



**Wisconsin
Electric**
POWER COMPANY

Point Beach Nuclear Plant
6610 Nuclear Rd., Two Rivers, WI 54241

(414) 755-2321

PBL 95-0208

August 31, 1995

Document Control Desk
U.S. NUCLEAR REGULATORY COMMISSION
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Gentlemen:

DOCKET NOS. 50-266 & 50-301
EMERGENCY PLAN IMPLEMENTING PROCEDURES
POINT BEACH NUCLEAR PLANT, UNITS 1 & 2

Enclosed are copies of revised procedures to the Point Beach Nuclear Plant Emergency Plan Implementing Procedures Manual. The Procedures consist of changes which should be filed in your copies of the subject document in accordance with the attached instructions.

Please note that the procedures containing names and telephone numbers are stamped "NRC ONLY, NOT FOR PUBLIC DISCLOSURE." A copy of the affected procedures, with names and numbers deleted, are provided and stamped "NAMES AND TELEPHONE NUMBERS DELETED" to assure confidentiality and facilitate your distribution to the public documents rooms.

Sincerely,

G. J. Maxfield
Manager

kmt

Enclosure

cc: NRC Resident Inspector (w/o/e)
Incident Response Center, Region III

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POINT BEACH NUCLEAR PLANT
EMERGENCY PLAN IMPLEMENTING
PROCEDURES

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Revision 32
August 31, 1995

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(T - Temporary Change)

C = Continuous Use
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STATE AND COUNTY AGENCY NOTIFICATION

1.0 PURPOSE

The purpose of this procedure is to establish the initial and subsequent state and county agency notifications associated with a classified emergency event. Necessary telephone numbers are included in Form EPIP-23, "Offsite Agency Emergency Call List."

2.0 REFERENCES

- 2.1 WE-NRC (Plant 12.3) May 19, 1983, "Staffing Levels for Emergency Situations, Point Beach Nuclear Plant"
- 2.2 Wisconsin Electric Power Company Emergency Plan, EP 5.0, Section 7.1
- 2.3 NRC-WE, December 20, 1985, RE: Inspection Report Nos. 50-266/83-01 and 50-301/83-01
- 2.4 EPIP-12, "Incident Report Form"
- 2.5 EPIP-13, "Status Update - Plant"
- 2.6 EPIP-13a, "Status Update - Radiological"
- 2.6 EPIP 1.2, "Event Classification"

3.0 PRECAUTIONS AND LIMITATIONS

- 3.1 Completion of this procedure shall not prevent the operators from bringing the plant to a safe condition. This priority protects the health and safety of the general public to the greatest degree.
- 3.2 The notification of state and local emergency government agencies, using the primary communications system, shall be made within 15 minutes of event classification.
- 3.3 If unable to contact a specific agency, continue with the notification to other agencies and then attempt to contact those who have not been notified.
- 3.4 If the Dial-Select is out of service, use the commercial telephones (see EPIP-23) to make initial notifications (EPIP-12), and to perform status updates (EPIP-13 and EPIP-13a).
- 3.5 EPIP-12, "Incident Report Form," is to be used for:
 - 3.5.1 The classification of an Unusual Event.
 - 3.5.2 The classification of an Alert.
 - 3.5.3 The classification of a Site Emergency.
 - 3.5.4 The classification of a General Emergency.
 - 3.5.5 All changes (escalation or deescalation) from one classification to another.
 - 3.5.6 The termination of any Emergency Plan event.
 - 3.5.7 All changes in protective action recommendations (PARs).

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STATE AND COUNTY AGENCY NOTIFICATION

- 3.6 EPIP-13, "Status Update - Plant," and EPIP-13a, "Status Update - Radiological" are to be used for updating offsite agencies until another classification or protective action recommendation upgrade is declared. Updates should be performed approximately hourly while an event is in progress.

4.0 INITIAL CONDITIONS

An emergency event (as defined in EPIP 1.2, "Event Classification") has been declared or terminated.

5.0 PROCEDURE

Security Shift Commander/Designated Offsite Communicator

NOTE: The notification of state and local emergency government agencies must be accomplished within 15 minutes of event classification, event termination, or changes in protective action recommendations.

NOTE: In the event of a drill or exercise, all notifications must begin and end with the phrase, "THIS IS A DRILL."

- _____ 5.1 Obtain EPIP-12, "Incident Report Form," (or equivalent) or EPIP-13, "Status Update - Plant," and EPIP-13a, "Status Update - Radiological" from the Plant Operations manager or Emergency Support manager.
- _____ 5.2 Review the form content with the Acting Emergency Support manager (Plant Operations manager/Emergency Support manager or designee) and ensure that the "Acting ESM Review" and the "Date/Time Approved" blanks on the top and/or bottom of the form are filled in.
- _____ 5.3 Report to whichever facility has responsibility for offsite notifications: Control Room (CR), Technical Support Center (TSC), or Emergency Operations Facility (EOF).
- _____ 5.4 IF EPIP-12, THEN continue with Attachment 1, otherwise, continue with Attachment 2.



STATE AND COUNTY AGENCY NOTIFICATION

ATTACHMENT 1
EPIP-12 NOTIFICATION

NOTE: *IF Dial-Select is out of service, use commercial telephone lines to make this notification (see EPIP-23).*

- ____ 1. Print your name, the facility name and callback number in the blanks in Step 11. Callback numbers for each facility are: CR - (414) 755-6504, TSC - (414) 755-2183, EOF - (414) 755-2313.
- ____ 2. Verify the Dial-Select line is clear:
 - a. Pick up the handset and ask if the line is clear. (Similar to Gai-tronics)
 - b. If someone is on the line, inform them you have a Priority 2 notification.
 - c. They will clear the line, unless they have a Priority 1 discussion in progress.
 - d. When the line is clear, continue with the notification.

- ____ 3. Using the Two-Digit Dial-Select telephone, call:

NOTE: *Dial "22". THEN listen for responders. If any of the agencies does not respond after five (5) rings, press the # key to stop the ringing and contact those agencies after completing this attachment.*

- a. Manitowoc County Sheriff
- b. Kewaunee County Sheriff
- c. State of Wisconsin, Division of Emergency Government (DEG)

NOTE: *Both County agencies and one State agency should remain on the line during the notification.*

Although you are calling TWO locations in the State, only ONE is required to answer and to complete notifications. During normal working hours, DEG in Madison will be responding; if off-hours, weekends, or holidays, the State Patrol in Madison will respond. Press the # key to stop the ringing for the location that does not answer.

- ____ 4. Record the time and the name of the person who answers FOR EACH AGENCY on the top section of EPIP-12.
- ____ 5. Read EPIP-12 and have all agencies stay on the line for verifications.
- ____ 6. With all agencies remaining on the line, ask one person, preferably from the state, to repeat the information you gave. (This serves as the verification for all agencies.)
- ____ 7. After the repeat-back, ask if all agencies have the correct information (as you presented it).
- ____ 8. Answer any questions the agencies have.



STATE AND COUNTY AGENCY NOTIFICATION

Attachment 1 (Cont.)

- ____ 9. IF necessary, notify by telephone those agencies not responding to the Dial-Select call. (Telephone numbers are listed in EPIP-23, "Offsite Emergency Call List.")
- a. Record the time the agency was contacted.
 - b. Record the name of the person responding.
 - c. Read EPIP-12.
 - d. Ask the person to repeat the information you gave. (This serves as verification of information.)
 - e. Answer questions as necessary.
- ____ 10. Receive verification callbacks from county and state emergency government.
- ____ 11. Log callbacks on top, right-hand side of EPIP-12 form.
- ____ 12. Have Staff Services telefax a copy of EPIP-12 to Manitowoc County, Kewaunee County, and Wisconsin DEG when possible.
- ____ 13. Notify the Wisconsin Electric External Affairs Department.

NOTE: *IF JPIC and EOF are activated, THEN use the EOF-JPIC ringdown.*

- a. Call 221-4444. (Outside of normal work hours, you may be asked to provide a callback number. The Duty Public Information Officer will return your call.)
 - b. Provide the information contained on EPIP-12.
- ____ 14. Notify Kewaunee Nuclear Power Plant Control Room. (See EPIP-23, "Offsite Agency Emergency Call List.")
- ____ 15. Log the following:
- _____ Time (2400-hour clock)
 - _____ Date
 - _____ Initials
- ____ 16. Ensure this procedure and Form EPIP-12 are returned to the Acting Emergency Support manager.



STATE AND COUNTY AGENCY NOTIFICATION

ATTACHMENT 2
STATUS UPDATE

NOTE: IF Dial-Select is out of service, use commercial telephone lines to make this notification.

- ____ 1. Have Staff Services telefax EPIP-13 and EPIP-13a to Manitowoc County, Kewaunee County, and State of Wisconsin, Emergency Operations Centers (EOCs).

NOTE: Steps 2 through 7 are NOT REQUIRED for an Unusual Event.

- ____ 2. After the telefax is complete, verify the Dial-Select line is clear.
- a. Pick up the handset and ask if the line is clear. (Similar to Gai-tronics)
 - b. If someone is on the line, inform them you have a Priority 3 notification.
 - c. They will clear the line, unless they have a Priority 1 or 2 discussion in progress.
 - d. When the line is clear, continue with the notification.
- ____ 3. Call the following agencies using the two-digit Dial-Select telephone.

NOTE: Dial all numbers consecutively, i.e., 53, 43, 83. THEN listen for responders. If any of the agencies does not respond after five (5) rings, press the # key to stop the ringing and contact those agencies after completing this attachment.

- a. 53, Manitowoc County EOC
 - b. 43, Kewaunee County EOC
 - c. 83, Wisconsin DEG EOC
- ____ 4. Verify all agencies received EPIP-13 and EPIP-13a.
- ____ 5. Answer any questions the agencies have.
- ____ 6. Log the confirmation time for each agency on the bottom section of EPIP-13 and on the bottom section of page 3 of EPIP-13a.
- ____ 7. If necessary, notify by telephone those agencies not responding to the Dial-Select call. (Telephone numbers are listed in EPIP-23, "Offsite Agency Emergency Call List.")
- a. Verify the agency(ies) received EPIP-13 and EPIP-13a.
 - b. Answer questions as necessary.
 - c. Record the confirmation time for the agency contacted.



STATE AND COUNTY AGENCY NOTIFICATION

Attachment 2 (Cont.)

____ 8. Notify the Wisconsin Electric External Affairs Department.

NOTE: *IF JPIC and EOF are activated, THEN use the EOF-JPIC ringdown.*

a. Call (414) 221-4444. (Outside of normal work hours, you may be asked to provide a callback number. The Duty Public Information Officer will return your call.)

b. Provide the information contained on EPIP-13 and EPIP-13a.

____ 9. Notify Kewaunee Nuclear Power Plant Control Room. (See EPIP-23, "Offsite Agency Emergency Call List.")

____ 10. Log the following:

_____ Time (2400-hour clock)

_____ Date

_____ Initials

____ 11. Ensure this procedure and Form EPIP-13 and EPIP-13a are returned to the Acting Emergency Support Manager.



TECHNICAL SUPPORT CENTER ACTIVATION

1.0 PURPOSE

- 1.1 To provide instructions for the activation of the technical support center after the declaration of an alert, site emergency, or general emergency or when deemed necessary to support plant operations during an emergency.
- 1.2 To provide instruction for emergency mode operation of the technical support center ventilation system.
- 1.3 To provide information regarding the operation of the technical support center emergency power supply.
- 1.4 To provide instruction for the operation of the technical support center iodine and noble gas monitors.
- 1.5 To provide instruction for activation of the Emergency Response Data System.

2.0 ACTIVATION OF THE TECHNICAL SUPPORT CENTER (Site Manager)

NOTE: In the absence of the site manager from the TSC, all on-site emergency responsibilities belong to the POM.

- 2.1 Assure completion of EPIP-4.1a, "TSC Activation Checklist."
- 2.2 Announce the activation of the TSC to TSC staff, all plant personnel, and other emergency response facilities (ERFs) that have been activated.

3.0 EMERGENCY VENTILATION SYSTEM (Duty Technical Advisor)

- 3.1 The technical support center heating and ventilating system has a normal and emergency operating mode. Under normal operation, the air intake is from the outside air vent on the east wall of the technical support center building. The intake air under normal operation is essentially unfiltered. (See Figure 4.1-1)

In the emergency mode, there are two optional air intake locations. One is adjacent to the normal intake on the east wall of the technical support center building (see Figure 4.1-2), and the other is on the north wall of the Unit 2 turbine hall. (See Figure 4.1-3)
- 3.2 Assure that air flow is from the TSC to the turbine building at Door 116. Check DPI-4713A on the annunciator panel (El. 18.5') to verify that the TSC is pressurized relative to the turbine building. If not, coordinate manipulation of the turbine building supply fans, dampers, and exhaust fans with the plant operations manager to achieve air flow from the TSC at Door 116.
- 3.3 To shift the heating, ventilating, and air conditioning system from the normal to emergency mode:
 - 3.3.1 Turn the auto/off/occupied switch on Panel M-1 to the occupied position. (See Figure 4.1-4 for location of Panel M-1.)
 - 3.3.2 Turn the normal/emergency control switch on Panel M-1 to the emergency position.
 - 3.3.3 Select the north or south (east) emergency intake depending on meteorological conditions. Select the upwind intake duct.

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TECHNICAL SUPPORT CENTER ACTIVATION

4.0 TECHNICAL SUPPORT CENTER AUXILIARY AIR CONDITIONING

- 4.1 Select "Hand" on compressor CH2 located on the west wall of El. 18.5' of the technical support center building (see Figure 4.1-4).
- 4.2 Turn on air handling unit (W89) on the technical support center room north wall (see Figure 4.1-5).

5.0 EMERGENCY POWER

- 5.1 The power source for the technical support center is 1B-01 480 V. (See Figure 4.1-4 for the main disconnect location.)
- 5.2 The emergency power supply is available by operation of the auxiliary diesel for 5G and the auto bus transfer switch. (See Figure 4.1-5 for the emergency transfer switch location.)
- 5.3 The TSC emergency power supply is described in detail at the back of this procedure.

6.0 PLANT STATUS

- 6.1 Print Form EPIP-04, "Status Report on Plant Systems and Controls for Affected Unit," from the PPCS dialogue menu. In the event that PPCS displays are not available, obtain data using control room instrumentation.
- 6.2 Print forms EPIP-05, "Release Point Monitors," -06, "RMS Status, Area Monitors," and -07, "RMS Status, Process Monitors," from the PPCS dialogue menu. In the event that PPCS displays are not available, obtain monitor data from the TSC RMS-CT.

7.0 ACTIVATION OF IODINE AND NOBLE GAS MONITORS

- 7.1 Coordinate with the health physics director to have the iodine and noble gas sample pump started. The pump is on the west side of the El. 18.5' mechanical equipment room. Ensure that a new charcoal canister is installed and that the initial sample flow rate and start time are recorded.
- 7.2 Interpretation of RMS Readouts
 - 7.2.1 The concentration of noble gas is determined by multiplying the observed count rate on the readout labeled "RE-238" by the calibration constant posted adjacent to the meter. The units are $\mu\text{Ci/cc}$ Xe-133 dose equivalents.
 - 7.2.2 The iodine activity in the charcoal cartridge is determined by multiplying the observed count rate on the readout labeled "RE-237" by the calibration constant posted adjacent to the meter. The units are μCi I-131 dose equivalents.
 - 7.2.3 To convert the iodine activity into a concentration, calculate the volume of air that passed through the filter. The concentration of iodine is approximately the activity on the filter (μCi) divided by the total volume (cm^3) for sampling periods less than 12 hours assuming no short-lived isotopes are present.



TECHNICAL SUPPORT CENTER ACTIVATION

NOTE: For longer sampling periods and when short-lived isotopes are expected to be present, the following formula may be used to calculate the iodine concentration.

$$C = \frac{(\lambda A e^{\lambda t}) t_s}{F p (1 - e^{-\lambda t_s})}$$

Where:

Units

C	=	concentration in air	μCi/cc
F	=	sample volume	cc
λ	=	decay constant, 0.693/T 1/2	min ⁻¹
A	=	total activity on filter	μCi
t	=	elapsed time from sample stop to count start	min
t _s	=	total sample time	min
p	=	filter collection efficiency	

- 7.2.4 Any changes to the alarm setpoints shall be made in accordance with the Radiation Monitoring System Alarm Setpoint & Response Book (RMSASRB), kept in the control room.

8.0 ACTIVATION OF EMERGENCY RESPONSE DATA SYSTEM (ERDS)

NOTE: ERDS should be activated within one-hour of declaration of an Alert or higher emergency.

- 8.1 To initiate the ERDS:

- 8.1.1 Sign on to a PPCS display station.
- 8.1.2 Call up the DIALOGUE page.
- 8.1.3 Select the ERDS page (Option 6).
- 8.1.4 Follow directions as listed on the display.

NOTE: The NRC must provide verbal concurrence before ERDS can be deactivated from PBNP.

- 8.2 To Deactivate the ERDS:

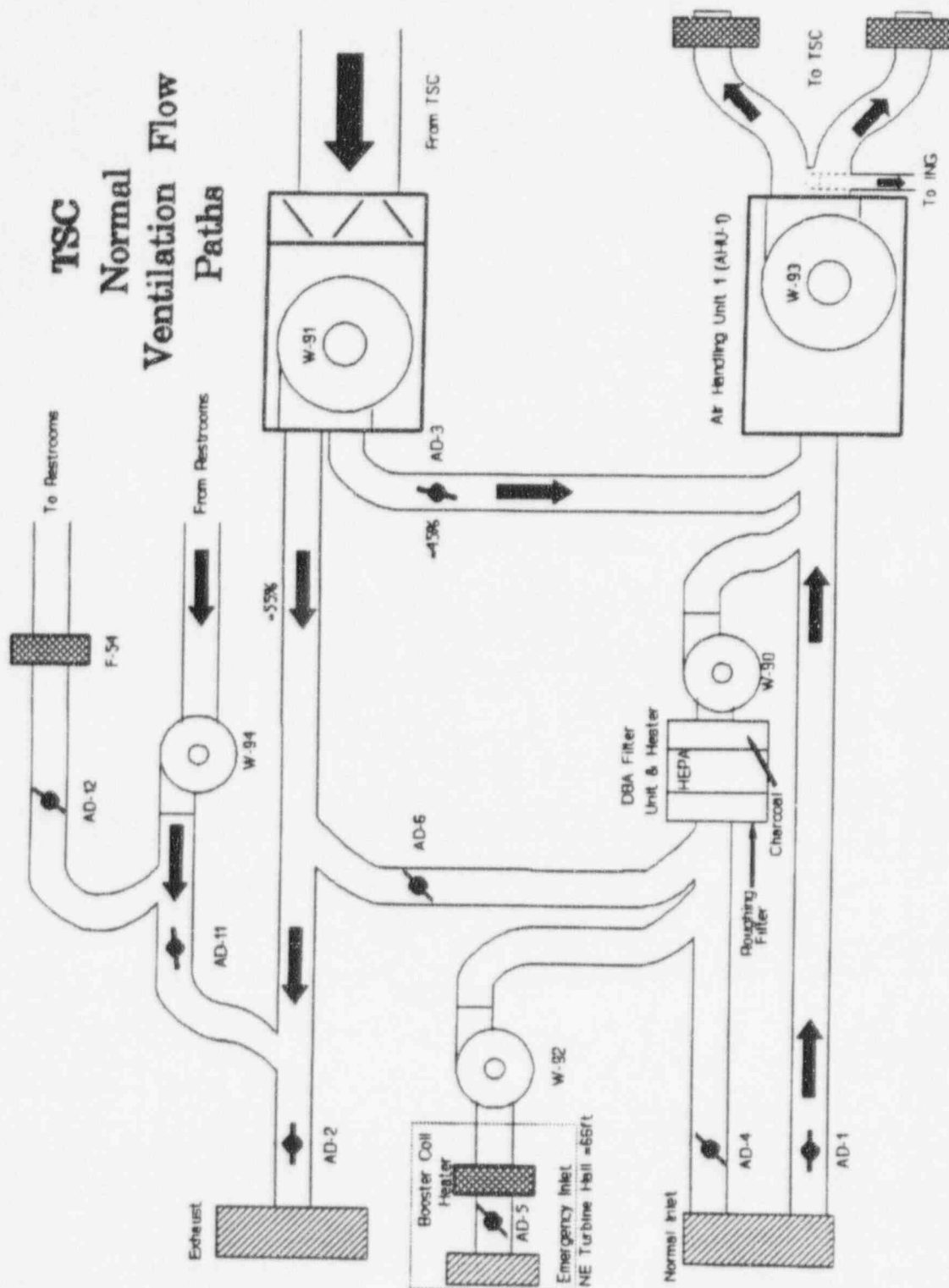
NOTE: You must have Security Level 3 (Control Room operators) to deactivate ERDS.

- 8.2.1 Sign on to a PPCS display station.
- 8.2.2 Call up the DIALOGUE page.
- 8.2.3 Select the ERDS page (Option 6).
- 8.2.4 Follow directions as listed on the display.



TECHNICAL SUPPORT CENTER ACTIVATION

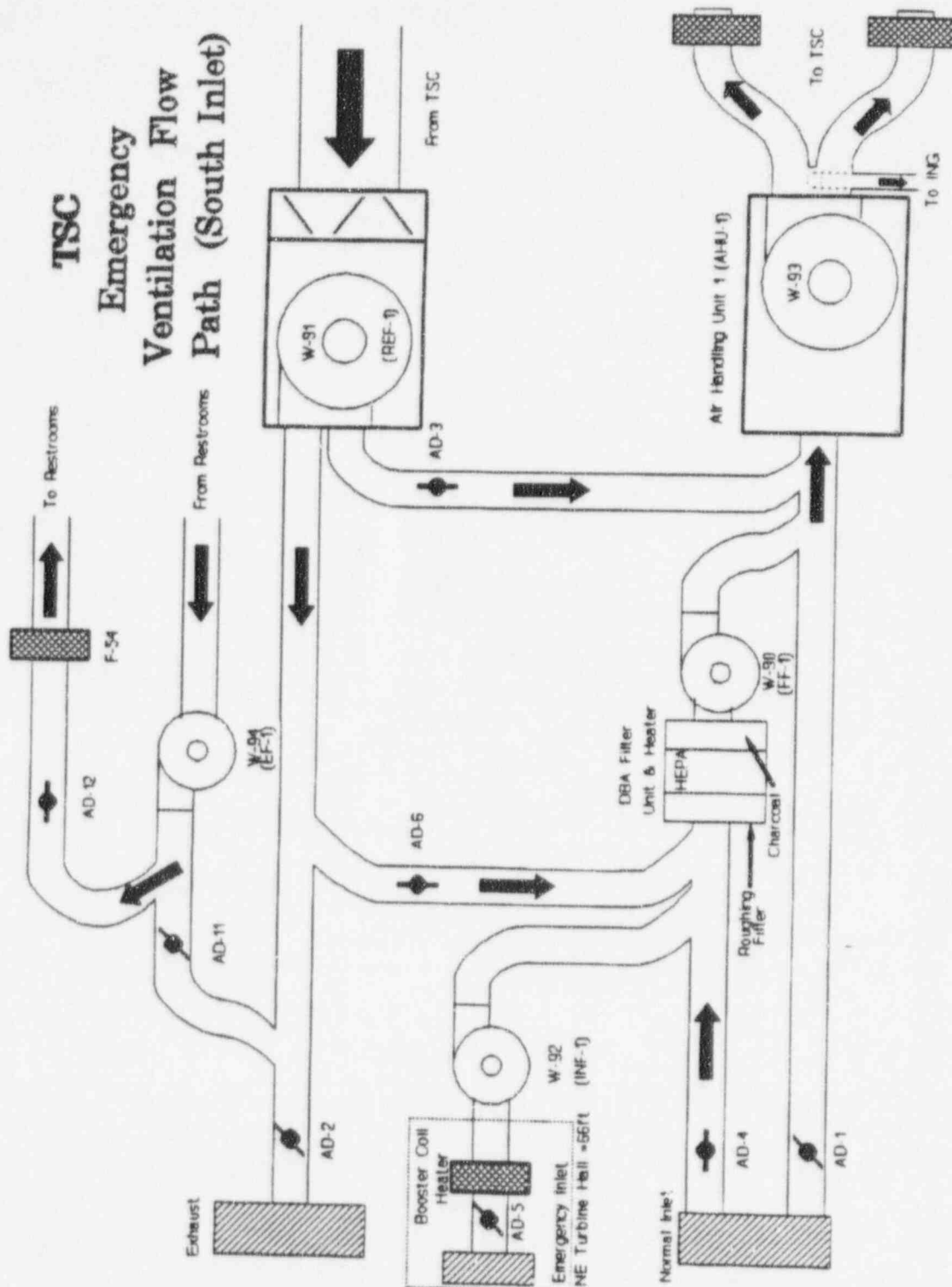
FIGURE 4.1-1





TECHNICAL SUPPORT CENTER ACTIVATION

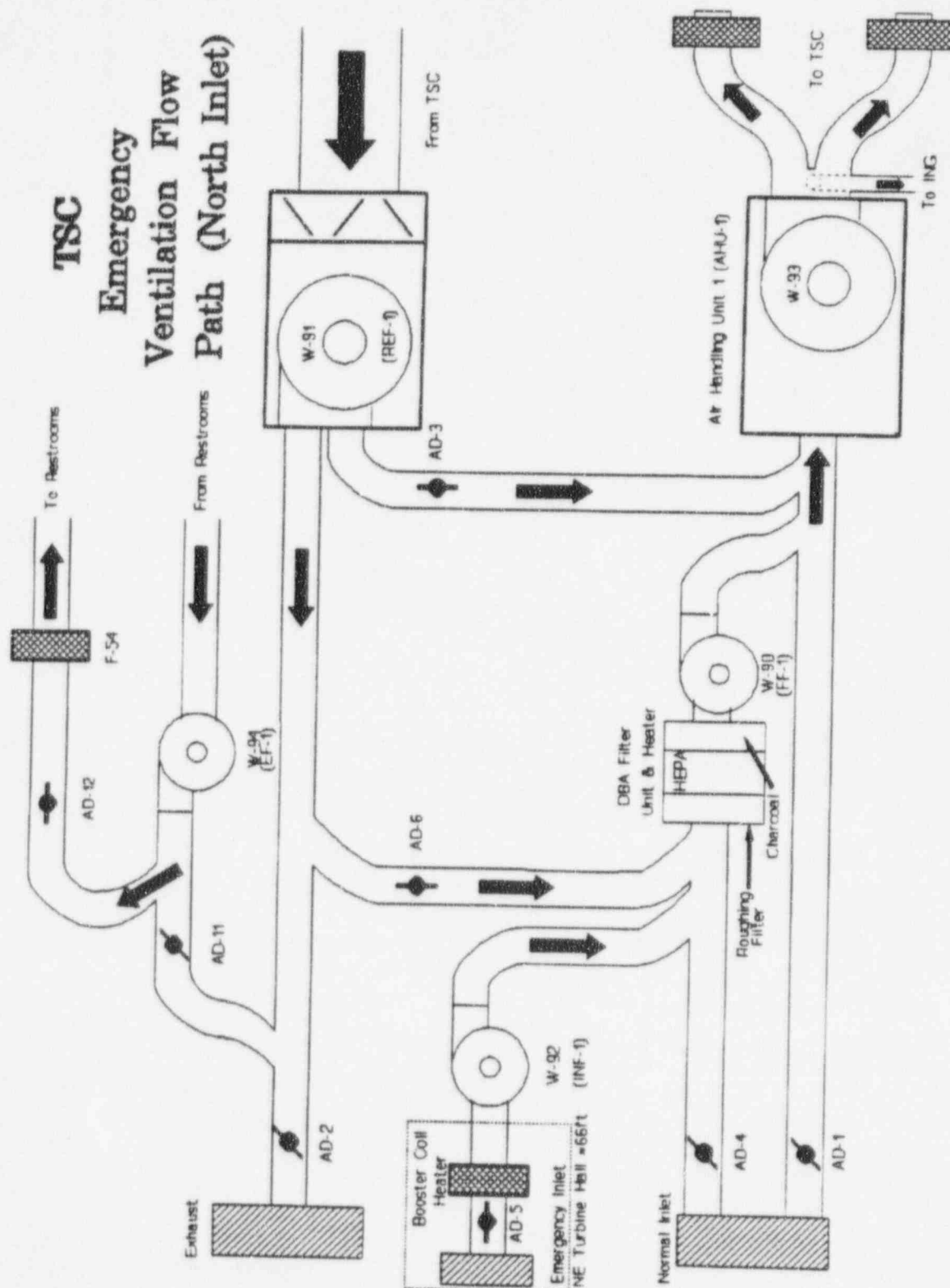
FIGURE 4.1-2





TECHNICAL SUPPORT CENTER ACTIVATION

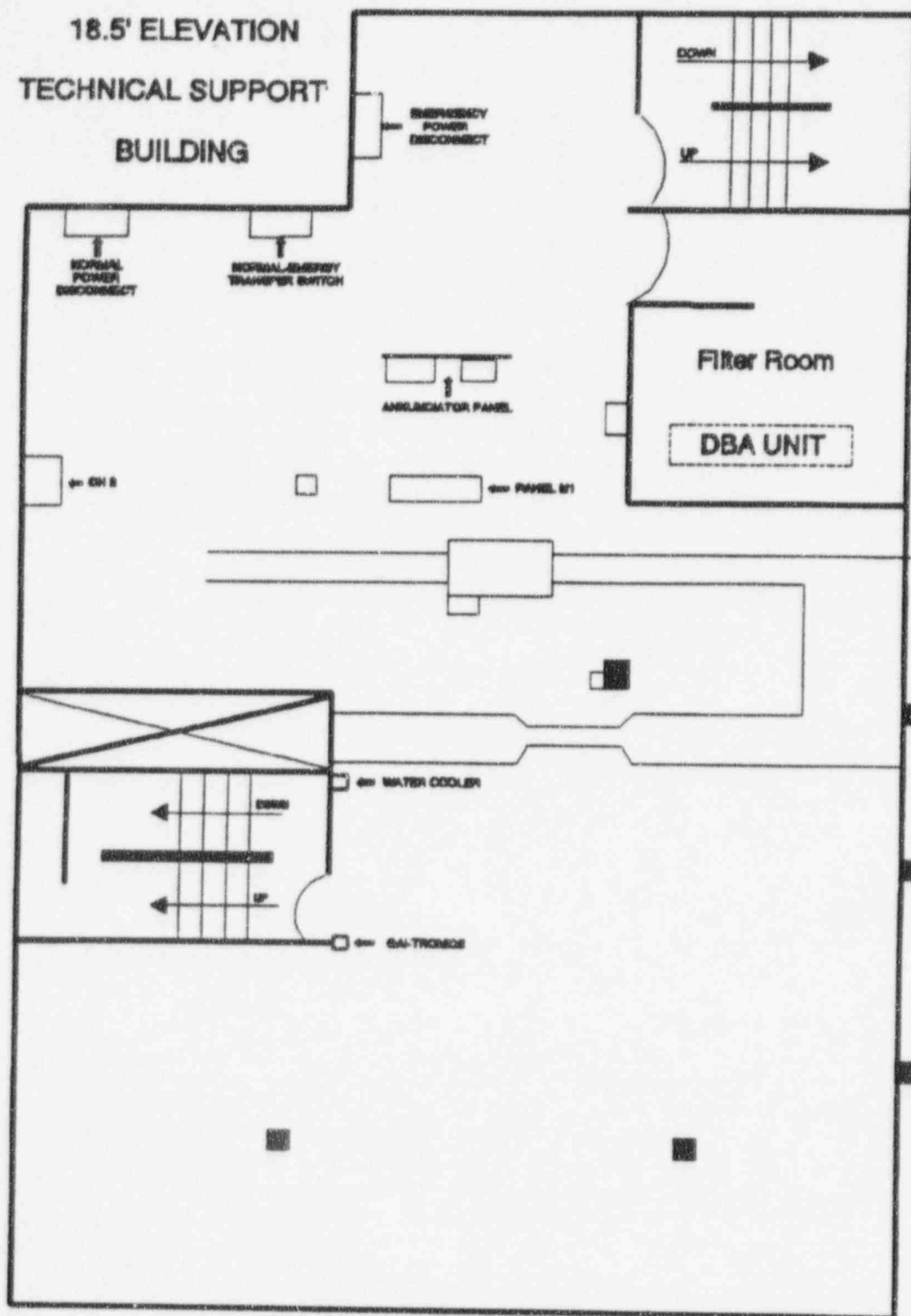
FIGURE 4.1-3





TECHNICAL SUPPORT CENTER ACTIVATION

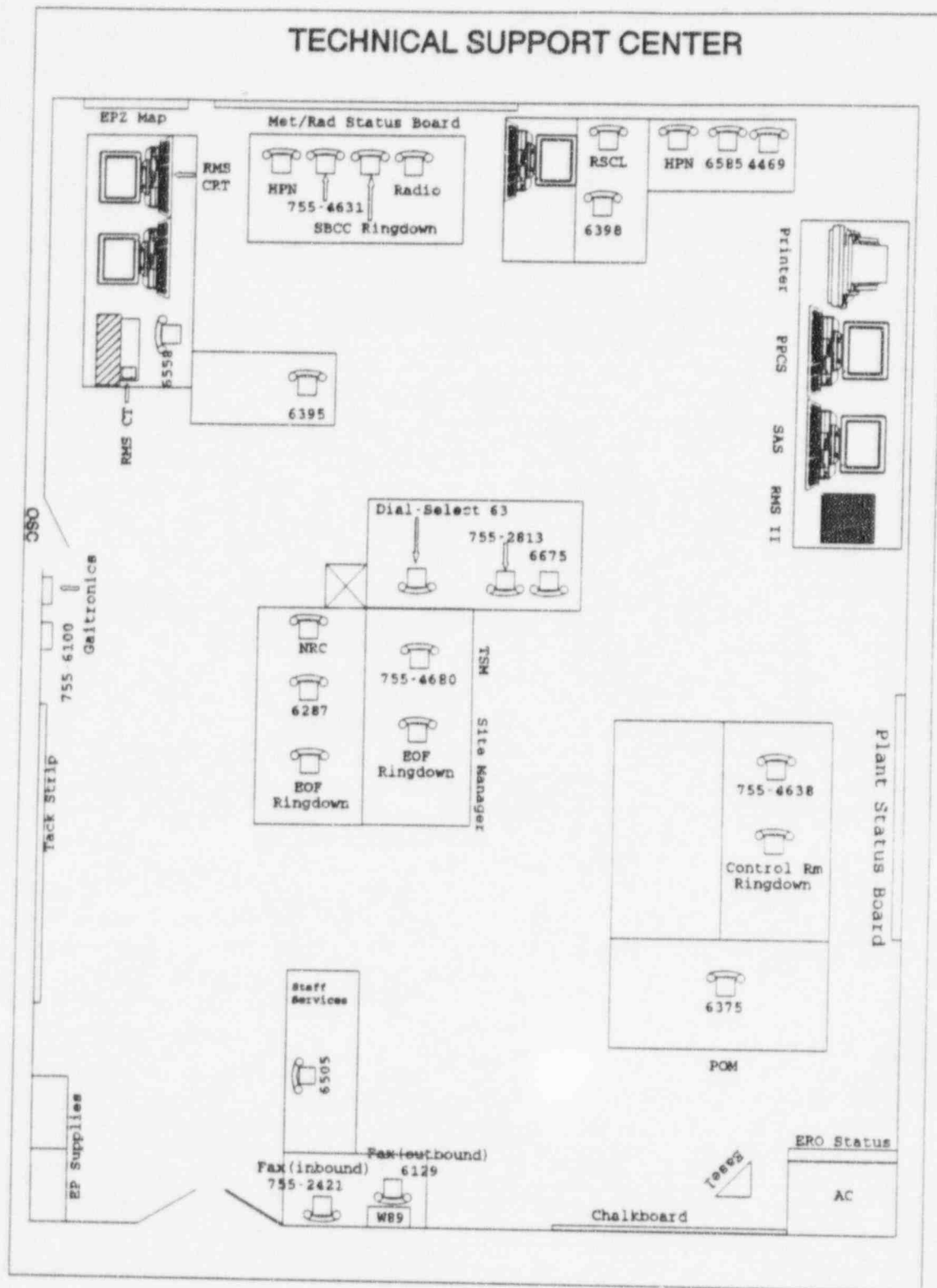
FIGURE 4.1-4





TECHNICAL SUPPORT CENTER ACTIVATION

FIGURE 4.1-5



TECHNICAL SUPPORT CENTER ACTIVATION

TECHNICAL SUPPORT CENTER EMERGENCY POWER SUPPLY

The purpose of this attachment is to establish guidelines for the use of the emergency power supply to the technical support center (TSC) building.

The small 225 kV diesel generator, which supplies backup power to the gas turbine auxiliary loads, has the capability of supplying an alternate source of power to the TSC via 480 V breaker (52T) located in the southwest corner of the gas turbine building. Control power is directly from the output of the auxiliary diesel generator. However, Breaker 52T close-open (maintained position) control switch is only electrically in the circuit when the auto/manual selector switch is in the manual position.

The TSC's normal (1B-01) and alternate (52T) power supplies are connected on El. 18.5' of the TSC, via normal manual fused disconnects, to a normal seeking auto bus transfer (ABT) switch. Upon sensing an undervoltage on the TSC's normal feeder (1B-01) for one second, the electronics within the ABT energize relay 52TX off the 24 Vdc TSC emergency lighting batteries via a 10 amp fuse located within the battery enclosure. Energizing the 52TX relay starts the diesel generator and with selector switch in auto, allows closure of alternate breaker 52T as soon as sufficient voltage is present on the output of the generator unless 5G auxiliaries have taken priority (52E emergency supply closed and/or 5G auxiliary bus undervoltage). The closing of breaker 52T establishes voltage on the alternate feeder, and the ABT switches to the alternate supply; this connects the TSC loads to the diesel generator. Subsequently, when voltage is restored to the TSC normal feeder for 30 minutes to assure stability, the ABT shifts to the "preferred" normal supply. This action activates a 5-minute time delay relay. The diesel generator continues to operate until the 5 minutes expire, whereupon relay 52TX deenergizes, opening alternate supply breaker (52T) and shutting down the diesel engine.

Apparently all time delays associated with this system are generated by the electronics package located within the auto bus transfer (ABT) switch. Relay 52TX is located just above and to the left of the TSC heating and ventilating control air compressors, also on El. 18.5'. The TSC emergency lighting batteries are located adjacent to the manual fused disconnect of the alternate supply to the ABT.

The control logic on breaker closure is arranged such that the need for the diesel to supply gas turbine auxiliaries has priority over the need to supply the TSC loads. This is true so long as the auto/manual selector switch on the original breaker control panel (in the 5G building) is left in the "AUTO" position. With the diesel generator supplying the 5G auxiliaries should it be discovered that 5G is inoperable, and it is deemed necessary to supply the TSC with emergency power, the following steps will be necessary IN ORDER shown:

1. Place 52T control switch to OPEN position.
2. The auto/manual selector switch must be placed to MANUAL.
3. Breaker (52E) to 5G auxiliaries, OPENED locally via its control switch.
4. Breaker (52T) TSC loads, CLOSED locally via its control switch.

The above steps are accomplished in the 5G building and personnel are cautioned regarding three aspects of manual system operation:

1. With the diesel generator in operation (voltage present), breaker 52T will operate to its control switch "maintained position" (close or open) coincident with placing the auto/manual selector switch to manual.



TECHNICAL SUPPORT CENTER ACTIVATION

2. No generator overload protection is provided to trip open breaker 52T. However, it does have breaker thermal and magnetic overcurrent trips.
3. In the manual mode it is possible to operate both breaker 52E and 52T to the closed position. If the normal feed to the TSC is deenergized, this could result in an abrupt overload of the diesel generator with no automatic tripping of either output breaker (the 480 V supply to breaker 52T is taken off upstream of the overload protection which trips breaker 52E) unless all 5G auxiliary 480 Vac loads are stripped except for P105, the fuel oil transfer pump. This stripping should only be done if it is obvious that 5G will remain inoperable for a relatively long period.

It should be realized that so long as an undervoltage condition exists on the 5G auxiliaries the fuel oil transfer pump (P105) is inoperable. The diesel generator fuel tank limits operation to approximately three hours at full TSC load. It is recommended that you attempt to fill the fuel oil tank utilizing the static head provided by the fuel oil storage tanks. If this proves to be inadequate, placing the auto/manual selector switch to "AUTO" will energize the 5G auxiliaries but simultaneously deenergize the TSC. In the interim, should the normal supply to the 5G auxiliaries (H01 bus) be restored, breaker 52N should be manually closed to provide power to the fuel oil transfer pump in lieu of repositioning the auto manual transfer switch.

The fuel usage for the auxiliary diesel is a conservative estimate based on communications with the diesel manufacturer, operational experience and calculations provided by Mr. Jim Wilson (SQA).



OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

1.0 PURPOSE

The purpose of this procedure is to give the instructions for obtaining air particulate, iodine and noble gas air samples and for performing direct plume and ground deposition surveys for use in evaluating the radiation and contamination levels from offsite locations from an accidental release of radioactive material.

2.0 REFERENCES

- 2.1 Health Physics Manual (HPs)
- 2.2 Health Physics Implementing Procedures Manual (HPIPs)
- 2.3 Procedure EPIP 7.1, "Health Physics Initial Response"
- 2.4 Procedure EPIP 7.2.1, "Activation of the Offsite Health Physics Facility at the Site Boundary Control Center"
- 2.5 Procedure EPIP 7.3.7, "Estimating Radioiodine Concentrations"

3.0 RESPONSIBILITIES

- 3.1 It is the responsibility of the health physics technologist/trainee to implement the requirements of this procedure when assigned by health physics management.
- 3.2 It is the responsibility of health physics management to implement the requirements of this procedure.

4.0 DEFINITION

Offsite - Areas outside the protected area.

5.0 INITIAL CONDITIONS/PREREQUISITES

- 5.1 There has been a release of radioactive materials, or it is highly probable that a release is going to occur, or the chemistry director or radcon/waste manager has requested offsite sampling be performed.
- 5.2 The offsite health physics director (OSHPD) has made initial personnel assignments in accordance with procedure EPIP 7.1.
- 5.3 The offsite health physics director (OSHPD) and assistant OSHPD have made further personnel assignments in accordance with procedure EPIP 7.2.1.

6.0 PRECAUTIONS

- 6.1 During the performance of radiation surveys, personnel may be subjected to radiological hazards including high radiation areas, contaminated areas and airborne radioactivity areas.
- 6.2 Survey teams shall carry survey instruments and continuously monitor the areas they are entering.
- 6.3 Safety equipment, including rotating amber beacons and safety cones, should be used, especially on the busier roads.

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OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

- 6.4 Personnel shall wear prescribed protective clothing, dosimetry devices and other protective equipment as required when performing surveys.
- 6.5 Improper handling of radioactive material can result in personnel contamination, radioactive material uptake and unplanned personnel exposure.
- 6.6 Survey teams shall be aware of the exposure authorized for a specific job assignment and shall not exceed the maximum authorized exposure.

7.0 PROCEDURE

7.1 Offsite Mobile Survey Team (OSMST) Management and Plume Tracking

- 7.1.1 The following section outlines actions to be taken to track radioactive "plumes" from an accidental release of radioactivity.
 - a. The following items would be appropriate to use during drills/exercises, as well as during an actual release.
 - b. These are not necessarily in the order they would be done, nor is this list necessarily complete.
- 7.1.2 The OSMST should be briefed before they depart the SBCC. The briefing should include the following.
 - a. The plume's suspected location
 - b. Where they are going
 - c. Plant status
 - d. Current wind speed and direction
 - e. Current emergency classification
 - f. The teams should be given specific directions, e.g., roads/routes to follow from the SBCC to a sample location, one sampling location to another, to the SBCC from a sample point, etc. This can prevent the teams from needlessly traversing through the plume or from going too far out of the way.
 - g. A discussion of the need for taking KI tablets.
 - h. If not a real emergency, "this is a drill" should be stated sometime during each and every communication, preferably at the beginning and end.
 - i. To phone or radio results of direct surveys to OSHPF.
 - j. To use and to refer to procedure EPIP 7.3.1.

- 7.1.3 Teams should don protective clothing prior to leaving the OSHPF.



OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

- 7.1.4 When it can be reasonably assumed that the plume is nearing land (i.e., the wind direction is taking the plume from being over Lake Michigan to over land), it is permissible to dispatch survey team(s) before a release has actually been detected at the plant and is encouraged. The team(s) sent out should be instructed to proceed approximately one mile out on the road most accessible to the suspected location where the plume will make landfall. The team(s) should be told to read their meters often when doing this to avoid being surprised by the plume.
- 7.1.5 When it can be reasonably assumed or it is known that a release has occurred and that the wind direction will allow the plume to be detected (i.e., the wind is blowing over land), dispatch survey team(s).
- 7.1.6 Maintain frequent communications with the mobile survey teams.
- a. The teams should be asked where they are, what the dose rates are, how the sampling is going, any problems, etc.
 - b. Throughout the drill/exercise or actual emergency, the teams should be informed of significant changes in wind speed and direction.
 - c. The following information, at a minimum, should be provided to the offsite mobile survey teams at approximately one half hour intervals:
 1. Significant changes in plant status that could affect offsite releases.
 2. Changes in plant emergency classifications.
- 7.1.7 The teams should be kept within the Emergency Planning Zone (EPZ) of ten miles.
- 7.1.8 The teams should be asked for the reading from their SRDs periodically, as appropriate.
- 7.1.9 All survey data or directions given via radio should be repeated back to the originator of the communication for verification purposes.

7.2 OSMST Initial Actions

NOTE: *The first OSMST may be prepositioned before an actual release has occurred.*

- 7.2.1 Perform radio check prior to leaving SBCC parking lot.
- 7.2.2 Perform cellular phone check prior to leaving SBCC parking lot.
- 7.2.3 Proceed to suspected plume location, as directed.
- 7.2.4 At approximately one to two miles from the plant, identify plume boundaries by traversing through plume, as well as possible, taking roads and lake into consideration.
- 7.2.5 Phone or radio plume survey meter readings with locations to the OSHPF.
- 7.2.6 When the highest initial plume direct radiation readings are obtained, phone or radio the results to the OSHPF and the TSC.



OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

NOTE: Use silver zeolite cartridges, unless instructed otherwise.

7.3 Air Sampling Instructions

- 7.3.1 Standard health physics air sampling procedures should be utilized.
- 7.3.2 To minimize the spread of contamination, a plastic bag should be placed in a convenient location inside the survey vehicle to store potentially contaminated trash.
- 7.3.3 At designated sample locations, take AP and iodine air samples (unless directed otherwise).
 - a. Place an air particulate filter in front of the charcoal filter.
 - b. The air sampler should be placed approximately four to five feet above the ground so as to sample the breathing zone. DO NOT place the air sampler on the ground.
 - c. It may be necessary to shield the filters from rain or snow during inclement weather.

NOTE 1: Air sampler flow rates vary depending upon the type of sampler used. The battery-powered air samplers normally provide the lowest flow rates (4 cfm). To obtain the suggested minimum sample volume a sample time of 10 minutes should be used. For sample flow rates less than 4 cfm the total sample time should be extended.

NOTE 2: One liter (1,075 cc) polybottles will be used to collect noble gas samples.

NOTE 3: Leave the plume as soon as possible after sampling is complete.

- 7.3.4 Take gas sample near the end of AP and iodine sampling period.

Type Sample	Recommended Minimum Sample Volume, cc
Air particulate	1E6 (1)
Iodine	1E6 (1)
Noble gas	1,075 (2)



OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

7.3.5 Record sample data on Form EPIP-7.3.1d.

7.3.6 Put the samples in individual bags.

NOTE: *The shuttle vehicle may be utilized for transport of subsequent samples, or for initial samples being delivered to Kewaunee Nuclear Power Plant.*

7.3.7 For the initial set of air samples, once outside of the plume, proceed directly to the OSHPF, TSC or checkpoint, as instructed.

7.3.8 Enroute, obtain a dose rate on the samples and record on Form EPIP 7.3.1d.

7.3.9 Phone or radio results of direct dose rates on the charcoal cartridge samples to the OSHPF. Take a closed window contact reading through the plastic bag.

7.3.10 Place the corresponding copy of Form EPIP-7.3.1d in each sample bag and seal.

7.3.11 Attach the white copy of Form EPIP-7.3.1d to EPIP-7.3.1a.

7.3.12 Deliver the samples and forms directly to (in order of preference):

- a. OSHPF, if the portable MCA is operational
- b. TSC count room
- c. Checkpoint, if RCA chemistry lab is operational.

7.3.13 Return to the SBCC for further assignment, unless directed otherwise.

7.4 Plume Direct Radiation Surveys

7.4.1 Direct radiation surveys within the plume area provide a means of determining whole body gamma dose rates. Initially, this data is used for dose projections. To obtain whole body dose rates using Eberline RO instruments, or equivalent, proceed as follows:

NOTE: *Beta dose rates may be requested by the offsite health physics director.*

- a. Hold the survey instrument approximately four to five feet above the ground with the detector facing upwards in the suspected direction of the plume and obtain a gamma dose rate (beta shield closed).
- b. Phone or radio the results of these direct radiation measurements to the OSHPF.
- c. Personnel at the OSHPF record the dose rates and times on the 11" x 17" maps from the results phoned or radioed in from the OSMSTs.

7.4.2 Isotopic determination of beta-gamma skin dose rates from noble gases

Upon completion of multi-channel analysis of the noble gas samples collected in Section 7.3, the true beta-gamma skin dose rate may be calculated using Form EPIP-7.3.1c.



OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

7.5 OSHDP Actions After the First OSMST has been Dispatched

- 7.5.1 If the TSC is activated and the chemistry director is available, ensure that they have the initial plume direct radiation survey results for dose projection purposes.
- 7.5.2 If the EOF is activated and the radcon/waste manager is available, ensure that they have the initial plume direct radiation survey results for dose projection purposes.
- 7.5.3 If the silver zeolite cartridge radiation levels are greater than 1 mrem/hour, calculate the estimated iodine concentration using procedure EPIP 7.3.7.
- 7.5.4 Phone or radio the results of the above calculation to the chemistry director or radcon/waste manager, as appropriate, as soon as possible.
- 7.5.5 If samples are being delivered to the TSC count room for analysis, inform the chemistry director.
- 7.5.6 Ready subsequent OSMSTs.

7.6 Ground Deposition Surveys

NOTE: *Ground deposition surveys are normally performed after the plume has passed the sample location, and are taken as directed by the OSHPD.*

- 7.6.1 Direct radiation dose rate surveys may be used to determine ground contamination by radioactive material from the plume as follows.
 - a. An Eberline RO type instrument or equivalent should be used for obtaining ground deposition dose rates.
 - b. Use Form EPIP-7.3.1b to record survey information and results.
 - c. With the beta shield closed and the detector facing the ground (held in a vertical position), obtain the gamma dose rate at three feet above the surface of the ground.

NOTE 1: *The following calculation of estimated ground deposition takes into consideration that the detector is affected by radioactive material evenly deposited over the entire area within about 10 feet of the detector. Ensure that the detector is not shielded by buildings, vehicles, etc., when obtaining the survey readings.*

NOTE 2: *Calculations are based on an average of 0.7 MeV and provide a reasonable estimate of ground deposition of mixed fission products.*

- d. As time permits (and out of the plume), perform the following calculation:

$$\text{Ground Deposition } (\mu\text{Ci}/\text{m}^2) = (3 \text{ ft Gamma Dose Rate, mrem/hr}) \left(2.6\text{E}+2 \frac{\mu\text{Ci}/\text{m}^2}{\text{mR/hr}} \right)$$

- e. Record calculations on Form EPIP-7.3.1b.



OFFSITE AIRBORNE RADIATION SAMPLING AND DIRECT DOSE RATE SURVEY GUIDELINES

7.6.2 Smear surveys for determining ground contamination should be taken on surfaces which are relatively smooth and hard (vehicles, metal, mail boxes, etc.). Smear an area of approximately 100 cm² and place the smear in a clean plastic bag for transport. Label the bag with date, time, location, sample size (100 cm²), and contact radiation reading. Record survey information of Form EPIP-7.3.1b.

7.6.3 In the event smear surveys are not feasible, vegetation type samples may be obtained. For this type of sample, carefully collect the vegetation (grass, leaves, etc.) from an area of approximately 100 cm². Package vegetation in a 2-inch diameter plastic petri dish. Some cutting may be necessary to fit sample in the petri dish. Label dish with date, time, location, sample size (100 cm²) and contact radiation reading, and place in a clean plastic bag. Record sample information on Form EPIP-7.3.1b.

NOTE: *To prevent cross contamination when using a shovel, wipe off the shovel prior to collecting the next sample.*

7.6.4 Ground scraping may also be used to determine ground contamination. When obtaining this type of sample, care should be used to collect only the surface material from an area of approximately 100 cm². Package in a 2-inch plastic petri dish and label with date, time, location, sample size (100 cm²) and contact radiation reading. Place dish in a clean plastic bag. Record sample information on Form EPIP-7.3.1b.

7.6.5 During the winter months it may be necessary to collect snow to determine ground contamination. Collect only the top approximate 1/4" layer of snow from an area of approximately 1 foot by 1 foot. Record the approximate area sampled on Form EPIP-7.3.1b. Place snow in a bucket and cover the bucket to prevent contamination from other sources. Record sample information on Form EPIP-7.3.1b.

7.6.6 Place Form EPIP-7.3.1b with the ground deposition samples.

Deliver the samples(s) and form(s) directly to (in order of preference):

- a. OSHPF, if portable MCA is operational
- b. TSC count room
- c. Checkpoint area, if RCA chemistry lab is operational.



CORE DAMAGE ESTIMATION

1.0 PURPOSE

This procedure is used to implement the Westinghouse Owner's Group (WOG) Core Damage Assessment Methodology. The WOG methodology is the primary method for estimating core damage through the measurement of fission product concentrations in the coolant system, containment atmosphere and containment sump. Auxiliary indicators: core exit thermocouple temperature, reactor vessel water level, containment radiation monitors, and containment hydrogen concentrations are also used to verify the extent of core damage.

2.0 REFERENCE

Westinghouse Owner's Group Post-Accident Core Damage Assessment Methodology

3.0 RESPONSIBILITY

This procedure is completed by the radcon waste manager. The core physics coordinator will assist in completing this procedure by obtaining data such as: plant power history, reactor shutdown time, and dilution quantities. The completion of this procedure does not have a specific time frame but will be performed whenever needed and appropriate. Implementation of this procedure shall not interfere with the overall response to the emergency.

4.0 PRECAUTIONS

4.1 If fuel damage or loss of reactor coolant system integrity has occurred, some or all of the following would be present:

4.1.1 The failed fuel monitor, 1(2)RE109, may be unusually high or offscale.

4.1.2 The containment airborne radiation monitors, 1(2)RE211 or 1(2)RE212, may be unusually high or offscale.

4.1.3 The containment area radiation monitors, 1(2)RE102 or 1(2)RE107 may be unusually high or offscale.

NOTE: Normal high range values are 1.2 - 1.5 R/hr.

4.1.4 The containment high range radiation monitors, 1(2)RM126, 127 or 128 may be elevated above background levels.

4.2 The procedure user(s) should use as many indications as possible to differentiate between the various core damage states. Because of overlapping values of release and potential simultaneous conditions of core damage, overtemperature, and/or core melt, considerable judgement needs to be applied.

5.0 INITIAL CONDITIONS

5.1 Reactor coolant, containment atmosphere and/or containment sump samples have been taken and analyzed in accordance with EPIP 8.4.1, "Post-Accident Sampling and Analysis of Potentially High Activity Reactor Coolant," EPIP 8.4.2, "Post-Accident Sampling of Containment Atmosphere," or EPIP 8.4.3, "Emergency Containment Sump "A" Sampling."

5.2 The Westinghouse Owner's Group (WOG) Post-Accident Core Damage Assessment Methodology is available for reference.

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CORE DAMAGE ESTIMATION

- 5.3 Plant data required for performance of this procedure is available from the Plant Process Computer System or documented on EPIP-04, "Status Report On Plant Systems and Controls For Affected Unit."

6.0 PROCEDURE

- 6.1 Obtain the following information:

Reactor Shutdown Time _____ Sample Time _____ Delta Time _____ hours

Power level at time of Shutdown _____ % Power

Temperature of Sample _____ °F



CORE DAMAGE ESTIMATION

6.2 Enter the sample results, in $\mu\text{Ci/cc}$, for the appropriate sample location in Table A.

TABLE A - SAMPLE RESULTS

	SAMPLE LOCATION	REACTOR COOLANT SYSTEM	CONTAINMENT ATMOSPHERE	CONTAINMENT SUMP
CORE DAMAGE STATE	ISOTOPE	SPECIFIC SAMPLE ACTIVITY IN $\mu\text{Ci/cc}$ (A)		
CLAD FAILURE	Kr-87			
	*Xe-131m			
	*Xe-133m			
	*Xe-133			
	*Xe-135			
	I-131			
	*I-132			
	I-133			
	I-135			
	Rb-88			
FUEL OVERHEAT	Cs-134			
	Cs-137			
	Te-129			
	Te-132			
FUEL MELT	Ba-140			
	*La-140			
	La-142			
	Pr-144			
* Isotopes with parent/daughter relationships				

6.3 Compare the isotopes identified in the samples with the core damage state listed to the left of Table A to determine the most likely type of fuel damage that may have occurred.

Most likely fuel damage : CLAD FAILURE FUEL OVERHEAT FUEL MELT
(Circle one)



CORE DAMAGE ESTIMATION

- 6.4 Decay correct sample results, for isotopes without parent/daughter relationships to the time of reactor shutdown using the formula:

$$A_0 = \frac{A}{e^{-\lambda \Delta t}}$$

Where:

A_0 = Sample Specific Activity at Time of Reactor Shutdown

A = Sample Activity

λ = Decay constant (hours⁻¹)

Δt = Time of Sample - Time of Reactor Shutdown

NOTE: If more than one location was sampled for this evaluation, use a separate copy of Table B for each sample location.

TABLE B - DECAY CORRECTION OF (RCS/ATMOSPHERIC/SUMP) SAMPLE RESULTS
(circle one)

ISOTOPE	SPECIFIC SAMPLE ACTIVITY (A)	DECAY CONSTANT (λ) hours ⁻¹	SAMPLE CORRECTED ACTIVITY (A_0) $\mu\text{Ci/cc}$
Kr-87		5.46E-1	
I-131		3.58E-3	
I-133		3.41E-2	
I-135		1.04E-1	
Rb-88		2.34E0	
Cs-134		3.95E-5	
Cs-137		2.60E-6	
Te-129		6.05E-1	
Te-132		8.92E-3	
Ba-140		2.26E-3	
La-142		4.50E-1	
Pr-144		2.41E0	



CORE DAMAGE ESTIMATION

- 6.5 If time allows, or if there is a large number of isotopes with parent-daughter relationships (those identified with an asterisk on Table A), decay correct the sample results by completing steps 6.5.1 through 6.5.5. If time is limited or the activity of isotopes with parent-daughter relationships is low, go directly to Step 6.6

- 6.5.1 Calculate the hypothetical daughter concentration (Q_B) at the time of the sample analysis assuming 100 percent release of the parent and daughter source inventory. Use the following equation:

$$Q_B(t) = K \cdot \frac{\lambda_B}{\lambda_B - \lambda_A} \cdot Q_A^0 \cdot (e^{-\lambda_A t} - e^{-\lambda_B t}) + Q_B^0 \cdot e^{-\lambda_B t}$$

Where:

Q_B = Concentration of daughter at time of sample analysis

Q_A^0 = 100% Source Inventory of Parent

Q_B^0 = 100% Source Inventory of Daughter

K = Decay Branching Factor

λ_A = Parent Decay Constant

λ_B = Daughter Decay Constant

t = Time of Shutdown - Time of Sample

$$Xe^{131m} \quad Q_B(t) = .011 (-2.168)(4.1E7) \cdot e^{-(3.58E-3)(hrs)} - e^{-(2.45E-3)(hrs)} + 2.7E5 \cdot e^{-(2.45E-3)(hrs)}$$

$$Xe^{133m} \quad Q_B(t) = .029 (-0.601)(8.5E7) \cdot e^{-(3.41E-2)(hrs)} - e^{-(1.28E-2)(hrs)} + 1.2E7 \cdot e^{-(1.28E-2)(hrs)}$$

$$Xe^{133} \quad Q_B(t) = .971 (-1.1915)(8.5E7) \cdot e^{-(3.41E-2)(hrs)} - e^{-(5.48E-3)(hrs)} + 8.5E7 \cdot e^{-(5.48E-3)(hrs)}$$

$$Xe^{135} \quad Q_B(t) = .835 (-2.650)(7.7E7) \cdot e^{-(1.04E-1)(hr)} - e^{-(7.58E-2)(hrs)} + 1.6E7 \cdot e^{-(7.58E-2)(hrs)}$$

$$I^{132} \quad Q_B(t) = 1.00 (1.03)(6.1E7) \cdot e^{-(8.92E-3)(hr)} - e^{-(3.07E-1)(hrs)} + 6.1E7 \cdot e^{-(3.07E-1)(hrs)}$$

$$La^{140} \quad Q_B(t) = 1.00 (2.26E-3)(7.7E7) \cdot e^{-2.26E-3)(hr)} - e^{-(1.72E-2)(hrs)} + 7.7E7 \cdot e^{-(1.72E-2)(hrs)}$$

For each isotope enter the decay time to be considered. Perform the calculation for each of the isotopes and list the results in Table C on the following page.



CORE DAMAGE ASSESSMENT

TABLE C - DECAY CORRECTION OF SAMPLE RESULTS
WITH PARENT/DAUGHTER RELATIONSHIPS

DAUGHTER ISOTOPE	VARIABLES FOR PARENT/DAUGHTER DECAY CORRECTIONS IN STEP 5.1					HYPOTHETICAL DAUGHTER ACTIVITY @ SAMPLE TIME (Q _s t) CURIES
	BRANCHING FACTOR (K)	SOURCE INVENTORY - PARENT Curies	SOURCE INVENTORY - DAUGHTER Curies	DECAY CONSTANT (λ) hours ⁻¹ PARENT	DECAY CONSTANT (λ) hours ⁻¹ DAUGHTER	
Xe-131m	.011	4.1E7	2.7E5	3.58E-3 (I-131)	2.45E-3 (Xe-131m)	
Xe-133m	.029	8.5E7	1.2E7	3.41E-2 (I-133)	1.32E-2 (Xe-133m)	
Xe-133	.971	8.5E7	8.5E7	3.41E-2 (I-133)	5.48E-3 (Xe-133)	
Xe-135	.835	7.7E7	1.6E7	1.04E-1 (I-135)	7.61E-2 (Xe-135)	
I-132	1.00	6.1E7	6.1E7	8.92E-3 (Te-132)	3.01E-1 (I-132)	
La-140	1.00	7.3E7	7.7E7	2.26E-3 (Ba-140)	1.72E-2 (La-140)	

NOTE: Branching factors are taken from Kocher, David.C., "Radioactive Decay Data Tables," Technical Information Center, USDOE, 1981. DCE/TIC - 11026.



CORE DAMAGE ESTIMATION

- 6.5.2 Using Table D and the formula below, calculate the fraction of contribution of the decay of the initial inventory of the daughter to the hypothetical daughter activity at sample time:

$$Fr = \frac{Q_B^0 e^{-\lambda_B \Delta t}}{Q_B \Delta t}$$

Where:

Fr = Fraction of Contribution of Decay of Initial Inventory of Daughter

Q_B^0 = 100% of Source Inventory of Daughter

$Q_B \Delta t$ = Hypothetical Daughter Activity at Sample Time

λ_B = Daughter Decay Constant (hours⁻¹)

Δt = Time of Shutdown - Sample Time (hours)

TABLE D - DETERMINATION OF THE DECAY OF THE HYPOTHETICAL DAUGHTER
ACTIVITY FOR SAMPLE RESULTS
WITH PARENT/DAUGHTER RELATIONSHIPS

DAUGHTER ISOTOPE	100 % SOURCE INVENTORY OF DAUGHTER (Q_B^0) CURIES	HYPOTHETICAL DAUGHTER ACTIVITY ($Q_B \Delta t$)	DECAY CONSTANT (λ) hours ⁻¹ DAUGHTER	FRACTION (Fr)
Xe-131m	2.7E5		2.45E-3	
Xe-133m	1.2E7		1.32E-2	
Xe-133	8.5E7		5.48E-3	
Xe-135	1.6E7		7.61E-2	
I-132	6.1E7		3.01E-1	
La-140	7.7E7		1.72E-2	

- 6.5.3 Using Table E and the formula below, calculate the amount of the measured sample activity associated with the decay of the daughter released:

$$M_B = Fr \times \text{measured specific activity } (\mu\text{Ci/cc})$$

Where:

M_B = Measured Sample Activity of Daughter

Fr = Fraction of Contribution of Decay of Initial Inventory of Daughter



CORE DAMAGE ESTIMATION

TABLE E - DETERMINATION OF THE MEASURED SAMPLE SPECIFIC ACTIVITY
FOR SAMPLE RESULTS
WITH PARENT/DAUGHTER RELATIONSHIPS

DAUGHTER ISOTOPE	FRACTION (Fr)	MEASURED SAMPLE ACTIVITY OF DAUGHTER ($\mu\text{Ci/cc}$)	SAMPLE SPECIFIC ACTIVITY (M_B)
Xe-131m			
Xe-133m			
Xe-133			
Xe-135			
Xe-135m			
I-132			
La-140			

6.5.4 Decay correct the measured sample activity (M_B) to the time of reactor shutdown using the following formula:

$$M_B^0 = \frac{M_B}{e^{-\lambda_B \Delta t}}$$

M_B^0 = Corrected Activity of Daughter at Time of Reactor Shutdown

M_B = Measured Sample Activity of Daughter

λ_B = Daughter Decay Constant

Δt = Time of Sample - Time of Reactor Shutdown (hrs)

Enter the results on Table F located on the following page.



CORE DAMAGE ESTIMATION

TABLE F - DETERMINATION OF THE DECAY CORRECTED SPECIFIC ACTIVITY
FOR SAMPLE RESULTS
WITH PARENT/DAUGHTER RELATIONSHIPS

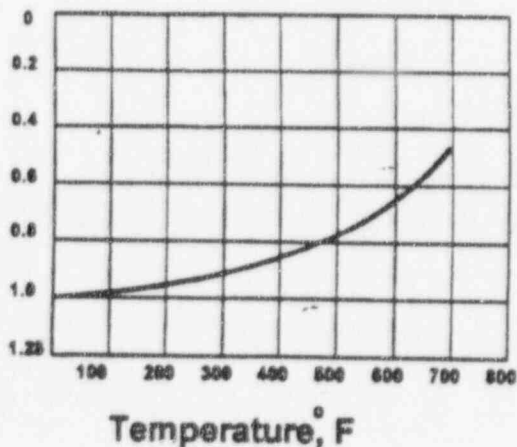
DAUGHTER ISOTOPE	SPECIFIC SAMPLE ACTIVITY (M_B) $\mu\text{Ci/cc}$	DAUGHTER DECAY CONSTANT λ_B	SAMPLE SPECIFIC ACTIVITY AT TIME OF REACTOR SHUTDOWN (M_B^0)
Xe-131m		2.45E-3	
Xe-133m		1.32E-2	
Xe-133		5.48E-3	
Xe-135		7.61E-2	
I-132		3.01E-1	
La-140		1.72E-2	

- 6.6 If the samples were taken from the reactor coolant system or containment sump and the temperature of the reactor coolant system or sump exceeded 200°F, then the specific sample activities need to be adjusted for temperature and volume. Correct the sample activities in Tables B & F for temperature and pressure. If only containment atmosphere sampling was performed, then proceed to step 7.0, since containment atmosphere samples are corrected for temperature and pressure during analysis. If the coolant or sump samples are $\leq 200^\circ\text{F}$ then use 1.0 as the water density ration and proceed to step 7.0.

Reference Figure 1 "Water Density Ratio" for the temperature of the sample. Enter the water density ratio on table G and multiply the Specific Sample Activity by the water density ratio to obtain the adjusted specific activity.

Figure 1.

p/p @ STP
Water density ratio
(temperature vs. STP)





CORE DAMAGE ESTIMATION

TABLE G - TEMPERATURE / PRESSURE CORRECTION

ISOTOPE	SPECIFIC SAMPLE ACTIVITY ($\mu\text{Ci/cc}$)	WATER DENSITY RATIO	ADJUSTED SPECIFIC ACTIVITY ($\mu\text{Ci/gm}$)
Kr-87			
*Xe-131m			
*Xe-133m			
*Xe-133			
*Xe-135			
I-131			
*I-132			
I-133			
I-135			
Rb-88			
Cs-134			
Cs-137			
Te-129			
Te-132			
Ba-140			
*La-140			
La-142			
Pr-144			



CORE DAMAGE ESTIMATION

- 6.7 Calculate the total activity for each sample location, Curies (Ci), at the time of reactor shutdown by adjusting for sample dilution and volumes for each isotope in Table H. Use as many copies of Table H as necessary for each sample location: Atmosphere, RCS or Sump.

Estimated volumes:

$$\text{Containment volume} = 1 \times 10^6 \text{ ft}^3 = 2.83 \times 10^{10} \text{ cc}$$

$$\text{Reactor Coolant System} = 6,040 \text{ ft}^3 = 1.71 \times 10^8 \text{ cc}$$

Available dilution sources for sump or coolant:

Accumulators:	2 at 8,000 gallons each	_____
RWST	275,000 gallons	_____
BAST (1 of 3)	5,000 gallons	_____
Spray Additive Tank	2,574 gallons	_____

Total Estimated Injection Volume (EIV)

_____ gallons

Convert EIV gallons to mass at STP.

$$\text{Total EIV (cc)} = \text{ESV (gallons)} \times .1337 \text{ ft}^3/\text{gal} \times 2.832 \text{E}4 \text{ gm/ft}^3$$

Add EIV to sump or RCS volume to obtain total mass from which sample was drawn.



CORE DAMAGE ESTIMATION

TABLE H - TOTAL ACTIVITY OF EACH MEDIUM (ATMOSPHERE, RCS, or SUMP)
circle one

ISOTOPE	ADJUSTED SAMPLE ACTIVITY ($\mu\text{Ci/gm}$)	VOLUME/MASS OF RCS (gm), SUMP (gm) OR CONTAINMENT ATMOSPHERE (cc)	TOTAL ACTIVITY (Ci)
Kr-87			
*Xe-131m			
*Xe-133m			
*Xe-133			
*Xe-135			
I-131			
*I-132			
I-133			
I-135			
Rb-88			
Cs-134			
Cs-137			
Te-129			
Te-132			
Ba-140			
*La-140			
La-142			
Pr-144			

- 6.8 Determine total activity release for each isotope by adding the total Curies released for each sample location. Enter the results in Table I below.



CORE DAMAGE ESTIMATION

TABLE I - TOTAL ACTIVITY RELEASED (ATMOSPHERIC, RCS, AND SUMP)

ISOTOPE	TOTAL ATMOSPHERIC ACTIVITY (Ci)	TOTAL REACTOR COOLANT SYSTEM ACTIVITY (Ci)	TOTAL SUMP ACTIVITY (Ci)	TOTAL ACTIVITY RELEASED FROM CORE (Ci)
Kr-87				
*Xe-131m				
*Xe-133m				
*Xe-133				
*Xe-135				
I-131				
*I-132				
I-133				
I-135				
Rb-88				
Cs-134				
Cs-137				
Te-129				
Te-132				
Ba-140				
*La-140				
La-142				
Pr-144				

- 6.9 Determine the fraction of total available core activity released.

NOTE: The total inventory values available for release, Curies, have been corrected for thermal output differences in the WOG Core Damage Methodology tables. The values in table J below are based upon PBNP's 1518 MW_T output versus the 1961 MW_T core inventory referenced in the WOG tables.

Calculate the fraction released by dividing the total activity released from the core (Table I) by the total activity (inventory) available for release. Multiply the results by 100 to obtain percentage of release. Enter the results in Table J.



CORE DAMAGE ESTIMATION

TABLE J - FRACTION OF CORE RELEASED (ATMOSPHERE, RCS, AND SUMP)

ISOTOPE	TOTAL ACTIVITY AVAILABLE FOR RELEASE (Ci)	TOTAL ACTIVITY RELEASED FROM TABLE I	FRACTION RELEASED (PERCENTAGE)
Kr-87	1.70E7		
*Xe-131m	2.71E5		
*Xe-133m	1.24E7		
*Xe-133	8.52E7		
*Xe-135	1.63E7		
I-131	4.18E7		
*I-132	6.12E7		
I-133	8.52E7		
I-135	7.67E7		
Rb-88	2.48E7		
Cs-134	1.01E7		
Cs-137	4.57E6		
Te-129	1.39E7		
Te-132	6.12E7		
Ba-140	7.28E7		
*La-140	7.67E7		
La-142	6.50E7		
Pr-144	5.34E7		

- 6.10 For each isotope, on the appropriate figure (Figure 2-2 through 2-9 located on pages 15 - 22 of the WOG Methodology Manual), find the Fraction Released (Percentage) value from Table J on the "Y" axis and read the percentage of clad damage on the "X" axis where the value of core inventory released crosses the average burn-up line on the graph.
- 6.11 If power history was not steady state prior to the accident, power correction may be necessary for core inventories. Reference page 4 of the WOG Methodology section 2.3.
- 6.12 If iodine spiking is suspected, the amount of clad damage may be overestimated. Reference page 25 of the WOG Methodology section 2.4.3.2.



CORE DAMAGE ESTIMATION

- 6.13. Evaluate the results for each isotope to determine which of the following seven categories best represents the condition of the core: No clad damage, 0-50% clad damage, 50-100% clad damage, 0-50% fuel pellet overtemperature, 50-100% fuel pellet overtemperature, 0-50% fuel melt, or 50-100% fuel melt.

Best estimation of Core Damage _____
(enter core damage category)

Completed by _____

Date _____ Time _____



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 11, 1995

50-266 Point Beach - Unit 1
50-301 Point Beach - Unit 2

MEMORANDUM TO: Chief Information and Records Management
Branch, IRM

FROM: *Carlton E. Kammerer*
Carlton E. Kammerer, Director
Division of Freedom of Information
and Publications Services, ADM

SUBJECT: REVIEW OF UTILITY EMERGENCY PLAN
DOCUMENTATION

The Division of Freedom of Information and Publications Services has reviewed the attached document and has determined that it may now be made publicly available.

Attachment:
Emergency Plan