlling liquid, gaseous, and solid wastes are used.	_____/_____	
4.	Direct offsite sampling programs, dose assessments, dose management, and radiation protection programs.	_____/_____	
5.	Notify the offsite authorities concerning offsite sampling programs and dose assessments.	_____/_____	
6.	Calculate the total maximum individual exposure periodically.	_____/_____	

*Revision

CECC EPIP Coversheet

Tennessee Valley Authority CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN IMPLEMENTING PROCEDURES	Title TRANSPORTATION AND STAFFING UNDER ABNORMAL CONDITIONS	CECC EPIP-18 REV. 8 Effective Date: 7/10/00

3844066682
CHAT CECC EPIP
CECC-EPIP-18
071000 8

WRITTEN BY: Thomas E. Adkins (Signature) REVIEWED BY: B K Marks (Signature) 7/7/00 (Date)

PLAN EFFECTIVENESS DETERMINATION: Thomas E. Adkins (Signature) 7/5/00 (Date)

CONCURRENCES

Concurrence Signature	Date
☐ Manager, EP Program Planning and Implementation B K Marks	7/7/00
☐ Manager, Emergency Preparedness E J Zitto	7/7/00
☐ Manager, Radiological and Chemistry Services C Ramdram	7/7/00
☐	

APPROVAL

APPROVED BY: J. A. BAKER (Signature) Vice President (Title) E&TS (Organization) 7/8/00 (Date)

CECC-EPIP-18
TRANSPORTATION AND STAFFING UNDER
ABNORMAL CONDITIONS

REVISION LOG

Rev. No.	Date	Revised Pages
0	04/07/89	All
1	06/20/89	Appendix A
2	07/02/90	Pgs. 1-4, App. A
3	05/15/92	Pgs. 1, 2, 3 revised. New coversheet and rev. log added. All pages issued.
4	05/13/93	Pgs. 1, 2, 3, 4; App. A pg. 1; App. B deleted; new App. C, App. D. All pages issued.
5	06/23/94	Pgs. 1 and 2. All pages issued.
6	6/27/95	Pgs. 1-4, App. A; App. B; and App. C
7	5/1/96	Pgs. 1-4, App. B; Revised to clarify site authority chain requirements; all pages issued.
8	7/10/00	Annual review and self-assessment items. All pages issued.

TRANSPORTATION AND STAFFING UNDER ABNORMAL CONDITIONS

1.0 PURPOSE

This procedure is designed to ensure TVA can provide adequate staffing to support nuclear activities at both the corporate and plant levels when abnormal conditions (NON-REP) exist. Abnormal conditions are events like severe storms, earthquakes, civil disturbances or other situations where special actions may be required of TVA to transport personnel to and from work and to provide food and sleeping quarters for employees who may be held over or prestaged at critical TVA facilities.

TVA can provide transportation services for employees when one or more of the following circumstances exist:

A. Transportation required for field work, which is generally limited to itinerant-type travel involving multiple stops at various locations at a distance from the employee's place of employment.

B. Transportation essential for the safe and efficient performance of protective services or criminal law enforcement.

C. Transportation necessary because of a clear and present danger, an emergency, or a compelling operational consideration.

This procedure can also be used to provide lodging and meals, as necessary, for emergency personnel.

2.0 SCOPE

This procedure contains instructions to be used by Nuclear Power personnel and TVA personnel that support Nuclear Power as outlined in 1.0 of this procedure. Portions of this procedure applicable to the provision of transportation, lodging, and/or meals may be implemented separately or collectively as appropriate.

3.0 REFERENCES

None.

4.0 ABBREVIATIONS AND DEFINITIONS

BFN - Browns Ferry Nuclear Plant.
CAS - Central Alarm Station.
CECC - Central Emergency Control Center.
JIC - Joint Information Center.
MS - Management Services
ODS - Operations Duty Specialist.

*

SQN - Sequoyah Nuclear Plant.
SS - Site Security
WBN - Watts Bar Nuclear Plant.

*Revision

5.0 RESPONSIBILITIES

5.1 The Senior Vice President, Nuclear Operations and Vice Presidents or their designees are responsible for authorizing the initiation of this procedure and approving the transportation of personnel. Upon activation of CECC-EPIP-18, the Corporate EP Manager or his designee notifies the affected plant(s) EP Manager(s) or the EP representative on duty that this procedure has been activated.

5.2 The Manager, Emergency Preparedness, or his designee, shall advise the appropriate Vice President as soon as possible of any impending conditions which may warrant the need to implement this procedure offsite.

5.3 The Site Vice President, or his designee, shall advise the Senior Vice President, Nuclear Operations, as soon as possible of any impending conditions which may warrant the need to implement this procedure onsite.

*5.4 The Chattanooga area TVA Police is responsible for providing TVA transportation service for personnel staffing offsite emergency facilities in the Chattanooga area.

5.5 SS and department heads or their designee are responsible for providing TVA transportation services for personnel needed for plant operations, site emergency facilities, and offsite emergency facilities (not in the Chattanooga area).

5.6 When requested by the Manager, EP, or his designee, the CECC Management Services responder is responsible for reserving a block of rooms at a hotel/motel within walking distance of the Chattanooga Office Complex for use by those personnel staffing the CECC.

5.7 Upon activation of this procedure the Manager, Emergency Preparedness, or his designee reviews the checklist provided in Appendix A of this procedure to determine what actions may be required.

5.8 Upon activation of this procedure the Site Vice President or designee reviews the checklist provided in Appendix B of this procedure to determine what actions may be required.

*Revision

6.0 PROCEDURES/REQUIREMENTS

*6.1 Offsite Emergency Facilities And CECC Staffing

6.1.1 Upon authorization by the Senior Vice President or a Vice President in TVAN, or their designees to initiate this procedure, the Manager, Emergency Preparedness, or his *designee, will contact Chattanooga area TVA Police CAS, Management Services *representative, and the ODS to inform them that this procedure is to be implemented. (This notification may vary according to the degree of implementation.)

*6.1.2 When this procedure is implemented, the Chattanooga area TVA Police will place on standby in the vicinity of the CECC a minimum of two vehicles, either 4-wheel drive or cars supplied with tire chains (if implementation is due to inclement weather).

6.1.3 When requested by the Manager, Emergency Preparedness, or his designee, the ODS will *call the Chattanooga area TVA Police CAS and give the TVA Police dispatcher the name of the person requiring transportation, his/her location, and a phone number where the person can be reached, if possible. These arrangements should be made by the ODS only as time permits. Prompt notification of emergency personnel remains the first priority.

*6.1.4 When notified by the ODS, Chattanooga area TVA Police will pick up the emergency personnel and transport them to the emergency facility.

*6.1.5 The Manager, Emergency Preparedness, or his designee, will notify Chattanooga area TVA *Police when their transportation services are no longer needed. Until then, the officers will remain on duty unless properly relieved by another officer.

*6.1.6 Management Services shall make reservations for up to six rooms (double) at a hotel/motel within walking distance of the CECC and provide meals as necessary to those persons being retained on standby. Only those emergency personnel authorized by the CECC Director will be allowed to occupy these rooms.

6.2 Onsite Emergency Facilities And Operations Staffing

6.2.1 Upon authorization by a TVAN Vice President, or their designee, to initiate this procedure, *the Site Vice President, or his designee, will contact the site department heads and SS to inform them that this procedure is to be implemented.

*Revision

6.2.2 SS will place a minimum of two vehicles on standby. Either 4-wheel drive or cars supplied with tire chains are required (if implementation is due to inclement weather).

6.2.3 When transportation services are needed, the Site Vice President, or his designee, will give SS the name of the person requiring transportation, his/her location, and a phone number where the person can be reached, if possible. SS will pick up the personnel and transport them to their destination.

6.2.4 The Site Vice President, or his designee, will notify SS when their transportation services are no longer needed. Until then the officers will remain on duty unless properly relieved by another officer.

6.2.5 The Site Vice President, or his designee, shall designate responsibilities for providing meals and/or arranging sleeping accommodations for site personnel as needed.

APPENDIX A Page 1 of 1

***CORPORATE EP MANAGER CECC-EPIP-18 CHECKLIST**
ITEMS TO BE CONSIDERED WHEN CECC-EPIP-18 IS ACTIVATED

1. Notify critical positions that CECC-EPIP-18 has been activated.
2. Establish contact with counterparts in other TVA organizations.
3. Determine which critical emergency responders are available and which live closest to the CECC.
4. Equip critical EP personnel with radios or cellular telephones.
5. Determine if a second ODS should be called in.
6. Verify 4-wheel drive vehicles are on standby.
7. Determine if hotel rooms should be reserved.
8. Decide if critical CECC staff should stay in a downtown hotel.
9. Make arrangements to provide food to the CECC and ODS if needed.
10. Special considerations/impacts for employee family needs.

*Revision

APPENDIX B Page 1 of 1

SITE CECC-EPIP-18 CHECKLIST
ITEMS TO BE CONSIDERED WHEN CECC-EPIP-18 IS ACTIVATED

*1. Notify critical site positions that CECC-EPIP-18 has been activated (e.g., SM, dept. heads, etc.).

2. Establish contact with counterparts in other TVA organizations as necessary.

3. Determine which critical emergency responders are available and which live closest to the plant.

4. Equip critical EP personnel with radios or cellular telephones.

5. Verify 4-wheel drive vehicles are on standby.

6. Determine if sleeping areas should be established onsite.

7. Decide if a second shift of critical plant staff should stay at the plant.

8. Make arrangements to provide food to the plant if needed.

9. Special considerations/impacts for employee family needs.

*Revision

CECC EPIP Coversheet

Tennessee Valley Authority CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN IMPLEMENTING PROCEDURES	Title POST ACCIDENT CORE DAMAGE ASSESSMENT	CECC EPIP-19 REV. 10 Effective Date: 7/10/00

3844072143
CHAT CECC EPIP
CECC-EPIP-19
071000 10

WRITTEN BY: Thomas E. Albin (Signature) REVIEWED BY: B K Marks (Signature) 7/7/00 (Date)

PLAN EFFECTIVENESS DETERMINATION: Thomas E. Albin (Signature) 7/5/00 (Date)

CONCURRENCES

Concurrence Signature	Date
☐ Manager, EP Program Planning and Implementation B K Marks	7/7/00
☐ Manager, Emergency Preparedness R D Kitto	7/7/00
☐ Manager, Radiological and Chemistry Services Chandram	7/7/00
☐	

APPROVAL

APPROVED BY: J. A Bailey (Signature)	Vice President (Title)	E&TS (Organization)	7/8/00 (Date)

CECC-EPIP-19
POST ACCIDENT CORE DAMAGE ASSESSMENT

REVISION LOG

Rev. No.	Date	Revised Pages
0	3/22/88	All (Changes from IPD to EPIP)
1	4/26/89	All
2	10/26/89	2-4
3	05/13/93	1-4; App. B, pg. 2; All pages issued to maintain revision level.
4	06/23/94	Pg. 2; All pages issued.
5	05/18/95	Pg. 1-3; App. B pg. 1 & 4; Add more specific information to the Purpose Section, add SPDS/OTSC and ERFDS definitions, add references to the PWR Core Damage Assessment Notebook, and update organization name.
6	11/8/95	Pg. 3, App. B pg. 1. Add new paragraph 6.1.5 to provide guidance for use of iodine samples. Also, delete second assumption in Appendix B, Section 3, because it is no longer needed.
7	4/7/97	Annual review. Update software documentation references, editorial changes, all pages issued.
8	6/9/98 ~~6/4/98~~ *RR*	Annual review. Update references. Add BWR information. All pages issued.
9	5/20/99	Annual review. Update reference. All pages issued.
10	7/10/00	Annual review and self-assessment items. All pages issued.

POST ACCIDENT CORE DAMAGE ASSESSMENT

1.0 PURPOSE

This procedure provides a method to assess the degree of reactor core damage from measured fission product concentrations and plant data such as containment hydrogen concentration, core exit temperatures, reactor vessel water levels, and containment radiation levels. The procedure also provides guidance in obtaining necessary information to predict gross or limiting estimates of radionuclide releases (source term) from TVA nuclear plants during accident conditions.

2.0 SCOPE

This procedure covers the actions of the core damage assessors on the plant assessment team during an Alert, Site Emergency, General Emergency, or hypothetical radiological emergency.

3.0 REFERENCES

3.1 Radiological Emergency Plan.

3.2 PACDAM: A computer system for core damage and source term assessment of accident at SQN, WBN, BFN. PCD-573, February 1985.

3.3 Dose Assessment Staff Activities During Nuclear Plant Radiological Emergencies, CECC-EPIP-8.

3.4 CECC Plant Assessment Staff Procedure for Alert, Site Area Emergency, and General Emergency, CECC-EPIP-6.

3.5 "PADCAM Version 3.0, a PWR Post Accident Core Damage Assessment Program, "May 25, 1995 (L57 950525 801) -OR- "PACDAM 96, Revision 1, " BFE-848, April 24, 1996 (L32 960425 800).

3.6 PWR Core Damage Assessment Notebook, Revision 2, February 27, 1998 (L36 980227 800)

3.7 BFNP Technical Instruction, 0-TI-88, "Procedure for Estimation of the Extent of Core Damage Under Accident Conditions."

4.0 ABBREVIATIONS AND DEFINITIONS

CECC - Central Emergency Control Center
PACDAM - Post Accident Core Damage Assessment Methodology (computer system).
RCS - Reactor Coolant System
Workbook - A notebook which contains data, notes, File IDs and hand calculations needed to support the accident assessment. The notebook is kept in the CECC Plant Assessment Room during accidents.

ICS - Integrated Computer System. The ICS is a computer software system that displays *real time plant data for SQN and WBN.

*Revision

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5.0 RESPONSIBILITIES

5.1 The Plant Assessment Coordinator is responsible for directing the core damage assessment and source term prediction activities of the CECC Plant Assessment Team, and keeping the Plant Assessment Manager and CECC Director informed of core damage and source term predictions.

5.2 The core damage assessors are responsible for performing core damage and source term assessments and for assisting the Plant Assessment Coordinator as necessary.

5.3 The Nuclear Fuel Division or Process Systems is responsible for the development, qualification, maintenance, documentation, and release of computer programs used by the assessment team to assess core damage and radiological releases.

6.0 PROCEDURE REQUIREMENTS

6.1 Accident Assessment

6.1.1 Evaluate all previously telecopied information and review the sequence of events in the Plant Status Log. Discuss observations and conclusions with the assessment team leader.

6.1.2 Obtain the necessary information and to make an initial assessment of: (1) the reactor fuel integrity, (2) any radioactivity in containment, RCS, or other systems, and (3) the degree of fuel clad damage, fuel overtemperature, or fuel melt. Requests for additional data can be made to the Plant Assessment Coordinator. Record the information or data needed for the assessment in the workbook (or computer). Appendix A contains a partial list of the types of information which can be used to assess core damage and radiological releases.

6.1.3 For PWRs, before measured concentrations of major fission products in either gas or water are available, the indications listed below should be considered to make an estimate of core damage. Some or all of these indications may be used depending on the data available and the situation. The PWR Core Damage Assessment Notebook, reference 3.6, is kept in the CECC and is controlled by the Nuclear Fuel Division.

- Hydrogen concentration in containment. Get the Hydrogen concentration information from the Technical Support Center. Refer to section labeled "PACDAM-WBN-001" in the PWR Core Damage Assessment Notebook to perform a core damage assessment.

- Core water level history. The reactor vessel level indication information
* is available in the CECC on the ICS displays for SQN and
* WBN. Refer to the section labeled PACDAM-WBN-001" in the PWR Core Damage
* Assessment Notebook to perform a core damage assessment.

*Revision

- Core exit thermocouples. The core exit thermocouple readings are available in the CECC on the ICS system displays for SQN and
* WBN. Refer to the section labeled "PACDAM-WBN-001" in the PWR Core Damage
* Assessment Notebook to perform a core damage assessment.

- Containment high-range radiation monitor readings. The containment high-range radiation monitor readings are available in the CECC on
* the ICS displays for SQN and WBN. For SQN, refer to the section labeled "SQN RADIATION MONITOR READINGS' in the PWR Core Damage Assessment Notebook to perform a core damage assessment. For WBN, refer to the section labeled "WBN Radiation Monitor Readings" in the PWR Core Damage Assessment Notebook to perform a core damage assessment.

6.1.4 After measured concentrations of major fission products in either gas or water are available, perform calculations of core damage and gross or limiting estimates of radiological releases using the methodologies incorporated into PACDAM (Post Accident Core Damage Assessment Methodology, reference 3.5). Since there are large uncertainties in partition and release factors, more accurate predictions can be made after using measured dose rates to adjust release parameters. If the computer systems are not operational, hand calculations may be performed consistent with the methodologies described in PACDAM and documented in the workbook. Appendix B contains a summary description of PACDAM.

6.1.5 For PWRs, care must be taken in using the iodine isotopes.

If liquid samples are available from either the sump, the RCS, or both, as appropriate, the iodine concentrations from those samples will be adequate and the iodine isotopes should be used to predict core damage, since the bulk of the iodine will be dissolved in the liquid.

If only containment air samples are available, then the noble gas isotopes should be primarily used to make the core damage estimate. The bulk of the iodine will be dissolved in the liquid in the RCS and the sump. In addition, iodine will plate out in the containment air sample line. The containment air sample will not necessarily give an accurate iodine concentration.

The iodine fission product ratio used to predict the type of core damage will be valid for any type of sample, since each iodine isotope will plate out at the same rate.

6.1.6 For BWRs: containment structure radiation levels, hydrogen concentration in containment atmosphere, and the core water level history can be used to confirm the initial core damage estimate which was based on radionuclide measurements. Refer to 0-TI-88, reference 3.7, to perform a core damage estimate based on these parameters.

6.1.7 If Nuclear Engineering is requested to perform special calculations to support an evaluation and prediction of plant radiological releases, the Engineering Coordinator will make the arrangements.

6.1.8 The assumptions and results from the core damage and source term calculations are discussed with the Plant Assessment and Dose Assessment and are documented in a workbook. The results will be used in the overall plant systems assessment which is documented on appendix B of CECC-EPIP-6, reference 3.4.

*Revision

6.1.9 Source term calculational results may be used by Dose Assessment to calculate dose rates. Measured dose rates may be also be used by the core damage assessors to adjust release parameters in the PACDAM computer system. Results and data will be plotted on trend charts as required to monitor accident conditions.

6.2 Potential Release Evaluation

6.2.1 If the potential exists for significant degradation in plant conditions, the team leader of Dose Assessment may request a potential release evaluation.

6.2.2 The core damage assessors will perform necessary calculations using PACDAM to support a predictive release evaluation. These calculations will be used to develop protective action recommendations.

6.2.3 The following areas will be considered in the calculations:

a. Increased fuel clad failure.
b. Increased fuel over-temperature conditions.
c. Increased fuel melt.
d. Increased Zirc-water reaction and H_2 production.
e. Increased RCS activity.
f. Increased containment activity.
g. Changes in RCS and containment leakage rates.
h. Containment failure.
I. Loss of core cooling and RCS inventory.
j. Measured dose rates.

6.2.4 Assumptions and results will be discussed with the Plant and Dose Assessment team in order to maintain a consistent evaluation and documentation in the workbook.

6.3 Updates

6.3.1 The core damage assessors will keep the team leader and Dose Assessment updated, as appropriate, to provide new information or to confirm that conditions are unchanged.

6.3.2 Significant changes in: (1) fuel damage/integrity, (2) radioactivity in RCS/containment, (3) radiological releases, (4) projected releases, and/ or (5) radionuclide mix will promptly be brought to the attention of the assessment team leader and Dose Assessment.

6.4 Relief of Duties

Should the accident be expected to last for an extended period of time, the core damage assessors may call in replacements. Before leaving, the original core damage assessors should brief the replacements on the sequence of events and the current status of the plant.

6.5 Recovery

The core damage assessors will support the Plant Assessment Team, as required, to carry out recovery efforts from the accident.

6.6 Event Termination

6.6.1 Upon termination of the emergency, all core damage and source term records generated during the event will be consolidated and added to the workbook as appropriate. Supplemental information may be added.

6.6.2 The core damage assessors will make themselves available for review of the accident. Any review notes will be added to the workbook.

6.6.3 Calculations done during the accident will be documented in the workbook.

APPENDIX A Page 1 of 2

EXAMPLES OF INFORMATION FOR CORE DAMAGE AND SOURCE TERM ASSESSMENT

1. Radionuclide Isotopic Concentrations

Isotope	Gas (μ Ci/cc)	Water (μ Ci/gm)
I-131		
I-132		
I-133		
I-134		
I-135		
Cs-137		
Cs-138		
KR-85m		
KR-85		
KR-87		
KR-88		
XE-133		
XE-135		

Sample Data

time _____

location _____

temp (F) _____

pres (psia) _____

gas vol(cc) _____

water mass (gm) ___

water level _____

2. Concentration of Hydrogen in Containment Atmosphere

Hydrogen concentration (mole %) _____
location _____
date/time _____
temp (F) _____
pres (psia) _____

3. Date/Time Of Shutdown _____

4. Power Level Prior To Shutdown _____

5. Operating Power History

Operating Period	Operating Time	Average Power (MWt)
1		
2		
i		

6. Containment Radiation Monitor Readings

Reading Number	Date Time	Reading (R/hr)	Monitor Location	Monitor Number
1				
2				
i				

7. Core Exit Thermocouple Readings (PWR)

Reading Number	Date Time	Reading (F)	Notes
1			
2			
i			

8. Reactor Water Level History (BWR)

Reading Number	Date Time	Reading (units)	RCS vol (cu. ft.)	Notes
1				
2				
i				

APPENDIX B Page 1 of 4
PACDAM: POST ACCIDENT CORE DAMAGE ASSESSMENT METHODOLOGY

1. Introduction: Core Damage Assessment

The PACDAM procedure is intended to provide the information required to permit the assessment of the degree of reactor core damage from measured fission product concentrations in either the water or gas samples taken from the reactor systems. Before measured samples are available, other indications such as containment hydrogen concentration, core exit temperatures, reactor vessel water level, and containment radiation levels will be the primary method of estimating core damage. After samples are available, these other indications will be used to confirm the estimate based on radionuclide measurements.

2. Methodology: Core Damage Assessment

The method involves the calculation of fission product inventories in the core and the release of this activity into the primary and containment systems. Measured concentrations of major fission products in either gas or water samples (after appropriate normalization) are compared with reference data to estimate the extent of core damage.

This methodology is based in part on the principles presented in the General Electric Company publication NEDO-22215, August 1982, and also reflects input by the NRC and various representatives of the Westinghouse Owners Group (WOG). See the bibliography for additional references.

3. Limitations and Assumptions: Core Damage Assessment

- Post accident systems are in place and functional representative samples are obtained.
- Radiochemical analysis via gamma spectrometry is used to calculate specifics of fission products.
- Radiochemical analysis under normal plant conditions is accurate to $\pm$10% and post accident analysis may have an error band of 20-50%.

- Release percentages of parent and daughter fission products are assumed equal.

- Gap releases are based on the ANS 5.4 standard and the accuracy is judged to be 20-25%.

* - Melt release estimates for refractory nuclides are assumed accurate to ±70%.

4. Source Term Prediction

The TVA method for predicting releases of radioactivity to the environment is based on evaluation of plant conditions (actual, suspected, or postulated) and a comparison with a range of calculated results. The parameters examined include:

a. primary coolant activity
b. radioactive discharge to containment
c. leakage from containment

Calculated results are reduced to tables and graphs for use in interpolation and projection. Since there are large uncertainties in partition and release factors, more accurate predictions can be made after using measured dose rates to adjust release parameters.

5. PACDAM Computer Module Description

- Primary Coolant Halogen Activity Calculation
- Primary Coolant Noble Gas Activity Calculation
- Containment Activity Calculation
- RCS Fission Product Concentration Calculation
- Source Term Calculation
- Fission Product Data Base
- Stack and Turbine Gas Data
- Water Density Ratio to STP
- Core Damage Summary
- Chemistry sample estimates based on level of core damage

*Revision

APPENDIX B Page 3 of 4

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CECC EPIP Coversheet

Tennessee Valley Authority CENTRAL EMERGENCY CONTROL CENTER EMERGENCY PLAN IMPLEMENTING PROCEDURES	Title OPERATIONS DUTY SPECIALIST TRANSPORTATION INCIDENTS INVOLVING A SHIPMENT OF RADIOACTIVE MATERIALS	CECC EPIP-22 REV. 16 Effective Date: 7/10/00

3844077566
CHAT CECC EPIP
CECC-EPIP-22
071000 16

WRITTEN BY: Thomas E. Adkins (Signature) REVIEWED BY: B K Marks (Signature) 7/7/00 (Date)

PLAN EFFECTIVENESS DETERMINATION: Thomas E. Adkins (Signature) 7/5/00 (Date)

CONCURRENCES

Concurrence Signature	Date
☐ Manager, EP Program Planning and Implementation B K Marks	7/7/00
☐ Manager, Emergency Preparedness R J Kitts	7/7/00
☐ Manager, Radiological and Chemistry Services Chandran	7/7/00
☐	

APPROVAL

APPROVED BY: J. A. Bailey (Signature) Vice President (Title) E&TS (Organization) 7/8/00 (Date)

CECC-EPIP-22
OPERATIONS DUTY SPECIALIST
TRANSPORTATION INCIDENTS INVOLVING A SHIPMENT OF
RADIOACTIVE MATERIALS

REVISION LOG

Rev. No.	Date	Revised Pages
0	3/22/88	All (Formerly IP-20; changed from IPD to EPIP)
1	4/27/88	2
2	11/18/88	2
3	4/26/89	All
4	10/26/89	2, App. A
5	5/21/91	1, 2
6	5/15/92	Pg. 2 revised. New coversheet and rev. log added. All pages issued.
7	02/09/93	Pgs. 1 & 2; Appendix A, pg. 1; Appendix B, Pgs. 1-3; all pages issued.
8	06/24/94	All
9	6/27/95	Page 2 notification list changes.
10	1/3/96	Procedure issued in new format which includes, in some cases, altering of the order of statements, editorial changes, and addition of boxes and shading to highlight statements. Changed accident to incident in title and through the procedure. Added step in Att. A checklist to get brief description of the event. Changed appendices to attachments. Added WBN phone numbers. All pages issued.
11	3/20/96	Page 2 change M. O. Medford to J. P. Maciejewski
12	10/30/96	Page 2 add M. O. Medford, change Shift Operations Supervisor to Shift Manager, add notification of Plant Assessment Manager. All pages issued.
13	12/12/96	Page 2 change M. O. Medford to O. J. Zeringue; All pages issued.
14	7/16/97	Modify notification list. All pages issued.
15	5/20/99	Annual review. Revise notification list. All pages issued.
16	7/10/00	Annual review and self-assessment items. All pages issued.

OPERATIONS DUTY SPECIALIST TRANSPORTATION ACCIDENT INVOLVING A SHIPMENT OF RADIOACTIVE MATERIALS

1.0 PURPOSE

This procedure is designed to direct the ODS in obtaining and providing immediate information in the event of a transportation incident involving a shipment of TVA radioactive materials. A transportation incident includes vehicle accidents, leaking containers, or other abnormal situations that could attract public attention or require assistance. This procedure is also designed to ensure that all appropriate notifications are made. If a request for assistance is made for a non-TVA shipment, contact the EDO for direction.

2.0 SCOPE

This procedure covers actions of the Operations Duty Specialist (ODS) when an incident occurs involving a shipment of radioactive materials.

3.0 REFERENCES

3.1 Radiological Emergency Plan.

4.0 ABBREVIATIONS AND DEFINITIONS

EDO - Emergency Duty Officer
ODS - Operations Duty Specialist
REND - Radiological Emergency Notification Directory

5.0 RESPONSIBILITIES

In the event of a transportation incident involving a shipment of TVA's radioactive materials, the ODS is notified by someone on the scene. Emergency instructions in the vehicle provide the appropriate telephone number. The ODS is authorized to accept collect telephone calls for this purpose. Upon receiving such notification, the ODS obtains from the caller the information outlined on the TRANSPORTATION INCIDENT CHECKLIST (Attachment A). The ODS makes the notifications as outlined in section 6.0.

NOTE: If an on scene responder requests immediate information concerning the shipment or how to respond to the incident, then refer to Attachment B of this procedure. Requested information shall be provided within 15 minutes from the time of the call to the ODS.

6.0 PROCEDURE REQUIREMENTS

6.1 If caller requests immediate information, refer to **Attachment B** of this procedure.

6.2 COMPLETE THE TRANSPORTATION INCIDENT CHECKLIST. **(Attachment A).**

6.3 The ODS notifies the following:

(Time/Initials)

_____/_____ 6.3.1 If the accident occurs in either Alabama or Tennessee, notify the appropriate State agency by direct line. After hours, the Alabama phone call will be made to *the Department of Public Safety (see numbers preprogrammed on phones). *Ask the officer to contact the Radiological Health Duty Officer by phone or pager and have the Duty Officer call back the ODS. Alternate telephone numbers for these agencies are listed in the TVA REND.

_____/_____ 6.3.2 Notify the Shift Manager of the plant where the shipment originated. Alternate numbers are listed in the TVA REND.

_____/_____ *6.3.3 Notify the following:

_____/_____ CECC EDO

_____/_____ CECC DIRECTOR

_____/_____ J. A. Scalice

_____/_____ J. A. Bailey

_____/_____ R. J. Kitts

*

_____/_____ 6.3.4 Notify the Radiological Assessment Manager.
* (See the CECC Pager Duty List.)

_____/_____ 6.3.5 Notify the Plant Assessment Manager. (See the CECC
* Pager Duty List)

_____/_____ 6.3.6 If the incident involves a TVA radiography shipment, advise the
* Radiological Assessment Manager to immediately notify the TS/ISO
* Radiography contact from the Pager Duty List, or REND Section G.

*Revision

ATTACHMENT A

TRANSPORTATION INCIDENT CHECKLIST

a. What is your name? _____

b. Brief Description of the incident. _____

_____

_____

c. What is your relationship to the accident (truck driver, State or local police, or a passerby)?

_____

d. Where did the incident occur, and at what time did it occur? _____

_____

_____

e. Where did the vehicle originate, and what is its destination?_____

_____

_____

f. What authorities, such as State or local police, have been notified? _____

_____

_____

g. Was anyone injured? What are the nature and extent of their injuries? _____

_____

_____

h. Has medical assistance been summoned for injured persons? _____

i. Is there a fire involved? _____

j. (If an accident has occurred) What is the extent of damage to the vehicle and shipping container?

_____

k. Is there an obvious breech of the shipping container? Have the contents of the container spilled?

_____

l. What type of shipment is this (cask, van-type trailer, or other vehicle)? _____

m. Where are you calling from? _____

n. How can you, State, or local police be contacted (area code and telephone number)?

_____

_____

o. Refer to the shipping papers and/or Attachment B of this EPIP if you need to provide any information to the caller.

Attachment B Page 1 of 4

INFORMATION FOR ON SCENE RESPONDERS

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 2 thru 4 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. If the shipment does not *originate at a nuclear plant, the Shift Manager or Site RADCON Staff at a TVA nuclear plant may be able to provide information concerning the radioactive material being shipped.

*	SQN SM	423-843-6214
	SQN RADCON Lab	423-843-6300
*	BFN SM	256-729-2213
	BFN RADCON Lab	256-729-2300
*	WBN SM	423-365-8213
		423-365-8391
	WBN RADCON Lab	423-365-8300
		423-365-3351

If you are unable to contact the Shift Operations Supervisor or RADCON Lab, then *contact the Radiological Assessment Manager listed on the Pager Duty List.

d. Continue with procedure requirements contained in Section 6.0.

*Revision

Attachment B Page 2 of 4

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 Health Authority with jurisdiction.

f. Do not move damaged containers.

Attachment B Page 3 of 4

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 4 of 4

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.