Nebraska Public Power District
Nebraska's Energy Leader

NLS2001067
July 10, 2001

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

Gentlemen:

Subject: Emergency Plan Implementing Procedures
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

Pursuant to the requirements of 10 CFR 50, Appendix E, Section V, "Implementing Procedures," Nebraska Public Power District is transmitting the following Emergency Plan Implementing Procedures (EPIPs):

EPIP 5.7.6	Revision 31 C1	"Notification"
EPIP 5.7.9	Revision 20 C1	"Activation of EOF"
EPIP 5.7.17	Revision 25	"Dose Assessment"

Should you have any questions concerning this matter, please contact me.

Sincerely,

Bradford L Houston

B. L. Houston
Acting Emergency Preparedness Manager

/nr
Enclosures

cc: Regional Administrator w/enclosures (2)
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The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described for information only and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
None	

CNS OPERATIONS MANUAL EPIP PROCEDURE 5.7.6 NOTIFICATION	USE: REFERENCE ⊛ EFFECTIVE: 6/28/01 APPROVAL: SORC OWNER: J. G. KELSAY DEPARTMENT: EP

1. PURPOSE

This procedure provides notification instructions to be followed upon the declaration of an emergency. These instructions cover Initial, Follow-Up, and Termination Notifications to responsible state and local governmental agencies, NRC Notifications, ERO Notification/Staff Augmentation, initial generation of press releases to the Media, and notifications to other off-site support agencies.

2. PRECAUTIONS AND LIMITATIONS

[ ] 2.1 Accuracy in communicating notification messages is extremely important. Avoid use of jargon and acronyms not understandable to the off-site agencies.

[ ] 2.2 Failure to transmit accurate notification messages may result in delayed or improper response by off-site agencies.

[ ] 2.3 Initial notifications to responsible state and local governmental agencies shall be performed within 15 minutes of the declaration of one of the emergency classes.

[ ] 2.4 NRC notification shall be performed immediately following notification of responsible state and local governmental agencies and not later than 1 hour after the time of declaration of one of the emergency classes.

[ ] 2.5 At an ALERT or higher classification, follow-up notifications to responsible state and local governmental agencies shall be performed approximately every 60 minutes or sooner if there is a significant change in the status of the emergency.

[ ] 2.6 Notification of Termination shall be performed within 1 hour after the termination of the emergency.

[ ] 2.7 Do <u>not</u> re-activate the CNS Automated Notification System if the emergency escalates to a higher class and ERO response to the site has been initiated (ERO pagers have already activated).

[ ] 2.8 If the Control Room must be evacuated and off-site notification responsibilities have <u>not</u> been transferred to the EOF, the Shift Communicator shall perform off-site notifications over the State Notification Telephone from the TSC or EOF.

3. REQUIREMENTS

[ ] 3.1 Ensure following equipment and materials are available, as needed:

[ ] 3.1.1 Installed communications equipment.

[ ] 3.2 A NOTIFICATION OF UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, or a GENERAL EMERGENCY has been declared per Procedure 5.7.1.

4. COMPLETION OF NOTIFICATION FORM

[ ] **<u>NOTE</u>** - Obtaining information in the EOF may be accomplished through the use of status boards or logs. The Emergency Preparedness Coordinator will assist with information retrieval.

[ ] 4.1 The Notification Report number is a sequential number indicating the order of off-site notifications. The first report made to off-site authorities will be #1 followed by #2, etc. Notification Report number is not dependent on classification or type of report, it is dependent on the number of reports.

[ ] 4.2 Transmittal time is the time when all four parties are on the telephone. The "Time of Notification" space in Section 1 of Attachment 2 or Attachment 3 should be the same.

[ ] 4.3 Check either initial or follow-up report. Initial report is required for each classification. Any other report is a follow-up.

[ ] 4.4 Provide the name of CNS Communicator and call back number in the Control Room or other designated area.

[ ] 4.5 Fill in the proper classification and corresponding Emergency Action Level (EAL) number.

[ ] 4.6 Section 3 of the notification form contains the meteorological data that could change between notifications. This information can be obtained from the "MET" screen on PMIS.

[ ] 4.6.1 Enter the proper wind speed. This will depend on release height. For an ERP release, use the wind speed at 100 meters. For any other release or release location unknown, use the wind speed at 10 meters. If unable to determine wind speed, use the default of 13 mph for elevated release point and 8 mph from any other source.

[ ] 4.6.2 Enter the proper wind direction in degrees. This will be the direction from which the wind is blowing. For example, winds from due north would be from 0°.

[ ] 4.6.3 Fill in either the yes or no box for precipitation.

[ ] 4.6.4 Fill in the proper stability class. Use the 100 m DT from the MET screen. If reading at 100 m is suspect, use the 60 m DT followed by the 10 m DT. If unable to determine stability class, use the default of "D". DT is the temperature difference from various heights.

[ ] 4.7 Fill in the proper boxes indicating the status of radioactive material release.

[ ] 4.7.1 In order for "is" to be chosen, the release has to be greater than Off-Site Dose Assessment Manual (ODAM) limits. This number is on the notification form for airborne release and is also indicated on various PMIS screens (e.g., PMIS05, SPDS01, and SPDS24). Liquid release limits are in Technical Specifications.

[ ] 4.7.2 There "was" a release indicates the release has fallen below ODAM limits.

[ ] 4.7.3 There "will be" a release of radioactive material is used when a planned evolution is going to take place causing the release to be greater than ODAM limits (e.g., primary containment purge or release of a waste hold-up tank).

[ ] 4.8 Indicate the proper protective action recommendations (PARs) in Section 5. These recommendations are given by the Emergency Director. Recommendations are driven by classification (General Emergency) or by dose. The following is an example of a General Emergency PAR due to plant conditions:

	NONE	EVACUATE SECTORS	GO INDOORS AND MONITOR EAS/EBS IN SECTORS
0-2 miles		All	
2-5 miles		R,A,B	Remainder
5-10 miles			All

The affected sectors are dependent on wind direction and stability class. Affected sectors can be determined manually using the 10 mile radius EPZ map (1" = mile) with the proper dispersion overlay for that stability class. Place the dispersion overlay at the center of EPZ (CNS) and then move centerline to the proper wind direction degree, 180° from indicated wind direction. For example, if the wind direction is from 35°, centerline should cross at 215°. The affected sectors are captured under the dispersion band. Affected sectors can also be determined by the CNS Dose Program. If no release is in progress and a General Emergency has been declared due to plant conditions, enter the proper wind direction and stability class and then ask for results. Respond yes to the question "declare a general emergency based on plant conditions". The automatic PAR will be given with the proper sectors. If a release, > 1 rem TEDE or > 5 rem CDE, is in progress the proper sectors will be given if all the questions are answered correctly.

[ ] 4.9 Fill in the prognosis as either stable or unstable. This is a judgement call made by Operations on the condition of the reactor. Fill in the plant status as either at power or shutdown.

[ ] 4.10 In the remarks section provide as much information on the classification and condition of the plant. Remember individuals receiving this information may not be familiar with technical terms or nuclear jargon.

[ ] 4.11 Section 8 contains information related the a release greater than Technical Specifications.

[ ] 4.11.1 Fill in the release location exceeding Technical Specifications.

[ ] 4.11.2 Fill in the proper release height, 300' for ERP and 30' for any other monitor location.

[ ] 4.11.3 Determine the release duration. If duration is unknown, use the default of 4 hours. Indicate release start time. Indicate stop time if known. If unknown, indicate as "unk". Military time format should be used for all times.

[ ] 4.11.4 Release rates (μCi/sec) can be determine by various PMIS screens (e.g., SPDS01, SPDS24, PMIS05). All monitored release points at CNS quantify noble gases. Release rates for particulate and iodides will not be given.

[ ] 4.11.5 The projected integrated dose and projected dose rate can be obtained from CNS DOSE or by hand calculations.

[ ] 4.11.6 The Emergency Director is responsible for ensuring all information on the notification form is correct. The Emergency Director signature is an indicator that he/she has reviewed the form and notifications can be made.

5. NOTIFICATIONS FROM CONTROL ROOM

[ ] 5.1 INITIAL NOTIFICATIONS TO STATE AND LOCAL GOVERNMENTAL AGENCIES

[ ] **NOTE 1** - Events which have taken place but are no longer occurring, which were not recognized at the time of occurrence as meeting the criteria listed in Procedure 5.7.1 for declaration as an emergency, must still be reported to responsible state and local governmental authorities as soon as possible after their discovery. Declaration and termination notifications of responsible state and local governmental authorities of an emergency which occurred, but no longer exists, may be performed together using the same incident report.

[ ] **NOTE 2** - Due to the 15 minute time constraint or the nature of the event, the Emergency Director may designate any qualified individual in the Control Room as Shift Communicator.

[ ] **NOTE 3** - When contacted by the Off-Site Communicator in the EOF, the Shift Communicator will transfer off-site notification responsibilities. This transfer of responsibilities will include plant status information, as well as a briefing of the status of notifications up to the time of transfer.

[ ] 5.1.1 The Shift Communicator shall complete Attachment 1, Sections 1 through 7, and forward to the Emergency Director for approval.

[ ] 5.1.2 The Emergency Director shall review, edit if necessary, and approve (sign) Attachment 1, and return it to the Shift Communicator.

[ ] 5.1.3 The Communicator shall contact the agencies listed in Section 1 of Attachment 2 and provide them with the information from Attachment 1 using the State Notification Telephone System. Pick up the handset to the hotline and push the "Group Call" button. This will automatically ring telephones at County and State agencies.

[ ] 5.1.4 Each time a party answers, ask them to obtain a Notification Report Form and standby until all four parties are on the line. Record the name of the person representing each agency and enter it in the appropriate blank in Section 1 of Attachment 2.

[ ] 5.1.5 Record the time when all four parties are on the telephone in the "Time of Notification" space in Section 1 of Attachment 2.

[ ] **CAUTION** - When performing Step 5.1.6, do not proceed to quickly.

[ ] 5.1.6 When all four parties have their Notification Report Forms, clearly and concisely state the information on Attachment 1. Give the parties enough time to accurately write down the information on their forms.

[ ] 5.1.7 In the event contact is lost with one of the agencies during the notification process, continue on with the notification to the group. When you are through with the group notification, attempt contact with the party that was lost by dialing the agency's individual number, which is printed next to the agency's name, on the telephone.

[ ] 5.1.8 If the State Notification Telephone System is inoperable, alternate telephone numbers can be found in the CNS Emergency Telephone Directory. In this case, a conference call should be established by calling each agency using the alternate telephone number and then pressing the conference-call button on the phone. You should then contact the remaining agencies in the same manner until all four agencies are conferenced in. When all agencies are on-line, proceed with the notification. If all four agencies cannot be conferenced in, attempt contact by individual number as in Step 5.1.7.

[ ] 5.2 FOLLOW-UP NOTIFICATIONS TO STATE AND LOCAL GOVERNMENTAL AGENCIES

[ ] 5.2.1 The Shift Communicator shall complete Attachment 1, Sections 1 through 7, and forward to the Emergency Director for approval.

[ ] 5.2.2 The Emergency Director shall review, edit if necessary, approve (sign) Attachment 1, and return it to the Communicator.

[ ] 5.2.3 The Communicator shall contact the agencies listed in Section 1 of Attachment 2 and provide them with the information from Attachment 1 in the same manner as the Initial Notifications were performed.

[ ] 5.3 NRC NOTIFICATIONS

[ ] **NOTE** - When contacted by the ENS Communicator in the TSC, the Shift Communicator will transfer NRC Notification responsibilities. This transfer of responsibilities will include plant status information, as well as, a briefing of the status of notifications up to the time of transfer.

[ ] 5.3.1 The NRC Senior Resident and Resident Inspectors are notified by pager when the CNS Automated Notification System is activated. These individuals can also be notified by normal communication methods. Examples of normal communication are phone, pager, and gaitronics. Applicable numbers are contained in the emergency telephone directory.

[ ] 5.3.2 The Shift Communicator shall make notifications to NRC Headquarters via the ENS Telephone System by picking up the handset and dialing the number, on the sticker, on the top of the telephone. The NRC will request information regarding the plant's status. Attachments 1 and 2 can be a source of information for NRC, but the NRC does not have a copy of this form.

[ ] 5.3.3 The NRC will likely request an open communications channel to receive continuous and detailed information at an ALERT or higher classification until the TSC is operational.

[ ] 5.3.3.1 Report the declaration of any of the emergency classes specified in the CNS Emergency Plan as well as any change from one emergency class to another or a termination of an emergency class.

[ ] 5.3.3.2 Report any further degradation in the level of safety of the plant or other worsening plant conditions.

[ ] 5.3.3.3 Any other information that is requested should be provided or an attempt to obtain the information should be made to the best of your ability relative to other responsibilities.

[ ] 5.3.4 If the ENS telephone is inoperable, contact via normal telephone using alternate numbers as listed in the Emergency Telephone Directory.

[ ] 5.4 ERO NOTIFICATION/STAFF AUGMENTATION

[ ] 5.4.1 Immediately after the declaration of an emergency, the Emergency Director should ensure the CNS Automated Notification System is activated per Attachment 4. The CNS Automated Notification System shall perform the functions of activating emergency pagers, receiving telephone call-backs from pager carriers, and placing telephone calls to ERO members at home.

[ ] 5.4.2 Scenarios associated with the CNS Automated Notification System have been numbered to match the pager "XYZ" informational codes described in Procedure 5.7.22 and designed to activate the ERO per the CNS Emergency Plan and Procedures.

[ ] **NOTE 1** - When executing scenarios 200#, 300#, and 400#, recording of a "Current Scenario Message" is required.

[ ] **NOTE 2** - If 12.5 KV power is lost, a "Current Scenario Message" to have EOF personnel report directly to the AEOF is required.

[ ] 5.4.3 The system scenarios will ask if you want to record a "Current Scenario Message". It is at the discretion of the Emergency Director to record a message except for scenarios 200#, 300#, and 400#, which require the recording of a "Current Scenario Message". If the Emergency Director chooses to record such a message, all ERO responders who interface with the CNS ANS will hear the message immediately after a scenario-specific, "Prerecorded" message. If a "Current Scenario Message" is recorded it should contain information such as the applicable EAL, information that the responder needs to know regarding his safety prior to arriving at CNS, or specific information relevant to the emergency event.

[ ] 5.4.4 The system is currently programmed to print reports at the Emergency Response Facilities. These reports identify the persons who are responding to fill ERO positions and their approximate times of arrival.

[ ] 5.4.5 If the CNS ANS is discovered to be inoperable (i.e., no Control Room personnel pagers are activated), then use the backup method of pager activation found in Attachment 5.

[ ] 5.5 NOTIFICATION OF TERMINATION

[ ] 5.5.1 The Shift Communicator shall complete Attachment 1, Sections 1 and 2, and forward to the Emergency Director for approval.

[ ] 5.5.2 The Emergency Director shall review Sections 1 and 2, edit if necessary, and then complete Section 7. The Emergency Director shall approve (sign) Attachment 1 and return it to the Shift Communicator.

[ ] 5.5.2.1 Section 7 should contain a brief and concise summary of the current plant status which has allowed for termination of the emergency.

[ ] 5.5.3 The Shift Communicator shall contact the agencies listed in of Attachment 2 and provide them with the information from Attachment 1.

6. EOF NOTIFICATIONS

[ ] 6.1 INITIAL NOTIFICATIONS TO STATE AND LOCAL GOVERNMENTAL AGENCIES

[ ] **NOTE** - Upon EOF activation and prior to the transfer of Emergency Command and Control from the Control Room to the EOF, the Off-Site Communicator shall contact the Control Room and coordinate the transfer of responsibility of notification of responsible state and local governmental agencies to the EOF. This transfer of responsibilities will include plant status information, as well as a briefing of the status of notifications up to the time of transfer and shall occur simultaneously with the transfer of Emergency Command and Control.

[ ] 6.1.1 The Off-Site Communicator shall complete Attachment 1, Sections 1 through 7, and forward to the Emergency Director for approval.

[ ] 6.1.2 The Emergency Director shall review, edit if necessary, approve (sign) Attachment 1, and return it to the Communicator.

[ ] 6.1.2.1 The EOF Director may sign Attachment 1, in the absence of the Emergency Director, after reviewing it with the Emergency Director, receiving his verbal approval of its content, and noting in the EOF Facility Log.©

[ ] 6.1.3 The Off-Site Communicator shall contact the agencies listed in Section 1 of Attachment 3 and provide them with the information from Attachment 1 using the State Notification Telephone System. Pick up the handset to the hotline and push the "Group Call" button. This will automatically ring telephones at County and State agencies.

[ ] 6.1.4 Each time a party answers, ask them to obtain a Notification Report Form and standby until all four parties are on the line. Record the name of the person representing each agency and enter it in the appropriate space in Section 1 of Attachment 3.

[ ] 6.1.5 Record the time when all four parties are on the telephone in the "Time of all parties on line" space in Section 1 of Attachment 3.

[ ] **CAUTION** - When performing Step 6.1.6, do not proceed to quickly.

[ ] 6.1.6 When all four parties have their Notification Report Form, clearly and concisely state the information on Attachment 1. Give the parties enough time to accurately write down the information on their forms.

[ ] 6.1.7 Notifications to the states, performed by the Off-Site Communicator in the EOF, may be provided by handing a copy of Attachment 1 directly to the States Governor's Authorized Representative, if present.

[ ] 6.1.8 In the event contact is lost with one of the agencies during the notification process, continue on with the notification to the group. When you are through with the group notification, attempt contact with the party that was lost by dialing the agency's individual number, which is printed next to the agency's name, on the telephone.

[ ] 6.1.9 If the State Notification Telephone System is inoperable, alternate telephone numbers can be found in the CNS Emergency Telephone Directory. In this case, a conference call should be established by calling each agency using the alternate telephone number and then pressing the conference-call button on the phone. You should then contact the remaining agencies in the same manner until all four agencies are conferenced on in. When all agencies are on-line, proceed with the notification.

[ ] 6.2 FOLLOW-UP NOTIFICATIONS TO STATE AND LOCAL GOVERNMENTAL AGENCIES

[ ] 6.2.1 The Off-Site Communicator shall complete Attachment 1, Sections 1 through 8, and forward to the Emergency Director for approval.

[ ] 6.2.1.1 The EOF Director may sign Attachment 1, in the absence of the Emergency Director, after reviewing it with the Emergency Director, receiving his verbal approval of its content and noting in the respective facility log.©

[ ] 6.2.2 The EOF Director may review and approve (sign) Attachment 1 of the follow-up notification, in lieu of the Emergency Director, if the protective action recommendation has not changed or other significant change in the status of the emergency has not occurred.

[ ] 6.2.3 The Off-Site Communicator shall contact the agencies listed in Section 1 of Attachment 3 and provide them with the information from Attachment 1 in the same manner as the Initial Notifications were performed.

[ ] 6.3 NOTIFICATION OF OFF-SITE SUPPORT AGENCIES

[ ] 6.3.1 The Off-Site Communicator shall contact the agencies listed in Section 1 of Attachment 3 as soon as possible after declaration of an ALERT or higher emergency classification, but not until after the required notifications to responsible state and local governmental agencies have been completed per Section 1.

[ ] 6.3.2 The notification shall include, but not limited to, the information provided on Attachment 1, and any other basic information concerning the emergency event that is currently known or can be readily obtained.

[ ] 6.3.3 If the event is a NOTIFICATION OF UNUSUAL EVENT or a higher emergency classification which has been terminated per station procedures prior to the above agencies being notified, notifications shall be performed by the Emergency Preparedness staff by close of the next business day following the termination of the emergency.

[ ] 6.4 NOTIFICATION OF TERMINATION

[ ] 6.4.1 The Off-Site Communicator shall complete Attachment 1, Section 1 and 2, and forward to the Emergency Director for approval.

[ ] 6.4.2 The Emergency Director shall review Sections 1 and 2, edit if necessary, and then complete Section 7. The Emergency Director shall approve (sign) Attachment 1 and return it to the Off-Site Communicator.

[ ] 6.4.2.1 Section 7 should contain a brief and concise summary of the current plant status which has allowed for termination of the emergency.

[ ] 6.4.3 The Off-Site Communicator shall contact the agencies listed in Attachment 3 and provide them with the information from Attachment 1.

7. NOTIFICATIONS FROM THE TSC

[ ] **NOTE** - After TSC activation and establishment of emergency communications between the TSC and Control Room, the ENS Communicator shall contact the Shift Communicator and coordinate the transfer of responsibility of NRC notification to the TSC. This transfer of responsibilities will include plant status information, as well as a briefing of the status of notifications up to the time of transfer. The ENS Communicator in the TSC can take the responsibility for notifying the NRC before the TSC is activated if concurrence is given by TSC Director and Control Room.

[ ] 7.1 If the Shift Communicator was unable to make contact with the NRC Senior Resident Inspector or Resident Inspector, the ENS Communicator shall continue attempts to contact them via normal communications.

[ ] 7.2 The ENS Communicator shall make notifications to the NRC Headquarters via the ENS Telephone System by picking up the handset and dialing the number, on the sticker, on the top of the telephone. The following information should be provided to the NRC:

[ ] 7.2.1 Any further degradation in the level of safety of the plant or other worsening conditions.

[ ] 7.2.2 Any change from one emergency class to another or termination of an emergency class.

[ ] 7.2.3 The results of ensuing evaluations or assessments of plant conditions.

[ ] 7.2.4 Effectiveness of the emergency response and any protective measures taken.

[ ] 7.2.5 Information related to plant behavior that is not understood.

[ ] 7.2.6 Any other information that is requested should be provided or an attempt to obtain the information should be made to the best of your ability.

[ ] 7.3 If the ENS telephone is inoperable, contact via normal telephone using alternate numbers as listed in the Emergency Telephone Directory.

8. MISCELLANEOUS

[ ] 8.1 Consider following information when making emergency notifications:

[ ] 8.1.1 At an ALERT or higher emergency classification, to receive continuous and detailed information, the NRC will likely request an open line of communication with the Control Room (ENS) until the TSC is operational.

[ ] 8.1.2 The NRC Resident Inspector(s) will likely respond to the CNS Control Room and/or TSC when notified.

[ ] 8.1.3 The Public Affairs Duty Officer (PADO) shall be notified by pager by the CNS ANS. Public Affairs Duty Officer functions shall be superseded by the activation of the Joint Information Center (JIC). The JIC shall receive follow-up information from the Technical Information Coordinator in the EOF.

[ ] 8.1.4 The On-Call Emergency Preparedness Coordinator should assume the responsibility of coordinating press releases after being notified and responding to a Notification of Unusual Event (NOUE).

[ ] 8.1.4.1 This responsibility shall be for the period immediately after the declaration of the NOUE and continue until the responsibility is transferred to appropriate NPPD Corporate Communications Department Personnel.

[ ] 8.1.4.2 Any press release that is generated during this period should be reviewed and approved by the Emergency Director or his designee prior to release to the media.

[ ] 8.1.5 Authorized Representatives of the Governors of Nebraska and Missouri may be represented in the EOF and set up Forward Command Posts at some other location.

Notification Report Number: _____ **Time of Transmittal:** _____

[ ] Initial Report (Complete Sections 1-7) [ ] Follow-Up Report (Complete Sections 1-8)

1) Name of CNS Communicator: **Call Back Number:** 402-825-

2) Classification: [ ] NOUE [ ] Alert [ ] Site Area [ ] General | EAL Number:

Event Declared (Date/Time): | Event Terminated (Date/Time):

3) Meteorological Conditions | Wind Speed: MPH | Wind From: Degrees | Precipitation: [ ] Yes [ ] No

Stability Class: [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

4) ODAM Airborne Release Values: There [ ] is [ ] no Release of Radioactive Material
ERP = 7.28E5 µCi/sec
Turbine Building = 3.6E4 µCi/sec [ ] was [ ] an airborne (Greater than ODAM Limits)
Reactor Building = 3.6E4 µCi/sec
Augment Radwaste = 3.6E4 µCi/sec [ ] will be [ ] a liquid

5) Protective Action Recommendations (PARS): General Emergency Automatic PAR - Evacuate 2 mi radius/5 mi downwind, go indoors, and monitor EAS/EBS remainder 10 mi EPZ.

	None	Evacuate Sectors	Go indoors and monitor EAS/EBS in Sectors
0-2 Miles			
2-5 Miles			
5-10 Miles			

6) Prognosis: [ ] Stable [ ] Unstable | Plant Status: [ ] at Power [ ] Shutdown

7) Remarks:

8) Release Information:

Release From: [ ] ERP [ ] Reactor Building [ ] Turbine Building [ ] Aug Radwaste Building [ ] Other: _____

Release Height: [ ] 300 ft (ERP) [ ] 30 ft (RB, TB, ARWB) [ ] Other: _____ ft | Release Rate (Ci/sec)

Est. Duration: _____ (Hours) | NobleGas: _____ Ci/sec

Start Time: _____ | Iodides: N/A

Stop Time: _____ | Particulate: N/A

Distance From Plant	Projected Integrated Dose (Rem)		Projected Dose Rate (Rem/hr)	
	TEDE	CDE (Thyroid)	TEDE	CDE (Thyroid)
Site Boundary				
2 Miles				
5 Miles				
10 Miles				

Emergency Director: | Date/Time:

ATTACHMENT 2	COOPER NUCLEAR STATION SHIFT COMMUNICATOR NOTIFICATION REPORT RECORD

Notification Report Number: _____

1. STATE AND LOCAL GOVERNMENTAL AGENCIES. Perform notifications **within 15 minutes** from the declaration of an emergency classification. Also requires follow-up notifications approximately every 60 minutes or sooner if there is a significant change of the status of the emergency.

Notify the Following Agencies	Phone	✔	Name of Contact
Nebraska Civil Defense via Nebraska State Patrol	**State Notification Telephone System**		
Nemaha County Sheriff			
Atchison County Sheriff			
Missouri SEMA via Missouri State Patrol			
			Time of all Parties on Line: _____
Record any comments, difficulties, or observations you had while making this notification.			

2. ERO NOTIFICATION/STAFF AUGMENTATION. Activate CNS Automated Notification System per Attachment 4. Activation is not required if the ERO is currently responding or if the emergency facilities are activated.

Activation Required	Performed By	Time
[ ] Yes [ ] No		

3. NRC HEADQUARTERS. Complete notifications via ENS immediately after the above notifications and not later than **60 minutes** after declaration of an emergency. Contact by normal telephone (Speed Dial), if ENS is inoperable.

NRC	ENS Telephone	Alternate	Person Contacted	Time
	Dial # on Phone Sticker	**Speed Dial - 10**		

Communicator Signature: _____ Date: _____

Notification Report Number: _____

1. STATE AND LOCAL GOVERNMENTAL AGENCIES. Perform notifications **within 15 minutes** from the declaration of an emergency classification. Also requires follow-up notifications approximately every 60 minutes or sooner if there is a significant change of the status of the emergency.

Notify the Following Agencies	Phone	✔	Name of Contact
Nebraska Civil Defense via Nebraska State Patrol	**State Notification Telephone System**		
Nemaha County Sheriff			
Atchison County Sheriff			
Missouri SEMA via Missouri State Patrol			
Time of all Parties on Line: _____			
Record any comments, difficulties, or observations you had while making this notification.			

2. SUPPORT AGENCIES - Perform notifications to the following support agencies, as soon as possible, after the declaration of an ALERT or higher emergency classification, but not until after all notifications are completed as required in Section 1.

Agency	Phone	Person Contacted	Time
INPO	**1-800-321-0614**		
Nuclear Electric Insurance Limited (NEIL)	**(860) 561-3433**		

Communicator Signature: _____ Date: _____

NOTE - The Emergency Director Password is located in the Shift Supervisors Cubicle in the CNS Control Room.

1. Call into the CNS ANS by dialing telephone extension 8579.

2. The system will inform you that you have accessed the "Remote Activation Module" and prompt you for your "scenario activation password followed by the # sign". Enter the Emergency Director's Password followed by the # sign.

   Emergency Director Password =

3. To start a scenario, enter the scenario ID number from the list below, followed by the # sign. Scenario Number = _____.

4. The system will verify the event code you entered. Press 2.

5. The system will ask you about the an "Current Scenario Message". To record a "Current Scenario Message", press 2, speak your message after the tone. When finished recording, press "#". If necessary, you may script your "Current Scenario Message" below; if more space is needed, continue on back. If you do not want to record a "Current Scenario Message", press "#".

   Current Scenario Message: (tone) _____

   _____ (#)

6. If a "Current Scenario Message" has been recorded, it is played back at this time. The system will then prompt you to replay the message, record a new message, or continue on with the activation process. Determine if you need to replay the message again or re-record it and press the associated key for that choice; or press "#" to proceed on with the scenario activation process.

7. Press "3" to activate the chosen scenario.

8. Press "#" to disconnect from the system.

Classification	Scenario Description	Scenario ID Number
NOUE	No ERF Activation - No ERO Response to Plant	100#
ALERT	No ERF Activation - No ERO Response to Plant**	200#
SAE	No ERF Activation - No ERO Response to Plant**	300#
G.E.	No ERF Activation - No ERO Response to Plant**	400#
NOUE	ERF Activation - Use Your NORMAL Route to Plant	111#
ALERT	ERF Activation - Use Your NORMAL Route to Plant	211#
SAE	ERF Activation - Use Your NORMAL Route to Plant	311#
G.E.	ERF Activation - Use Your NORMAL Route to Plant	411#
ALERT	ERF Activation - Use SOUTH Access Road to Plant	212#
SAE	ERF Activation - Use SOUTH Access Road to Plant	312#
G.E.	ERF Activation - Use SOUTH Access Road to Plant	412#
ALERT	ERF Activation - Use NORTH Access Road to Plant	213#
SAE	ERF Activation - Use NORTH Access Road to Plant	313#
G.E.	ERF Activation - Use NORTH Access Road to Plant	413#

** These codes should only be used if current conditions could potentially affect the safety of the ERO responders. An on-the-fly message is required to explain the conditions to the ERO. As soon as conditions no longer pose a personnel safety issue, the Automated Notification System shall be re-activated with the appropriate code requiring activation of the emergency response facilities.©

NOTE - This section is not necessary if the CNS Automated Notification System is operational.

The steps listed under Voice mail Message Preparation are for those events where Emergency responders need to be provided more specific information prior to arrival at CNS. This information can be recorded on Voice mail for their retrieval when they call back in response to a page.

Voice mail Message Preparation:

1. Dial **5200** (Voice Mail).
2. Enter mailbox number, **5522 and #.**
3. Enter password, **5522 and #.**
4. Enter **8, 2** (Mailbox Greeting).
5. Enter **1** (External Greeting).
6. Enter **2**, wait until end of greeting.
7. Enter **5** (record command).
8. **Read** information on classification etc., (above) as an addition to the external greeting.
9. Enter **#** when completed.
10. Enter **8, 3** (Exits Voice Mail).

To Activate ALL ERO Pagers

NOTE - Be sure to obtain the Caller Password which is located in a sealed envelope in the Shift Supervisor's Cubicle before attempting to activate the pagers.

1. Dial (402) 633-0469 on any telephone.
2. When prompted by the computer voice, enter the caller password listed in the sealed envelope.
3. Enter "numeric message" when prompted by the computer voice.

   - The numeric message includes a three digit informational code (Scenario ID Number located in Attachment 4) and a seven digit telephone call-back number.

   Example: 211 825-5522 - This represents an ALERT with TSC/OSC/EOF activation required and responders instructed to drive to CNS using the route they would normally drive.

   - The telephone number is a Voice Mail address to provide additional information (if necessary) and verify pager carriers received the page and are responding.

4. You may hang up after hearing the message, "Thank you for using ATS".
5. ERO management will check the voice mailbox during facility activation to verify ERO response.

1. DISCUSSION

1.1 All notifications and communications will be handled from the Control Room (CR) until the Technical Support Center (TSC) and Emergency Operations Facility (EOF) are activated. The responsibility of generating press releases to the media may be transferred to NPPD Corporate Communications Department Personnel prior to activation of the Joint Information Center (JIC).

1.2 During a declared Emergency at CNS, Emergency notifications to the State of Nebraska; State of Missouri; Atchison County, Missouri; and Nemaha County, Nebraska are accomplished through the State Notification Telephone System. The CNS State Notification Telephone System is a conference-calling system. When the handset to this hotline is picked up, and the "Group Call" button is pushed, dedicated telephones will automatically ring at Nebraska State Patrol, Missouri State Patrol, Atchison County Sheriff's Department, and Nemaha County Sheriff's Department. The utilization of law enforcement agencies as initial points of contact provides for 24 hour coverage. The dedicated lines listed also have extension lines which ring at the following facilities respectively: Nebraska State Civil Defense EOC, Missouri State Emergency Management EOC, Atchison County EOC, and Nemaha County EOC. Once the EOCs become operational, notifications may be made using the extension lines at the EOCs with concurrence between the respective EOC and law enforcement agency.

1.3 Notifications to the NRC are normally accomplished through the Emergency Notification System (ENS). The Emergency Notification System is a dedicated telephone system which is manned 24 hours by the Duty Officer at the NRC Headquarters Operations Center.

1.4 During any notification activity, if the primary communications system fails, communication methods shall be attempted such as alternate telephones, National Warning System (NAWAS), base station radio, or relay through a third party. Alternate telephone numbers are listed in the Emergency Telephone Directory.

1.5 Initial Notification - First notification made to responsible state and local governmental agencies after declaration of one of the emergency classes.

1.5.1 If the emergency classification escalates, state and local notifications of the higher classification shall be considered as Initial Notifications, and must be completed within 15 minutes.

1.6 Follow-Up Notification - Notifications made to responsible state and local governmental agencies following any initial notification, which provides additional emergency information.

1.6.1 Follow-up notifications are required at least every 60 minutes during an alert or higher classification. Under certain situations a follow-up notification should be under the same time constraints as an initial notification. For example, significant change in release rate (classification change), change in Protective Action Recommendations (PARs), or changes in meteorological conditions that could effect dose assessment results.©

1.7 Notification of Termination - Notification of responsible state and local governmental agencies of termination of the emergency.

2. REFERENCES

2.1 CODES AND STANDARDS

2.1.1 10CFR50.

2.1.2 NPPD Emergency Plan for CNS.

2.2 PROCEDURES

2.2.1 Conduct of Operations Procedure 2.0.5, Shift Communicator Responsibility.

2.2.2 Emergency Plan Implementing Procedure 5.7.1, Emergency Classification.

2.2.3 Emergency Plan Implementing Procedure 5.7.22, Communications.

2.2.4 CNEP-1.0.

2.3 MISCELLANEOUS

2.3.1 QA Report 86-06.

2.3.2 NRC Inspection Report 89-35, Item 1.

2.3.3 NCR 93-52.

2.3.4 QA Observation 93-05A.

2.3.5 NRC Inspection Report 94-11.

2.3.6 NRC Inspection Report 94-29, Item 1.

2.3.7 CNS Emergency Telephone Directory.

2.4 NRC COMMITMENTS

2.4.1 © NRC Inspection Report 92-14. Commitment affects Steps 6.1.2.1 and 6.2.1.1.

2.4.2 © NRC Inspection Report 98-12 (NLS980074-05 and NLS980074-06). Commitments affect Step 1.6.1 on Attachment 6 and Attachment 4 footnote.

CNS OPERATIONS MANUAL EPIP PROCEDURE 5.7.9 ACTIVATION OF EOF	USE: REFERENCE ⊛ EFFECTIVE: 6/28/01 APPROVAL: SORC OWNER: R. L. ZIPFEL DEPARTMENT: EP

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1. PURPOSE

[ ] 1.1 This procedure describes the sequence of events and requirements for the activation of the Emergency Operations Facility (EOF) in the event of an ALERT or higher classification.

[ ] 1.2 The topics addressed are:

[ ] 1.2.1 Functions of the EOF and its interface with both on-site and off-site emergency organizations.

[ ] 1.2.2 Activation criteria, including a roster of personnel and their associated responsibilities.

2. PRECAUTIONS AND LIMITATIONS

[ ] 2.1 Upon activation of the EOF, ensure Security is upgraded to allow access to only those personnel assigned to this facility.

[ ] 2.2 If Area Radiation Monitor or Continuous Air Monitor alarms, an area habitability survey should be conducted.

[ ] 2.3 In the event that the environment in the EOF becomes uninhabitable, or 12.5 KV power is lost, EOF personnel will be evacuated to the AEOF.

[ ] 2.4 The EOF shall be activated within ~ 1 hour of declaration of an ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY declaration.

3. ACTIVATION AND OPERATION OF THE EOF

[ ] 3.1 Upon declaration of an ALERT or higher classification, EOF personnel shall report to the EOF. ERO positions assigned a Positional Instruction Manual (PIM), as defined below, shall obtain their PIM when reporting to the EOF and follow instructions contained within. The responsibilities of EOF ERO personnel are as follows:

[ ] 3.1.1 Emergency Director is responsible for:

[ ] 3.1.1.1 In all accident classifications, the Emergency Director is in charge of the Emergency Response Organization. He is the individual assigned the authority and responsibility to immediately and unilaterally initiate emergency response actions. The Emergency Director may <u>not</u> delegate the following:

[ ] a. Event declaration.

[ ] b. The decision to notify authorities responsible for off-site emergency measures.

[ ] c. The recommendation of protective actions to authorities responsible for off-site emergency measures.

[ ] 3.1.1.2 Verifying NPPD on-site and off-site emergency response functions are being performed in a timely manner.

[ ] 3.1.1.3 Ensuring adequate technical and logistical support is available to the station emergency organization.

[ ] 3.1.1.4 Ensuring continuity of emergency response resources.

[ ] 3.1.1.5 Ensuring interface functions between NPPD and governmental organizations are being properly executed per the respective Emergency Plans.

[ ] 3.1.2 EOF Director is responsible for:

[ ] 3.1.2.1 Ensuring the EOF provides the necessary off-site support to the CNS response organization.

[ ] 3.1.2.2 Ensuring contact with federal, state, and local officials is made to inform them of the current situation at CNS.

[ ] 3.1.2.3 Ensuring communications are established between the EOF, TSC, Control Room, and the Joint Information Center (JIC).

[ ] 3.1.2.4 Providing guidance to the Radiological Control Technical Information Coordinator and other key members of the EOF Staff and to inform the Emergency Director of significant activities in the EOF.

[ ] 3.1.3 Radiological Control Manager is responsible for:

[ ] 3.1.3.1 Directing the activities of the Radiological Assessment Supervisor, off-site survey teams, and the site boundary survey team (outside the Protected Area).

[ ] 3.1.3.2 Ensuring dose assessment is performed.

[ ] 3.1.3.3 Providing assistance to the Emergency Director in the formulation of Protective Action Recommendations.

[ ] 3.1.3.4 Monitoring radiological conditions and advising the Emergency Director on when to issue Potassium Iodide (KI).

[ ] 3.1.3.5 Interfacing with appropriate state and local dose assessment groups.

[ ] 3.1.4 Operations/EOP Advisor is responsible for:

[ ] 3.1.4.1 Providing technical assistance and operational information to the Emergency Director and/or EOF Director.

[ ] 3.1.4.2 Monitoring plant conditions in regard to EALs. Recommends changes in emergency classification to Emergency Director if warranted.

[ ] 3.1.4.3 Providing assistance to the Emergency Director in the formulation of Protective Action Recommendations.

[ ] 3.1.4.4 Monitoring event mitigation activities with respect to EOPs. Provides current and future status of EOP implementation.

[ ] 3.1.4.5 Assisting the Technical Information Coordinator by reviewing technical information for transmission to the JIC.

[ ] 3.1.5 Emergency Preparedness Coordinator is responsible for:

[ ] 3.1.5.1 Assisting with activation of the Emergency Response Facilities.

[ ] 3.1.5.2 Ensuring ERO personnel are performing their duties as defined by the appropriate EPIPs.

[ ] 3.1.6 Off-site Communicator is responsible for gathering and disseminating information to appropriate off-site agencies per the EPIPs.

[ ] 3.1.7 Radiological Assessment Supervisor is responsible for:

[ ] 3.1.7.1 Developing Protective Action Recommendations.

[ ] 3.1.7.2 Coordinating the activities of the Field Monitoring Teams.

[ ] 3.1.8 Logistics Coordinator is responsible for:

[ ] 3.1.8.1 Assisting in obtaining additional off-site support:

[ ] a. Personnel.

[ ] b. Equipment.

[ ] c. Arrange for specialized contractor assistance as required. Arrange for training of contractor personnel. Use CNS and Corporate resources to carry out these responsibilities (i.e., GE, Burns & Roe, INPO, etc.).

[ ] d. Developing a 24 hour schedule for EOF personnel.

[ ] e. Ensure financial support is available to the EOF. POs EP1001 through EP1050 are approved for use.

[ ] 3.1.8.2 Food/lodging/transportation support.

[ ] 3.1.9 Dose Assessment Coordinator is responsible for assisting the Radiological Assessment Supervisor by maintaining status boards and coordinating dose projections.

[ ] 3.1.10 Field Team Coordinator is responsible for movement and sampling activities of the CNS downwind survey field teams as directed by the Radiological Assessment Supervisor.

[ ] 3.1.11 Technical Information Coordinator is responsible for gathering technical information to be transmitted to the JIC.

[ ] 3.1.12 Clerical Coordinator is responsible for ensuring sufficient clerical support exists in the EOF to adequately support EOF personnel.

[ ] 3.1.13 Dose Assessment Clerk is responsible for operating the dose assessment model.

[ ] 3.1.14 EOF Logkeeper is responsible for maintaining EOF log.

[ ] 3.1.15 EOF Radiation Protection Pool Personnel are responsible for:

[ ] 3.1.15.1 Conducting plume-tracking activities.

[ ] 3.1.15.2 Performing in-field sampling activities as requested.

[ ] 3.1.15.3 Habitability surveys in the EOF as directed by the Radiological Assessment Supervisor.

4. EVACUATION OF EOF

[ ] 4.1 In the event the EOF must be evacuated, responsibilities will be formally turned over to the TSC.

[ ] 4.2 Evacuation of EOF to AEOF shall be conducted using Procedures 5.7.9.1, 5.7.11, and 5.7.13 as guidelines.

1. DISCUSSION

1.1 FUNCTIONS OF EOF

1.1.1 Provides overall off-site management of NPPD emergency response and resources.

1.1.2 Provides coordination of off-site radiological assessment and recommendations for the protection of the public.

1.1.3 Provides coordination of off-site emergency response activities with Local, State, and Federal organizations.

1.1.4 Provides guidance and instructions to Off-Site Radiological Emergency Survey Teams.

1.1.5 Disseminates emergency status information to the Joint Information Center (JIC).

1.2 The EOF is located adjacent to the Security Building outside the Protected Area.

1.3 If emergency conditions dictate relocation from the EOF, emergency evaluation and coordination activities will be accomplished from the Alternate Emergency Operations Facility (AEOF). The AEOF is located in the town of Auburn, Nebraska, housed in the former Auburn National Guard Armory. Activation of the AEOF shall be accomplished per Procedure 5.7.9.1.

1.4 STAFFING OF EOF

1.4.1 Positional Instruction Manuals (PIMs) contain positional checklists for the activation and operation of the EOF. PIMs are numbered and controlled by the Emergency Preparedness Department, labeled by ERO position, and are located in the EOF.

1.4.1.1 The EOF is staffed with the following personnel:

a. *Emergency Director - PIM #01.

b. *EOF Director - PIM #02.

c. *Radiological Control Manager - PIM #03.

d. Operations/Emergency Operating Procedure Advisor - PIM #04.

e. Emergency Preparedness Coordinator - PIM #05.

f. *Off-Site Communicator - PIM #06.

g. *Radiological Assessment Supervisor - PIM #07.

h. Logistics Coordinator - PIM #08.

i. Dose Assessment Coordinator - PIM #09.

j. Technical Information Coordinator - PIM #10.

k. Clerical Coordinator - PIM #12.

l. Dose Assessment Clerk - PIM #13.

m. EOF Logkeeper - PIM #14.

n. EOF RP Pool - PIM #16.

o. Down Wind Driver - PIM #17

p. Field Team Coordinator - PIM #18.

* Minimum staff required for activation.

2. REFERENCES

2.1 CODES AND STANDARDS

2.1.1 NPPD Emergency Plan for CNS.

2.1.2 NUREG 0654, Revision 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.

2.2 PROCEDURES

2.2.1 Emergency Plan Implementing Procedure 5.7.1, Emergency Classification.

2.2.2 Emergency Plan Implementing Procedure 5.7.9.1, Activation of Alternate EOF.

2.2.3 Emergency Plan Implementing Procedure 5.7.11, Evacuation of Non-Essential Site Personnel.

2.2.4 Emergency Plan Implementing Procedure 5.7.13, Personnel Monitoring and Decontamination.

2.2.5 Emergency Plan Implementing Procedure 5.7.21, Emergency Equipment Inventory.

2.2.6 Emergency Plan Implementing Procedure 5.7.22, Communications.

2.3 MISCELLANEOUS

2.3.1 QA Audit 86-06.

2.3.2 NRC Inspection Report 89-35.

2.3.3 NRC Inspection Report 92-14, Accident Management Techniques.

2.3.4 QA Audit 93-05.

CNS OPERATIONS MANUAL EPIP PROCEDURE 5.7.9 ACTIVATION OF EOF	USE: REFERENCE ⊛ EFFECTIVE: 6/28/01 APPROVAL: SORC OWNER: R. L. ZIPFEL DEPARTMENT: EP

1. PURPOSE

[ ] 1.1 This procedure describes the sequence of events and requirements for the activation of the Emergency Operations Facility (EOF) in the event of an ALERT or higher classification.

[ ] 1.2 The topics addressed are:

[ ] 1.2.1 Functions of the EOF and its interface with both on-site and off-site emergency organizations.

[ ] 1.2.2 Activation criteria, including a roster of personnel and their associated responsibilities.

2. PRECAUTIONS AND LIMITATIONS

[ ] 2.1 Upon activation of the EOF, ensure Security is upgraded to allow access to only those personnel assigned to this facility.

[ ] 2.2 If Area Radiation Monitor or Continuous Air Monitor alarms, an area habitability survey should be conducted.

[ ] 2.3 In the event that the environment in the EOF becomes uninhabitable, or 12.5 KV power is lost, EOF personnel will be evacuated to the AEOF.

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[ ] a. Event declaration.

[ ] b. The decision to notify authorities responsible for off-site emergency measures.

[ ] c. The recommendation of protective actions to authorities responsible for off-site emergency measures.

[ ] 3.1.1.2 Verifying NPPD on-site and off-site emergency response functions are being performed in a timely manner.

[ ] 3.1.1.3 Ensuring adequate technical and logistical support is available to the station emergency organization.

[ ] 3.1.1.4 Ensuring continuity of emergency response resources.

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[ ] 4.2 Evacuation of EOF to AEOF shall be conducted using Procedures 5.7.9.1, 5.7.11, and 5.7.13 as guidelines.

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1.1.5 Disseminates emergency status information to the Joint Information Center (JIC).

1.2 The EOF is located adjacent to the Security Building outside the Protected Area.

1.3 If emergency conditions dictate relocation from the EOF, emergency evaluation and coordination activities will be accomplished from the Alternate Emergency Operations Facility (AEOF). The AEOF is located in the town of Auburn, Nebraska, housed in the former Auburn National Guard Armory. Activation of the AEOF shall be accomplished per Procedure 5.7.9.1.

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d. Operations/Emergency Operating Procedure Advisor - PIM #04.

e. Emergency Preparedness Coordinator - PIM #05.

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h. Logistics Coordinator - PIM #08.

i. Dose Assessment Coordinator - PIM #09.

j. Technical Information Coordinator - PIM #10.

k. Clerical Coordinator - PIM #12.

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m. EOF Logkeeper - PIM #14.

n. EOF RP Pool - PIM #16.

o. Down Wind Driver - PIM #17

p. Field Team Coordinator - PIM #18.

* Minimum staff required for activation.

2. REFERENCES

2.1 CODES AND STANDARDS

2.1.1 NPPD Emergency Plan for CNS.

2.1.2 NUREG 0654, Revision 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.

2.2 PROCEDURES

2.2.1 Emergency Plan Implementing Procedure 5.7.1, Emergency Classification.

2.2.2 Emergency Plan Implementing Procedure 5.7.9.1, Activation of Alternate EOF.

2.2.3 Emergency Plan Implementing Procedure 5.7.11, Evacuation of Non-Essential Site Personnel.

2.2.4 Emergency Plan Implementing Procedure 5.7.13, Personnel Monitoring and Decontamination.

2.2.5 Emergency Plan Implementing Procedure 5.7.21, Emergency Equipment Inventory.

2.2.6 Emergency Plan Implementing Procedure 5.7.22, Communications.

2.3 MISCELLANEOUS

2.3.1 QA Audit 86-06.

2.3.2 NRC Inspection Report 89-35.

2.3.3 NRC Inspection Report 92-14, Accident Management Techniques.

2.3.4 QA Audit 93-05.

CNS OPERATIONS MANUAL EPIP PROCEDURE 5.7.17 DOSE ASSESSMENT	USE: REFERENCE ⊛ EFFECTIVE: 7/2/01 APPROVAL: SORC OWNER: R. L. ZIPFEL DEPARTMENT: EP

OPERATOR AID 00-03

1. PURPOSE

[ ] 1.1 This procedure provides a means of dose projection based on meteorological and radiological conditions using the CNS-DOSE Computer Program.

[ ] 1.2 This procedure provides a manual backup method for Step 1.1.

[ ] 1.3 This procedure provides a method for rapid gross estimation of core damage based on in-containment high range radiation monitor readings for primary containment LOCA events.

2. PRECAUTIONS AND LIMITATIONS

[ ] 2.1 Actual dose rates will vary as a function of:

[ ] 2.1.1 The total curies released.

[ ] 2.1.2 Release rate.

[ ] 2.1.3 The duration of the release.

[ ] 2.1.4 The isotopic mixture of the release.

[ ] 2.1.5 Meteorological conditions.

[ ] 2.2 Update and refine dose calculations upon significant changes in one or more of the above parameters.

[ ] 2.3 Should a release occur which necessitates rapid decision making concerning the recommendation of protective actions, the guidance contained in Procedure 5.7.20 should be followed.

[ ] 2.4 Attachment 7 should be used to estimate core damage only in cases where the high range in-containment radiation monitors are exposed to coolant or steam (i.e., only for primary containment LOCA situations). For other accident sequences, utilize the Post-Accident Sampling System (PASS) and Core Damage Assessment Program (CORDAM).

3. REQUIREMENTS

[ ] 3.1 Ensure following equipment and materials are available, as needed:

[ ] 3.1.1 COMPUTERIZED DOSE PROJECTION (CNS-DOSE)

[ ] 3.1.1.1 Computer terminals.

[ ] 3.1.1.2 Computer printers.

[ ] 3.1.2 MANUALLY CALCULATED DOSE PROJECTION

[ ] 3.1.2.1 Environs map.

[ ] 3.1.2.2 χ/Q isopleths.

[ ] 3.1.2.3 Scientific calculator.

[ ] 3.2 A release of airborne radioactive material has occurred or has the potential of occurring.

[ ] 3.3 Release Rate Determinations shall be conducted using Procedure 5.7.16 when KAMAN monitors are inoperable.

[ ] **NOTE 1** - When PMIS data used by CNS-DOSE is unavailable or "unhealthy", refer to Attachment 5 for alternate sources of data.

[ ] **NOTE 2** - If the user is not familiar with the use of PMIS, Attachment 6 is referred to for detailed instructions on access and selected use of PMIS.

4. COMPUTER DOSE PROJECTION (CNS-DOSE)

[ ] 4.1 To start the dose projection program on a PMIS terminal, enter the turn-on code "DOSE" on a terminal logged into either the Primary or Backup System.

[ ] 4.2 The dose projection program can also be run on a non-PMIS terminal. However, this is reserved for personnel having access to an account on the computer and familiar with its use. To start the dose projection program on a non-PMIS terminal, on either PMIS computer, login to an account that has privileges to run PMIS software and run program [NPPD.EXECUTE]NPDOSEZ.

[ ] 4.3 Each time the program is started or the "New Sample" option is selected, new data will be loaded into the program. Verify that Field 1 correctly indicates the origin of the release and the data displayed is "healthy" and correct.

[ ] 4.4 Estimate the duration of release (consult with Operations and/or Engineering for this time estimate) in hours. If the estimated duration of release cannot be determined, use the 4 hour default value.

[ ] 4.5 Determine if SGT is in the effluent stream and if it is functional. Consult with Radiological, Operations, and Engineering personnel for this determination, if available.

[ ] **NOTE** - The Iodine to Noble Gas ratio is very dependent on the answer to the core degraded question and has a significant impact on the resultant dose projection calculations. The core is considered to be degraded if any of the listed conditions are met OR if they were met and have subsequently dropped below the condition threshold. The answer to the core degraded question is coordinated between Radiological Protection, Chemistry, Operations, and Engineering, if available.

[ ] 4.6 Determine if the core is degraded (fuel cladding loss) as indicated by any of the following conditions:

[ ] 4.6.1 SJAE reading $\geq$ 15,000 mrem/hr.

[ ] 4.6.2 Reactor Coolant Sample > 300 μCi/gm Dose Equivalent I-131.

[ ] 4.6.3 Primary Containment Monitor (Drywell Hi-range Radiation Monitor) reading > 2500 Rem/hr.

[ ] 4.6.4 Reactor water level below 0" FZ (Fuel Zone).

[ ] 4.6.5 Indication of fuel overheat.

[ ] 4.7 DETERMINE IF RELEASE BYPASSES SECONDARY CONTAINMENT

[ ] 4.7.1 If release bypasses secondary containment (i.e., direct venting of drywell or a release from the Turbine Building), then enter Y.

[ ] 4.7.2 If release does not bypass secondary containment, then enter N.

[ ] 4.8 Make corrections or changes, as necessary.

[ ] 4.9 Use the ENTER key to accept data and move to the next field.

[ ] 4.10 Press the RESULTS option to display the dose projections.

[ ] 4.11 Select either the PRINT or HARD COPY option to make a hard copy of the results.

[ ] 4.12 Select the "New Sample" or "Edit" option to return to the previous display and obtain new data or make additional changes.

[ ] 4.13 Exit the program by entering "Q" or pressing the "CANC" key on PMIS terminals.

[ ] 4.14 Select the "Help" option for additional program operational information.

5. HAND-CALCULATED DOSE PROJECTION (CENTERLINE)

[ ] **NOTE** - This method reflects the methodology used in the CNS-DOSE Program. It gives only downwind dose values for plume centerline at distances of 1, 2, 5, and 10 miles from the site. For calculating doses at specific receptor locations, the method in Section 7 is used.

[ ] 5.1 Obtain release rate from effluent KAMAN monitor digital readout in µCi/sec and record value in Block 1 on Attachment 3. If KAMAN is inoperable, complete appropriate attachment of Procedure 5.7.16 and record the noble gas release rate value (µCi/sec) in Block 1 on Attachment 3.

[ ] **NOTE** - The answer to the question concerning the status of the Standby Gas Treatment System has a significant impact on the resultant dose projection calculation. The answer to this question is coordinated with Radiological, Operations, and Engineering personnel, if available.©

[ ] 5.2 Determine if SGT is in the effluent stream.

[ ] 5.2.1 If SGT is in the effluent stream, enter 0.01 in Block 2 of Attachment 3.

[ ] 5.2.2 If SGT is not in the effluent stream, enter 1 in Block 2 of Attachment 3.

[ ] **NOTE** - The Iodine to Noble Gas ratio is very dependent on the answer to the core degraded question and has a significant impact on the resultant dose projection calculations. The core is considered to be degraded if any of the listed conditions are met OR if they were met and have subsequently dropped below the condition threshold. The answer to the core degraded question is coordinated between Radiological Protection, Chemistry, Operations, and Engineering, if available.

[ ] 5.3 Determine if the core is degraded (fuel cladding loss) as indicated by any of the following conditions:

[ ] 5.3.1 SJAE reading ≥ 15,000 mrem/hr.

[ ] 5.3.2 Reactor Coolant Sample > 300 μCi/gm Dose Equivalent I-131.

[ ] 5.3.3 Primary Containment Monitor (Drywell Hi-range Radiation Monitor) reading > 2500 Rem/hr.

[ ] 5.3.4 Reactor water level below 0" FZ (Fuel Zone).

[ ] 5.3.5 Indication of fuel overheat.

[ ] 5.3.6 If core is degraded, obtain the Iodine to Noble Gas ratio from Table 1 of Attachment 3 and enter that value in Block 3 of Attachment 3.

[ ] 5.3.7 If core is not degraded, enter 1.86E-7 in Block 3 of Attachment 3.

[ ] 5.4 Obtain the Noble Gas energy factor (MeV/dis) based on time since reactor shutdown in hours from Table 2 on Attachment 3 and enter this value in Block 4 on Attachment 3.

[ ] 5.5 Obtain the wind speed in miles per hour (mph) from PMIS or MET recorders in the Computer Room and record the value in Block 5 of Attachment 3.

[ ] 5.5.1 If the release is from the ERP, use wind speed at the 100 meter level. Default is 13 mph.

[ ] 5.5.2 If the release is from any other source, use the wind speed at the 10 meter level. Default is 8 mph.

[ ] 5.6 Determine the atmospheric stability class (A→G) from PMIS or the MET System and record in Block 6 on Attachment 3. If the stability class cannot be obtained from PMIS or Met System, use D as the default value and record this in Block 6 of Attachment 3.

[ ] 5.7 DETERMINE IF RELEASE BYPASSES SECONDARY CONTAINMENT

[ ] 5.7.1 If release bypasses secondary containment (for example, direct venting of drywell or a release from the Turbine Building), then enter 1 in Block 7 on Attachment 3.

[ ] 5.7.2 If release does not bypass secondary containment, then enter 0.5 in Block 7 on Attachment 3.

[ ] 5.8 Obtain TEDE Noble Gas Dose Conversion Factor from Table 3 of Attachment 3 and record in Block 8 on Attachment 3.

[ ] 5.9 Obtain TEDE Iodine Dose Conversion Factor from Table 3 of Attachment 3 and record in Block 9 on Attachment 3.

[ ] 5.10 Obtain CDE Iodine Dose Conversion Factor from Table 3 of Attachment 3 and record in Block 10 on Attachment 3.

[ ] 5.11 Compute TEDE "sub-calculation" value and record in Block 11 of Attachment 3.

$$\frac{[(\text{Block 1})(\text{Block 4})(\text{Block 8})] + [(\text{Block 1})(\text{Block 2})(\text{Block 3})(\text{Block 7})(\text{Block 9})]}{(\text{Block 5})}$$

[ ] 5.12 Using the appropriate release point (ERP or other) and stability class (Block 6), obtain the mixing factors (χ/Qs) for distances 1, 2, 5, and 10 miles from Table 4 on Attachment 3 and record in Block 12 of Attachment 3.

[ ] 5.13 Compute the TEDE dose rate for each distance and record values in Block 13 on Attachment 3.

(Block 11) x (Block 12)

[ ] 5.14 Estimate the duration of the release (consult with Operations and/or Engineering for this time estimate) in hours and record value in Block 14 on Attachment 3. If the estimated duration of release cannot be determined, use 4 hours as a default value.

[ ] 5.15 Compute integrated TEDE doses for each distance and record values in Blocks 15 on Attachment 3.

(Block 13) x (Block 14)

[ ] 5.16 Compute CDE "sub-calculation" value and record in Block 16 of Attachment 3.

$$\frac{\text{(Block 1)(Block 2)(Block 3)(Block 7)(Block 10)}}{\text{(Block 5)}}$$

[ ] 5.17 Compute the CDE dose rate for each distance and record values in Block 17 on Attachment 3.

(Block 16) x (Block 12)

[ ] 5.18 Compute the CDE dose for each distance and record values in Block 18 on Attachment 3.

(Block 17) x (Block 14)

[ ] 5.19 Refer to Procedure 5.7.1 to determine if an emergency should be declared due to radiological effluent (dose rate or integrated dose to a member of the public) calculated at or beyond 1 mile.

[ ] 5.20 Refer to Procedure 5.7.20 to determine if any protective action recommendations should be made to off-site authorities.

[ ] 5.21 Recalculate dose projections whenever conditions change significantly.

[ ] 5.22 Record name, time, and date at the bottom of Attachment 3.

6. HAND-CALCULATED DOSE PROJECTION (NON-CENTERLINE)

[ ] 6.1 Obtain release rate from effluent KAMAN monitor digital readout in μCi/sec and record value in Block 1 on Attachment 1. If KAMAN is inoperable, complete appropriate attachment of Procedure 5.7.16 and record the noble gas release rate value (μCi/sec) in Block 1 on Attachment 1.

[ ] **NOTE** - The answer to the question concerning the status of the Standby Gas Treatment System has a significant impact on the resultant dose projection calculation. The answer to this question is coordinated with Radiological, Operations, and Engineering personnel, if available.

[ ] 6.2 Determine if SGT is in the effluent path.

[ ] 6.2.1 If SGT is in effluent path, enter 0.01 in Block 2 on Attachment 1.

[ ] 6.2.2 If SGT is not in effluent path, enter 1 in Block 2 on Attachment 1.

[ ] **NOTE** - The Iodine to Noble Gas ratio is very dependent on the answer to the core degraded question and has a significant impact on the resultant dose projection calculations. The core is considered to be degraded if any of the listed conditions are met OR if they were met and have subsequently dropped below the condition threshold. The answer to the core degraded question is coordinated between Radiological Protection, Chemistry, Operations, and Engineering, if available.

[ ] 6.3 Determine if the core is degraded (fuel cladding loss) as indicated by any of the following conditions:

[ ] 6.3.1 SJAE reading ≥ 15,000 mrem/hr.

[ ] 6.3.2 Reactor Coolant Sample > 300 μCi/gm Dose Equivalent I-131.

[ ] 6.3.3 Primary Containment Monitor (Drywell Hi-range Radiation Monitor) reading > 2500 Rem/hr.

[ ] 6.3.4 Reactor water level below 0" FZ (Fuel Zone).

[ ] 6.3.5 Indication of fuel overheat.

[ ] 6.3.6 If core is degraded, obtain the Iodine to Noble Gas ratio from Table 1 of Attachment 1 and enter that value in Block 3 on Attachment 1.

[ ] 6.3.7 If core is not degraded, enter 1.86E-07 in Block 3 on Attachment 1.

[ ] 6.4 Determine the energy factor (MeV/dis) based on time since reactor shutdown in hours and Table 2 on Attachment 1, and enter value in Block 4 on Attachment 1.

[ ] 6.5 Obtain the wind speed in miles per hour (mph) from PMIS or MET recorders in the Computer Room and record the value in Block 5 on Attachment 1.

[ ] 6.5.1 If the release is from the ERP, use wind speed at the 100 meter level. Default is 13 mph.

[ ] 6.5.2 If the release is from any other source, use the wind speed at the 10 meter level. Default is 8 mph.

[ ] 6.6 Determine the wind direction (from) in degrees from PMIS, MET, or direct observation and record in Block 6 on Attachment 1.

[ ] 6.7 Determine the atmospheric stability class (A→G) from PMIS or the MET System and record in Block 7 on Attachment 1. If the stability class cannot be obtained from the PMIS or MET System, use D as the default.

[ ] 6.8 DETERMINE IF RELEASE BYPASSES SECONDARY CONTAINMENT

[ ] 6.8.1 If the release bypasses secondary containment (for example direct venting of the drywell or a release from the Turbine Building), then enter 1 in Block 8 on Attachment 1.

[ ] 6.8.2 If the release does not bypass secondary containment, then enter 0.5 in Block 8 on Attachment 1.

[ ] 6.9 Obtain TEDE Noble Gas Dose Conversion Factor from Table 3 of Attachment 1 and record in Block 9 on Attachment 1.

[ ] 6.10 Obtain TEDE Iodine Dose Conversion Factor from Table 3 of Attachment 1 and record in Block 10 on Attachment 1.

[ ] 6.11 Obtain CDE Iodine Dose Conversion Factor from Table 3 of Attachment 1 and record in Block 11 on Attachment 1.

[ ] 6.12 Obtain the mixing factor (χ/Q) for the receptor point or location.

[ ] 6.12.1 Record location or receptor point ID at the top of Attachment 1.

[ ] 6.12.2 Obtain the proper χ/Q isopleth overlay based on stability class and release point.

[ ] 6.12.2.1 Overlays are available in the TSC or EOF for both elevated and ground level releases for each stability class. Use ground level isopleths for all releases which are not from the ERP.

[ ] 6.12.3 Place the isopleth overlay on an Emergency Planning Zone map scaled to 1" per mile. The preferred map is the "Cooper Nuclear Station 20 Mile Plume Exposure" map with sectors, radii, and wind direction labeled. One is posted in the TSC and EOF.

[ ] 6.12.4 Orient the isopleth overlay so the centerline of the isopleth is over the wind direction radius, the open end of the isopleth is downwind, and the asterisk is over CNS.

[ ] 6.12.5 Lightly mark the desired receptor location on the isopleth with a pencil.

[ ] **NOTE** - All χ/Qs have negative exponents.

[ ] 6.12.6 Using the legend in the lower right hand corner of the isopleth overlay, linearly interpolating as necessary, determine a χ/Q value for the receptor site.

[ ] 6.12.7 Record the χ/Q value in Block 12 on Attachment 1.

[ ] 6.13 Compute TEDE dose rate (rem/hr) and record in Block 13 on Attachment 1.

$$\frac{[(\text{Block 1})(\text{Block 4})(\text{Block 9})]+[(\text{Block 1})(\text{Block 2})(\text{Block 3})(\text{Block 8})(\text{Block 10})]}{(\text{Block 5})} \times (\text{Block 12})$$

[ ] 6.14 Estimate the duration of the release (consult with Operations and/or Engineering for this time estimate) in hours and record the value in Block 14 on Attachment 1. If the estimated duration of release cannot be determined, use 4 hours as a default value.

[ ] 6.15 Compute the integrated TEDE dose (rem) and record in Block 15 on Attachment 1.

(Block 13) x (Block 14)

[ ] 6.16 Compute CDE dose rate (rem/hr) and record in Block 16 on Attachment 1.

$$\frac{(\text{Block 1})(\text{Block 2})(\text{Block 3})(\text{Block 8})(\text{Block 11})}{(\text{Block 5})} \times (\text{Block 12})$$

[ ] 6.17 Compute CDE dose (rem) and record in Block 17 on Attachment 1.

(Block 14) x (Block 16)

[ ] 6.18 Record name, time, and date at the bottom of Attachment 1.

7. CORRELATING OFF-SITE SAMPLE RESULTS WITH DOSE PROJECTIONS©

[ ] **NOTE 1** - This section describes the methodology to be used to correlate CNS-DOSE results (estimated gross iodine concentrations) with gross iodine concentrations sampled in the field.

[ ] **NOTE 2** - This section is to be used by dose assessment personnel in the EOF once field teams have been dispatched and sample results become available.

[ ] **NOTE 3** - Initial dose projections (computer and hand-calculated) are based upon assumed radionuclide concentrations until actual concentrations have been measured. Off-site sample results are used to determine a dose correction factor which may be applied to adjust the CNS-DOSE Program.

[ ] 7.1 CORRECTION FACTOR DETERMINATION USING OFF-SITE SAMPLE DATA

[ ] 7.1.1 Radiological Assessment Coordinator shall:

[ ] 7.1.1.1 Record off-site sample location, time, and gross iodine concentration as determined by field teams in Blocks 1 through 3 on Attachment 4.

[ ] 7.1.1.2 Obtain the CNS-DOSE calculated gross iodine concentration corresponding to the location of the above sample and record in Block 4 on Attachment 4.

[ ] 7.1.1.3 Divide Block 3 by Block 4 to obtain the correction factor (CF) and record the results in Block 5 on Attachment 4.

[ ] 7.1.1.4 Report correction factor to the Radiological Control Manager or Chem/RP Coordinator.

[ ] 7.1.2 Radiological Control Manager or Chem/RP Coordinator shall determine if the correction factor shall be applied to dose projections.

[ ] 7.1.2.1 If correction factor is significant, the Radiological Control Manager or Chem/RP Coordinator may apply the CF to adjust the Iodine/Noble Gas ratio used by CNS-DOSE to verify PARs are adequate. See next section.

[ ] 7.2 APPLYING CORRECTION FACTOR TO CNS-DOSE

[ ] 7.2.1 Apply the correction factor to CNS-Dose using the "Field Adjust" OPTION of CNS-DOSE.

[ ] 7.2.1.1 At the MAIN CNS-DOSE screen, select option "Field Adjust".

[ ] 7.2.1.2 Enter the radius distance from CNS in miles at the prompt (1, 2, 5, and 10 are the only options).

[ ] 7.2.1.3 Enter the gross iodine concentration (in μCi/cc) obtained from the field at the prompt.

[ ] 7.2.1.4 After obtaining new Results from CNS-DOSE, compare new PARs to any PARs previously transmitted to off-site authorities.

[ ] a. If PARs have changed, notify the Emergency Director and, if PARs have become more severe, the Emergency Director shall initiate notification of new PARs to off-site authorities.

[ ] b. If PARs have not changed, periodically perform this portion of the procedure to compare field iodine concentrations with CNS-DOSE calculated iodine concentrations.

8. CORE DAMAGE ESTIMATE USING IN-CONTAINMENT HI-RANGE RADIATION MONITORS

[ ] **NOTE 1** - Attachment 7 is only used for core damage estimates where the in-containment radiation monitors are exposed to coolant or steam (i.e., only for primary containment LOCA situations). For other accident sequences, utilize the Post-Accident Sampling System (PASS) and Core Damage Assessment Program (CORDAM).

[ ] **NOTE 2** - The release from the core may bypass the containment, be retained in the primary system, or not be uniformly mixed. Therefore, a low containment radiation reading does not guarantee a lack of core damage. The levels of damage indicated by the value in Attachment 7 are considered minimum levels unless there are inconsistent monitor readings.

[ ] **NOTE 3** - Inconsistent monitor readings may be due to the uneven mixing in containment (e.g., steam rising to the top of the dome). It may take hours for uniform mixing.

[ ] 8.1 The Chem/RP Coordinator or designee, shall perform following steps to determine an estimate of core damage, if decisions must be made which are based on core conditions and PASS results are not available.

[ ] 8.1.1 Obtain highest in-containment hi-range radiation monitor reading from RMA-RM-40A(B), DRYWELL RAD MONITOR, and record in Block 1 on Attachment 7.

[ ] 8.1.2 Complete the calculations on Attachment 7.

[ ] 8.1.3 Report results to the TSC Director.

ATTACHMENT 1 HAND-CALCULATED DOSE PROJECTION (NON-CENTERLINE)

Location or Receptor ID: _____

(1) Noble Gas Release Rate from KAMAN or 5.7.16 (μCi/Sec)	(2) Release Path through SBGT? Yes = 0.01; No = 1	(3) Iodine/Noble Gas Ratio (from Table 1)	(4) Energy Factor (from Table 2)	(5) Wind Speed (mph) from PMIS or MET Defaults ERP = 13; Other = 8	(6) Wind Direction (° from)	(7) Stability Class Default = D	(8) Secondary Containment Bypassed? No = 0.5; Yes = 1

Conversion Factors (from Table 3)	
TEDE Noble Gas	(9)
TEDE Iodine	(10)
CDE Iodine	(11)

Mixing Factor (from Isopleths)
(12)

TEDE Dose Rate (13): _____ (rem/hr)

Duration (Hours) Default = 4 hrs
(14)

TEDE Dose (rem) (Block 13) x (Block 14)
(15)

CDE Dose Rate (16): _____ (rem/hr)

CDE Dose (rem) (Block 14) x (Block 16)
(17)

Name/Time/Date: _____ / _____ / _____

TABLE 1 - IODINE TO NOBLE GAS RATIO VS. TIME SINCE SHUTDOWN

TIME SINCE SHUTDOWN (hrs)	IODINE/NOBLE GAS RATIO	
	NON-DEGRADED CORE	DEGRADED CORE
$t < 1$	1.86 E-7	2.71 E-1
$1 \leq t < 2$	1.86 E-7	3.57 E-1
$2 \leq t < 4$	1.86 E-7	3.41 E-1
$4 \leq t < 10$	1.86 E-7	2.81 E-1
$10 \leq t < 30$	1.86 E-7	2.30 E-1
$30 \leq t < 100$	1.86 E-7	1.65 E-1
$100 \leq t$	1.86 E-7	1.40 E-1

TABLE 2 - ENERGY FACTORS

TIME SINCE SHUTDOWN (hrs)	ENERGY FACTOR (MeV/dis)
$t < 1$	0.75
$1 \leq t < 2$	0.60
$2 \leq t < 4$	0.40
$4 \leq t < 10$	0.25
$10 \leq t < 30$	0.15
$30 \leq t < 100$	0.09
$100 \leq t$	0.07

TABLE 3 - DOSE CONVERSION FACTORS

	NON-DEGRADED CORE	DEGRADED CORE
TEDE Noble Gas	1.48 E-3	9.19 E-4
TEDE Iodine	8.77 E-2	2.98 E-2
CDE Iodine	2.04 E 0	4.96 E-1

ATTACHMENT 2	TRANSIT TIMES AND EFFECTIVE AGES OF NOBLE GASES AT RECEPTOR SITES

1. Effective Age is defined as time elapsed (hrs) since shutdown. For off-site locations, the effective age of the isotopic mixture may be obtained through summarizing following components:

[ ] 1.1 The effective age at the time of release onset.

[ ] 1.2 The transit time from the release point to the receptor site (refer to Section 2 below).

2. CALCULATION OF TRANSIT TIME FROM THE RELEASE POINT TO THE RECEPTOR LOCATION

[ ] 2.1 Estimate the downwind distance (miles) to the receptor location.

[ ] 2.2 Divide the distance in miles by the 100m meter level wind speed (mph) to determine the plume transit time.

(1) RECEPTOR SITE DOWNWIND DISTANCE (miles)	(2) 100 METER LEVEL WIND SPEED (mph)	(3) PLUME TRANSIT TIME (hrs) (1) ÷ (2)

3. DETERMINATION OF EFFECTIVE AGES AT RECEPTOR SITES

(1) EFFECTIVE AGE OF MIXTURE AT TIME OF RELEASE ONSET (hrs)	(2) TRANSIT TIME FROM RELEASE POINT TO RECEPTOR LOCATION (hrs)	(3) EFFECTIVE AGE OF ISOTOPIC MIXTURE AT RECEPTOR LOCATION (hrs) (1) + (2)

Name/Time/Date: _____ / _____ / _____

ATTACHMENT 3 HAND-CALCULATED DOSE PROJECTION (CENTERLINE)

(1) Noble Gas Release Rate from KAMAN or 5.7.16 (µCi/Sec)	(2) Release Path through SBGT? Yes = 0.01; No = 1	(3) Iodine/Noble Gas Ratio (from Table 1)	(4) Energy Factor (MeV/dis) (from Table 2)	(5) Wind Speed (mph) from PMIS or MET Defaults ERP = 13; Other = 8	(6) Stability Class Default = D	(7) Secondary Containment Bypassed? No = 0.5; Yes = 1

Conversion Factors (from Table 3)	
TEDE Noble Gas	(8)
TEDE Iodine	(9)
CDE Iodine	(10)

TEDE Sub-Calculation (11): _____

Mixing Factors (from Table 4)	
1 Mile	(12)
2 Mile	(12)
5 Mile	(12)
10 Mile	(12)

TEDE RATE (rem/hr) (Block 11 x Block 12)	
1 Mile	(13)
2 Mile	(13)
5 Mile	(13)
10 Mile	(13)

Duration (hours) Default = 4 hrs
(14)

TEDE Dose (rem) (Block 13 x Block 14)	
1 Mile	(15)
2 Mile	(15)
5 Mile	(15)
10 Mile	(15)

CDE Sub-Calculation (16): _____

CDE Rate (rem/hr) (Block 16 x Block 12)	
1 Mile	(17)
2 Mile	(17)
5 Mile	(17)
10 Mile	(17)

CDE Dose (rem) (Block 14 x Block 17)	
1 Mile	(18)
2 Mile	(18)
5 Mile	(18)
10 Mile	(18)

Name/Time/Date: _____ / _____ / _____

TABLE 1 - IODINE TO NOBLE GAS RATIO VS. TIME SINCE SHUTDOWN

TIME SINCE SHUTDOWN (hrs)	IODINE/NOBLE GAS RATIO	
	NON-DEGRADED CORE	DEGRADED CORE
$t < 1$	1.86 E-7	2.71 E-1
$1 \leq t < 2$	1.86 E-7	3.57 E-1
$2 \leq t < 4$	1.86 E-7	3.41 E-1
$4 \leq t < 10$	1.86 E-7	2.81 E-1
$10 \leq t < 30$	1.86 E-7	2.30 E-1
$30 \leq t < 100$	1.86 E-7	1.65 E-1
$100 \leq t$	1.86 E-7	1.40 E-1

TABLE 2 - ENERGY FACTORS

TIME SINCE SHUTDOWN (hrs)	ENERGY FACTOR (MeV/dis)
$t < 1$	0.75
$1 \leq t < 2$	0.60
$2 \leq t < 4$	0.40
$4 \leq t < 10$	0.25
$10 \leq t < 30$	0.15
$30 \leq t < 100$	0.09
$100 \leq t$	0.07

TABLE 3 - DOSE CONVERSION FACTORS

	NON-DEGRADED CORE	DEGRADED CORE
TEDE Noble Gas	1.48 E-3	9.19 E-4
TEDE Iodine	8.77 E-2	2.98 E-2
CDE Iodine	2.04 E 0	4.96 E-1

TABLE 4 - PLUME CENTERLINE X/Q'S (MIXING FACTORS)

RELEASE POINT	STABILITY CLASS	A	B	C	D	E	F	G
ERP (ELEVATED)	1 MILE	2.87E-6	6.04E-6	1.17E-5	8.35E-6	1.03E-6	2.35E-11	1.31E-23
	2 MILE	7.94E-7	1.78E-6	4.55E-6	8.21E-6	4.98E-6	8.12E-8	5.62E-13
	5 MILE	1.50E-7	3.42E-7	1.18E-6	3.77E-6	4.66E-6	1.09E-6	5.67E-9
	10 MILE	4.51E-8	1.03E-7	4.58E-7	1.82E-6	3.13E-6	1.44E-6	4.00E-8
OTHER THAN ERP (GROUND LEVEL)	1 MILE	3.01E-6	6.90E-6	1.73E-5	5.10E-5	1.09E-4	3.07E-4	7.67E-4
	2 MILE	8.03E-7	1.84E-6	5.15E-6	1.78E-5	3.86E-5	1.09E-4	2.71E-4
	5 MILE	1.50E-7	3.44E-7	1.21E-6	4.98E-6	1.25E-5	3.52E-5	8.81E-5
	10 MILE	4.51E-8	1.03E-7	4.63E-7	2.07E-6	6.43E-6	1.81E-5	4.52E-5

ATTACHMENT 4	CORRELATING OFF-SITE SAMPLE RESULTS WITH DOSE PROJECTIONS

1. CORRECTION FACTOR DETERMINATIONS USING OFF-SITE SAMPLING DATA

(1) SAMPLE LOCATION	(2) SAMPLE TIME	(3) FIELD GROSS IODINE CONCENTRATION (μCi/cc)	(4) CNS-DOSE IODINE CONCENTRATION 2.(μCi/cc)	(5) CORRECTION FACTOR (CF) (3) ÷ (4)

Name/Time/Date: _____ / _____ / _____

3. Route completed form to Emergency Preparedness Department.

ATTACHMENT 5	METEOROLOGICAL AND RADIOLOGICAL DATA SOURCES FOR CNS-DOSE

NOTE 1 - When the normal source of 100M/60M/10M meteorological data is not available, or is "unhealthy", use the next available "healthy" source in the order of preference of 100M, 60M, 10M.

NOTE 2 - If the user is not familiar with the use of PMIS, Attachment 6 is referred to for detailed instructions on access and selected use of PMIS.

NOTE 3 - The Turn-On-Code "VALUE" is used to display single point values and qualities.

NOTE 4 - The Turn-On-Code "MET" is used to display most meteorological point values and stability classes.

PMIS POINT ID	DESCRIPTION	ALTERNATE SOURCE
MET001	100M LVL SIGMA THETA (15 MIN AVE)	MET Chart Recorder
MET004	100M LVL TEMPERATURE	MET Chart Recorder
MET005	DELTA TEMPERATURE (100M-10M)	MET Chart Recorder
MET006	100M LVL WIND DIR. (15 MIN AVE)	MET Chart Recorder
MET007	100M LVL WIND SPEED (15 MIN AVE)	MET Chart Recorder
MET009	60M LVL SIGMA THETA (15 MIN AVE)	MET Chart Recorder
MET012	60M LVL TEMPERATURE	MET Chart Recorder
MET013	DELTA TEMPERATURE (100M-60M)	MET Chart Recorder
MET014	60M LVL WIND DIR. (15 MIN AVE)	MET Chart Recorder
MET015	60M LVL WIND SPEED (15 MIN AVE)	MET Chart Recorder
MET017	10M LVL SIGMA THETA (15 MIN AVE)	MET Chart Recorder
MET020	10M LVL TEMPERATURE	MET Chart Recorder
MET021	DELTA TEMPERATURE (60M-10M)	MET Chart Recorder
MET023	10M LVL WIND DIR. (15 MIN AVE)	MET Chart Recorder
MET024	10M LVL WIND SPEED (15 MIN AVE)	MET Chart Recorder
MET027	PRECIPITATION (15 MIN PERIOD)	MET Chart Recorder
MET028	10M TWR SIGMA THETA (15 MIN AVE)	MET Chart Recorder
MET029	10M TWR TEMPERATURE	MET Chart Recorder
MET030	10M TWR WIND DIR. (15 MIN AVE)	MET Chart Recorder
MET031	10M TWR WIND SPEED (15 MIN AVE)	MET Chart Recorder
N8000	RX BLDG EFFLUENT FLOW AVE	
N8001	TURB BLDG EFF HI RAD MON AVE	
N8002	TURB BLDG EFF NORM RAD MON AVE	
N8003	TURB BLDG FLOW AVE	
N8004	AOG & RW EFF HI RAD MON AVE	
N8005	AOG & RW EFF NORM RAD MON AVE	
N8006	RX BLDG EFF RAD MON AVE	
N8007	AOG & RW BLDG EFF FLOW AVE	
N8010	ERP HI RAD MON AVE	
N8011	ERP NORMAL RAD MON AVE	
N8012	ERP FLOW AVE	
N8013	SGT FLOW TO ERP AVE	

1. PLANT MANAGEMENT INFORMATION SYSTEM (PMIS)

   1.1 The PMIS System (PMIS) is a set of programs and hardware provided by NPPD that make use of VMS functions and additional peripherals (Data Concentrators) which provides access to plant parameters.

2. PMIS COMPUTERS

   2.1 PMIS computers share a common set of peripherals (disk drives, tape drives, terminals, etc.) and software.

3. VMS OPERATING SYSTEM

   3.1 The VMS Operating System (VMS) is the host operating system for the PMIS computers. It is a set of programs that interface with the computer hardware and peripherals, and allows the computers to recognize and process commands.

4. PMIS MODES

   4.1 PMIS has three operational modes, Primary, Primary/Backup, and Backup, and will operate on either computer in one of the three modes. A computer with PMIS operating in either the Primary or Primary/Backup Mode is referred to as the Primary System and the one with PMIS operating in the Backup Mode is referred to as the Backup System.

   4.2 The Primary and Primary/Backup Modes provide full PMIS capabilities, consisting (in part) of data acquisition and conversion, data display, data archiving, alarm processing, self monitoring, and many other functions that perform specialized calculations and displays.

   4.3 The Backup Mode monitors the Primary System, transfers information necessary to keep the Backup System files and tables up-to-date, and automatically changes to the Primary Mode when a loss of the Primary System is detected (referred to as a FAILOVER). Although many functions are available on the Backup System, their use is discouraged because the lack of real-time data results in the display of inaccurate information (CNS-DOSE is an exception).

5. PMIS ACCESS

5.1 Access to PMIS is gained through various video display terminals, printer/plotters, and printers, including color graphic Information Display Terminals (IDTs) dedicated exclusively for PMIS access in the Control Room, TSC, and EOF.

5.2 The IDTs and printers are selectively connected to either computer through a switching device controlled by PMIS. At system start or during a FAILOVER, all terminals and printers are switched to the Primary System. However, the SWITCH position may be changed at any time after that.

6. SCREEN FORMAT

6.1 When a terminal is under control of PMIS (instead of VMS), the screen display will be in a standard format consisting of four areas, OCA, GGDA, SSA, and FKA.

6.2 The OCA (Operator Communication Area) consists of the top two (one and two lines on the screen. This area is generally used to prompt-for and receive user inputs and display advisory and warning messages. In addition, some displays that require only one or two lines of screen use the OCA for display. Also (though technically not part of the OCA), the current date and time (updated once a second) is displayed at the right side of the screen on lines 1 and 2.

6.3 The GGDA (General and Graphic Display Area) consists of lines 4 through 47 and is used for most displays. In addition, some displays (chiefly functions requiring significant editing) also prompt-for and receive user inputs in the GGDA.

6.4 The SSA (SPDS Status Area) consists of lines 45 through 48 and contain four boxes that represent (by color code) the status of the SPDS (Safety Parameter Display System), which is a software system that monitors selected plant parameters and determines overall plant safety status.

6.5 The FKA (Function Key Area) consists of the bottom two (50 and 51) lines of the screen. The FKA is used to indicate which of the definable function keys are enabled. It also indicates which mode PMIS is in, the Plant Mode, and whether or not a PMIS "event" has occurred.

7. SCREEN-COPY FUNCTION

7.1 The screen-copy function, which is activated by pressing the HARD COPY key, provides full screen reproduction in color on a printer located in the same general area as the terminal.

8. PRINTER

8.1 The printers are connected to a specific computer and are generally accessed when a "...PRINT..." option is selected and a "logical name" is entered.

9. LOGICAL NAME

9.1 Printers and terminals are usually referenced by "logical names", in the format of TT00, TT01, etc. (IDTs), and LA00, LA01, etc. (printers). The "logical name" for a device can usually be found on a tag on the device.

10. RESET FUNCTION

10.1 This function, which is activated by pressing the RESET key (PC keyboard) or CONTROL-RESET keys (IDT keyboard), clears the screen, sounds the bell, and resets internal parameters to the default settings, producing the same effect as a re-boot or turning power off and on.

11. IDE FIELD

11.1 User input to PMIS Programs is through an open IDE (Interactive Data Entry) field on the terminal. An open IDE field is denoted by a yellow box that appears in the OCA or GGDA area. Anything typed on the keyboard will be echoed in the box. Erasing or back-spacing is accomplished with the DEL key. All entries into an IDE field must be terminated by pressing the ENTER key unless the field is overfilled or a function key is pressed (the terminal automatically adds a carriage return character in those cases).

12. TURN-ON-CODE

12.1 The Turn-On-Code (TOC) is the mechanism by which commands are issued to PMIS. This is a one to eight character code which is interpreted by PMIS and a corresponding command is issued.

13. PMIS DATABASE

13.1 All plant parameters (or additional data based on plant or PMIS parameters) that are processed by PMIS SYSTEM are defined in the PMIS DATABASE, which is a file that specifies the origin of the data, the frequency at which it is processed, the type of processing to be performed, etc. Each parameter is referred to as a "point" and is identified by a one to eight character name or POINT-ID (PID).

14. PMIS DATA PROCESSING

14.1 Some PMIS points are processed by scanning plant sensors (through the Data Concentrator) while others are calculated based on the values of previously processed points or PMIS parameters. All points values are then assigned a quality code stored in the Current Value Table (CVT).

14.2 Data in the CVT is considered to be "real-time" and representative of current plant and system conditions.

14.3 At regular intervals (and other special circumstances) point values are also stored in an Archive File, which provides ~ 24 hours of on-line historical information.

15. PMIS DATA ACCESS

15.1 All point values in the CVT and Archive File are accessed by the POINT-ID.

16. QUALITY CODES

16.1 The Quality Code, assigned when point values are assigned, represents the general status and "health" of the point, and determines how it is used by PMIS Programs. The following is a list of PMIS quality codes and related information.

CODE	DESCRIPTION	COLOR	HEALTH
UNK	Value unknown - not yet processed	White	Bad
DEL	Processing has been disabled	Magenta	Bad
INVL	Data concentrator error	Magenta	Bad
RDER	Data concentrator error	Magenta	Bad
OIC	Data concentrator error	Magenta	Bad
BAD	Outside instrument range	Magenta	Bad
STAG	Point failed stagnation check	Magenta	Bad
UDEF	Undefined (spare)	Magenta	Bad
REDU	Fails redundant point check	Magenta	Bad
HALM	Above high alarm limit	Red	Good
LALM	Below low alarm limit	Red	Good
HWRN	Above high warning limit	Yellow	Good
LWRN	Below low warning limit	Yellow	Good
ALM	State/Change-of-State alarm	Red	Good
SUB	Value has been substituted	Blue	Good
DALM	Alarm checking has been disabled	Green	Good
NCAL	Value cannot be calculated	White	Good
INHB	Alarm inhibited by cut-out point	Green	Good
GOOD	Passes all other checks	Green	Good

16.2 Not listed above is quality code OSUB (Operator Substituted), which is treated the same as SUB, and indicates that the value was substituted within that program. OSUB is not used in the CVT.

17. PMIS LOGIN

17.1 If the current date and time is displayed in the OCA and is being updated about once a second:

17.1.1 If "ENTER PASSWORD..." is displayed on line 2, press the ENTER key.

17.1.2 If "SELECT FUNC. KEY OR TURN ON CODE..." and an open IDE field is displayed on line 2, the IDT is logged into PMIS. No further action is necessary.

17.1.3 If a display is operating, press the CANC key.

17.1.4 If terminal does not respond or does not meet any of the above criteria, press the XOFF key once. The terminal should be automatically reset (screen clears and the bell sounds) after about 30 seconds, and either the "ENTER PASSWORD..." or "...TURN-ON-CODE..." prompt should be displayed. Refer to the applicable previous step for more instruction.

17.2 If the current date and time is NOT displayed or is displayed but is not being updated:

17.2.1 Press the RESET key (PC keyboard) or CONTROL-RESET keys (IDT keyboard), wait at least 10 seconds, and press the ENTER key. If the date and time appear and began updating, refer to the previous (date and time updating) step.

17.2.2 If a "$" is displayed at the left of the screen, enter "LO" and press the ENTER key. After the "...LOGGED OFF..." message is displayed, press the ENTER key again.

17.2.3 After "Username:" is displayed, enter "PMIS" and press the ENTER key. A welcome message followed by "PMIS LOGGED OUT..." will be displayed. Do not press any keys for 5 minutes or until the PMIS login display appears. When the "ENTER PASSWORD..." prompt is issued, refer to the previous (date and time updating) step and login to PMIS.

17.3 If neither of the above criteria is met or the specified sequence of events does not occur, contact the Nuclear Information Services (NIS) Department for assistance.

18. ACTIVATING A TURN-ON-CODE

18.1 If a display is currently operating in the area of the screen that the desired TOC requires, press the CANC key.

18.2 When "SELECT FUNC. KEY OR TURN ON CODE..." is displayed followed by an open IDE field, enter one of following:

18.2.1 A TOC (i.e., "GROUP" -- activates the Group Display Program; the program will then prompt the user to select a menu option).

18.2.2 A TOC followed by a space and optional text (i.e., "PLOT ARM1" -- activates the Real-Time Plot Program and plots the group "ARM1" without further user input; note that optional text is recognized by only selected TOCs).

18.2.3 Press one of the programmable function keys on the right hand key pad or top row of function keys (i.e., blue "GROUP DISP" key -- functions the same as the first example).

18.3 Refer to the FKA for the function keys that are enabled and their descriptions. Use other options as provided by each program.

18.4 To exit a program, use the specified exit option (if provided) or press the CANC function key.

19. DETERMINING TO WHICH SYSTEM A TERMINAL IS CONNECTED

The PMIS System to which a terminal is connected is indicated by the "CONSOLE =..." on the bottom line of the FKA as follows:

CONSOLE = PRIMARY -- Connected to the Primary System operating in the Primary Mode.

CONSOLE = PRIM/BAC -- Connected to the Primary System operating in the Primary/Backup Mode.

CONSOLE = BACKUP -- Connected to the Backup System.

CONSOLE = UNKNOWN -- PMIS is in a transition or unknown state.

20. SWITCHING A DEVICE TO THE OTHER SYSTEM

20.1 On a terminal located in the same area as the device to be switched and connected to either PMIS System, activate the TOC "SWITCH".

20.2 A list of all devices that can be switched from that terminal will be displayed. Included will be their logical names, description, and the CPU to which the device is connected.

20.3 To switch a device, press function key F1 and then enter the logical name at the prompt.

20.4 If the device is an IDT, it will be logged off PMIS.

20.5 If the device being switched is a terminal other than the one running SWITCH, both are connected to the same system and a TOC is currently active, a message will be displayed to that effect, and the user will be asked if it is to be switched anyway. If the answer is not YES, the device is not switched.

NOTE - This attachment is only used for core damage estimates where the in-containment radiation monitors are exposed to coolant or steam (i.e., only for primary containment LOCA situations). For other accidents sequences, utilize the Post-Accident Sampling System (PASS) and Core Damage Assessment Program (CORDAM).

(1) HIGHEST DRYWELL RAD MONITOR READING (RMA-RM-40A,B)	(2) 100% CORE MELT FACTOR	(3) CORE MELT FRACTION (1) ÷ (2)	(4) PERCENT CORE MELT (3) x 100	(5) PERCENT CLAD FAILURE (4) x 10
	2.44E+6			

Report the results of the core damage estimate (Blocks 4 and 5) to the TSC Director.

Name/Time/Date: _____ / _____ / _____

1. DISCUSSION

1.1 This procedure covers dose projection. Dose projection represents calculation of an accumulated dose at some time in the future if current conditions continue.

1.2 The CNS-DOSE Computer Program is a software application operated on the PMIS computers. It makes use of current meteorological and radiological data from PMIS and manually entered data to perform dose projection for the area surrounding CNS. CNS-DOSE is the primary method of dose projection.

1.2.1 The PMIS Computer System consists of two computers operating in a Primary and Backup Mode. Historical data may be obtained from either system; however, current data may be obtained only from the Primary System.

1.2.2 Personal unfamiliar with the operation of PMIS should reference procedures governing the operation of PMIS or refer to Attachment 6.

1.3 The manual dose projection methods in this procedure are intended to be used when CNS-DOSE is unavailable. Where possible, data used is from the same source as that used by the computer programs. The hand calculations are divided into two sections. Section 5 is intended to be used by the on-shift personnel for centerline dose projections. Section 6 is intended for dose assessment personnel in projecting non-centerline values.

1.4 The correlation methodology as described in Section 8 provides EOF dose assessment personnel with a means of correlating field team iodine concentration data with CNS-DOSE projected iodine concentration. Such a correlation is necessary to determine if initial Protective Action Recommendations (PARs) were adequate to protect the health and safety of the public.

1.5 Containment radiation level provides a measure of core damage, because it is an indication of the inventory of airborne fission products (i.e., noble gases, a fraction of the halogens, and a much smaller fraction of the particulates) released from the fuel to the containment (refer to NEDO-22215, Pages 1 and 2).

2. REFERENCES

2.1 CODES AND STANDARDS

2.1.1 NRC Regulatory Guide 1.109, Revision 1, October 1977, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I, Iodine Inhalation Dose Factors.

2.1.2 NRC Regulatory Guide 1.111, July 1977, Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors.

2.1.3 NRC Regulatory Guide 1.145, August 1979, Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants.

2.1.4 Health Physics Journal, November 1981, Noble Gas Dose Rate Conversion Factors.

2.1.5 ICRP 59, Working Breathing Rate.

2.1.6 EPA 400-R-92-001, May 1992, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.

2.2 DRAWINGS (MAPS)

2.2.1 NPPD Drawing CNS-MI-102, Atmospheric Dispersion Model (EPM2) Special Receptor Points, 10 Mile Radius.

2.2.2 NPPD Drawing CNS-MI-03, Preselected Radiological Sampling and Monitoring Points in the Vicinity of Cooper Nuclear Station, 10 Mile Radius.

2.2.3 NPPD Drawing 2.2 (P3-A-45), Revision 1, Cooper Nuclear Station Site and Property Boundary, 1 Mile Radius.

2.2.4 Cooper Nuclear Station 50 Mile Emergency Planning Zone, Revision 2, 50 Mile Radius.

2.3 VENDOR MANUALS

2.3.1 CNS Number 0984, PMIS Operator's Manual - SAIC Document 502-85500107-72.

2.4 PROCEDURES

2.4.1 Emergency Plan Implementing Procedure 5.7.1, Emergency Classification.

2.4.2 Emergency Plan Implementing Procedure 5.7.16, Release Rate Determination.

2.4.3 Emergency Plan Implementing Procedure 5.7.20, Protective Action Recommendations.

2.5 MISCELLANEOUS

2.5.1 NRC Inspection Report 89-35.

2.5.2 © NRC Inspection Report 91-12, Emergency Preparedness Annual Inspection Report. Affects Section 7 and NOTE prior to Step 5.2.

2.5.3 NRC Inspection Report 92-14, Emergency Preparedness Annual Inspection Report.

2.5.4 General Electric Corporation, NEDO-22215, Procedures for the Determination of the Extent of Core Damage Under Accident Conditions.