

Public Service Electric and Gas Company

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LR-N96185

JUL 0 3 1996

U. S. Nuclear Regulatory Commission Attn: Document Control Desk Washington, DC 20555

Gentlemen:

REVIEW AND APPROVAL OF REVISED EMERGENCY ACTION LEVELS SALEM GENERATING STATION UNIT NOS. 1 AND 2 DOCKET NOS. 50-272 AND 50-311 HOPE CREEK GENERATING STATION UNIT NO. 1 DOCKET NO. 50-354

Enclosed for your review and approval are Public Service Electric & Gas Company's Salem and Hope Creek Emergency Action Level (EAL) documents. These documents will be referred to as the Event Classification Guides (ECG's) and their associated Technical Basis Documents. These documents are based on the approved methodology outlined in NUMARC/NESP-007, "Methodology for Development of Emergency Action Levels."

The first draft of these documents was submitted for your review in August 1995 in accordance with Revision 3 to Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Plants." This final draft incorporates review comment resolutions from PSE&G's internal review, a detailed review by the State of New Jersey, Bureau of Nuclear Engineering (NJBNE) and by the Nuclear Regulatory Commission. The states of New Jersey and Delaware are in agreement with the final draft set of EAL's.

The following attachments are provided to support your review:

- Attachment 1, NRC review comments and resolution log for Salem and Hope Creek proposed EAL's.
- Attachment 2, Summary of major changes due to BNE comments.
- Attachment 3, Salem revisions annotated for easy review.
- Attachment 4, Hope Creek revisions annotated for easy review.
- Attachment 5, NJBNE letter of agreement on Salem and Hope Creek proposed EAL's.
- Final draft, Salem ECG Sections 1 through 9 (EAL's).
- Final draft, Salem ECG Technical Basis (ECGTB).
- Final draft, Hope Creek ECG Sections 1 through 9 revised (EAL's).
- Final draft, Hope Creek ECG Technical Basis (ECGTB).

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Review and training sessions have been conducted with the New Jersey and Delaware Emergency Management organizations. PSE&G will schedule additional training to the New Jersey and Delaware Emergency Management organizations after the documents are approved by the NRC. PSE&G is requesting that NRC review and approval be completed by August 1, 1996.

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Should you have any questions or require additional information, please contact John Polyak, Manager - Radiological Safety at 609-339-1517 or Dennis Hassler, Station Licensing Engineer at 609-339-1989.

Sincerely,

Louis 7. S

Attachments

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All without attachments unless otherwise noted:

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7/3/96

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ATTACHMENT 1 PUBLIC SERVICE ELECTRIC & GAS

NRC REVIEW COMMENTS AND RESOLUTION LOG FOR SALEM & HOPE CREEK EALs.

PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALS</u>

NOTE: NRC comments were received during various phone conversations and may not be in the exact words of the NRC reviewer.

Comment #1:

Discussed with NRC reviewer the concept of common site events and was requested to provide clarification if PSE&G used any "common site event" Emergency Action Levels.

Resolution:

Events at the UE level or below that are common to both sites will be declared as "common site events". One station will take the lead on making any required notifications for these events. The ECGs have been revised to call out these type of events. See EAL #s 9.1.1 for Security UE, #9.4.1.a for toxic gas UE, #9.5.1 for Seismic UE and 9.6.2.a/b for Tornado/high winds UE. Alert or higher events require that plant specific information be supplied to both the States of NJ and Delaware as well as the NRC and therefore those events will not be classified as common site events.

Comment #2:

Review Salem EAL 3.2.3.b to see if it captures both parts of NUMARC RC3? NUMARC RC3 is broken into 2 parts to capture both a steam line break as well as an stuck open safety or relief valve.

Resolution:

EAL was revised to specifically address leakage to the environment to include; steam line breaks, feed breaks, and stuck open safety and relief valves. Corresponding bases also revised to reflect same.

Comment #3:

Why did we combine both the loss and potential loss PC 1 & 2. Deviation on bases page 3.3.2.a needs to be strengthened to support. Why didn't we make Venting a Loss?

Resolution:

EAL was revised to make actual venting of the containment per EOPs a Loss of the containment barrier. Previously requested deviation is withdrawn

Comment #4:

For HC EALs 3.3.2.a/b, why are the limits for Drywell design pressure and H2 value to vent not included in EAL?

Resolution:

Revised EAL 3.3.2.a to include threshold values for hydrogen/oxygen concentration and design pressure of the Primary Containment as indications for a potential loss of the Containment.

PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALs</u>

Comment #5:

Review Salem EAL 3.3.4.a, could it lead to over classification if combined with other non-related EALs in section 3? If a LOCA was ongoing and a faulted SG also occurred it would result in a SAE due to adding the 1 point from the faulted SG. This could be over conservative since the LOCA and faulted SG are not related and the faulted SG does not provide a path for the LOCA to escape to the environment.

Resolution:

Added the following conditional statement to EAL 3.3.4.a; ...and no loss or potential loss of the RCS barrier has occurred. This will still allow for the UE call for a faulted SG only and if the faulted SG later were to develop a SGTR then SAE classification would result from 3.2.3.b and 3.3.4.b.

Comment #6:

EAL 6.1.1.a - Salem, Verify that basis in computer says 60 minutes and not 15 min for EAL.

Resolution:

Verified that both the EAL and bases are in agreement with 60 minutes.

Comment #7:

EAL 6.1.1.d - Salem - Why no Iodine channels, Iodine release rate ?

- Hope Creek - Add RMS Iodine channel to EAL in sections and in basis.

Resolution:

Salem does not have plant vent iodine RMS monitor and a plant vent sample would be needed to quantify the Iodine release rate and then compare the results to EAL 6.1.1.c. For Hope Creek, the RMS Iodine channel was added to EAL and bases for Unusual Event.

Comment #8:

For both ECGs, EALs 6.1.1.d & 6.1.2.d needs to be revised to say; "Dose assessment results NOT available."

Resolution:

Wording revised as suggested on Salem and Hope Creek EALs.

PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALs</u>

Comment #9:

EAL 6.1.2.d - Question? Does alarm response procedure referenced in basis AB-126, Abnormal Releases of Gaseous Activity, call for dose assessment to be done. Is there another procedure in Rad Pro? Add statement in basis that tell operators and users where to find total NG release rate or how to total up using individual RMS effluent channels. Same concern for Salem.

Resolution:

At Hope Creek, AB-126 directs that RP implement AR-0001, RMS Alarm Response which in turn calls for dose assessment to be performed if any plant vent pathway monitor is in HIGH alarm. Salem AB-0001, "Abnormal Radiation", directs that a release rate be calculated by the operators and to request RP and Chemistry assistance to sample and determine source of increased activity. This request should result in dose assessment being performed. Bases has been revised to tell operators where to obtain a total NG release rate value.

Comment #10:

HC EALs 6.1.3.b & 6.1.4.b need to match wording of Salem EALs (Release expected to continue...)

Resolution:

Wording revised as suggested to be consistent.

Comment #11:

For both ECGs, EALs in Section 6. NUMARC EAL AS1.1 & AG1.1 require EALs that use monitor readings which equate to a site boundary doses of 100mr and 1000mr, respectively. Justification for deviation is not adequate because white paper referenced does call for backup method of classification if dose assessment not available.

Resolution:

EALs 6.1.3.d & 6.1.4.d have been added to utilize monitor readings as a default should dose assessment not be available. Due to potential inaccuracies in using these default EAL values, a deviation to require the release to be ongoing for 30 minutes has been requested.

Comment #12:

Check Salem EAL 6.2.1 to see if it should include RMS monitor for "Service Water Discharge Header".

Resolution:

There is no Radiation Process Monitor for SWS discharge header. There are Process Monitors on the CFCU Service Water Discharges which are part of this EAL and are called "Containment Fan Coil Process" monitor and are identified by "R13"

PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALs</u>

Comment #13:

Salem and Hope Creek EAL 6.3.2.a bases document needs to address areas which require access to maintain plant safety functions and EALs should have "areas of the plant" bolded so the user knows to look in the bases for definition of those areas.

Resolution:

Both bases documents have been revised to include areas as suggested and EAL key words were bolded.

Comment #14:

Make Salem EAL 6.3.2.e wording similar to HC EAL 6.3.2.d. Also, show shielding calculation to show that if fuel uncovered or near uncovered that dose in area would be > 2000mr/hr OR add EAL for visual observation of fuel uncovery is an ALERT.

Resolution:

Salem EAL 6.3.2.e wording revised to be similar to Hope Creek. Added EAL to address visual observation of irradiated fuel uncovery.

Comment #15:

NRC submittal copy contained bases pages for EAL 7.1.2.c but no EAL existed.

Resolution:

There is no such EAL and bases pages have been removed from document and program

Comment #16:

Hope Creek EAL 7.1.4 - Review EAL, Loss of 2 1/2 barriers is by itself a GE. Consider loss of all vitals and loss of 2 barriers or some other barrier type threshold identifiers.

Resolution:

This EAL was revised. A loss of all offsite and onsite power coincident with a loss or imminent loss of 2 FP barriers will constitute a GE.

Comment #17:

For Salem EAL 8.1.3.c the mode should match the mode in the bases document. For bases 8.1.3.c the last line should say "...with EAL 8.1.3.a instead of b.

Resolution:

Modes revised to match. Typo on last line corrected.

PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALs</u>

Comment #18:

EAL 8.2.1.a - Delete ESSEX and NETS since they are not normal onsite methods of communications.

Resolution:

This EAL revised as suggested.

Comment #19:

Revise Salem & HC Loss of OHAs (EALs in Section 8.2) to reflect changes made to Salem's current approved Loss of OHA EALs.

Resolution:

Salem and Hope Creek EALs for Loss of OHAs have been revised to be like current approved Salem EALs with one exception. At the request of the NJ-BNE, a second UE pathway was added which calls for an Unusual Event declaration to be promptly made (i.e.; 15 minutes not part of the EAL) if a Loss of OHAs has occurred coincident with a transient. The concern was that event classification not be delayed based on the 15 minute criteria if 2 thresholds (loss of OHAs & transient) are reached.

Comment #20:

EALs 9.1.1 and 9.1.2 both use SCP 8 as a threshold criterion, does SCP 8 differentiate between the 2 situations? Will info told to SNSS be clear enough so he can make the correct call?

Resolution:

When the EC is notified of the event by security, a description of the ongoing event will be provided and that info will ensure that the SNSS can properly classify.

Comment #21:

EAL 9.1.2 - both - Q & A #9 on page 22 says that a device found should be SAE. Review and see if last part of this EAL should be moved to SAE EAL # 9.1.3

Resolution:

Malicious Acts in a vital area was moved to be a threshold value for SAE EAL #9.1.3.

Comment #22:

Change earthquake EAL (9.5.1) so that any seismic event felt onsite is a UE regardless if seismic monitor picks up the event.

Resolution:

Added as suggested. See EAL 9.5.1.a at Salem and Hope Creek.

file: nucwb/docs/nrcres2.ecg PSE&G NUMARC EAL submittal.

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PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALS</u>

Comment #23:

EAL 9.6.1.b - Sal and HC, EALs should read the same if going to common site event. HC uses 15 min in EAL and Salem does not. Make consistent. In basis, Salem says sustained is 5 minutes and HC says 15 minutes. Make both 15 minute MET average.

Resolution:

Both EALs revised to match and use 75 mph as threshold value and both now say 15 minutes as sustained.

Comment #24:

EAL 9.6.2 - Sal and HC, Basis defines safety system as systems or components included in TS. Is that correct? for example MET tower in TS???

Also, consider adding another EAL to state wind speed sustained > 100 mph as a stand alone alert.

Resolution:

Definition for safety systems was revised to state, systems or components required for the safe shutdown of the plant.

Hurricanes are not sudden events and emergency facilities would be manned and ready to activate well before hurricane impact. State, Utility and Federal official would be aware of impending hurricanes well before they would effect a nuclear facility. The need to declare an alert based only on a wind speed when wind speed indications would not be a reliable indication does not seem prudent. As stated in NUMARC Q&A (page 23) #11 & 12, damage exceeding HA1/EAL3 would be prima facie evidence of winds exceeding design bases.

Comment #25:

River level EALs - Both - make common site action levels and support in basis, current basis is confusing since HC shuts down sooner yet they declare an UE later. Also HC 9.7.1.a has incorrect grade level as 100' and 102' and should be 99.5 and 101.5 feet.

EAL 9.7.2.b - both - make both thresholds at 76' based on design of Service water system. Make a common site event.

High level EALs - Both for UE and Alert - make Salem and HC the same. UE base on exceeding historical High river level and Alert based on grade level at Salem.

Resolution:

EALs dealing with "Abnormal River Level" have been deleted from both the Salem and Hope Creek Event Classification Guides. As per NUMARC NESP-007, these EALs are to cover "site specific occurrences" as deemed appropriate by the utility. These EALs would appear to apply to stations with cooling ponds or on inland rivers were water level fluctuation has a much higher potential to occur. Conditions that would cause either severe site flooding or severe low river level would be covered under the Tornado/ Hurricane EALs in section 9.6, the internal flooding EALs in section 9.7 and the

PUBLIC SERVICE ELECTRIC & GAS <u>NRC REVIEW COMMENTS AND RESOLUTION LOG FOR</u> <u>SALEM AND HOPE CREEK PROPOSED EALS</u>

Emergency Coordinator Discretion EALs in section 4. Specific EALs for high and low river level are redundant and serve no useful purpose.

Comment #26:

EAL 9.8.1 - Salem - define endangered or verify it is defined in procedure OP-AB.ZZ-0002.

Resolution:

Renumbered as EAL 9.7.1. Endangered defined as severe enough to jeopardize safe operation of safety equipment.

PUBLIC SERVICE ELECTRIC & GAS

SUMMARY OF MAJOR CHANGES DUE TO BNE REVIEW COMMENTS

SUMMARY OF MAJOR CHANGES DUE TO BNE REVIEW

NOTE:

The New Jersey NJBNE provided various editorial, clarification, and usability comments which were incorporated in the final revision as annotated in Attachments 3 & 4. The following is a summary of major changes made as a result of comments and concerns provided by the NJBNE.

Item #1:

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EALs 6.1.1.c & d, both for Unusual Event and EALs 6.1.2.c & d, both for Alert, have been revised to use a new initiating condition as the EAL bases. Radiological releases in excess of 2 and 200 times 10CFR20 limits were used in place of Technical Specification limits as in NESP-007.

Item #2:

EALs 6.1.3.c & 6.1.4.c for SAE and GE were revised to reflect the use of the DRCF per EPA 400 as suggested by the NJBNE.

Item #3:

EAL 8.2.1.c, Loss of Overhead Annunciators, was revised to add another pathway for an Unusual Event Classification. A loss of OHAs coincident with a significant transient is now an Unusual Event without a time (15 minutes) restriction. If after 15 minutes the same 2 condition still exist an Alert would be declared.

PUBLIC SERVICE ELECTRIC & GAS

SALEM REVISIONS ANNOTATED FOR EASY REVIEW

3.0 Fission Product Barriers

3.2 RCS Barrier

3.2.3.b

IC Loss of RCS

EAL

One Centrifugal Charging Pump <u>CANNOT</u> maintain PZR level >17% with letdown secured (as a result of a SGTR)

<u>AND</u>

Ruptured Steam Generator pressure is decreasing in an uncontrolled manner or completely depressurized

<u>AND</u>

Q.Y

Prolonged, direct secondary leakage to the environment <u>(steam breaks, feed breaks, stuck open safety or relief valves)</u>

MODE - 1, 2, 3, 4

BASIS

This EAL is indicative of a loss of RCS inventory due to a Steam Generator Tube Rupture and the Ruptured SG is also Faulted outside containment. The threshold values for determining that a Steam Generator Tube Rupture exist are those used in the EOP network. This condition results in a prolonged, direct release of radioactive fission and activation products to the environment. This EAL excludes SG depressurization events that are a direct result of EOP directed operator action. The term "decreasing in an uncontrolled manner" is defined consistent with the EOP definition of a faulted S/G. A "prolonged" release is defined as an unisolable rupture (steam breaks, feed breaks, stuck open safety or relief valves excluding minor valve leakage) of a steam or feed line outside of containment, or a stuck open relief valve on the ruptured SG. The term "direct secondary leakage to the environment" is intended to include all flowpaths of contaminated secondary coolant to the environment either directly or via systems which exhaust to the Plant Vent (e.g.; leakage to the Auxiliary Building ventilation system) with the following exception: If the EOPs require steaming the ruptured SG to the main condenser, the condenser off-gas (R15) pathway is excluded from this EAL provided the release is both controlled and monitored.

EAL - 3.2.3.b Rev. 00 NRC

INRC

3.0 Fission Product Barriers

3.3 Containment Barrier

3.3.4.a

IC Potential Loss of Containment

EAL

Unisolable, Faulted Steam Generator <u>OUTSIDE</u> of Containment as indicated by S/G pressure decreasing in an uncontrolled manner or completely depressurized

<u>and</u>

no loss or potential loss of the RCS barrier has occurred

MODE - 1, 2, 3, 4

BASIS

S/Gs which have unisolable faults outside of the Containment will require feed isolation and secondary side dryout in order to stop the resultant cooldown. This subsequent dryout will result in significant thermal and differential pressures across the tube sheet and greater risk of a SGTR on an already faulted S/G. As such, this event is considered to be a precursor to a more serious event and will lead to at least an Unusual Event classification. This EAL excludes SG depressurization events that are a direct result of EOP directed operator action. The term "decreasing in an uncontrolled manner" is defined consistent with the EOP definition of a faulted S/G. "Unisolable" is defined as a condition where manual isolation is not possible such as a pipe rupture with no accessible isolation valves, a stuck open relief valve, etc. (excluding minor valve leakage).

Barrier Analysis

Containment Barrier has been potentially lost.

ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL section 3.0.

EAL - 3.3.4.a Rev. 00 NRC

DISCUSSION

This EAL was added to the Barrier Table as a Containment Bypass "potential loss" to ensure that all unisolable steam or feedwater break events, where the fault is outside of the Containment, are at least classified as an Unusual Event. The "potential loss" category (1 point) was selected to ensure that further challenges to other Fission Product Barriers result in Emergency Classifications consistent with current philosophy. The Containment Barrier section was selected since Technical Specifications section 3.6.3 "Containment Isolation Valves" require both Main Steam Isolation and Steam Generator Blowdown Isolation. The Containment Bypass section was selected based upon the leakage being non-radioactive steam or feedwater with concerns for RCS integrity appropriately classified under the RCS Barrier section. An NRC inspection at Calvert Cliffs Nuclear Plant resulted in the addition of this EAL.

DEVIATION

This EAL was added as a Potential Loss of Containment due to the Containment Bypass concern discussed in HU5 "Uncontrolled RCS cooldown due to Secondary Depressurization". A review of NRC Inspection Report Nos. 50-317/94-27; 50-318/94-27 for the Calvert Cliffs Nuclear Power Plant indicated that an unisolable, faulted S/G outside of containment represents at least a UE Classification. Technical Specification 3.6.3 for Containment Isolation Valves require OPERABLE Main Steam Isolation valves MS7s and MS18s. The Main Steam Isolation Valves (MS167s) also receive a MSL Isolation Signal but are covered under their own Tech. Spec 3.7.1.5. Therefore, failure of any Main Steam Isolation valve to close upon demand represents a potential loss of Containment integrity and was included in the Fission Product Barrier Table in order to properly classify events in conjunction with the RCS and Fuel Clad Barriers.

REFERENCES

NUMARC NESP-007, PC7 NRC Inspection Report 50-317/94-27 EOP-TRIP-1 EOP-LOSC-1 OP-AB.STM-0001(Q)

> EAL - 3.3.4.a Rev. 00

3.0 Fission Product Barriers

3.3 Containment Barrier

3.3.4.b

IC Loss of Containment

EAL

Primary to Secondary Leakage > Tech Spec Limits

<u>AND</u>

Prolonged, <u>d</u>Direct <u>s</u>Secondary leakage to the environment exists

MODE - 1, 2, 3, 4

BASIS

Primary to Secondary leakage greater than Technical Specifications along with indication of prolonged secondary side leakage outside the containment indicates a Steam Generator Tube leak that is discharging directly to the environment. A "prolonged" release is defined as an unisolable rupture (excluding minor valve leakage) of a steam or feed line outside of containment, or a stuck open relief valve on a secondary system connected to the steam side of the leaking S/G. The term "direct secondary leakage to the environment" is intended to include all flowpaths of contaminated secondary coolant to the environment either directly or via systems which exhaust to the Plant Vent (e.g.; leakage to the Auxiliary Building ventilation system) with the following exception: If the procedure in effect requires steaming the leaking SG to the main condenser, the condenser off-gas (R15) pathway is excluded from this EAL provided the release is both controlled and monitored. For Steam Generator Tube Ruptures, this EAL is used in conjunction with the RCS Barrier SGTR EALs to ensure proper classification if the ruptured SG is also faulted outside of containment.

Barrier Analysis

Containment Barrier has been lost.

ESCALATION CRITERIA

This event will be classified and/or escalated based on the potential loss or loss of additional barriers per EAL section 3.0.

EAL - 3.3.4.b Rev. 00 P5

DISCUSSION

The primary intent of this EAL is to ensure, in conjunction with the RCS Barrier "Loss" SGTR EAL, that Ruptured SGs that are also faulted outside of containment, are classified as <u>at least</u> a Site Area Emergency. The threshold for establishing the bypass of containment was intended to be a prolonged release of radioactivity from the ruptured SG directly to the environment.

The secondary purpose of this EAL is to classify SG tube leak events which exceed Technical Specification limits, but do not exceed the RCS Barrier SGTR thresholds. If a prolonged release occurs from a SG during a leak, only an Unusual Event would be declared based on the "Loss" of the containment barrier.

DEVIATION

None

REFERENCES

NUMARC NESP-007, PC4

4.0 Miscellaneous

4.1 Emergency Coordinator Discretion

ALERT - 4.1.2

IC Other Conditions Exist Which In the Judgement of the Emergency Coordinator Warrant Declaration of an Alert

EAL

Events are in progress or have occurred which, in the judgement of the Emergency Coordinator, indicate EITHER one of the following:

- Plant safety systems (more than one) are, or may be degraded and Increased monitoring of plant functions is warranted
- Criteria for declaration of an Alert per the ECG Introduction Section exists
- ANY plant Vital Structure is degraded or potentially degraded
- <u>AND</u>

Increased monitoring of Safety Functions is warranted

MODE - All

BASIS

Emergency Coordinator judgement to declare an Alert, based on the determination that Plant Systems are, or may be degraded, should be implemented <u>ONLY</u> when conditions are not explicitly addressed elsewhere in the ECG. This includes a determination by the SNSS that hazards exist that have, or may have caused damage to more than one safety system or to a plant vital structure. In addition, if plant conditions degrade to the point where increased monitoring of plant functions is warranted to better determine the plants actual safety status than an Alert classification may be appropriate.

Barrier Analysis

Additional guidance on EC judgement for Fission Product Barriers is found on the Fission Product Barrier Table, Section 3.0.

EAL - 4.1.2 Rev. 00

ESCALATION CRITERIA

Emergency Coordinator Judgement

DISCUSSION

Dose consequences for an Alert, if a radiological release was ongoing, would only be a small fraction of the EPA Protective action Guideline (PAG) plume exposure level, i.e., 10 to 100 mRem TEDE. Refer to ECG Section 6 if a radiological release is ongoing.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA6, HA1.4, Section 3.7. EPA-400

4.0 Miscellaneous

4.1 Emergency Coordinator Discretion

SITE AREA EMERGENCY - 4.1.3

IC Other Conditions Exist Which In the Judgement of the Emergency Coordinator Warrant Declaration of a Site Area Emergency

EAL

Events are in progress or have occurred which, in the judgement of the Emergency Coordinator, indicate an Actual or likely major failure of plant functions needed for protection of the public <u>EITHER</u> one of the following:

- The Potential for an uncontrolled radiological release or the source term available in the Containment atmosphere could result in Site Boundary Dose rates in excess of 100 mRem/hr
- Criteria for declaration of a Site Area Emergency per the ECG Introduction Section
 exists

MODE - All

BASIS

Emergency Coordinator judgement to declare a Site Area Emergency, based on the determination -that -the potential exists for an uncontrolled radiological release or the source term available in the Containment atmosphere could result in Site Boundary dose rates in excess of 100 mRem/hr, should be implemented <u>ONLY</u> when conditions are not explicitly addressed elsewhere in the ECG. In addition, any criteria that satisfies the definition of a Site Area Emergency in the ECG Introduction Section, also warrants declaration under this EAL. A Site Area Emergency is intended to be anticipatory of potential fission product barrier failure, and allows offsite agencies to commence preparation for emergency response.

Barrier Analysis

Additional guidance on EC judgement for Fission Product Barriers is found on the Fission Product Barrier Table, Section 3.

ESCALATION CRITERIA

EAL - 4.1.3 Rev. 00 BNZ

BNE

Emergency Coordinator Judgement

DISCUSSION

Radiological release rates during a Site Area Emergency declaration are not expected to result in exposure levels which exceed the EPA Protective Action Guideline threshold values except within the Site Boundary. However, plume exposure levels of 100 to < 1000 mRem TEDE may be possible offsite and levels > 1000 mRem TEDE could be experienced onsite. Refer to ECG Section 6 if a radiological release is ongoing.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HS3, Section 3.7. EPA-400

4.0 Miscellaneous

4.1 Emergency Coordinator Discretion

GENERAL EMERGENCY - 4.1.4

IC Other Conditions Exist Which In the Judgement of the Emergency Coordinator Warrant Declaration of a General Emergency

EAL

Events are in progress or have occurred which, in the judgement of the Emergency Coordinator, indicate an Actual or imminent substantial core degradation with the potential for loss of containment-Either one of the following:

- The Potential for an uncontrolled radiological release is expected to exceed Protective Action Guideline levels per EAL 6.1.4.a
- Criteria for declaration of a General Emergency per the ECG Introduction Section exists

MODE - All

BASIS

Emergency Coordinator judgement to declare a General Emergency , based on the determination that the potential for an uncontrolled radionuclide release exists, should be implemented <u>ONLY</u> when conditions are not explicitly addressed elsewhere in the ECG. In addition, any criteria that satisfies the definition of a General Emergency in the ECG Introduction Section, also warrants declaration under this EAL. A General Emergency is intended to be anticipatory of fission product barrier failure, and permits maximum offsite intervention time.

Barrier Analysis

This EAL is intended for EC judgement for declaration at the General Emergency level. Additional guidance on EC judgement for Fission Product Barriers is found on the Fission Product Barrier Table, Section 3.0.

ESCALATION CRITERIA

N/A

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DISCUSSION

Radiological release rates during a General Emergency may exceed the EPA Protective Action Guidelines, i.e., >1000mRem TEDE, for more than the immediate site area. ECG Section 6, Radiological Releases/Occurrences should be consulted for releases of this magnitude.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HG2, Section 3.7. EPA-400



6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.a

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 Times the Radiological Technical Specifications for 60 minutes or longer

EAL

Dose Assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

- TEDE 4-Day Dose of **>2.0E-01 mRem**
- Thyroid-CDE Dose of <u>>6.8E-01 mRem</u> based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine <u>Ratio</u>

<u>AND</u>

Release is ongoing for \geq 60 minutes

MODE - All

BASIS

Dose Assessment at or beyond the MEA exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 2 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of dose assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built-in inaccuracies because ODCM default Meteorological data is used. As long as dose assessment is available, this EAL should be used in place of EAL 6.1.1.d.

EAL - 6.1.1.a Rev. 00 It is not intended that the release be averaged over 60 minutes, but <u>exceed</u> 2 times the Technical Specification limit for 60 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when the effluent release concentration increases to 200 times the Technical Specification limit.

DISCUSSION

Prorating the 500 mRem/yr criterion for the TEDE 4-day dose: time (8766 hr/yr); the 2 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 0.057 mRem/hr.

TEDE 4-Day MEA Dose Rate =
$$\left(\frac{500 \text{mRem}/\text{yr}}{8766 \text{hr}/\text{yr}}\right)(2)(.5) = 0.057 \text{mRem/hr}$$

This is rounded to .05 mRem/hr.

The TEDE 4-day Dose is based on a 4 hour release duration. Therefore .05 mRem/hr*4 hours = 0.2 mRem.

Prorating the 1500 mRem/yr criterion for the Thyroid-CDE Dose: time (8766 hr/yr); the 2 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 0.17 mRem/hr.

Thyroid-CDE MEA Dose Rate = $\left(\frac{1500m\text{Rem}/yr}{8766hr/yr}\right)(2)(.5)=0.17\text{mRem/hr}$

The Thyroid-CDE Dose is based on a 4 hour release duration. Therefore 0.17 mRem/hr*4 hours = 0.68 mRem.

DEVIATION

None

REFERENCES

EAL - 6.1.1.a Rev. 00

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REFERENCES

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NUMARC NESP-007, AU1.4 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94 Technical Specification 3/4.11.2.1

6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.b

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 Times the Radiological Technical Specifications for 60 minutes or longer

EAL

Dose Rate measured at the Protected Area Boundary or beyond <u>EXCEEDS</u> .05 mRem/hr above normal background

AND

Release is ongoing for ≥ 60 minutes



MODE - All

BASIS

Measured Dose Rate at or beyond the Protected Area Boundary exceeding the EAL threshold can result from a Gaseous Radiological Release in excess of 2 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 60 minutes, but exceed 2 times Tech. Spec. limits for 60 minutes or longer. Further, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

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N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when effluent release concentration increases to 200 times the Technical Specification limit.

DISCUSSION

Prorating the 500 mRem/yr criterion for: time (8766 hr/yr); the 2 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary (MEA) dose rate would be 0.057 mRem/hr.

Protected Area Boundary Dose Rate = $\left(\frac{500 \text{mRem}/\text{yr}}{8766 \text{hr}/\text{yr}}\right)(2)(.5)=0.57 \text{mRem/hr}$

This is rounded to .05 mRem/hr

DEVIATION

None

REFERENCES

NUMARC NESP-007, AU1.3 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3/4.11.2.1

> EAL - 6.1.1.b Rev. 00

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.c

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds Two Times the <u>10CFR20</u>, <u>Appendix B limits</u><u>Radiological Technical Specifications</u> for |BNE 60 minutes or longer

EAL

Gaseous effluent release sample analysis on <u>EITHER</u> one of the following indicates a concentration of:

- <u>>1.282.56</u>E-02<u>3</u> μCi/cc Total Noble Gas
- \geq 1.11<u>3.71</u>E-06<u>8</u> μ Ci/cc I-131

<u>AND</u>

Dose Assessment results NOT available

<u>AND</u>

Release is ongoing for ≥ 60 minutes

MODE - All

BASIS

A sample analysis of the release from all vent paths in excess of 2 times <u>10CFR20</u>, <u>Appendix</u> <u>B limitsTechnical Specifications</u> that continues for 60 minutes or longer represent an uncontrolled situation and hence a potential degradation in the level of safety. The EAL thresholds are based on 2 times <u>10CFR20</u>, <u>Appendix B limitsTechnical Specification</u> Noble Gas and Iodine release rates limits.

The final integrated dose is very low and is not the primary concern; rather it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes. It is not intended that the release be averaged over 1 hour, but exceed 2 times <u>10CFR20</u>, <u>Appendix BTechnical Specifications</u> limit for 1 hour. Further, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for greater than 1 hour. Unplanned is defined as any release for which a radioactive

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discharge permit was not prepared, or a release that exceeded the conditions on the applicable permit.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when the effluent release concentration increase to 200 times <u>10CFR20</u>, <u>Appendix BTechnical Specification</u> limit.

DISCUSSION

Refer to Basis Section for EAL 6.1.1.d for the 10CFR20, Appendix B Noble Gas release rate calculation.

10CFR20, Appendix B Thyroid Committed Dose release rate is calculated in the following manner:

WHERE: $\mu Ci/sec = 10CFR20$, Appendix B Thyroid Committed Dose Release Rate50mRem/year = 10CFR20, Appendix B thyroid Committed Dose limitODCM χ/Q = Salem specific dispersion factor at the Site Boundary in sec/m³(2.20E-06sec/m³)ODCM DRCF THY = is the most limiting potential pathway(inhalation, child, Thyroid I-131) dose rate conversion factor in

 $\frac{\text{mRem/year/}\mu\text{Ci/m}^3 (1.62\text{E}+07\text{mRem/year/}\mu\text{Ci/m}^3)}{5.00\text{E}\cdot01}$

Allocation Factor = 5.00E-01

 $\frac{\mu \text{Ci/sec} = 50 \text{ mRem/ year } * (5.00\text{E-}01)}{(2.20\text{E-}06\text{sec/m}^3) * (1.62\text{E}+07\text{mRem/yr/}\mu\text{Ci/m}^3)}$

 $\underline{\mu Ci/sec} = 7.01E-01$

 $7.01E-01\mu Ci/sec * 2 = 1.40\mu Ci/sec$ 1.40 μ Ci/sec = 2 times the 10CFR20, Appendix B Release Rate for Thyroid Committed Dose

Calculation of the threshold sample concentrations are as follows:

SGS EAL/RALTechnical Basis

Noble Gas Sample Concentration =
$$\frac{9.68E + 04\,\mu\text{Ci}\,/\,\sec}{472\,x80000cfm} = \frac{9.68E + 04\,\mu\text{Ci}\,/\,\sec}{4.62\times1000} = \frac{1.282.56}{1.282.56} = \frac{1.282.56}$$

 $023 \mu Ci/cc$

$$I-131 \text{ Sample Concentration} = \frac{1.40E + 00\,\mu\text{C}i\,/\,\sec}{472\,x80000cfm} = \frac{1.40E + 00\,\mu\text{C}i\,/\,\sec}{472\,x80000cfm} = \frac{1.113.71E-068\mu\text{C}i/\text{cc}}{1.113.71E-068\mu\text{C}i/\text{cc}} = \frac{1.113.71E-068\mu\text{C}i/\text{cc}}{1.1131} = \frac{1.113.71E-068\mu\text{C}i/\text{cc}}{1.1131} = \frac{1.113.71E-068\mu\text{C}i/\text{cc}}{1.1131} = \frac{1.1131}{1.1131} = \frac{1.1131$$

 $472 = \text{conversion factor } (28.317 \text{ cc/ft}^3 \text{ x } 1 \text{ min.}/60 \text{ sec.})$ Where: 80000 cfm = Plant Vent Flow (normal)The noble gas release rate of $4.849.68E + 054 \mu$ Ci/sec is obtained by multiplying the 10CFR20, Appendix BTechnical Specification release rate of $2.424.84E + 054 \mu$ Ci/sec times 2. The iodine release rate of $4.21.40E + 040 \mu Ci/sec$ is obtained by multiplying the 10CFR20, Appendix BTechnical Specification release rate of 2.17.00E+_ 01μ Ci/sec times 2.

DEVIATION

None The value for EAL 6.1.1.c is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a TEDE Dose which would require an Alert classification or not meet the Unusual Event classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.1.c would not be used unless EAL 6.1.1.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential of this "default" EAL.

Two times the 10CFR20, Appendix B limits for noble gas and Iodine 131 are being used for this EAL, due to concerns that the State of New Jersey have pertaining to this EAL and based on the above mentioned uncertainties.

REFERENCES

NUMARC NESP-007, AU1.2, AU1.1, AU1.4 Off-Site Dose Calculation Manual, Section 2.0 NUMARC Draft White Paper, 7/25/94; 9/10/94. Technical Specification 3.11.2.1

EAL - 6.1.1.c

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 times the 10CFR20, Appendix B for 60 minutes or longer

EAL

Valid Plant Vent Effluent Alarm

<u>AND</u>

Release Rate EXCEEDS 9.68E+04 μ Ci/sec Total Noble Gas

<u>AND</u>

Dose Assessment isresults NOT available

<u>AND</u>

Release is ongoing for ≥ 60 minutes

MODE - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 2 times <u>10CFR20</u>, <u>Appendix B limits</u>. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. **Valid** is defined as the High alarm <u>actuating specifically</u> due to a Gaseous Release exceeding <u>10 CFR 20</u>, <u>Appendix B limits</u>, thus precluding unwarranted event declaration as the result of spurious actuation. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit

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EAL - 6.1.1.d Rev. 00 The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.1.a -for classification.

The Total Noble Gas monitored Release Rate can be obtained from SPDS or inaccordance with S1.OP-AB.RAD-0001(Q) or S2.OP-AB.RAD-0001(Q) Abnormal Radiation.

It is not intended that the release be averaged over 60 minutes, but <u>exceed</u> 2 times <u>10 CFR20</u>, <u>Appendix B limits</u> for 60 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will be escalate to an Alert when the effluent release concentration increases to 200 times the 10CFR20, Appendix B limits,

DISCUSSION

Release rates thresholds for this EAL are obtained by multiplying the <u>10CFR20</u>, Appendix B release rate for Noble Gas of 4.84E+04 μ Ci/sec times 2. This EAL does not include Iodine Release Rates, since the Plant Vent does not have an Iodine detector.

10CFR20, Appendix B Calculation for Noble Gas

 $uCi/Second = \frac{(100 mRem / year) * (Allocation Factor)}{(ODCM X / O) * (ODCM DRCF)}$

- WHERE: uCi/Second = Total Noble Gas Release Rate from Salem (Unit 1 & Unit 2) or Hope Creek (all Vents; NPV, SPV, FRVS, and HTV) which would result in a TEDE Dose Rate of 50 mRem/year.
 - **ODCM X/Q** = Site Specific (Salem or Hope Creek) dispersion factor at the Site Boundary in sec/m^3 .

ODCM DRCF = Site Specific (Salem or Hope Creek) dose rate

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conversion factor in mRem/year/uCi/m³.

ODCM X/Q = 2.202.67E-06sec/m³ ODCM DRCF = 4.70E+027.80E+03 mRem/yr/uCi/m³ Allocation Factor = 5.00E-01

4.84E + 042.40E + 03uCi/Second =

<u>4.84</u>2.40E+034uCi/Second <u>*2 = EAL value.</u> is the Hope Creek 10CFR20, Appendix A value. <u>9.68E+04µCi/sec is the EAL value.</u>

DEVIATION

The value for EAL 6.1.1.d is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a TEDE Dose which would require an Alert classification or not meet the Unusual Event classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.1.d would not be used unless EAL 6.1.1.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential uncertainty of this "default" EAL.

Two times the <u>10CFR20</u>, Appendix B limits for noble gas and <u>Iodine 131</u> are being used for this EAL, due to concerns that the State of New Jersey have pertaining to this EAL and based on the above mentioned uncertainties.

The time limit has been increased from 15 minutes to 30 minutes, to allow additional time to perform dose assessment, since the threshold for this EAL is only 20% of the value allowed per NESP-007 and we do not wish to use this default EAL unless absolutely necessary.

REFERENCES

NUMARC NESP-007, AU1.1, AU1.4 HC.OP AB.ZZ 126(Q), Abnormal Releases of Gaseous Radioactivity HC.RP AR.SP 0001(Q), Radiation Monitoring System Alarm Response Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

6.1 Gaseous Effluent Release

ALERT - 6.1.2.a

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 times Radiological Technical Specifications for 15 minutes or longer

EAL

Dose Assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

- TEDE 4-Day Dose \geq 2.0E+01 mRem
- Thyroid-CDE Dose > 6.8E+01 mRem based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine Ratio

<u>AND</u> Release is ongoing for <u>>15 minutes</u>



MODE - All

BASIS

Dose Assessment at or beyond the MEA exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 200 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in significantly elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 15 minutes.. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of dose assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built-in inaccuracies because ODCM default Meteorological data is used. As long as dose assessment is available, this EAL should be used in place of EAL 6.1.2.d.

It is not intended that the release be averaged over 15 minutes, but <u>exceed</u> 200 times the Technical Specification limit for 15 minutes or longer. In addition, it is intended that the

event be declared as soon as it is determined that the release will exceed 200 times the limit for 15 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

<u>Emergency Classification This event will be escalated to a Site Area Emergency when the</u> effluent release concentration increases to a level that would cause a 100 <u>mRemmrem</u> dose at the <u>Protective AreaMEA</u> boundary.

DISCUSSION

Prorating the 500 mRem/yr criterion for the TEDE 4-day dose: time (8766 hr/yr); the 200 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 5.7 mRem/hr.

TEDE 4-Day MEA Dose Rate = $\left(\frac{500 \text{mRem}/\text{yr}}{8766 \text{hr}/\text{yr}}\right)(200(.5)=5.7\text{mRem/hr}$

This is rounded to 5.0 mRem/hr.

The TEDE 4-day Dose is based on a default (assumed) 4 hour release duration. Therefore 5.0 mRem/hr x 4 hours = 20 mRem.

Prorating the 1500 mRem/yr criterion for the Thyroid-CDE Dose: time (8766 hr/yr); the 200 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 17 mRem/hr.

Thyroid-CDE MEA Dose Rate = $\left(\frac{1500 \text{mRem}/\text{yr}}{8766 \text{hr}/\text{yr}}\right)(200)(.5) = 17 \text{mRem/hr}$

The Thyroid-CDE Dose is based on a 4 hour release duration. Therefore $17.0 \text{ mRem/hr x 4} | \frac{19}{100} \text{ hours} = 68 \text{ mRem}.$

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA1.4

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Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7/25/94; 9/10/94 Technical Specification 3.11.2.1

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6.1 Gaseous Effluent Release

ALERT - 6.1.2.b

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 times Radiological Technical Specifications for 15 minutes or longer

EAL

Dose Rate measured at the Protected Area Boundary or beyond <u>EXCEEDS</u> 5 mRem/hr <u>AND</u> Release is ongoing for \geq 15 minutes

MODE - All

BASIS

Measured Dose Rates at or beyond the MEA exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 200 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in significantly elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 15 minutes.. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 15 minutes, but <u>exceed</u> 200 times the Technical Specification limit for 15 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 15 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

<u>Emergency Classification</u>This event will be escalated to a Site Area Emergency when effluent release concentration increases to a level that would cause a 100 mRem dose at the <u>Pp</u>rotected <u>Aarea Bboundary in 60 minutes or less</u>.

EAL - 6.1.2.b Rev. 00 PS

DISCUSSION

Prorating the 500 mRem/yr criterion for: time (8766 hr/yr); the 200 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 5.7 mRem/hr.

Protected Area Boundary Dose Rate = $(\frac{500m\text{Rem}/yr}{8766hr/yr})(200)(.5)=5.7\text{mRem/hr}$

This is rounded to 5 mRem/hr

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA1.3 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7/25/94; 9/10/94 Technical Specification 3.11.2.1



6.1 Gaseous Effluent Release

ALERT - 6.1.2.c

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 times the 10CFR20, Appendix B limitsRadiological Technical Specifications for 1530 minutes or longer

EAL

Gaseous effluent release sample analysis on <u>EITHER</u> one of the following indicates a concentration of:

- <u>>1.282.56</u>E+_00<u>1</u> μCi/cc Total Noble Gas
- \geq 1.113.71E-046 μ Ci/cc II-131

AND

Dose Assessment results NOT available

<u>AND</u>

Release is ongoing for \geq 1530 minutes

MODE - All

BASIS

Total gaseous effluent sample analysis exceeding the EAL threshold for the Plant Vent, can result from a Gaseous Radiological Release in excess of 200 times <u>10CFR20</u>, <u>Appendix B</u> <u>limitsTechnical Specifications</u>. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within <u>1530</u> minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over <u>1530</u> minutes, but <u>exceed</u> 200 times <u>10CFR20</u>, <u>Appendix BTechnical Specifications</u> limit for <u>1530</u> minutes or longer. Further, it is

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intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 1530 minutes or longer.

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Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when effluent release concentration increases to a level that would cause a 100 mRem dose <u>or Thyroid-CDE Dose of 500mRem for I-131</u> at the Protected Area Boundary.

DISCUSSION

Refer to Basis Section for EAL 6.1.2.d for the 10CFR20, Appendix B Noble Gas release rate calculation or Basis Section for EAL 6.1.1.c for the 10CFR20, Appendix B Thyroid Committed Dose Release Rate Calculation.

Calculation of the threshold sample concentrations are as follows:

Noble Gas Sample Concentration =
$$\frac{9.68E + 06\mu Ci / sec}{472x80000cfm} = \frac{9.68E + 06\mu Ci / sec}{4.68E + 06\mu Ci / sec} = \frac{1.282.56E + 2}{1.282.56E + 2}$$

0<u>01</u>µCi/cc

$$I-131 \text{ Sample Concentration} = \frac{1.40E + 02\,\mu\text{Ci}\,/\,\sec}{472\,x80000cfm} = \frac{1.40E + 02\,\mu\text{Ci}\,/\,\sec}{1.40E + 02\,\mu\text{Ci}\,/\,\sec} = \frac{1.113.71}{1.113.71} E-046\mu\text{Ci}/\text{cc}$$

Where: $472 = \text{conversion factor } (28,317 \text{ cc/ft}^3 \times 1 \text{ min.}/60 \text{ sec.})$ 80000 cfm = Plant Vent Flow (normal)

The noble gas release rate of $4.849.68E+076 \ \mu Ci/sec$ is obtained by multiplying the <u>10CFR20</u>, <u>Appendix BTechnical Specification</u> release rate of $2.424.84E+054 \ \mu Ci/sec$ times 200. The Iodine release rate of $4.21.40E+032 \ \mu Ci/sec$ is obtained by multiplying the <u>10CFR20</u>, <u>Appendix BTechnical Specification</u> release rate of $2.17.00E+01\mu Ci/sec$ times 200.

DEVIATION

None The value for EAL 6.1.2.c is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a

EAL - 6.1.2.c Rev. 00 BNI

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classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.2.c would not be used unless EAL 6.1.2.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential of this "default" EAL.

Two hundred times the 10CFR20, Appendix B limits for noble gas and Iodine 131 are being used for this EAL, due to concerns that the State of New Jersey have pertaining to this EAL and based on the above mentioned uncertainties.

The time limit has been increased from 15 minutes to 30 minutes, to allow additional time to perform dose assessment, since the threshold for this EAL is only 20% of the value allowed per NESP-007 and we do not wish to use this "default" EAL, unless absolutely necessary.

REFERENCES

NUMARC NESP-007, AA1.2, <u>AA1.1, AA1.4</u> Off-Site Dose Calculation Manual, Section 2.0 NUMARC Draft White Paper, 7/25/94; 9/10/94 Technical Specification 3.11.2.1

EAL - 6.1.2.c Rev. 00

6.1 Gaseous Effluent Release

ALERT - 6.1.2.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 times Radiological <u>10CFR20</u>, Appendix B Limit for <u>30Technical Specifications for 15</u> | $\mathcal{B}^{\mathcal{W}^{\text{Env}}}$ minutes or longer

EAL

Valid Plant Vent Effluent Alarm <u>AND</u> Release rate <u>EXCEEDS</u> 9.684.84E+067 μ Ci/sec Total Noble Gas <u>AND</u> Dose Assessment <u>resultsis</u> <u>NOT</u> available <u>AND</u> Release is ongoing for \geq 3015 minutes

MODE - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 200 times <u>10CFR20</u>, <u>Appendix B</u> <u>LimitsTechnical Specifications</u>. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 15 minutes. The final integrated dose is very low and is not the primary concern. **Valid** is defined as the High alarm <u>actuating specifically</u> due to a Gaseous Release exceeding Technical Specification limits, thus precluding unwarranted event declaration as the result of spurious actuation. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a

EAL - 6.1.2.d Rev. 00 BNE

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more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.2.a for classification.

The Total noble gas monitored Release Rate can be obtained from SPDS or inaccordance with S1.OP-AB.RAD-001(O) or S2.OP-AB.RAD-001(O) Abnormal Radiation.

It is not intended that the release be averaged over <u>3015</u> minutes, but exceed 200 times 10CFR20, Appendix BTechnical Specification limits for <u>3015</u> minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 3015 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification This event will be escalated to a Site Area Emergency when effluent release concentration increases to a level that would cause a 100 mRemmrem dose at the Perotected Aarea Beoundary.

DISCUSSION

The release rate thresholds for this EAL are obtained by multiplying the <u>10CFR20</u>, Appendix <u>B Limit</u>Technical Specification release rate of 4.842.42E + 054 µCi/sec for Noble Gases times 200. This EAL does not include Iodine Release Rates, since the Plant Vent does not have an Iodine detector. Total Noble Gas release rate is the summation of Unit 1 and Unit 2 Noble Gas release rates.

10CFR20, Appendix B Technical Specification Calculation for Noble Gas	BNG
$uCi/Second = \frac{5100 \text{ mRem}/\text{year } * (Allocation Factor)}{(ODCM X/Q)} * (ODCM DRCF)$	BNG
WHERE: uCi/Second = Total Noble Gas Release Rate from Salem (Unit 1 & Unit 2) or Hope Creek (all Vents; NPV, SPV, FRVS, and HTV) which would result in a TEDE Dose Rate of 250 <u>mRemmrem</u> /year.	BNG
ODCM X/Q = Site Specific (Salem or Hope Creek) dispersion factor at the Site Boundary in sec/m^3 .	
ODCM DRCF = Site Specific (Salem or Hope Creek) dose rate conversion factor in <u>mRemmrem</u> /year/uCi/m ³ . EAL - 6.1.2.d Rev. 00	BNG
Page <u>2</u> of 3	

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BNG

ODCM X/Q = 2.20E-06 sec/m³ ODCM DRCF = $4.70E+02 \text{ mRemmrem/yr/uCi/m}^3$ Allocation Factor = 5.00E-01 4.842.42E+054 uCi/Second = (5100 mRemmrem/year) * (5.00E-01) (2.20E-06 sec/m³) * (4.70E+02 mRemmrem/yr/uCi/m³)

<u>4.84</u>2.42E+054 uCi/Second * 200 = EAL value is the Salem Unit 1 or 2 Technical Specification value. 9.68E+04uCi/sec = EAL value.

DEVIATION

The value for EAL 6.1.2d is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a TEDE Dose which would require a General Emergency classification or not meet the Alert classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.2.d would not be used unless EAL 6.1.2.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential uncertainty of this "default" EAL.

Two hundred times the 10CFR20, Appendix B limits of 100 mRem/year noble gas are being used for this EAL, due to concerns that the State of New Jersey had pertaining to this EAL and based on the above mentioned uncertainties.

The time limit has been increased from 15 minutes to 30 minutes, to allow additional time to perform dose assessment, since the threshold for this EAL is only 20% of the value allowed per NESP-007 and we do not wish to use this "default" EAL, unless absolutely necessary. None

REFERENCES

NUMARC NESP-007, AA1.1, <u>AA1.4</u> Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents OP-AB.RAD-0001 NUMARC Draft white paper, 7/25/94;9/10/94 Technical Specification 3.11.2.1

> EAL - 6.1.2.d Rev. 00

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ATTACHMENT 4 (Page 1 of 1)

TOTAL RELEASE RATE CALCULATION

NOTE

Attachment 5, 1R41C Release Rate Tables, may be used to estimate Unit 1 Release Rate using Plant Vent Flow Rate (cfm) and current 1R41C reading in cpm. This value is added to Unit 2 release rate to obtain total release rate.

UNIT 1 NOBLE GAS RELEASE RATE CALCULATION USING 1R41C:

 μ Ci/sec = 1R41C count rate (cpm) X 7.352E-6 X Plant Vent Flow Rate (cfm) (A)

UNIT 2 NOBLE GAS RELEASE RATE CALCULATION USING 2R41C (Obtain from Unit 2):

 μ Ci/sec = 2R41C count rate (cpm) X 7.013E-6 X Plant Vent Flow Rate (cfm) (B)

UNIT 1 RELEASE RATE CALCULATION USING 1R16, PLANT VENT EFFLUENT:

 μ Ci/sec = 1R16 count rate (cpm) X 1.31E-5 X Plant Vent Flow Rate (cfm) (C)

UNIT 2 RELEASE RATE CALCULATION USING 2R16, PLANT VENT EFFLUENT (Obtain from Unit 2):

 μ Ci/sec = 2R16 count rate (cpm) X 1.35E-5 X Plant Vent Flow Rate (cfm) (D)

TOTAL RELEASE RATE = (A) + (B) (preferred)

OR (B) + (C)OR (A) + (D)OR (C) + (D)

FORM-1 - Page 1 of 1
PROCEDURE REVISION REQUEST
(INCLUDING NEW PROCEDURE DEVELOPMENT)
TO SPONSOR: DATE: DATE:
PROCEDURE NO: 51/52 OP-AB. ROD-0001(0) CURRENT REV: 10
PROCEDURE TITLE: ABNORMAL RadiATION - ATT 1 - See ATTACIED
OTHER AFFECTED PROCEDURES (Each procedure may need a separate revision request):
REQUESTED COMPLETION CODE: S (PAIDA TO) MADE 2 REQUESTED COMPLETION DATE: 8-196
PROPOSED PROCEDURE CHANGE (ATTACH MARKED-UP COPY OF PROCEDURE):
be Directed TO for forme Drie RESERCE TAS forme matter
TO GET Release Pote Total And USE ATT4 & 5 AS Backup method.
LIST SUPPORTING DOCUMENTS AND PROVIDE JUSTIFICATION FOR CHANGING AN APPROVED PROCEDURE (ATTACH COPIES OF SUPPORTING DOCUMENTS):
Solom NUMAR ECG WILL USE DOJE ASSESSMENT VESULTS ON
messured Dose Notes AT Site Boundy AS primas method Todoclare
AN emergency, FAILURE TO get Dose Assessment resorts Cost result N
declaration Oat A UE WHEN NOT TOSTIFIED IT Based Solely EN Rolesve Rate.
ORIGINATOR (Please print): CRAIC BOWNER EXTENSION: 1157
DEPARTMENT: E.P. 0 MAIL CODE: X03
ORIG. DEPT. APPROVAL (Optional):NA DATE:
COMPLETION CODES:
A - prior to next scheduled useM - according to DCP scheduleB - prior to commitment due dateR - next refuel outageC - next biennial reviewS - next startup or shutdown (explain)D - next revisionO - other (explain)
X - Will not be incorporated (explain)
To be completed by Sponsor or Procedure Writing Group Supervisor:
COMPLETION CODE ASSIGNED REQUEST APPROVED BY:
ESTIMATED COMPLETION DATE:
RESOLUTION TO REQUEST:
Return a copy of the completed Request to the Originator.

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	s1.op-	AB.RAD-0001(Q)
	(Page 4 of 7)	-
- La	PROCESS RADIATION MONITORS	
9.2 N 9.2	IF 1R41, Plant Vent Monitor-Noble Gas, is in ALARM, THEN:	
Asser (1,2)	A. ENSURE 1WG41, Gaseous Waste Discharge Valve, is (CLOSED.
2 4 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7 2 7	B. TERMINATE gaseous release IAW appropriate Discharge Waste procedure in effect.	ge of Gaseous
extorn nov, de	C. Are all four Control Area Radiation Monitors 1R1A, 1R1B, 2R1A & 2R1B OPERABLE?	
5 RP) TO P	NOYES> GO TO Step 9.2.F	TIME
Tech (D. ALIGN Control Room Ventilation for ACCIDENT INSI IAW S1.OP-SO.CAV-0001(Q), Control Room Ventilation	DE AIR on Operation.
	E. NOTIFY Unit 2 NCO to ALIGN Control Room Ventilat ACCIDENT INSIDE AIR IAW S2.OP-SO.CAV-0001(Q Ventilation Operation.	tion for)), Control Room
2027 2092	F. CALCULATE release rates every 30 minutes using one	of the following:
ALL ALL	Attachment 4, Total Release Rate Calculation	Neels
iver iver	OR .	Roms Progect
	Attachment 5, 1R41C Release Rate Table (for Un release calculation).	nit 1 portion of
9.3	PLACE Auxiliary Building HEPA Plus Charcoal in service IAV S1.OP-SO.ABV-0001(Q), Auxiliary Building Ventilation Operat	tion.
9.4	COORDINATE with Chemistry and Rad Pro to PERFORM the	following:
	♦ SAMPLE to determine source of increased activity	
	♦ LOCATE and ISOLATE source of activity	
9.5	RECORD sample results in the Control Room Log.	
Salem 1	Page 7 of 22	Rev. 10

ATTACHMENT 1 (Page 5 of 7)

PROCESS RADIATION MONITORS

10.0 IF 1R16, Plant Vent Effluent Monitor is in ALARM, THEN: 10.1 PLACE Auxiliary Building HEPA Plus Charcoal in service IAW S1.OP-SO.ABV-0001(Q), Auxiliary Building Ventilation Operation. 10.2 Are all four Control Area Radiation Monitors 1R1A, 1R1B, 2R1A & 2R1B OPERABLE? TIME NO -----> GO TO Step 10.5 YES v 10.3 ALIGN Control Room Ventilation for ACCIDENT INSIDE AIR IAW S1.OP-SO.CAV-0001(Q), Control Room Ventilation Operation. NOTIFY Unit 2 NCO to ALIGN Control Room Ventilation for ACCIDENT 10.4 INSIDE AIR IAW S2.OP-SO.CAV-0001(Q), Control Room Ventilation Operation. 10.5 CALCULATE release rates every 30 minutes using one of the following: Attachment 4, Total Release Rate Calculation OR Attachment 5, 1R41C Release Rate Table (for Unit 1 portion of release calculation). OBTO, J . . , 10.6 COORDINATE with Chemistry and Rad Pro to PERFORM the following: SAMPLE to determine source of increased activity LOCATE and ISOLATE source of activity 10.7 RECORD sample results in the Control Room Log.



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Condition

MODE

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6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.a

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mRem Total Effective Dose Equivalent (TEDE) or 500 mRem Thyroid-CDE Dose for the actual or projected duration of the release

EAL

Dose assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

TEDE 4-Day Dose \geq 1.0E+02 mRem Thyroid-CDE Dose \geq 5.0E+02 mRem

based on Plant Vent effluent sample analysis and default Noble Gas to Iodine Ratio

MODE - All

BASIS

The TEDE 4-Day Dose of 100 mRem corresponds directly to the NUMARC dose of 100 mRem.

The Thyroid-CDE Dose of 500 mRem corresponds directly to the NUMARC dose of 500 mRem.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of dose assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built-in inaccuracies because ODCM default Meteorological data is used. Imminent is defined as expected to occur within 2 hours.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of Dose Assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built in inaccuracies because ODCM default Meteorological data is used.

Barrier Analysis

N/A

ESCALATION CRITERIA

<u>Emergency Classification This event will be escalated to a General Emergency when actual or projected doses exceed EPA Protective Action Guidelines.</u>

DISCUSSION

The EAL values provide a desirable gradient (one order of magnitude) between the Site Area Emergency and General Emergency classifications. No site allocation factor (.5) is used in this calculation due to the assumption that releases of this magnitude will be from one site.

The dose projection code assumes a 4 hour release utilizing current 15 minute average release rate data. For the TEDE 4-day dose, 100 mRem/hr * 4hr = 400 mRem. For the Thyroid-<u>CDE dose 500 mRem/hr * 4 hr = 2000 mRem. The TEDE 4 Day Dose of 100 mRem is based</u> on the 10CFR20 average annual population exposure limit. It is deemed that exposure less than this limit is not consistent with the Site Area Emergency classification description. The 500 mRem Thyroid LDE Dose was established to align with the 1:5 ratio used in EPA Protective Action Guidelines for Whole Body vs. Thyroid dose.

DEVIATION

<u>NONENUMARC EAL AS1.1 (Classification based on noble gas release rate) is not desirable</u> per NUMARC Draft White Paper dated 7 25 94;9 10 94. The classification could be under conservative if it were made on the basis of noble gas release rate.

Since dose assessment would continue in either case and the classification escalated if necessary, the impact from not having this EAL would be a delay in reaching the appropriate classification. This delay was deemed to be acceptable since in significant release situations, the plant operational conditions EALs should provide the anticipatory classifications necessary for the implementation of offsite protective measures.

REFERENCES

NUMARC NESP-007, AS1.3 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents NUMARC Draft White Paper 7-25-94;9-10-94. 75

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.b

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 <u>mRemmrem</u> Total Effective Dose Equivalent (TEDE) <u>or</u> <u>500mRem Thyroid CDE Dose</u> for the actual or projected duration of the release _____

EAL

Dose Rate measured at the Protected Area Boundary or beyond <u>EXCEEDS</u> 100 mRem/hr <u>AND</u> Release is expected to continue for \geq 15 minutes

MODE - All

BASIS

An actual dose rate of 100 <u>mRemmrem</u>/hr which is expected to continue for 15 minutes indicates a substantial radiological release which could exceed the 10CFR20 Average Annual Population exposure limit of 100 <u>mRemmrem</u> TEDE using the assumption of a one hour release duration. <u>Imminent is defined as expected to occur within 2 hours.</u>

Barrier Analysis

N/A

ESCALATION CRITERIA

<u>Emergency Classification</u>This event will be escalated to a General Emergency when actual or projected doses exceed EPA Protective Action Guidelines.

DISCUSSION

An actual dose of 100 mRem Total Effective Dose Equivalent (TEDE) is based on the 10CFR20 annual average population exposure limit. Measured dose rates will be taken at the Protected Area Boundary and a 15 minute threshold will be applied to be conservative. Unless otherwise indicated, the conversion from whole body dose to TEDE is 1:1. **DEVIATION**

EAL - 6.1.3.b Rev. 00

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None REFERENCES

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NUMARC NESP-007, AS1.4 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

NUMARC Draft White Paper, 7/25/94; 9/10/94

EAL - 6.1.3.b Rev. 00

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.c

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds <u>100mRem Total Effective Dose Equivalent (TEDE) or 500</u> mRem Thyroid-CDE for the actual or projected duration of the release

EAL

Analysis of field survey samples at the Protected Area Boundary indicates <u>EITHER</u> one of the following:

• <u>>4.36</u>5.24 E+02 CCPM

• > 3.854.63E-07 µCi/cc I-131

MODE- All

BASIS

The Corrected Counts per Minute (CCPM) value is based on reading(s) obtained using a radiation count rate meter such as a RM-14 or E-140N with an HP260 probe attached. The Iodine-131 field survey sample concentration threshold is based on I-131 dose conversion factors (DCFs) from EPA-400. The thresholds are based on a Thyroid-CDE Dose Rate of 500 mRem/hr Thyroid for I-131. Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification This event will be escalated to a General Emergency when actual or projected doses exceed EPA Protective Action Guidelines.

DISCUSSION

The release sample concentration calculations are as follows.

The sample concentration is calculated using the I-131 Dose Conversion Factor from EPA-400:

EAL - 6.1.3.c Rev. 00 Solving the following equation for μ Ci/cc:

mRem/hr = $(\mu Ci/cc)$ (Dose Conversion Factor)

Then;

$$I-131 \text{ Sample Concentration} = \left(\frac{500m \text{Rem}/hr}{1.30E + 09m \text{Rem}/\mu\text{Ci}/cc/hr}\right) = \frac{3.854.763}{1.30E + 09m \text{Rem}/\mu\text{Ci}/cc/hr} = \frac{3.854.763}{1.30E + 09m \text{Rem}/\mu\text{Ci}/cc/hr}$$

07µCi/cc

Where 1.3008E+09 mRem/ μ Ci/cc/hr is the Dose Conversion Factor from EPA-400, Table 5- $|\beta\nu\rangle$ 4 and includes the EPA breathing rate.

The Corrected Counts per Minute reading is calculated using the I-131 Sample concentration, and factors for using an RM-14 or E-140N with an HP260 probe.

Solving the following equation for CCPM:

 $\mu Ci/cc =$

ССРМ

(Detector Efficiency)(Collection Efficiency)(Conversion Factor - DPM to μ Ci)(Volume - ft³)(Conversion Factor - cc to ft³)

Then;

CCPM = $(3.854.63E-07\mu Ci/cc)(0.9)(2.22E+06DPM/\mu Ci)(2.00E-03CCPM/DPM)$ $(10ft^{3})(2.832E+04cc/ft^{3}) = 4.365.24E+02 CCPM$

Where:

2.00E-03 =	Detector Efficiency - CCPM/DPM
0.9 (or 90%) =	Collection Efficiency
2.22E + 06 =	Conversion factor - DPM/µCi
$10 ft^3 =$	Volume
2.832E + 04 =	Conversion factor - cc to ft ³
CCPM =	Corrected Counts per Minute using an RM-14 or E-140N
	with an HP260 probe.

DEVIATION

None

REFERENCES

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NUMARC NESP-007, AS1.4

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

FEMA REP-2, Rev. 1/July 1987, Guidance on Offsite Emergency Radiation Measurement Systems, Phase-1 Airborne Release SORC Summary 07/10/89

RPCS Thyroid Dose Commitment Factor Paper (NRP-94-0557), 11-22-94.

6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 100 mRem TEDE 4-Day Dose for 30 minutes or longer

<u>EAL</u>

Valid Plant Vent Effluent Alarm

<u>AND</u>

Total Plant Vent release rate EXCEEDS 8.47E+08 µCi/sec Total Noble Gas

AND

Dose Assessment results NOT available

AND

Release is ongoing for > 30 minutes

MODE - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, indicates a substantial Gaseous Radiological Release which could exceed the 10CFR20 average annual population exposure limit of 100 mRem TEDE, using the assumption of a one hour release duration.

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.3.a for classification.

> EAL - 6.1.3.d Rev. 00

NRC

The Total Noble Gas monitored Release Rate can be obtained from SPDS or inaccordance with S1.OP-AB.RAD-001(Q) or S2.OP-AB.RAD-001(Q) Abnormal Radiation.

It is not intended that the release be averaged over 30 minutes, but that the Release Rate exceed the EAL value for > 30 minutes.

Barrier Analysis

<u>N/A</u>

ESCALATION CRITERIA

Emergency Classification will escalate to a General Emergency when effluent release concentration increases to a level that would cause a 1000 mRem dose at the Protected Area Boundary

DISCUSSION

To obtain a site specific value to trigger the performance of dose assessment is not necessary, since this will be done when the UE value is reached. This value will supply a set point to classify a Site Area Emergency (SAE), if dose assessment has not been performed within 30 minutes.

The ODCM methodology calculates yearly values. To be consistent with the ODCM methodology the SAE classification trigger point of 100 mRem/hour needs to be converted to a yearly dose. This is done in the following manner;

365 days/year * 24 hours/ day = 8760 hours/year.

100 mRem/hour * 8760 hours/year = 8.76E+05 mRem/year.

<u>ODCM Dose Rate Conversion Factor = $4.70E + 02mRem/year/\muCi/m^3$ </u>

 $\underline{ODCM \ \chi/Q} = 2.20\underline{E} \cdot 06 \ \underline{Sec/m^3}$

No allocation factor is used for SAE.

 $\frac{8.76E+05 \text{ mRem/year}}{2.20E-06 \text{ Sec/m}^3 * 4.70E+02 \text{ mRem/year/}\mu\text{Ci/m}^3} = 8.47E+08 \mu\text{Ci/Sec}$

8.47E+08 µCi/Sec is the SAE Total Noble Gas Release Rate.

DEVIATION

NRC

This EAL is based on default meteorological and isotopic mixture assumption as found in the ODCM. Depending on actual meteorological conditions and isotopic mixture, the release rate used as the threshold value in this EAL could produce TEDE value which could be within Alert ranges or as high as the General Emergency threshold. This potential to overclassify or underclassify this event is not desirable. To preclude/limit this possibility, PSE&G has used 30 minutes instead of 15 as in AS1.1. This extra 15 minutes would allow personnel to obtain dose assessment projections from a second onsite computer should the primary location computer fail. In addition, events that result in a release of this magnitude would required degradation of multiple fission product barriers and should be classified per Section 3, fission Product Barriers.

REFERENCES

•

NUMARC NESP-007, AS1.1, AS1.4 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

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6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.a

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mRem Total Effective Dose Equivalent (TEDE) or 5000 mRem Thyroid-CDE Dose for the actual or projected duration of the release

EAL

Dose assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

TEDE 4-Day Dose \geq 1.0E+03 mRem Thyroid-CDE Dose \geq 5.0E+03 mRem based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine Ratio



MODE - All

BASIS

The TEDE 4-Day Dose of 1000 mRem corresponds directly to the NUMARC dose of 1000 mRem which exceeds EPA Protective Action Guideline Criteria for a General Emergency. The Thyroid-CDE Dose of 5000 mRem corresponds directly to the NUMARC dose of 5000 mRem, which exceeds EPA Protective Action Guideline criteria for a General Emergency. Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

N/A

DISCUSSION

No site allocation factor (.5) is used in this calculation due to the assumption that releases of this magnitude will be from one site.

EAL - 6.1.4.a Rev. 00

NRC

<u>NONENUMARC EAL AG1.1 (Classification based on noble gas release rate) is not desirable</u> per NUMARC Draft White Paper dated 7 25 94;9 10 94. The classification could be under conservative if it were made on the basis of noble gas release rate.

Since dose assessment would continue in either case and the classification escalated if necessary, the impact from not having this EAL would be a delay in reaching the appropriate elassification. This delay was deemed to be acceptable since in significant release situations, the plant operational conditions EALs should provide the anticipatory classifications necessary for the implementation of offsite protective measures.

REFERENCES

NUMARC NESP-007, AG1.3

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

NUMARC Draft White Paper 7-25-94; 9-10-94.

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.b

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 <u>mRemmrem</u> Total Effective Dose Equivalent (TEDE) <u>or</u> <u>5000mRem Thyroid CDE Dose</u> for the actual or projected duration of the release_

EAL

Dose Rate measured at the Protected Area Boundary or beyond <u>EXCEEDS</u> 1000 mRem/hr <u>AND</u> Release is expected to continue for \geq 15 minutes

MODE - All

BASIS

An actual dose rate of 1000 mRem/hr indicates the EPA Protective Action Guide may be exceeded for the general public. <u>Imminent is defined as expected to occur within 2 hours.</u>

Barrier Analysis

N/A

ESCALATION CRITERIA

N/A

DISCUSSION

An actual projected dose of 1000 mRem Total Effective Dose Equivalent (TEDE) is based on the EPA protective action guidance which indicates that public protective actions are indicated if the dose exceeds 1 Rem whole body. This is consistent with the emergency class description for a General Emergency. A release rate equivalent to 1000 mRem/hr boundary dose rate may also be used if TEDE projections are not available. Unless otherwise indicated, the conversion from whole body dose to TEDE is 1:1. **DEVIATION**

None

EAL - 6.1.4.b Rev. 00

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REFERENCES

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NUMARC NESP-007, AG1.4

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

6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.c

 IC
 Boundary Dose Resulting from an Actual or Imminent Release of Gaseous

 Radioactivity Exceeds 1000mRem Total Effective Dose Equivalent (TEDE) or 5000

 mRem Thyroid-CDE for the actual or projected duration of the release

EAL

Analysis of field survey samples at the Protected Area Boundary indicates <u>EITHER</u> one of the following:

<u>>4.36</u>5.24E+03 CCPM <u>>3.85</u>4.63E-06 μCi/cc I-131

MODE - All

BASIS

The Corrected Counts per Minute (CCPM) value is based on reading(s) obtained using a radiation count rate meter such as a RM-14 or E-140N with an HP260 probe attached. The Iodine-131 field survey sample concentration threshold is based on I-131 dose comparison factors from EPA-400. The thresholds are based on a dose rate of 5000 mRem/hr Thyroid CDE for <u>II-131</u>. <u>Imminent is defined as expected to occur within 2 hours</u>.

Barrier Analysis

N/A

ESCALATION CRITERIA

N/A

DISCUSSION

The release sample concentration calculations are as follows.

The sample concentration is calculated using the I-131 Dose Factor from EPA-400:

Solving the following equation for μ Ci/cc:

BNB

| P5'

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mRem/hr = $(\mu Ci/cc)$ (Dose Conversion Factor)

Then;



Where 1.3008E+09 mRem/ μ Ci/cc/hr is the Dose conversion factor from EPA-400, Table 5-4 | \mathcal{BNE} and includes the EPA breathing rate.

The Corrected Counts per Minute reading is calculated using the I-131 Sample concentration, and factors for using an RM-14 or E-140N with an HP260 probe.

Solving the following equation for CCPM:

$$\mu \text{Ci/cc} = \underbrace{\text{CCPM}}_{(\text{Detector Efficiency})(\text{Collection Efficiency})(\text{Conversion Factor - DPM to }\mu\text{Ci})(\text{Volume - ft}^3)(\text{Conversion Factor - cc to ft}^3)}$$

$$\underbrace{\text{Then;}}_{\text{CCPM} = \underbrace{}}_{(\underline{3}.\underline{854},\underline{63E}-06\mu\text{Ci}/\text{cc})(0.9)(2.22E+06\text{DPM}/\mu\text{Ci})(2.00E-03\text{CCPM}/\text{DPM})(10ft^3)(2.832E+04cc/ft^3)}_{= \underline{4}.\underline{365},\underline{24E}+03} \text{ CCPM}$$

$$\boxed{R}^{N}\overline{P}$$

$$Where:$$

$$\underbrace{2.00E-03 = Detector Efficiency - CCPM/DPM \\ 0.9 (or 90\%) = Collection Efficiency \\ 2.22E+06 = Conversion factor - DPM/\mu\text{Ci} \\ 10ft^3 = Volume \\ 2.832E+04 = Conversion factor - cc to ft^3$$

- CCPM = Corrected Counts per Minute using an RM-14 or E-140N with an HP260 probe.

DEVIATION

None

REFERENCES

PS

NUMARC NESP-007, AG1.4 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents FEMA REP-2, Rev. 1/July 1987, Guidance on Offsite Emergency Radiation Measurement Systems, Phase-1 Airborne Release SORC Summary 07/10/89 RPCS Thyroid Dose Commitment Factor Paper (NRP-94-0557); 11-22-94.

6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 1000 mRem TEDE 4-Day Dose for 30 minutes or longer

<u>EAL</u>

Valid Plant Vent Effluent Alarm

<u>AND</u>

Total Plant Vent release rate EXCEEDS 8.47E+09 µCi/sec Total Noble Gas

AND

Dose Assessment results NOT available

AND

Release is ongoing for > 30 minutes

MODE - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, indicates a substantial Gaseous Radiological Release which could exceed the EPA Protective Action Guide exposure of 1000 mRem TEDE, using the assumption of a one hour release duration.

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.4.a for classification. The Total Noble Gas monitor Release Rate can be obtained from SPDS or inaccordance with S1.0P-AB.RAD-001(Q) or S2.0P-AB.RAD-0001(Q)

> EAL - 6.1.4.d Rev. 00

NEL
Abnormal Radiation. It is intended that the release be averaged over 30 minutes, but that the Release Rate exceed the EAL value for > 30 minutes.

Barrier Analysis

<u>N/A</u>

ESCALATION CRITERIA

<u>NONE</u>

DISCUSSION

To obtain a site specific value to trigger the performance of dose assessment is not necessary, since this will be done when the UE value is reached. This value will supply a set point to classify a General Emergency (GE), if dose assessment has not been performed within 30 minutes.

The ODCM methodology calculates yearly values. To be consistent with the ODCM methodology the GE classification trigger point of 1000 mRem/hour needs to be converted to a yearly dose. This is done in the following manner;

<u>365 days/year * 24 hours/ day = 8760 hours/year.</u>

1000 mRem/hour * 8760 hours/year = 8.76E+06 mRem/year.

<u>ODCM Dose Rate Conversion Factor = $4.70E + 02mRem/year/\muCi/m^3$ </u>

 $\underline{ODCM \ \chi/Q} = 2.20\underline{E} - 06 \ \underline{Sec/m^3}$

No allocation factor is used for GE.

8.76E+06 mRem/year 2.20E-06 Sec/m³ * 4.70E+02mRem/year/µCi/m³ $= 8.47E + 09 \mu Ci/Sec$

 $8.47E + 09 \ \mu Ci/Sec$ is the GE Total Noble Gas Release Rate.

DEVIATION

This EAL is based on default meteorological and isotopic mixture assumptions as found in the ODCM. Depending on actual meteorological conditions and isotopic mixture, the Release Rate used as the threshold value in this EAL could produce TEDE values which could be within Alert or Site Area Emergency Thresholds. This potential to underclassify this Event is not desirable. To preclude/limit this possibly, PSE&G has used 30 minutes instead of 15 as in

EAL - 6.1.4.d Rev. 00 NRC

AS1.1. This extra 15 minutes would allow personnel to obtain Dose Assessment projects from a second computer should the primary location computer fail. In addition events that result in a release of this magnitude would require degradation of multiple Fission Product Barriers and should be promptly classified.

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REFERENCES

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NUMARC NESP-007, AG1.1, AG1.4 OP-AB.ZZ-126(Q), Abnormal Releases of Gaseous Radioactivity Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

BNE

6.2 Liquid Effluent Release

UNUSUAL EVENT - 6.2.1

IC Any Unplanned Release of Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Technical Specifications for 60 minutes or longer

EAL

Valid Alarm from <u>ANY</u> one of the following RMS Channels: Containment Fan Coil Process (R13) Liquid Radwaste Disposal Process (R18) Steam Generator Blowdown Process (R19) Chemical Waste Basin Process (2R37)
<u>AND</u> Sample analysis of liquid effluent indicates concentration in excess of 2 times Tech. Spec. limits

<u>AND</u>

Release continues for ≥ 60 minutes after the alarm occurs

MODE - All

BASIS

Releases in excess of 2 times Technical Specifications that continue for 60 minutes represent an uncontrolled situation and hence a potential degradation in the level of safety. The final integrated dose is very low and is not the primary concern. Rather it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes. The calculation called for in this EAL should also be conducted whenever a liquid release occurs for which a radioactive release authorization wasn't prepared or that exceeds the conditions on the radioactive release authorization (e.g. minimum dilution, alarm setpoints, etc.).

It is not intended that the release be averaged over 60 minutes, but exceed 2 times Technical Specifications limit for 60 minutes or longer. Further, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer. Unplanned is defined as any release for which radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

Barrier Analysis

N/A

PS

ESCALATION CRITERIA

This event will be escalated to an Alert when Liquid Effluent Release exceeds 200 times Technical Specification limits.

DISCUSSION

The radiation monitors selected for this EAL monitor radioactivity before it is discharged into the Delaware River and warns personnel of an excessive amount of radioactivity (greater than Technical Specification limits) being released to the environment.

DEVIATION

None

REFERENCES

NUMARC NESP-007, AU1.2 Off-Site Dose Calculation Manual, Section 1.0 - Liquid Effluents Technical Specifications 3.11.1.1 (U1 and U2)



6.2 Liquid Effluent Release

ALERT - 6.2.2

IC Any Unplanned Release of Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Technical Specifications for 15 minutes or longer

EAL

Valid Alarm from ANY one of the following RMS Channels:
Containment Fan Coil Process (R13)
Liquid Radwaste Disposal Process (R18)
Steam Generator Blowdown Process (R19)
Chemical Waste Basin Process (2R37)
AND
Sample analysis of liquid effluent indicates concentration in excess of 200 times Tech.
Spec. limits
AND
Release continues for \geq 15 minutes after the alarm occurs

MODE - All

BASIS

Releases in excess of 200 times Technical Specifications that continue for 15 minutes represent an uncontrolled situation and hence a potential degradation in the level of safety. This event escalates the Unusual Event by a factor of 100. The required release duration was reduced to 15 minutes in recognition of the increased severity of a release of this magnitude. The calculation called for in this EAL should also be conducted whenever a liquid release occurs for which a radioactive release authorization wasn't prepared or that exceeds the conditions on the radioactive release authorization (e.g. minimum dilution, alarm setpoints, etc.). Unplanned is defined as any release for which a radioactive permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 15 minutes, but exceed 200 times Technical Specifications limit for 15 minutes or longer. Further, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 15 minutes or longer.

Barrier Analysis

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N/A

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ESCALATION CRITERIA

N/A

DISCUSSION

The radiation monitors selected for this EAL monitor radioactivity before it is discharged into the Delaware River and warns personnel of an excessive amount of radioactivity (greater than Technical Specification limits) being released to the environment.

DEVIATION

None

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REFERENCES

NUMARC NESP-007, AA1.2 Off-Site Dose Calculation Manual, Section 1.0 - Liquid Effluents

6.3 In-Plant Radiation Occurrences

UNUSUAL EVENT - 6.3.1.a

IC Unplanned Increase in Plant Radiation

EAL

Unplanned increase in-plant radiation levels inside the Protected Area > 1000 times normal as indicated by <u>EITHER</u> one of the following: Permanent or portable Area Radiation Monitors General Area Radiological Survey

MODE - All

BASIS

An Unplanned increase in radiation levels within the Protected Area by a factor of 1000 times over normal represent a degradation in the control of radioactive material and a potential degradation in the level of safety of the plant. Unplanned is defined as those events or conditions which are not associated with a planned evolution, such that radiation levels are increasing in an uncontrolled manner. This condition specifically represents an uncontrolled increase in radiation levels within the Protected Area. Planned evolutions which cause elevated radiation levels <u>do not warrant</u> classification under this EAL.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to an Alert when radiation levels increase to a level that would impede access to areas required for the safe shutdown of the plant.

DISCUSSION

Normal level is considered as the highest reading in the past 24-hours excluding current peak values. RMS strip charts, RMS computer and/or SPDS can be used to confirm these values.

EAL - 6.3.1.a Rev. 00

DEVIATION

NUMARC IC AU2 includes unexpected increases in Airborne concentration in addition to plant radiation. The corresponding Hope Creek IC does not address Airborne concentration, since an increase in Airborne concentration is not addressed in the example EALs or the basis for the Unusual Event or Alert. Apparently, the Airborne concentration example EAL was deleted by NUMARC, but the corresponding IC was overlooked.

REFERENCES

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NUMARC NESP-007, AU2.4

6.3 In-Plant Radiation Occurrences

UNUSUAL EVENT - 6.3.1.b

IC Unplanned increase in Plant Radiation

EAL

An uncontrolled level decrease in the Refueling Cavity as indicated by <u>EITHER</u> one of the following:

Visual observation RVLIS - Refueling Mode

MODE - 6

BASIS

This EAL condition indicates a possible failure of the Refueling Cavity Seal or RHR System that results in inventory loss from the Refueling Cavity when flooded. Coverage of these events is appropriate due to the potential for increased doses to plant staff. These events have a long lead time relative to potential for radiological release outside the site boundary, thus the impact to public health and safety is very low. Classification as an Unusual Event is warranted as a precursor to a more serious event. Uncontrolled means that the level decrease can not be terminated, on Level Connor be required by operation.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to an Alert as a result of uncovery of a fuel assembly and/or indication of high radiation levels on the refueling floor.

DISCUSSION

Design of the Refueling Cavity is such that a liner failure in these volumes is unlikely; however, should such a failure occur, it would come under this EAL. If uncovery of fuel elements occur or if there is indication of high radiation levels on the refuel floor then the event will be classified as an Alert.

> EAL - 6.3.1.b Rev. 00

PS

During refueling operations the Reactor Vessel and Refuel Cavity are flooded. During fuel handling operations, the Fuel Transfer Tube will connect the Reactor Cavity and the Spent Fuel Pool. An unexplained lowering of Refuel Cavity level or Spent Fuel Pool level can be an indication that these volumes are draining. A drop in Reactor Cavity and Spent Fuel Pool level may result in a Spent Fuel Pool low level alarm. This alarm would be validated by visual observation of lowering level in the Refuel Cavity/Spent Fuel Pool.

DEVIATION

NUMARC states that this EAL will be applicable in all modes of operation. In modes other than Mode 6 the Reactor Vessel head will be fully tensioned and there will be no interconnection between the Refueling Cavity and the Spent Fuel Pool. In other modes, a loss of Reactor Vessel inventory is addressed in Section 3. Uncontrolled loss of water level in the Spent Fuel Pool, however, is classified under EAL 6.3.1.c in all modes of operation.

REFERENCES

NUMARC NESP-007, AU2.1 OP-AR.ZZ-0003(Q) OHA-C35 OP-AB.FUEL-0002(Q)

6.3 In-Plant Radiation Occurrences

UNUSUAL EVENT - 6.3.1.c

IC Unexpected increase in Plant Radiation

EAL

Valid SFP Low Level alarm - OHA C-35 <u>AND</u> Visual observation of an uncontrolled level decrease in the Spent Fuel Pool

MODE - All

BASIS

These EAL conditions indicate a possible failure of the Spent Fuel Pool Cooling System that results in inventory loss from the Spent Fuel Pool. This EAL also works in conjunction with the loss of Refueling Cavity EAL for Mode 6 operations, with the Spent Fuel Pool and Refueling Cavity connected via the Fuel Transfer Canal. Coverage of this event is appropriate due to the potential for increased doses to plant staff. This event has a long lead time relative to potential for radiological release outside the site boundary, thus the impact to public health and safety is very low. Classification as an Unusual Event is warranted as a precursor to a more serious event. Uncontrolled means that the level decrease can not be terminated, or U = V = L + V = L

Barrier Analysis

N/A

ESCALATION CRITERIA

<u>Emergency Classification</u> This event will be escalated to an Alert as a result of uncovery of a <u>irradiated fuel as indicated by fuel assembly and/or indication of high radiation levels in the</u> fuel handling building.

DISCUSSION

Design of the Spent Fuel Pool is such that a liner failure in this volume is unlikely; however, should such a failure occur, it would be classified under this EAL. Lowering of water level in the Spent Fuel Pool to below the level of the spent fuel bundles may result in an increase in

EAL - 6.3.1.c Rev. 00 P5

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the airborne contamination level in the Fuel Handling Building. If uncovery of fuel elements occur or if there is indication of high radiation levels in the fuel handling building then the event will be classified as an Alert.

This alarm would be validated by visual observation of lowering level in the Spent Fuel Pool. The added requirement for an uncontrolled decrease in SFP level with a low level alarm is included to allow normal makeup to recover level for minor level deviations due to evaporation losses, etc.

DEVIATION

None

REFERENCES

NUMARC NESP-007, AU2.2 OP-AR.ZZ-0003(Q) OHA-C35 OP-AB.FUEL-0002(Q)

6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.a

IC Release of Radioactive Material or increases in Radiation Levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown

EAL

Unplanned increase in-plant radiation levels inside the Protected Area by a factor 1000 over normal as indicated by <u>EITHER</u> one of the following:

Permanent or portable Area Radiation Monitors General Area Radiological Survey

AND

Unplanned Dose Rate > 2000 mRem/hr above normal in any <u>area of the plant</u> which requires access to maintain plant safety functions (excluding the Control Room or CAS)

NRC

PS

MODE - All

BASIS

The term **"unplanned"** is defined as those events which are not associated with a pre-planned evolutions such that radiation levels are increasing for reasons which cannot be immediately explained. The EAL addresses radiation levels which would impede operation of systems required to maintain safe operations or to establish or maintain cold shutdown. <u>RadiationRadiations</u> levels could be indicated by ARM or radiological survey. It is the impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. The Dose Rate of 2000 mRem/hr was chosen as a threshold based upon NAP-24 Administrative Dose Limits and Extension criteria which has Senior Radiation Protection Supervisor approval required prior to exceeding 2000 mRem/yr. This valve is low enough to allow any increase in normal radiation level, by a factor of 1000, to be classified as an Unusual Event per EAL 6.3.1.a.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when loss of control of radioactive materials causes significant offsite doses.

DISCUSSION

Emergency Coordinator judgement must be used to determine areas that contain systems that must be operated manually, or require local surveillances to assure reliable support of safe plant operation for the conditions that exist. Areas having equipment that must be operated locally during an accident and areas along associated access routes require HP coverage and continuous update of changing radiological conditions.

Areas of the plant which require access to maintain plant safety functions include but are not limited to :

4kv Switchgear Room	Radwaste Control Center
CCW Pump Room	Corridor next to the Spent Fuel Pit Hx Room
CCW Hx Room	Electrical Control Center
Chemistry Lab	Aux Feedwater Pump & Valve Area
Primary-Sample-Room-	Diesel Oil Supply Tank Compartment
Counting Room	Electrical Relay and Switchgear Room
100 ft Chiller Area	Boric Acid Evaporator Room Unit 1
Diesel Generator Compartment	Boric Acid Evaporator Room Unit 2
Diesel Generator Control Room	AREAS SON REMOTE Shutdown
	CORD Residual Heat Renoval system areas

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA3.2 NC.NA-AP.ZZ-0024(Q)- Radiation Protection Program <u>S-C-VAR-MDC-1518 Rev 0, Draft</u> NRC

NRC

6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.b

IC Release of Radioactive Material or increases in Radiation Levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown

EAL

Unplanned radiation levels > 15 mRem/hr in <u>EITHER</u> one of the following: The Control Room The Security Central Alarm Station (CAS)

MODE - All

BASIS

The term "unplanned" is defined as those events which are not associated with a pre-planned evolutions such that radiation levels are increasing for reasons which cannot be immediately explained. The EAL addresses radiation levels which would jeopardize continuous occupancy of the Control Room or Security CAS. <u>RadiationRadiations</u> levels could be indicated by ARM $|\mathcal{P}|$ or radiological survey. It is the impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. In addition, unplanned increases in in-plant radiation levels represent a degradation in the control of radioactive materials and represent a degradation in the level of safety of the plant.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to a Site Area Emergency when loss of control of radioactive materials causes significant off-site doses.

DISCUSSION

The Control Room and Security Central Alarm Station general area radiation level threshold is set at 15 mRem/hr and was chosen because continuous occupancy is required. This is

EAL - 6.3.2.b Rev. 00 consistent with General Design Criteria 19, which addresses continuous occupancy of the Control Room for 30 days after an accident. Additionally, since the Control Room is shielded, this radiation level represents a serious loss of control of radioactive material.

The Security Secondary Alarm Station (SAS) was excluded because it is fully redundant to the Security CAS. For a radiological event, SAS would be evacuated, with all Security functions performed by the CAS.

Events which may require Control Room evacuation to establish or maintain Cold Shutdown will be classified per Section 8 EALs.

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA3.1 10CFR50



6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.c

IC Major Damage to Irradiated Fuel or Loss of Water Level that has or will result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel

EAL

Major Damage to Irradiated Fuel reported in the Fuel Handling Bldg. AND
Valid High Alarm is received on EITHER one of the following:
R5
R32
AND
Valid High Alarm received from EITHER one of the following RMS channels:
R41
R45

MODE - All

BASIS

Major Damage to an irradiated fuel bundle that results in a High Fuel Handling Building Radiation Monitor alarm coincident with a Plant Vent Exhaust Process Radiation Monitor alarm warrants declaration of an Alert, due to the potential for an offsite release exceeding the Technical Specification limit. The intent of this EAL is to classify those events that result in the actual release of fission products from an irradiated Fuel Bundle, due to physical damage. Events that result in increased radiation levels due to shine, as a result of decreased shielding, but do not involve a release of fission products should not be classified under this EAL, but should be classified EAL 6.3.2.e, when those conditions exist. R45 was selected as a plant vent monitor for those events which result in R41 being deenergized or Out Of Service due to the magnitude of the release.

Major Damage is defined as physical damage to an Irradiated Fuel Bundle that results from either dropping or physical contact with other components, such that the magnitude of the damage <u>specifically</u> results in actuation of an Area Radiation Alarm. Valid is defined as the High alarm occurring as a result of the damage to the irradiated fuel bundle.

EAL - 6.3.2.c Rev. 00

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when loss of control of radioactive materials causes significant offsite doses.

DISCUSSION

The Fuel Handling Building Area Monitors provide an early warning of developing problems which may be related to a damaged fuel bundle. The Plant Vent Exhaust Rad Monitors are Process Monitors and are designed to detect a release of Fission Products. Hence, they are included as part of the EAL threshold, to confirm the magnitude of damage to an irradiated fuel bundle.

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA2.1 OP-AR.ZZ-0003(Q) OHA-C35 OP-AB.FUEL-0002(Q) NUREG/CR-4982 NRC Information Notice no. 90-08 10CFR50

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6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.d

IC Major Damage to Irradiated Fuel or Loss of Water Level that has or will result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel

EAL

Major Damage to Irradiated Fuel reported in the Containment
AND
Valid High Alarm is received on <u>ANY</u> one of the following:
R2
R10A
R10B
AND
Valid High Alarm received from ANY one of the following RMS channels:
R11A
R12A
R12A

MODE - All

BASIS

Major Damage to an irradiated fuel bundle that result in a High Containment Area Radiation Monitor alarm coincident with a Containment Process Radiation Monitors alarm warrants declaration of an Alert, due to the potential for an offsite release exceeding the Technical Specification limit. The intent of this EAL is to classify those events that result in the potential release of fission products from an irradiated Fuel Bundle, due to physical damage. Events that result in increased radiation levels due to shine, as a result of decreased shielding, but do not involve a release of fission products should not be classified under this EAL, but should be classified EAL 6.3.2.e, when those conditions exist.

Major Damage is defined as physical damage to an Irradiated Fuel Bundle that results from either dropping or physical contact with other components, such that the magnitude of the damage <u>specifically</u> results in actuation of an Area Radiation Alarm. Valid is defined as the High alarm occurring as a result of the damage to the irradiated fuel bundle.

EAL - 6.3.2.d Rev. 00

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when loss of control of radioactive materials causes significant offsite doses.

DISCUSSION

The Containment Area Monitors provide an early warning of developing problems which may be related to a damaged fuel bundle. The Containment Rad Monitors are Process Monitors and are designed to detect a release of Fission Products. Hence, they are included as part of the EAL threshold, to confirm the magnitude of damage to an irradiated fuel bundle.

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA2.1 OP-AR.ZZ-0003(Q) OHA-C35 OP-AB.FUEL-0002(Q) NUREG/CR-4982 NRC Information Notice no. 90-08 EPA 400-R-92-001, Manual of Protective Action Guide and Protective Actions for Nuclear Incidents

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6.0 Radiological Releases/Occurrences

6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.e/6.3.2.5

IC Major Damage to Irradiated Fuel or Loss of Water Level that has or will result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel

EAL

EITHER one of the following:

- Unplanned, increase \geq 2000 mRem/hr on ANYany one of the following Area Rad monitors or by general area rad survey; indicates >2000 mRem/hr R2 Containment, General Area Low **R5** Fuel Handling Building Area Fuel Pool R9 Fuel Handling Building Fuel Storage Area R32A Spent Fuel Handling Crane, Area Monitor
- Visual observation of Irradiated Fuel uncovered

MODE - All

BASIS

This EAL indicates a possible failure of the Refueling Cavity Seal, RHR System, or Spent Fuel Pool Cooling System that results in inventory loss from the Refueling Cavity when flooded or the Spent Fuel Pool. Design of the Refueling Cavity and Spent Fuel Pool is such that a liner failure in these volumes is unlikely; however, should such a failure occur, it would come under this EAL. Lowering of water level in the Spent Fuel Pool to such a value as to cause Dose Rates to increase to this value will result in evacuation of the local areas. Uncovery of irradiated fuel elements can lead to their fuel clad failure due to loss of cooling.

The term "unplanned" is defined as those events which are not associated with a pre-planned evolutions such that radiation levels are increasing for reasons which cannot be immediately explained. The EAL addresses radiation levels which would impede operation of systems required to continue efforts to stop the loss of Refueling water level. RadiationRadiations levels could be indicated by ARM or radiological survey. The Dose Rate of 2000 mRem/hr was chosen as a threshold based upon NAP-24 Administrative Dose Limits and Extension criteria which has Senior Radiation Protection Supervisor approval required prior to exceeding 2000 mRem/yr. This value is low enough to ensure classification of an Alert before personnel



EAL - 6.3.2.e/f. Rev. 00

NPC

access is severely hampered and high enough to allow any unplanned increase in normal radiation level, by a factor of 1000, to be classified as an Unusual Event per EAL 6.3.1.a.

Visual observation of irradiated fuel uncovered will result in onsite dose levels changing significantly.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to a Site Area Emergency when loss of control of radioactive materials causes significant offsite doses.

DISCUSSION

It is understood that a decrease in Refueling Cavity water level will cause Dose Rates to increase due to the uncovery of irradiated Reactor components other than a spent fuel assembly. However, Dose Rates in excess of 2 Rem/hr indicate a loss of level such that recovery options may be limited and thus an Alert declaration is warranted.

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA2.3 and AA2.4 OP-AR.ZZ-0003(Q) OHA-C35 OP-AB.FUEL-0002(Q) NUREG/CR-4982 NRC Information Notice no. 90-08

> EAL - 6.3.2.e/f. Rev. 00

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7.0 Electrical Power

7.1 Loss of AC Power Capabilities

ALERT - 7.1.2.a

IC AC power capability to vital buses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout

EAL

Loss of 4.16-KV Vital Bus Power Sources (Offsite and/or Onsite) which results in the **availability** of <u>only</u> one 4.16-KV Vital Bus Power Source (Offsite or Onsite)

_ *u* 1 to

<u>AND</u>

> 15 Minutes have elapsed

MODE - 1, 2, 3, 4

BASIS

The condition indicated by this EAL is the degradation of offsite and onsite power systems supply to the 4KV Vital Buses, with two separate concerns. First, this EAL declares an Alert for conditions such that any additional, single power source failure would result in a loss of power to <u>ALL</u> 4KV Vital Buses. Second, an Alert would also be declared for < 2 4KV Vital Buses energized to be consistent with EOP-LOPA-1 entry conditions. At least 2 4KV Vital Buses are required to ensure one full train of ESF equipment is available for plant control. <u>Prolonged loss of AC powerThese coditions</u> reduces redundancy and potentially degrades the level of safety by increasing plant vulnerability to a complete loss of <u>Vital</u> AC power. <u>"Availability"</u> means that the power source can be aligned to provide power to the bus within 15 minutes or is currently supplying power to at least one Vital Bus. Fifteen (15) minutes was chosen to exclude transient or momentary power losses. Resetting of the 15 minute "clock" should not occur until a reliable source of power has been restored to the vital bus.

Barrier Analysis

None

ESCALATION CRITERIA

PS

This event will be escalated to the Site Area Emergency classification level on loss of power to all 4KV Vital Buses for > 15 minutes.

DISCUSSION

The intent of this EAL is to classify events strictly as they relate to 4KV Vital Bus power availability. For the purposes of the EAL, availability of Diesel Generators that have not been challenged to start during degradation of AC power sources to the 4KV Vital Buses should be based on meeting Technical Specification action requirements for loss of offsite AC power sources. There are two separate conditions addressed by this EAL.

The first condition is directly related to the Initiating Condition, and is precautionary in classifying the event as an Alert <u>if</u> a single failure of one power source could result in a total loss of all 4KV Vital power. Should such a loss actually occur, it would result in classification at the Site Area Emergency Level <u>after 15 minutes if no other power sources are available</u>. Examples of this condition are:

- 1) Failure of the 13(23) Station Power Transformer with all Diesel Generators inoperable; or
- 2) loss of all offsite power with a failure of two Diesel Generators (results in only one 4KV Vital Bus energized by its associated Diesel Generator).

The second condition is unique to Salem Generating Station due to the three 4KV Vital Bus vs. two trains of ESF equipment arrangement. Two energized 4KV Vital Buses are required to ensure the availability of one full train of ESF equipment. This threshold is consistent with EOP-LOPA-1 entry conditions used in the EOP Network.

DEVIATION

None

REFERENCES

NUMARC NESP-007, SA5 EOP-TRIP-1 EOP-LOPA-1 OP-AB.LOOP-0001(Q) OP-AB.LOOP-0002(Q) OP-AB.4KV-0001(Q) OP-AB.4KV-0002(Q) OP-AB.4KV-0003(Q) SGS 1(2) Technical Specifications Section 3/4.8

BNG

.7.0 Electrical Power

7.1 Loss of AC Power Capabilities

ALERT - 7.1.2.b

IC Loss of All Offsite Power and All Onsite AC Power to Vital 4 KV Buses While the Plant is in Cold Shutdown <u>or Refueling or Defueled</u> Mode

EAL

Loss of power to All 4KV Vital Buses

<u>AND</u>

> 15 minutes have elapsed

MODE - 5, 6, Defueled

BASIS

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Fan Coil Unit, Spent Fuel Pool Cooling and Service Water. When in cold shutdown, refueling, or defueled modes, this event can be classified as an Alert. This is because of the significantly reduced decay heat load with lower temperatures and pressures. Fifteen (15) minutes was chosen to exclude transient or momentary power losses. Resetting of the 15 minute "clock" should not occur until a reliable source of power has been restored to the vital bus.

Barrier Analysis

None

ESCALATION CRITERIA

Escalation to a Site Area Emergency would occur on Radiological Release (EAL Section 6.0), or on the long term inability to remove Decay Heat (EAL Section 8.0).

DISCUSSION

In Modes 5, or 6, OP-AB.LOOP-0001(Q) provides guidance for maintaining plant control regardless of power remaining to the 4KV Vital Buses.

EAL - 7.1.2.b Rev. 00 It is assumed that the plant will be maintained in a cold shutdown condition; if the plant is not able to be maintained in this mode then escalation to Site Area Emergency would be appropriate based on Loss of Decay Heat Removal Capability EALs in Section 8.0.

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DEVIATION

None

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REFERENCES

NUMARC NESP-007, SA1 OP-AB.LOOP-0001(Q) OP-AB.4KV-0001(Q) OP-AB.4KV-0002(Q) OP-AB.4KV-0003(Q) SGS 1(2) Technical Specifications Section 3/4.8

NC.NA-AP.22-0001 (Q)

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PROCEDURE REVISION REQUEST	
(INCLUDING NEW PROCEDURE DEVELOPMENT)	
TO SPONSOR: BOD LaughLIN DATE:	4-25-96
PROCEDURE NO: $SC, MD-ST, 125-004(\phi)$ curre	ENT REV:
PROCEDURE TITLE: 125 VOLT STATION Batteries 18	HONTH SERVICE TR
OTHER AFFECTED PROCEDURES (Each procedure may need a separate	e revision request):
REQUESTED COMPLETION CODE:	DATE:
PROPOSED PROCEDURE CHANGE (ATTACH MARKED-UP COPY OF PROCEDURE	;):
ADD GOSS-REFERENCE "7.6.9. Salen EC	G Section
7.2.3. a, Loss of DC Dower Cap	a bILITIES
	· · · · · · · · · · · · · · · · · · ·
LIST SUPPORTING DOCUMENTS AND PROVIDE JUSTIFICATION FOR CHANG PROCEDURE (ATTACH COPIES OF SUPPORTING DOCUMENTS):	$\frac{\nu = \omega}{ECG}$
EALS USE This Procedure for a Re	FERENCE TO
TOTAL BOTTERY LOW VOLTEGE for Tech	Seeco
It This Proceeduce changes the EAU	Lwill have To
ORIGINATOR (Please print): FRANK Hughes	EXTENSION: 1529
DEPARTMENT: EMPROPRIS PREPARTALIESS	MAIL CODE: 203
ORIG. DEPT. APPROVAL (Optional):	DATE: 4-25-91
COMPLETION CODES:	
A - prior to next scheduled use M - according to DCP sc	hedule
C - next biennial review S - next startup or shu	tdown (explain)
0 - next revision 0 - other (explain)	
K - Will not be incorporated (explain)	
To be completed by Sponsor or Procedure Writing Group Supervis	sor:
COMPLETION CODE ASSIGNED REQUEST APPROVED BY:	
STIMATED COMPLETION DATE:	·····
RESOLUTION TO REQUEST:	··
Return a copy of the completed Request to the Orig	jinator.
	<u></u>

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- 7.5.6 C&D Batteries Letter dated October 3, 1989 from Graham Walker, Manager Applications Engineering to L. Miceli/R. Chranowski; Subject: Correcting Electrolyte Specific Gravity for Level
- 7.5.7 Design Calculation ES-4.003(Q), Rev. 0
- 7.5.8 SAR Change Notice #94-04
- 7.6 <u>Cross-References</u>
 - 7.6.1 SC.MD-CM.ZZ-0009(Q), Battery Equalizing Charge Procedure
 - 7.6.2 NC.NA-AP.ZZ-0009(Q), Work Control Process
 - 7.6.3 NC.NA-AP.ZZ-0011(Q), Records Management Program
 - 7.6.4 NC.NA-AP.ZZ-0014(Q), Training, Qualification and Certification
 - 7.6.5 NC.NA-AP.ZZ-0015(Q), Safety Tagging Program
 - 7.6.6 NC.NA-AP.ZZ-0020(Q), Control of Nonconforming Components and Structures
 - 7.6.7 NC.NA-AP.ZZ-0025(Q), Nuclear Department Operational Fire Protection Program
 - 7.6.8 NC.NA-AP.ZZ-0038(Q), Chemical Control Program
 - Baking soda (bicarbonate sodium) CICP# 900-0047

7.6.9 Salen ECG SELTION 7.2.3.2, LONS OF DE POWER Capabilities



7.0 Electrical Power

7.2 Loss of DC Power Capabilities

UNUSUAL EVENT - 7.2.1.a

IC Unplanned Loss of Required DC Power While the Unit is in Either Cold Shutdown or Refueling Mode for Greater Than 15 Minutes

EAL

Unplanned decrease in Voltage to < 114VDC on All 125VDC Vital buses <u>AND</u> > 15 minutes have elapsed

MODE - 5, 6

BASIS

A loss of all DC power compromises the ability to monitor and control plant functions. 125 volt DC system provides control power to decay heat removal systems, diesel generator auxiliaries, plant alarm and indication circuits as well as the control power for the associated loads. If 125 volt DC power is lost for an extended period of time (greater than 15 minutes) critical plant functions required to maintain safe plant conditions may not operate and core uncovery with subsequent reactor coolant system and primary containment failure might occur. Fifteen (15) minutes was chosen to exclude transient or momentary power losses. Although this EAL threshold is not met unless ALL 125 VDC is lost, EC judgement should be used to classify an event that result in loss of two of the three 125 VDC Vital buses if the loss causes an extensive loss of control of the plant and/or safety systems. Threshold values for bus voltage were derived from SC.MD-ST.125-0004(Q).

Barrier Analysis

None

ESCALATION CRITERIA

This event would be escalated to an Alert based on Loss of Decay Heat Removal Capability.

EAL - 7.2.1.a Rev. 00

DISCUSSION

Two of the three 125 VDC buses are required operable in Modes 5 or 6 per Technical Specifications. This EAL addresses an unplanned loss of ALL 125 VDC buses such that Technical Specification requirements are not met. The minimum voltage value was selected based on the minimum allowable voltage (rounded to 114.0 for consistency and readability on Control Room analog indications) required for DC bus operability as per SC.MD-ST.125-0004(Q). Although continued operation may occur with degraded voltage, this value signifies the minimum operable voltage allowed. Loss of DC power may result in the loss of control power and instrumentation associated with equipment necessary to maintain Cold Shutdown conditions.

DEVIATION

None

REFERENCES

NUMARC NESP-007, SU7 OP-AR.ZZ-0002(Q) SGS 1(2) Technical Specifications, 3/4.8 CBD DE-CB, 125-0018(Q) SC.MD-ST.125-0004(Q)

> EAL - 7.2.1.a Rev. 00

8.0 System Malfunctions

8.1 Loss of Heat Removal Capability

SITE AREA EMERGENCY - 8.1.3.c

IC Complete Loss of Functions Needed to Achieve or Maintain the Plant in Hot Shutdown

EAL

Heat Sink RED PATH

MODE - 1, 2, 3, & 4/RHR in Injection Lineup

BASIS



This EAL addresses complete loss of a function required to reach Hot Shutdown conditions while operating in Mode 1, 2, 3, or Mode 4 with both trains of RHR aligned for injection. The ability to place the plant in Mode 3 from any "at Power" condition represents the loss of Reactivity Control which is adequately addressed in Section 5.0, ATWS. CFST Heat Sink RED PATH will limit the ability of the Control Room crew to place the plant in a Hot Shutdown condition due the inability to remove heat from the RCS. This represents an actual loss of functions intended for protection of the public and is consistent with the Fission Product Barrier Table threshold values; thus declaration of a Site Area Emergency is warranted. This EAL works in conjunction with EAL 8.1.3.ba for events which occur while the plant is in on RHR cooling.

Barrier Analysis

N/AFuel Clad and RCS Barriers have been potentially lost.

ESCALATION CRITERIA

Escalation to a General Emergency would be based on loss of Fission Product Barriers or Radiological Releases.

DISCUSSION

Symptom based criteria from the Emergency Operating Procedures Critical Safety Function Tree (CFST) Monitoring program. The CFSTs are contained as a tab to the ECG. The intent of using CFST status is to simplify the identification of the threshold criteria.

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DEVIATION

None

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REFERENCES

NUMARC NESP, SS4 EOP-CFST-1

8.0 System Malfunctions

8.1 Loss of Heat Removal Capability

SITE AREA EMERGENCY - 8.1.3.d

IC Complete Loss of Functions Needed to Achieve or Maintain the Plant in Hot Shutdown

EAL

All Turbine Stop Valve Closed (MS 28)	BNE
AND	
LOSS of All Steam Dump Valves (TB 10, 20, 30, 40)	BNG
AND	
LOSS of All MS10 (Steam Generator Power-Operated Relief Valves) Valve Control (in Auto AND Manual)	BNZ
AND	
>15 minutes have elapsed	

MODE - 1, 2, 3, and 4 with RHR in Injection Mode

BASIS

This EAL addresses complete loss of a function required to reach Hot Shutdown conditions while operating in Mode 1, 2, 3, or Mode 4 with both trains of RHR aligned for injection. The inability to place the plant in Mode 3 from any "at Power" condition represents the loss of Reactivity Control which is adequately addressed in Section 5.0, ATWS. A total loss of Steam Generator heat removal capability will limit the ability of the Control Room crew to place the plant in a Hot Shutdown condition due to the inability to remove heat from the RCS. The 15 minute threshold value was added to allow for restoration of unavailable systems. This represents an actual loss of functions intended for protection of the public; thus declaration of a Site Area Emergency is warranted. This EAL works in conjunction with EAL 8.1.3.a for events which occur while the plant is in on RHR cooling.

EAL - 8.1.3.d Rev. 00

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Barrier Analysis

N/A

ESCALATION CRITERIA

Escalation to a General Emergency would be based on loss of Fission Product Barriers or Radiological Releases.

DISCUSSION

This EAL attempts to identify a condition where all secondary heat removal capabilities have been lost due to inability of the Steam Generators to transfer heat either to the atmosphere or the Main Condenser. This loss of heat removal capabilities will result in an inability to cooldown the RCS to a Hot Shutdown condition.

DEVIATION

None

REFERENCES

NUMARC NESP, SS4



8.0 System Malfunctions

8.2 Loss of Assessment Capability

UNUSUAL EVENT - 8.2.1.a

IC Unplanned Loss of All Onsite or Offsite Communications Capabilities

EAL

Unplanned Loss of <u>ALL ONSITE</u> communications as evidenced by the loss of <u>ALL</u> of the following systems:

- Station Page System (Gaitronics)
- Station Radio System
- Direct Inward Dial System (DID)
- ------Essex (Centrex) Phone System
- ------Nuclear Emergency Telephone System (NETS)



MODE - All

BASIS

An Unplanned loss of communication ability significantly degrades the operating crews ability to perform tasks necessary for plant operations and/or the ability to communicate with offsite authorities, warrants declaration of an Unusual Event. The loss of off-site communications capability is more comprehensive than that addressed by 10CFR50.72.b. Unplanned is defined as the loss of communication capabilities not being the result of planned maintenance activities, where compensatory measures would be taken.

Barrier Analysis

N/A

ESCALATION CRITERIA

None

DISCUSSION

None

NRC
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DEVIATION

None

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REFERENCES

NUMARC NESP-0007, SU6

EAL - 8.2.1.a Rev. 00

8.0 System Malfunctions

8.2 Loss of Assessment Capability

UNUSUAL EVENT - 8.2.1.c

IC Unplanned loss of Most or All Annunciation or Indication in the Control Room for Greater Than 15 minutes

EAL

Unplanned loss of \geq 75% of Control Room Overhead Annunciators for \geq 15 minutes

<u>AND</u>

EITHER one of the following:

- 15 minutes have elapsed since the loss of OHAs
- <u>A significant transient** is in progress</u>



MODE - 1, 2, 3, 4

BASIS

A unplanned loss of most or all Control Room Overhead annunciators without a plant transient in MODES 1, 2, 3, or 4 for greater than 15 minutes warrants a heightened awareness by Control Room Operators. Qualification of "most" is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss. OP-AB.ANN-0001(Q) details increased monitoring and surveillance requirements as well as alternate indicators. 15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification must be made under this EAL regardless of time required for restoration. If it is determined that the annunciators were lost for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL but a review of the "After The Fact" RAL must be completed. Unplanned loss of annunciators excludes scheduled maintenance and testing activities.

**A significant transient is left to the determination of the SNSS/EC; but, as a minimum, plant transients for this EAL should include:

BNE

BNZ

EAL - 8.2.1.c Rev. 00

BNZ

BNG

BNE

- <u>Reactor Trips (Manual and Automatic)</u>
- Load Rejections > 25% Thermal Power
- ECCS Injections
- <u>Thermal Power Oscillation > 10%</u>

Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated to an Alert if a transient is in progress or if alternate indications become unavailable and 15 minutes have elapsed since the loss of OHAs.

DISCUSSION

This EAL is not required in modes 5 or 6 due to the limited number of safety systems required for operation.

In judging the severity of the annunciator loss, consideration should be given to those annunciators needed for by the operating staff for operation in abnormal and emergency operating procedures.

DEVIATION

Example 1.c is not required in this EAL as the referenced procedure describes the monitoring, -surveillance, and judgement that must be made. A section for declaring an UE has been added if a transient is in progress when the loss of annunicators occurs as requested by the NJ-BNE, two independent events occurring at the same time warrants a expeditious notification and not waiting the 15 minutes for the Unusual Event declaration.

REFERENCES

NUMARC NESP-007, SU3 OP-AB.ANN-0001(Q)

BNE

8.0 System Malfunctions

8.2 Loss of Assessment Capability

ALERT - 8.2.2.a/8.2.2.b

IC Unplanned loss of Most or All Control Room Annunciators and a significant Transient is in Progress or Compensatory Indicators are Unavailable

EAL

Unplanned loss of 75% of Control Room Overhead Annunciators for 15 minutes

<u>AND</u>

EITHER one of the following:

- Alternate Indications are <u>NOT AVAILABLE</u> per AB.ANN-0001(Q)
- A significant transient** is in Progress

<u>AND</u>

15 minutes have elapsed since the loss of OHAs

MODE - 1, 2, 3, 4

BASIS

A unplanned loss of most or all Control Room Overhead annunciators without a plant transient in MODES 1, 2, 3, or 4 for greater than 15 minutes warrants a heightened awareness by Control Room Operators. Qualification of "most" is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss. OP-AB.ANN-0001(Q) details increased monitoring and surveillance requirements as well as alternate indicators. 15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification must be made under this EAL regardless of time required for restoration. If it is determined that the annunciators were lost for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL but a review of

EAL - 8.2.2.a/8.2.2.b Rev. 00

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the "After The Fact" RAL must be completed. Unplanned loss of annunciators excludes scheduled maintenance and testing activities.

<u>**</u>A significant transient is left to the determination of the SNSS/EC; but, as a minimum, plant $|\mathcal{B}^{N\mathcal{B}}|$ transients for this EAL should include:

- Reactor Trips (Manual and Automatic)
- Load Rejections > 25% Thermal Power
- ECCS InjectionsActuations
- <u>Thermal Power Oscillation > 10%</u>

Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated to a Site Area Emergency with a failure of alternate indications and a plant transient in progress.

DISCUSSION

Without Control Room annunciators, it may be difficult to monitor conditions associated with normal plant operations. During transient event such as those listed in the EAL, the difficulty becomes more acute.

This EAL is not required in modes 5 or 6 due to the limited number of safety systems required for operation.

DEVIATION

None

REFERENCES

NUMARC NESP-007, SA4 OP-AB.ANN-0001(Q)

8.0 System Malfunctions

8.2 Loss of Assessment Capability

SITE AREA EMERGENCY - 8.2.3

IC Inability to Monitor a Significant Transient in Progress

EAL

Loss of 75% of Control Room Overhead Annunciators

<u>AND</u>.

A significant tansient** is in Progress

AND

Alternate Indications are NOT AVAILABLE per OP-AB. ANN-0001(Q)

<u>AND</u>

Control Room indications are unavailable to monitor <u>ANY</u> one of the following:

- RCS/Core Status
- Reactivity Control
- ECCS
- Secondary Systems (SGs, AFW)
- Containment Parameters

<u>AND</u>

Alternate Indications are NOT AVAILABLE per OP AB.ANN 0001(Q)

MODE - 1, 2, 3, 4

BASIS

A loss (planned or unplanned) of most or all Control Room Overhead annunciators with a plant transient in MODES 1, 2, 3, or 4 for any amount of time warrants a heightened awareness by Control Room Operators. Qualification of "most" is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss.

EAL - 8.2.3 Rev. 00 195

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PS

A significant plant transient is left to the determination of the SNSS/EC; but, as a minimum, plant transients for this EAL should include:

- Reactor Trips (Manual and Automatic)
- Load Rejections > 25% Thermal Power
- ECCS Injection
- Thermal Power Oscillations $\geq 10\%$

The list of systems requiring Control Room monitoring ability (e.g.; RCS/Core, Reactivity Control, ECCS, etc.) was included to ensure all safety functions (including the ability to shut down the reactor, maintain core cooling, maintain the RCS intact, provide for a heat sink, and maintain an intact Containment) can be determined by some form of Control Room instrumentation. OP-AB.ANN-0001(Q), Loss of Overhead Annunciator System, details increased monitoring and surveillance requirements as well as alternate indicators.

Barrier Analysis

None

ESCALATION CRITERIA

This event would be escalated to a General Emergency based on the loss of Fission Product Barriers or abnormal radiological releases.

DISCUSSION

Without Control Room Overhead Annunciators, it may be difficult to monitor conditions associated with normal plant operations. During significant transient events such as those listed in the EAL, the difficulty becomes more acute. Compounding these, a concurrent loss of Control Room backup monitoring will further hinder Operations staff decision making needed to respond to the transient.

DEVIATION

None

REFERENCES

NUMARC NESP-007, SS6 OP-AB.ANN-0001(Q)



9.1 Security Threats

ALERT - 9.1.2

IC Security Event in a Plant Protected Area

EAL

Confirmed hostile intrusion or malicious acts as evidenced by ANY one of the following:

- Discovery of an intruder(s), armed and violent, within the Protected Area resulting in SCP-6 implementation
- Hostage held on-site in a non-vital area resulting in SCP-8 implementation
- Malicious acts or destructive device discovered in a Vitial Area resulting in SCP 10 implementation

MODE - All

BASIS

This class of security event represents an escalated threat to the level of safety of the plant. This event is satisfied if physical evidence supporting the hostile intrusion or assault exists. The intent of this EAL is to classify security events which represent an actual intrusion into the plant Protected Area. The SNSS/EC will declare an Alert upon consulting with the Security to determine the validity of the entry conditions. Security Contingency Procedure (SCP) numbers are referenced following each EAL threshold. Since some SCP numbers appear in more than one EAL, the on-duty PSE&G Security Supervisor will provide information concerning the specific event to aid in classification.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to a Site Area Emergency based upon a hostile intrusion in plant Vital Areas.

DISCUSSION

The following is an index of Security Contingency Procedures referenced by this event: SCP-6 "Discovery of Intruders or Attack"

> EAL - 9.1.2 Rev. 00

NRC

SCP-8 "Hostage Situation"

SCP 10 "Discovery of Destructive Devices or Evidence of Malicious Acts"

NRC

DEVIATION

None

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REFERENCES

NUMARC NESP-007, HA4.1, HA4.2 Safeguards Contingency Plan

9.1 Security Threats

SITE AREA EMERGENCY - 9.1.3

IC Security Event in a Plant Vital Area

EAL

Confirmed hostile intrusion or malicious acts in plant Vital Areas as evidenced by:

- Discovery of an intruder(s), armed and violent, within the Vital Area resulting in SCP-6 implementation
- <u>Malicious acts or destructive device discovered in a Vital Area resulting in SCP-10</u> implementation

MODE - All

BASIS

This class of security event represents an escalated threat to plant safety above that contained in an Alert in that a hostile intrusion or assault has progressed from the Protected Area to a Vital Area. The Vital Areas are within the Protected Area and are generally controlled by key card readers. These areas contain vital equipment which includes any equipment, system, device or material required for safe shutdown and for protection of the health and safety of the public and plant personnel. The Security Contingency Procedure (SCP) number is referenced following the EAL threshold. Since some SCP numbers appear in more than one EAL, the onduty PSE&G Security Supervisor will provide information concerning the specific event to aid in classification.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to a General Emergency based upon the loss of physical control of the Control Room or Remote Shutdown Capability.

DISCUSSION

The following is an index of -the Security Contingency Procedure referenced by this event:

NRC

NRC

EAL - 9.1.3 Rev. 00

NRC

SCP-6 _ "Discovery of Intruders or Attack" SCP-10 "Discovery of Destructive Devices or Evidence of Malicious Acts"

DEVIATION

None

REFERENCES

NUMARC NESP-007, HS1.1, HS1.2 Safeguards Contingency Plan

> EAL - 9.1.3 Rev. 00

9.2 Fire

ALERT - 9.2.2

IC Fire Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL

Fire within <u>ANY</u> one of the following Plant Vital Structures: Auxiliary Building Service Water Intake Structure Control Point Area Inner/Outer Penetration Areas Containment Fuel Handling Building Service Building RWST, PWST, and AFWST Area AND The Fire is of a magnitude that it <u>SPECIFICALLY</u> results in **Damage** to <u>ANY</u> one of the following: TWO OR MORE Trains of a Safety System MORE THAN ONE Safety System Any Plant Vital Structure which renders the structure incapable of performing its **Design** Function AND Damaged Safety System(s) or Plant Vital Structure is required for the present MODE of operation

MODE - All

BASIS

The primary concern in this EAL is the magnitude of the fire and the effects on safety systems required for the present MODE of operation. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the fire has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching, blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system or

SGS EAL/RALTechnical Basis *RepuireD To new term Sofe operation or To 55 loblish or maintain Cold Shutbow* component included in Technical Specifications. In those cases where it is believed that the fire may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full

extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for the present MODE of operation.

For example, a fire that has been confirmed to be localized to a single piece of equipment, like a 4.16 KV Breaker, with no potential to spread to adjacent equipment, does not warrant classification as an Alert. In the event, however, that the fire has spread or is believed to be spreading to other 4.16 KV Breakers for component(s) required for the present MODE of_____ operations, then an Alert is warranted.

Fire is defined as combustion characterized by the generation heat and smoke. Sources of smoke such as overheated electrical equipment and slipping drive belts, for example, do not constitute fires. Observation of a flame is preferred but is NOT required if large quantities of smoke and heat are observed.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency Coordinator</u> Discretion and escalate the classification to SAE based on the nature of the fire.

DISCUSSION

No lengthy and timely assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any safety system but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the fire. In short, if the fire is big enough that it has damaged more than one safety system, or more than one train of a safety system, then the fire is big enough to justify an Alert declaration. Damage to Plant Vital Structures must be to the extent that EC judgement must be used to determine if the structure is still capable of performing its design function. Electrical failures (such as shorts, grounds, arcing, etc.) should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA2

BNE

9.3 Explosion

ALERT - 9.3.2

IC Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL

Confirmed explosion within <u>ANY</u> one of the following Plant Vital Structures: Auxiliary Building Service Water Intake Structure Control Point Area Inner/Outer Penetration Areas Containment
Fuel Handling Building
Service Building
RWST, PWST, and AFWST Area
AND
The Explosion is of a magnitude that it <u>SPECIFICALLY</u> results in Damage to <u>ANY</u> one of
the following:
<u>TWO OR MORE</u> Trains of a Safety System
MORE THAN ONE Safety System
Any Plant Vital Structure which renders the structure incapable of performing its
Design Function
AND
Damaged Safety System(s) or Plant Vital Structure is required for the present MODE of operation

MODE - All

BASIS

The primary concern in this EAL is the magnitude of the explosion and the effects on safety systems required for the present MODE of operation. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the explosion has caused component malfunction (pump trip, breaker trip, etc.) that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system or component included in Technical $\lambda equired To raw Taw Sasse Obsertions on to Fotoblish on mamform$ EAL - 9.3.2Coll Shurdow M.Rev. 00 Specifications. In those cases where it is believed that the explosion may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for the present MODE of operation.

A confirmed explosion is defined as visual evidence that a rapid, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to damage or potentially damage permanent plant structures, systems or components.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency Coordinator</u> <u>Discretion and escalate the classification to SAE based on the nature of the explosion.</u>

DISCUSSION

No lengthy and timely assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any safety system but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the explosion. In short, if the explosion is big enough that it has damaged more than one safety system, or more than one train of a safety system, then the explosion is big enough to justify an Alert declaration. Damage to Plant Vital Structures must be to the extent that EC judgement must be used to determine if the structure is still capable of performing its design function. Electrical failures (such as shorts, grounds, arcing, etc.) should not be considered an explosion; however, they should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA2 M10-FRS-I-001, Control Room Fire Response



BNE

9.4 Toxic Gases

ALERT - 9.4.2.a

IC Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain **Cold Shutdown Conditions**

EAL

Uncontrolled Toxic Gas release within <u>ANY</u> one of the following Plant Structures Auxiliary Building Service Water Intake Structure Control Point Area Inner/Outer Penetration Area Containment Fuel Handling Building Service Building RWST, PWST, and AFWST Area AND

Toxic Gas concentrations result in ANY one of the following:

An IDLH atmosphere Plant personnel report severe adverse health reactions, including burning eyes, nose, throat, or dizziness The Lower Toxicity Limit being EXCEEDED

AND

Plant personnel are unable to perform actions necessary to complete a Safe Shutdown of the plant without appropriate personnel protection equipment

MODE - All

BASIS

An uncontrolled Toxic Gas release entering any of the plant structures listed in the EAL, that threatens the ability of plant personnel to perform actions required for safe shutdown of the plant, warrants declaration of an Alert. The EAL threshold includes those conditions that present a significant challenge to plant personnel. This EAL specifically addresses only those plant structures that either contain safe shutdown equipment or are contiguous to those areas. Release classified under this EAL include those that originate both onsite and offsite. A Toxic Gas is considered to be any substance that is dangerous to life or limb by reason of inhalation or skin contact. Uncontrolled Toxic Gas releases are considered to be those releases that can not be

EAL - 9.4.2.a Rev. 00

isolated / confined to a single compartment or area, or are not as the result of a designed plant safety feature.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalated based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. The EC may use Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the toxic gas release.

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DISCUSSION

Access is considered impeded if the Toxic Gas concentrations are life threatening, i.e. require the use of personnel protective equipment. Use of protective equipment also limits the mobility and vision. The cause or magnitude of the gas concentration is not the major concern in this EAL, but rather that access required to an area that may be impeded. An IDLH atmosphere is any atmosphere that is determined to be Immediately Dangerous to Life and Health.

This EAL should not be construed to include confined spaces that must be ventilated prior to entry or situations involving Site Protection personnel who are using respiratory equipment during the performance of their duties unless it also affects personnel not involved with Site Protection activates. In addition, those situations that require personnel to wear respiratory protection equipment as the result of airborne contamination as required by Radiation Protection personnel do not meet the intent of this EAL.

An offsite event (such as a tanker accident or a barge accident) may place the Protected Area within the evacuation area. The evacuation is determined from the DOT Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA3.1 SC.OP-AB.ZZ-0003(Q)



EAL - 9.4.2.a Rev. 00

PS

9.0 Hazards - Internal/External

9.4 <u>FlammableToxic</u> Gases

ALERT - 9.4.2.b

IC Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown Conditions

EAL

Uncontrolled Flammable Gas release within <u>ANY</u> one of the following Plant Structures Auxiliary Building

Service Water Intake Structure Control Point Area Inner/Outer Penetration Area Containment Fuel Handling Building Service Building RWST, PWST, and AFWST Area

AND

Flammable Gas concentrations EXCEED 50% of the LEL

AND

Plant personnel are unable to perform actions necessary to complete a Safe Shutdown of the plant without appropriate personnel protection equipment

MODE - All

BASIS

An uncontrolled Flammable Gas release entering any of the plant structures listed in the EAL, that threatens the ability of plant personnel to perform actions required for safe shutdown of the plant, warrants declaration of an Alert. The EAL threshold includes those conditions that present a significant challenge to plant personnel. This EAL specifically addresses only those plant structures that either contain safe shutdown equipment or are contiguous to those areas. Release classified under this EAL include those that originate both onsite and offsite. A Flammable Gas is considered to be any substance that is capable of being easily ignited or burning quickly. Uncontrolled Flammable Gas releases are considered to be those releases that can not be isolated / confined to a single compartment or area, or are not as the result of a designed plant safety feature. For example, an uncontrolled release of hydrogen into the Auxiliary Building in concentration exceeding 50% of the LEL (Lower Explosive Limit) warrants declaration of an

BNE

Alert. In comparison, a controlled release of Hydrogen during Generator purging does not warrant event declaration, as this evolution is controlled.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalated based on subsequent damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency</u> <u>Coordinator Discretion and escalate the classification to SAE based on the nature of the flammable gas release.</u>

DISCUSSION

For Hydrogen Gas, the explosive limit is 4%. Hence, a threshold of 50% of the LEL equates to 2% Hydrogen. This EAL should not be construed to include those controlled evolutions that may discharge a Flammable Gas within the Protected Area, but present no danger to plant safety, since the evolution is planned and controlled.

An offsite event (such as a tanker accident or a barge accident) may place the Protected Area within the evacuation area. The evacuation is determined from the DOT Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA3.2 SC.OP-AB.ZZ-0003(Q)

> EAL - 9.4.2.b Rev. 00

9.5 Seismic Events

UNUSUAL EVENT - 9.5.1.a/9.5.1.b

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

Confirmed seismic event onsite

Seismic-event measured $\geq 0.02g$

EITHER one of the following conditions:

- Seismic Event felt by personnel within the Protected Area
- Valid actuation of the Seismic Trigger (>0.01g) has occurred as verified by the SMA-3 Event Indicator (flag) being White on the Seismic Monitor System cabinet in the # 1 CR Equipment Room

MODE - All

BASIS

This EAL addresses a confirmed earthquake. An earthquake of this magnitude is not expected to affect the capability of plant safety functions. A seismic event recording a magnitude of ≥ 0.021 g is<u>the slightly above the minimum</u> level at which the Seismic Monitoring System would monitor the event. The term "confirmed" is defined as positive identification that a seismic event has occurred in the vicinity of the site regardless of the magnitude. The actual valueThis can be determine by engineering confirmation of magnitude as read on the seismic recorder, information provided by Hope Creek station, or confirmation by the National Earthquake Center, or actual seismic activity felt by site personnel. The Overhead Annunciator , "SEIS RCDR SYS ACT" willmay alert operators to this event and the seismic monitoring instrumentation would begin to monitor the event. This value is well below the Operating Basis Earthquake of 0.1g, and is 1/10 of the Design Basis level of 0.2g.

Barrier Analysis

None

ESCALATION CRITERIA



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Escalation of this event would occur if <u>actuation of the Hope Creek Seismic Switch (>0.1g)</u> <u>has occured</u>. Call the Hope Creek SNSS to request this information. a subsequent seismic event would occur in excess of the Operating Basis Earthquake level.

DISCUSSION

An earthquake of this magnitude is not expected to affect the capability of plant safety functions. For further information, the National Earthquake Center can be contacted at (303) 273-8500. An approximate relationship between acceleration and magnitude is as follows:

An Acceleration of:	is approx. equal to a Richter Scale Magnitude of:	
0.019	<i>Y</i> , O	
0.02g	4.5	
0.1g	5.5	
0.2g	6.5	

DEVIATION

None

REFERENCES

NUMARC NESP-007, HU1.1 UFSAR, Chapter 52, Seismic Monitoring System

> EAL - 9.5.1 Rev. 00

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9.0 Hazards - Internal/External

9.5 Seismic Events

ALERT - 9.5.2

IC Natural and Destructive Phenomena Affecting the Plant Vital Area

EAL

Confirmed seismic event onsite <u>AND</u> Seismic event measured > 0.1g Valid Actuation of the Hope Creek Seismic Switch (>0.1g) has occurred as verified by the Hope Creek SNSS

MODE - All

BASIS

This EAL addresses a confirmed earthquake at or above the Operating Basis Earthquake level of 0.1g. At this level, plant safety systems are designed to remain functional and within design stress and deformation limits. Thus, an earthquake of this magnitude is not expected to affect the capability of plant safety functions required to shut down the plant and place it in a cold shutdown condition. An earthquake of this magnitude is not expected to affect the capability of plant safety functions. The term "confirmed" is defined as positive identification that a seismic event has occurred in the vicinity of the site regardless of the magnitude. The actual valueThis can be determine by engineering confirmation of magnitude as read on the seismic recorder, information provided by Hope Creek station, or confirmation by the National Earthquake Center, or actual seismic activity felt by site personnel. The Overhead Annunciator , "SEIS RCDR SYS ACT" willmay alert operators to this event and the seismic monitoring instrumentation would begin to monitor the event.

Barrier Analysis

N/A

ESCALATION CRITERIA

Escalation of this event would occur if the seismic event caused additional damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. The EC may

EAL - 9.5.2 Rev. 00

Richter Scale Magnitude of:

Escalation of this event would occur if the seismic event caused additional damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. The EC may use Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the event.

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DISCUSSION

The Overhead Annunciator, "SEIS RCDR SYS ACT" may alert operators to this event and the seismic monitoring instrumentation would begin to monitor the event. If analysis of the event indicates that the threshold value has been exceeded, immediate plant shutdown is-required to evaluated possible equipment damage. This threshold value is well below the Design Basis Earthquake of 0.2g that is the maximum seismic event that is expected to occur based on local geological and seismological factors. For further information, the National Earthquake Center can be contacted at (303) 273-8500. An approximate relationship between acceleration and magnitude is as follows:

An Acceleration of:	is approx. equal to a
ODlg	4.0
0.02g	4.5
0.1g	5.5
0.2g	6.5

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA1.1 UFSAR, Chapter 52, Seismic Monitoring System

9.6 High Winds

UNUSUAL EVENT - 9.6.1.a/9.6.1.b

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

Report of a Tornado <u>TOUCHING DOWN</u> within the Protected Area <u>OR</u> Sustained wind speeds > 705 MPH for 15 minutes, from ANY elevation of the Met Tower

NRC

MODE - All

BASIS

This EAL addresses either a tornado reported onsite or sustained, high winds being detected onsite. A tornado touching down within the Protected Area or sustained wind speeds in excess of 750 MPH are of sufficient velocity to have the potential to cause damage to Plant Vital Structures. These conditions are indicative of unstable weather conditions and represent a potential degradation in the level of safety of the plant. "Sustained" wind speed means winds in excess of the threshold value for greater than 15 minutes.

Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated to an Alert if the tornado or high winds cause damage to Plant Vital Structures. If it is determined that the abnormal weather condition results in a loss of shutdown cooling, then the event will be escalated based on the Loss of Decay Heat Removal Capability.

DISCUSSION

These conditions are indicative of unstable weather conditions and represent a potential degradation in the level of safety of the plant. The windspeed threshold is well below the structure design basis of 108 mph, and is set slightly below the value used to characterize Hurricane force winds. Setting this threshold value at > 750 mph ensures site accessibility

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EAL - 9.6.1.a/9.6.1.b Rev. 00

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for Emergency response. It is also set 5 mph below the Hope Creek windspeed threshold to prevent an Unusual Event at both sites at the same time based on this parameter.

NOTE: The Wind Speed indication from the Met Tower instrumentation is full scale at 100 mph.

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HU1.2 and HU1.7 OP-AB.ZZ-0001(Q), Severe Weather SGS UFSAR, Sections 2.3, 3.3

9.6 High Winds

ALERT - 9.6.2

IC Natural and Destructive Phenomena Affecting the Plant Vital Area

EAL

EITHER one of the following:	
Report of a Tornado <u>TOUCHING DOWN</u> within the Protected Area	
Sustained wind speeds > 750 MPH for 15 minutes, from ANY elevation of the	NRC
Met Tower	-
AND	
The Wind Speed is of a magnitude that it SPECIFICALLY results in Damage to ANY one	
of the following:	
TWO OR MORE Trains of a Safety System	2
MORE THAN ONE Safety System	
Rendering ANY of the following structures incapable of performing its Design	
Function:	
* Auxiliary Building	
* Service Water Intake Structure	
* Control Point Area	
* Inner/Outer Penetration Areas	
* Containment	
* Fuel Handling Building	
* Service Building	
* RWST, PWST, and AFWST Area	
AND	
Damaged Safety System(s) or Plant Vital Structure is required for the present MODE of	
operation	
	1

MODE - All

BASIS

The primary concern in this EAL is the magnitude of the high winds and the effects on safety <u>functionssystems required for the present MODE of operation</u>. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the high winds have caused component malfunction (pump trip, breaker trip, etc.) or a report of visible

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EAL - 9.6.2 Rev. 00 deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system of component required for safe structown of the plant included in Technical Specifications. In those cases where it is believed that the high winds may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for <u>safe</u> shutdown of the Plant the present MODE of operation.

It is not intended that a lengthy engineering analysis be performed to determine if damage has affected structural design but EC judgement must determine whether to exclude minor exterior damage which does not affect the structural design capability. The value of 750 MPH is below the design basis wind speed of 108 MPH determined for Salem Generating Station. "Sustained" wind speed means winds in excess of the threshold value for greater than 15 minutes.

Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated to higher classifications based upon damage consequences covered under various other EAL sections. The EC may use Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the winds.

DISCUSSION

With damage to these areas confirmed, an actual degradation in the level of plant safety has occurred. The windspeed threshold is well below the structure design basis of 108 mph, and is set slightly below the value used to characterize Hurricane force winds. Setting this threshold value at > 70 mph ensures site accessibility for Emergency response. It is also set 5 mph below the Hope Creek windspeed threshold to prevent an Unusual Event at both sites at the same time based on this parameter. EC judgement must be used to discriminate between minor "cosmetic" and "design function" structural damage.

NOTE: The Wind Speed indication from the Met Tower instrumentation is full scale at 100 mph.

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602



DEVIATION None

> EAL - 9.6.2 Rev. 00

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REFERENCES

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NUMARC NESP-0007, HA1.2 and HA1.3 OP-AB.ZZ-0001(Q), Severe Weather SGS UFSAR, Sections 2.3, 3.3

9.7 Flooding

UNUSUAL EVENT - 9.7.1

IC Internal Flooding in Excess of Sump Handling Capability Affecting Safety Related Areas of the Plant

EAL

Severe Flooding of Safety System Areas <u>HAS ENDANGERED</u> safety related equipment per OP-AB.ZZ-0002

MODE - All

BASIS

This EAL addresses conditions where severe flooding is occurring in areas that affect safety related equipment. Endangered means that a determination has been made that the flooding is severe enough to jeopardize safe operation of the unit.

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Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated to an Alert based upon the loss of vital equipment due to flooding.

DISCUSSION

Severe flooding can occur from several sources including the Circulating Water System, Service Water System, Demineralized Water, Component Cooling Water, Fire Protection and Refueling Water Storage Tank.

Flooding is detailed in these areas by visual report from staff or by confirmation of sump alarms. OP-AB.ZZ-0002(Q) directs the operators to determine the exact location and severity of flooding. Attachments <u>in this procedure delineates the affected plant areas</u>, potential source(s) of water, affected vital equipment, flood rate and time to submerge vital equipment. **DEVIATION**

EAL - 9.7.1 Rev. 00

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None

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REFERENCES

NUMARC NESP-007, HU1.7 OP-AB.ZZ-0002(Q), Flooding

> EAL - 9.7.1 Rev. 00

9.7 Flooding

ALERT - 9.7.2

IC Internal Flooding Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL

Visual Observation of Flooding within <u>ANY</u> one of the following Plant Vital Structures: Auxiliary Building Service Water Intake Structure Fuel Handling Building Service Building Containment <u>AND</u> The Flooding is of a magnitude that it <u>SPECIFICALLY</u> results in Damage to <u>ANY</u> one of the following: <u>TWO OR MORE</u> Trains of a Safety System <u>MORE THAN ONE</u> Safety System Any of the above listed Plant Vital Structures which renders the structure incapable

of performing its Design Function

AND

Damaged Safety System(s) or Plant Vital Structure is required for the present MODE of operation

MODE - All

BASIS

The primary concern in this EAL is the magnitude of the internal flooding and the effects on safety systems required for the present MODE of operation. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the internal flooding has caused component malfunction (pump trip, breaker trip, etc.) that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system of component included in the equipment. In those cases where it is believed that the internal flooding may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is

EAL - 9.7.2 Rev. 00 required under this EAL if the structure houses or otherwise supports safety systems required for the present MODE of operation.

Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated based upon the consequences of the loss of vital equipment as covered in various other EAL sections. <u>The EC may use Emergency Coordinator Discretion</u> and escalate the classification to SAE based on the nature of the flooding.

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DISCUSSION

Severe flooding can occur from several sources including the Circulating Water System, Service Water System, Demineralized Water, Component Cooling Water, Fire Protection and Refueling Water Storage Tank.

Flooding is detailed in these areas by visual report from staff or by confirmation of sump alarms. OP-AB.ZZ-0002(Q) directs the operators to determine the exact location and severity of flooding. Attachments of this procedure delineates the affected plant areas, potential source(s) of water, affected vital equipment, flood rate and time to submerge vital equipment.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA1.7 OP-AB.ZZ-0002(Q), Flooding

> EAL - 9.7.2 Rev. 00

9.8 Turbine Failure / Vehicle - Missile Impact

UNUSUAL EVENT - 9.8.1.a

IC Natural and Destructive Phenomena Affecting <u>Certain Structures Within</u> the Protected | 𝔅 № 𝔅 Area

EAL

Catastrophic damage to the Main Turbine as evidenced by <u>EITHER</u> one of the following: Main Turbine casing penetration Main Turbine/Generator Damage potentially releasing Lube Oil or Hydrogen Gas to the Turbine Building

MODE - 1,2,3

BASIS

Turbine failure of sufficient magnitude to cause damage to the turbine casing or generator seals increases the potential for leakage of combustible/explosive gases and of combustible liquids to the Turbine Building or damage to plant systems due to missiles. The presence of H_2 gas in sufficient quantities may present a flammable/explosive hazard. Oil may also be present which may contribute to the flammability hazard.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated to an Alert based upon damage done by missiles generated by the failure or by any subsequent fire.

DISCUSSION

Turbine rotating component failures may also result in other direct damage to plant systems and components. Damage may rupture the turbine lubricating oil system, which would release flammable liquids to the Turbine Building. Potential rupture of the condenser and condenser tubes may cause flooding in the lower levels of the Turbine Building. This damage should be readily observable.

> EAL - 9.8.1.a Rev. 00

Escape of hydrogen gas from the generator due to a loss of seal oil pumps or turbine lube oil without a turbine rotating component failure should not be classified under this event.

DEVIATION

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Modes 1,2,3 are the only MODES of operation where Main Steam pressure is high enough to allow for Main Turbine operation.

REFERENCES

NUMARC NESP-0007, HU1.6 EOP-TRIP-1

9.8 Turbine Failure / Vehicle - Missile Impact

UNUSUAL EVENT - 9.8.1.b

IC Natural and Destructive Phenomena Affecting <u>Certain Structures Within</u> the Protected | BNE Area

EAL

Vehicle Crash / Missile Impact with or within <u>ANY</u> one of the following Structures: Auxiliary Building Service Water Intake Structure
<u>Control Point Area</u> Inner/Outer Penetration Areas Containment Fuel Handling Building Service Building RWST, PWST, and AFWST Area

BNB

MODE - All

BASIS

A Vehicle Crash / Missile Impact with or within a listed Plant Structure represents a potential challenge to plant safety. Events classified under this EAL include those of a magnitude and extent that may be a potential precursor to damage to Safety Systems, and hence has safety significance. Vehicle Crash includes Aircraft, Helicopters, Ships, Barges, or any other vehicle types of sufficient size to potentially damage the structure. Missile Impact includes flying objects from <u>both offsite and</u>, onsite, rotating equipment or turbine failure causing turbine casing penetration.

BNE

Barrier Analysis

None

ESCALATION CRITERIA

This event will be escalated to Alert if the crash or missile impact causes damage to Plant Vital Structures.

EAL - 9.8.1.b Rev. 00

DISCUSSION

Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HU1.4 NUMARC Questions and Answers, June 1993, "Hazards Question #6"
9.0 Hazards - Internal/External

9.8 Turbine Failure / Vehicle - Missile Impact

ALERT - 9.8.2

IC Natural and Destructive Phenomena Affecting <u>Certain Structures Within</u> the Plant Vital | びん ^C Area

EAL

Vehicle Crash / Missile Impact with or within <u>ANY</u> one of the following plant Vital Structures:

Auxiliary Building Service Water Intake Structure --Control Point-Area Inner/Outer Penetration Areas Containment Fuel Handling Building Service Building RWST, PWST, and AFWST Area

AND

The Vehicle Crash / Missile Impact is of a magnitude that it <u>SPECIFICALLY</u> results in Damage to <u>ANY</u> one of the Following:

TWO OR MORE Trains of a Safety System

MORE THAN ONE Safety System

Any of the above Plant Vital Structures which renders the structure incapable of performing its Design Function

<u>AND</u>

Damaged Safety System(s) or Plant Vital Structure is required for the present MODE of operation

MODE - All

BASIS

The primary concern in this EAL is the magnitude of the vehicle crashes / missile impact and the effects on safety systems required for the present MODE of operation. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the vehicle crashes / missile impact has caused component malfunction (pump trip, breaker trip, etc.) that may have resulted in the equipment/structure being INOPERABLE or otherwise

incapable of performing it's design function. A Safety System is defined as any system of component included in Technical Specifications. In those cases where it is believed that the vehicle crashes / missile impact may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for the present MODE of operation.

Barrier Analysis

N/A

ESCALATION CRITERIA

This event will be escalated based on further damage to plant safety systems, fission product barriers, or abnormal radiation releases in other EAL sections. <u>The EC may use Emergency</u> <u>Coordinator Discretion and escalate the classification to SAE based on the nature of the damage.</u>

DISCUSSION

No lengthy and timely assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any safety system but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the vehicle crashes / missile impact. In short, if the vehicle crashes / missile impact is big enough that it has damaged more than one safety system, or more than one train of a safety system, then the vehicle crashes / missile impact is big enough to justify an Alert declaration. Damage to Plant Vital Structures must be to the extent that EC judgement must be used to determine if the structure is still capable of performing its design function. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA1.5 and HA1.6 NUMARC Questions and Answers, June 1993, "Hazards Question #6"

> EAL - 9.8.2 Rev. 00

BNB

ATTACHMENT 4

PUBLIC SERVICE ELECTRIC & GAS

HOPE CREEK REVISIONS ANNOTATED FOR EASY REVIEW

2.0 RCS Challenge

2.1 RCS Leakage

UNUSUAL EVENT - 2.1.1.a / 2.1.1.b

IC RCS Leakage

EAL

EITHER one of the following:

Pressure Boundary Leakage > 10 gpm (Using 10 minute average)

Reactor Coolant System Unidentified Leakage > 10 gpm (Using 10 minute average)

OPERATIONAL CONDITION - 1, 2, 3

BASIS

RCS Pressure Boundary and Unidentified Leakage exceeding 10 gpm is indicative of possible degradation of the RCS and may be a precursor of a more serious condition. RCS Operational Leakage addressed by these 2 EALs is <u>specifically</u> RCS leakage into the Drywell. Leakage into the Drywell that is confirmed to <u>not</u> be RCS Leakage, i.e. a leaking Drywell Cooling Coil, does not warrant classification under this EAL. These types of RCS Operational Leakage, exceeding their respective EAL thresholds, should be classified as an Unusual Event, regardless of whether or not the leak has been isolated, since the EAL thresholds exceed the Technical Specification limit. Classification should be based on the 10 minute average and not an instantaneous value, to assure accurate event classification.

The value of 10 gpm for RCS Pressure Boundary and Unidentified Leakage was set higher than the Technical Specification limit of 0 and 5 gpm respectively, to allow time to implement)corrective actions (including plant shutdown) prior to exceeding the threshold.

The only operating conditions in which there is fuel in the reactor coolant system and the system is pressurized are specified.

BNE

Barrier Analysis

This event does not reach the threshold for the loss of the RCS Barrier, but does affect that barrier.

EAL - 2.1.1.a / 2.1.1.b Rev. 00

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when either Unisolable RCS Leak Rate exceeds 50 gpm or Drywell Pressure exceeds 1.68 PSIG per EAL Section 3.2.2

DISCUSSION

Allowable leakage rates from the Reactor Coolant System are based on predicted and experimentally observed behavior of cracks in pipes. Utilizing the leak before break methodology, it is anticipated that there will be indication(s) of minor reactor coolant system boundary leakage prior to a fault escalating to a major leak or a system rupture. Detection of low levels of leakage while pressurized allows for implementation of mitigative actions and permits monitoring for catastrophic failure or rupture precursors.

The limit for Unidentified and Pressure Boundary Leakage is set to a lower value, than Identified Leakage due to concern over "break propagation" resulting from an Unidentified or Pressure Boundary Leak (Small Break), that could potentially lead to a significantly larger loss of inventory. Identified leakage occurs when there is degradation or failure of a mechanical joint. Pipe "break propagation" is thus not an issue.

Instrumentation available via the Radiation Monitoring System (RM-11) to determine RCS Leakage into the Drywell includes:

- (9AX313) Drywell Equipment Drain Sump (DLD EQPT) Monitor
- (9AX314) Drywell Floor Drain Sump (DLD FLR) Monitor
- (9AX317) Lower Drywell Air Condensate Coolers (DLD CCM LOW) Monitor
- (9AX318) Upper Drywell Air Condensate Coolers (DLD CCM UP) Monitor
- (9AX319) Drywell Sumps (DLD SMS) Monitor
- (9AX320) Drywell Air Condensate Coolers Summation (DLD CCM SUM) Monitor

Redundant Instrumentation for Drywell Leak Detection is available on panel 10-C-604 located in the back of the Main Control Room.

Technical Specification required actions based on this leak rate may require a plant shutdown and subsequent depressurization, unless the source of the leak can be located, identified, and/or stopped.

DEVIATION

None

REFERENCES

NUMARC NESP-007, SU5
NUMARC Questions and Answers, June 1993, "General Question #12"
NUMARC Questions and Answers, June 1993, "Fission Product Barrier Question #11"
HC.OP-SO.SM-0001(Q), Isolation Systems Operation
HC.OP-AB.ZZ-0116 (Q), Containment Isolation and Recovery From An Isolation
HC.OP-AB.ZZ-0201 (Q), Drywell High Pressure/Loss of Drywell Cooling
HC.OP-EO.ZZ-0101 (Q)-FC, Reactor Pressure Vessel (RPV) Control
HC.OP-GP.ZZ-0005 (Q), Drywell Leakage Source Detection
HCGS Technical Specifications, LCO 3.4.3.2

EAL - 2.1.1.a / 2.1.1.b Rev. 00

2.0 RCS Challenge

2.1 RCS Leakage

UNUSUAL EVENT - 2.1.1.c

IC RCS Leakage

EAL

Reactor Coolant System Identified Leakage > 25 gpm averaged over any 24 hour period

OPERATIONAL CONDITION - 1, 2, 3

BASIS

RCS Identified Leakage exceeding 25 gpm is indicative of possible degradation of the RCS and may be a precursor of a more serious condition. RCS Operational Leakage addressed by this EAL is <u>specifically</u> RCS leakage into the Drywell. Leakage into the Drywell that is confirmed to <u>not</u> be RCS Leakage, i.e. a leaking Drywell Cooling Coil, does not warrant classification under this EAL. Identified Leakage should <u>ONLY</u> be classified as an Unusual Event, when the leak rate exceeds 25 gpm when averaged over any 24 hour period, regardless of whether or not the leak has been isolated. The 24 hour average is included as part of the EAL threshold to provide consistency with the Technical Specification limit for Identified Leakage.

Only operating conditions in which there is fuel in the reactor coolant system and the system is pressurized are specified.

Barrier Analysis

This event does not reach the threshold for the loss of the RCS Barrier, but does affect that barrier.

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when either Unisolable RCS Leak Rate exceeds 50 gpm or Drywell Pressure exceeds 1.68 PSIG per EAL Section 3.2.2

BNE

DISCUSSION

Allowable leakage rates from the Reactor Coolant System are based on predicted and experimentally observed behavior of cracks in pipes. Utilizing the leak before break methodology, it is anticipated that there will be indication(s) of minor reactor coolant system boundary leakage prior to a fault escalating to a major leak or a system rupture. Detection of low levels of leakage while pressurized allows for implementation of mitigative actions and permits monitoring for catastrophic failure or rupture precursors.

The limit for Unidentified and Pressure Boundary Leakage is set to a lower value, then Identified Leakage due to concern over "break propagation" resulting from an Unidentified or Pressure Boundary Leak (Small Break), that could potentially lead to a significantly larger loss of inventory. Identified leakage occurs when there is degradation or failure of a mechanical joint. Pipe "break propagation" is thus not an issue.

Instrumentation available via the Radiation Monitoring System (RM-11) to determine RCS Leakage into the Drywell includes:

- (9AX313) Drywell Equipment Drain Sump (DLD EQPT) Monitor
- (9AX314) Drywell Floor Drain Sump (DLD FLR) Monitor
- (9AX317) Lower Drywell Air Condensate Coolers (DLD CCM LOW) Monitor
- (9AX318) Upper Drywell Air Condensate Coolers (DLD CCM UP) Monitor
- (9AX319) Drywell Sumps (DLD SMS) Monitor

• (9AX320) Drywell Air Condensate Coolers Summation (DLD CCM SUM) Monitor Redundant Instrumentation for Drywell Leak Detection is available on panel 10-C-604 located in the back of the Main Control Room.

Technical Specification required actions based on this leak rate may require a plant shutdown and subsequent depressurization, unless the source of the leak can be located, identified, and/or stopped.

DEVIATION

NUMARC EAL SU5 suggests that exceeding an RCS Identified Leakage limit of 25 gpm warrants the declaration of an Unusual Event because it may be a precursor to a more serious condition. The Hope Creek Technical Specification limit for RCS Identified Leakage is <u>25 GPM</u> <u>averaged over any 24 hour period</u>. The plant is within the safety envelope of the Technical Specification as long as this limit is not exceeded and hence an Unusual Event is not warranted until the limit is exceeded. This philosophy is consistent with that contained in NUMARC EAL SU2, which only requires declaration of an Unusual Event when the plant is outside the Technical Specification Safety Envelope. RCS Pressure Boundary and Unidentified Leakage that exceed the NUMARC EAL threshold will be classified as an Unusual Event, as this leakage exceeds the Technical Specification limit.

BNG

BNE

In addition, NUMARC EAL SU5 appears to apply specifically to those plants that do not-allow for averaging of RCS Identified Leakage over a 24 hour period. Furthermore, NUMARC Questions and Answers Document, June 1993, "General Question #12", addresses those cases where the <u>Technical Specification LCO has been exceeded</u> and the required Action section has been entered (i.e. 4 Hours to identify and reduce the leakage below the limit). The EAL threshold for RCS Identified Leakage does not consider this time for Unusual Event declaration. The Q&A also states that the EAL for RCS Identified Leakage has been significantly raised from 10 to 25 gpm at some plants. Since the Hope Creek Technical Specification limit is already set at 25 gpm averaged over any 24 hour period, the EAL should not be more limiting than the Technical Specifications.

REFERENCES

NUMARC NESP-007, SU5

NUMARC Questions and Answers, June 1993, "General Question #12"
NUMARC Questions and Answers, June 1993, "Fission Product Barrier Question #11"
HC.OP-SO.SM-0001(Q), Isolation Systems Operation
HC.OP-AB.ZZ-0116 (Q), Containment Isolation and Recovery From An Isolation
HC.OP-AB.ZZ-0201 (Q), Drywell High Pressure/Loss of Drywell Cooling
HC.OP-EO.ZZ-0101 (Q)-FC, Reactor Pressure Vessel (RPV) Control
HC.OP-EO.ZZ-0102 (Q)-FC, Primary Containment Control
HC.OP-GP.ZZ-0005 (Q), Drywell Leakage Source Detection
HCGS Technical Specifications, LCO 3.4.3.2

2.0 RCS Challenge

2.1 RCS Leakage

UNUSUAL EVENT - 2.1.1.d

IC **RCS** Leakage

EAL

Successful Isolation of a Reactor Recirc Pump Dual Seal Failure within 10 minutes of recognition

OPERATIONAL CONDITION - 1, 2, 3

BASIS

Successful Isolation of a Reactor Recirc Pump Dual Seal Failure within 10 minutes of recognition is classified as an Unusual Event, due to the significance of the event. Even though the consequences of a successfully isolated Recirc Pump Dual Seal failure are minor, with no possibility for "break propagation", an Unusual Event is warranted due to the multiple failures of mechanical joints that allowed the discharge of a significant quantity of Reactor Coolant (>50 GPM) directly into the Drywell Air Space.

Successful is defined as indication of <u>ALL</u> of the following within 10 minutes of recognition of the Recirc Pump Dual Seal failure.

- Recirc Pump Suction and Discharge Valves have closed
- RWCU Suction Valve from the Recirc Loop has closed
- Recirc Pump Seal Purge Water Valve have closed
- Drywell Pressure and Temperature has begun to decrease
- RCS Leakage has begun to decrease

10 minutes was determined to be a reasonable amount of time to isolate the pump and monitor for the effectiveness of the actions.

BNE Only operating conditions in which there is fuel in the reactor coolant system and the system is pressurized are specified.

Barrier Analysis

This event does not reach the threshold for the loss of the RCS Barrier, but does affect that barrier.

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert if ten minutes elapse prior to successful isolation or Drywell Pressure exceeds 1.68 PSIG per EAL Section 3.2.2

DISCUSSION

Prompt recognition of a Recirc Pump Dual Seal failure by the operating crew will allow for implementation of actions to isolate the leakage source in accordance with Abnormal Operating Procedures. The design of the Recirc Pump seal limits the magnitude of the identified leakage for this event to 60 gpm due to the presence of a breakdown bushing. As a result, RCS inventory will not be significantly effected. The ability to monitor the leak rate is limited to 50 gpm, the upper limit of the Drywell Leak Detection Instrumentation. Drywell Pressure is not expected to reach the High Drywell Pressure Scram setpoint for this event, provided that the isolation was successfully completed within 10 minutes.

DEVIATION

None

REFERENCES

NUMARC NESP-007, SU5 NUMARC Questions and Answers, June 1993, "General Question #12" NUMARC Questions and Answers, June 1993, "Fission Product Barrier Question #11" HC.OP-AB.ZZ-0112 (Q), Recirculation Pump Trip HC.OP-AB.ZZ-0201 (Q), Drywell High Pressure/Loss of Drywell Cooling HC.OP-EO.ZZ-0101 (Q)-FC, Reactor Pressure Vessel (RPV) Control HC.OP-EO.ZZ-0102 (Q)-FC, Primary Containment Control HC.OP-GP.ZZ-0005 (Q), Drywell Leakage Source Detection HCGS Technical Specifications, LCO 3.4.3.2

3.0. Fission Product Barriers

3.3 Containment Barrier

3.3.2.a

IC Potential Loss of Containment

EAL

Supp Chamber press CANNOT be MAINTAINED below 65 psig OR Primary Containment H2 concentration >4% and O2 concentration >5%

- Containment Venting is Required by the Emergency Operating Procedures (EOPs) - EXCLUDING Containment Venting due to an ATWS

OPERATIONAL CONDITION - 1, 2, 3

BASIS

Containment venting required by the EOPs indicates a degrading condition in containment and is implemented in an effort to preclude containment failure. Venting is required before Suppression Chamber pressure reaches **65 PSIG** or Hydrogen concentration reaches the Lower Explosive Limit (LEL = 4%) and Oxygen concentration reaches **5%**. Exceeding these parameters creates the potential for an unisolable breach of the primary containment, which could result in an uncontrolled, unmonitored, and untreated release of radioactivity to the environment. This EAL represents a Potential Loss of Containment, since containment venting is required due to Containment parameters potentially exceeding their design limits. During an ATWS event, classification should be made in accordance with ECG Section 5, since this will provide a more accurate classification of the condition. Hence, Containment Venting due to an ATWS should not be classified under this EAL. The magnitude of any radiological release is dependent upon events leading to the requirement for -emergency venting, including a loss of the RCS and a loss of the Fuel Clad Barriers.

A Downcomer failure, by itself, <u>does not</u> represent a Loss of the Primary Containment Barrier. This failure does, however, render the Primary Containment inoperable per the Technical Specification, as Primary Containment integrity has been compromised. A Downcomer failure combined with a large break LOCA will likely result in a Potential Loss of Primary Containment under this EAL if Containment pressure can not be maintained below 65 PSIG and Containment Venting is required.

> EAL - 3.3.2.a Rev. 00

NRC

NRC

Barrier Analysis

Primary Containment Barrier has been potentially lost.

ESCALATION CRITERIA

Emergency Classification will escalate based on the Potential Loss or Loss of additional Fission Product Barriers per EAL Section 3.0.

DISCUSSION

Venting of the Primary Containment is initiated to preserve containment integrity under accident conditions. Primary Containment venting is required when Suppression Chamber cannot be maintained below 65 psig, which is well above the maximum pressure expected to be present in the Primary Containment during a design basis Loss of Coolant Accident (LOCA). Primary Containment venting is also required based on -hydrogen concentrations exceeding -4%._H₂ concentrations in excess of 6.0 % requires Emergency Depressurization and subsequent containment venting. -Venting is continued until either H₂ concentration has been reduced to <-6.0% or O₂ levels have been reduced to <-5.0%. Venting with elevated hydrogen concentration conditions ensures that containment failure resulting from a hydrogen detonation or deflagration does not occur.

The elevated hydrogen in the containment may result from excessive zircaloy-water reaction occurring following a LOCA. Additionally, hydrogen and oxygen gas may be introduced into the containment environment from long term disassociation of water in the Suppression Chamber.

EOP procedural guidance in these cases is provided to vent the Primary Containment regardless of off-site dose consequences. Although radiological releases resulting from venting containment may exceed EPA limits, a controlled, monitored, and isolable release is preferred to a potential uncontrolled, unmonitored radiological release that would result from a failure of containment.

DEVIATION

<u>None</u>

NUMARC PC2 EAL says intentional venting per EOPs is a loss of containment. Per Hope Creek procedures the containment is vented if design pressure or explosive mixture conditions exist. Per NUMARC PC 1 this is considered a potential loss of containment. Since both conditions are essentially the same, PSE&G has decided to call this a potential loss as recommended in NUMARC PC1.

REFERENCES

NUMARC NESP-0007, PC1, PC2

EAL - 3.3.2.a Rev. 00 NRC

Nnc

3.0 Fission Product Barriers

3.3 Containment Barrier

3.3.2.b

IC Loss of Containment

EAL

Containment Failure as indicated by a rapid decrease in Drywell pressure following an increase in pressure above 1.68 psig OR

Containment is Vented by the Emergency Operating Procedures (EOPs)

OPERATIONAL CONDITION - 1, 2, 3

BASIS

Containment failure indicated by a rapid decrease in Drywell pressure following a significant increase in Drywell pressure is indicative of a Loss of the Containment barrier. This EAL <u>specifically</u> represents a Loss of Containment, whereby a unisolable breach of the containment structure has occurred. Conditions that result in a decrease in Drywell pressure following a pressure rise that are not the direct result of a Containment failure do not warrant classification under this EAL. These events include the initiation of Drywell Sprays, the re-establishment of Drywell Cooling, Containment Venting as required by the EOPs, and anticipated Drywell pressure decrease due to ambient losses.

Containment Venting is a controlled loss of containment. This venting is performed for the purpose of preventing an unisolable, unmonitored radiological release of containment gases.

A Downcomer failure, by itself, <u>does not</u> represent a Loss of the Primary Containment Barrier. This failure does, however, render the Primary Containment inoperable per the Technical Specification, as Primary Containment integrity has been compromised. A Downcomer failure combined with a large break LOCA will likely result in a Potential Loss of Primary Containment under EAL 3.3.2.a if Containment pressure can not be maintained below 65 PSIG and Containment Venting is required.

Barrier Analysis

Primary Containment Barrier has been lost.

NRC

NRL

ESCALATION CRITERIA

Emergency Classification will escalate based on the Potential Loss or Loss of additional Fission Product Barriers per EAL Section 3.0.

DISCUSSION

Appropriate classification under this EAL occurs as the result of a Containment failure. Drywell pressure reaching 1.68 psig indicates that there is a significant release of reactor coolant to the containment. Unless this source of leakage is isolated or the Reactor is — depressurized, Drywell pressure would not be expected to decrease in a rapid manner.

Other indications such as Reactor Building Area Radiation Monitors (ARMs) radiation levels, Reactor Building area temperatures, Reactor Building floor and sump levels, Plant Effluent radiation levels, and containment isolation status should be used to confirm the loss of containment integrity if possible. Reactor Building to Torus vacuum breaker status should be monitored to ensure that this pathway does not result in a loss of containment integrity.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, PC1 HC.OP-AB.ZZ-0114 (Q), Loss of Primary Containment Integrity HC.OP-AB.ZZ-0116 (Q), Containment Isolations and Recovery from an Isolation HC.OP-AB.ZZ-0201 (Q), Drywell High Pressure/Loss of Drywell Cooling HC.OP-EO.ZZ-0100 (Q)-FC, Reactor Scram HC.OP-EO.ZZ-0101 (Q)-FC, Reactor Pressure Vessel (RPV) Control HC.OP-EO.ZZ-0102 (Q)-FC, Primary Containment Control HC.OP-EO.ZZ-0103 (Q)-FC, Reactor Building Control BWR Owners Group Emergency Procedure Guidelines, Revision 4

4.0 EC Discretion

4.1 Emergency Coordinator Discretion

ALERT - 4.1.2

IC Other Conditions Exist Which In the Judgement of the Emergency Coordinator Warrant Declaration of an Alert

EAL

Events are in progress or have occurred which, in the judgement of the Emergency Coordinator, indicate EITHER one of the following:

- ------Plant safety systems (more than one) are, or may be degraded and Increased monitoring of plant functions is warranted
- <u>ANY plant Vital Structure is degraded or potentially degraded</u>
 <u>Criteria for declaration of an Alert per the ECG Introduction Section exists</u>

<u>AND</u>

Increased monitoring of Safety Functions is warranted

OPERATIONAL CONDITION - All

BASIS

Emergency Coordinator judgement to declare an Alert, based on the determination that Plant Systems are, or may be degraded, should be implemented <u>ONLY</u> when conditions are not explicitly addressed elsewhere in the ECG. This includes a determination by the SNSS that hazards exist that have, or may have caused damage to more than one safety system or to a plant vital structure. In addition, if plant conditions degrade to the point where increased monitoring of plant functions is warranted to better determine the plants actual safety status than an Alert classification may be appropriate.

Barrier Analysis

Additional guidance on EC judgement for Fission Product Barriers is found on the Fission Product Barrier Table, Section 3.0.

ESCALATION CRITERIA

Emergency Coordinator Judgement

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DISCUSSION

Dose consequences for an Alert, if a radiological release was ongoing, would only be a small fraction of the EPA Protective action Guideline (PAG) plume exposure level, i.e., 10 to 100 mRem TEDE. Refer to ECG Section 6 if a radiological release is ongoing.

DEVIATION

None

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REFERENCES

NUMARC NESP-0007, HA6, HA1.4, Section 3.7. EPA-400

4.0 EC Discretion

4.1 Emergency Coordinator Discretion

SITE AREA EMERGENCY - 4.1.3

IC Other Conditions Exist Which In the Judgement of the Emergency Coordinator Warrant Declaration of a Site Area Emergency

EAL

Events are in progress or have occurred which, in the judgement of the Emergency Coordinator, indicate an Actual or likely major failure of plant functions needed for the protection of the public <u>EITHER</u> one of the following:

- The Potential for an uncontrolled radiological release or the source term available in the Containment atmosphere could result in Site Boundary Dose rates in excess of 100 mRem/hr
- Criteria for declaration of a Site Area Emergency per the ECG Introduction Section exists

OPERATIONAL CONDITION - All

BASIS

Emergency Coordinator judgement to declare a Site Area Emergency, based on the determination that the potential exists for an uncontrolled radiological release or the source term available in the Containment atmosphere could result in Site Boundary dose rates in excess of 100 mRem/hr, should be implemented <u>ONLY</u> when conditions are not explicitly addressed elsewhere in the ECG. In addition, any criteria that satisfies the definition of a Site Area Emergency in the ECG Introduction Section, also warrants declaration under this EAL. A Site Area Emergency is intended to be anticipatory of potential fission product barrier failure, and allows offsite agencies to commence preparation for emergency response.

Barrier Analysis

Additional guidance on EC judgement for Fission Product Barriers is found on the Fission Product Barrier Table, Section 3.

ESCALATION CRITERIA

BUZ

Emergency Coordinator Judgement

DISCUSSION

Radiological release rates during a Site Area Emergency declaration are not expected to result in exposure levels which exceed the EPA Protective Action Guideline threshold values except within the Site Boundary. However, plume exposure levels of 100 to < 1000 mRem TEDE may be possible offsite and levels > 1000 mRem TEDE could be experienced onsite. Refer to ECG Section 6 if a radiological release is ongoing.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HS3, Section 3.7. EPA-400

4.0 EC Discretion

4.1 Emergency Coordinator Discretion

GENERAL EMERGENCY - 4.1.4

IC Other Conditions Exist Which In the Judgement of the Emergency Coordinator Warrant Declaration of a General Emergency

EAL

Events are in progress or have occurred which, in the judgement of the Emergency Coordinator, indicate an Actual or imminent substantial core degradation with the potential for loss of containment Either one of the following:

- The Potential for an uncontrolled radiological release is expected to exceed Protective Action Guideline levels per EAL 6.1.4.a
- Criteria for declaration of a General Emergency per the ECG Introduction Section exists

OPERATIONAL CONDITION - All

BASIS

Emergency Coordinator judgement to declare a General Emergency , based on the determination that the potential for an uncontrolled radionuclide release exists, should be implemented <u>ONLY</u> when conditions are not explicitly addressed elsewhere in the ECG. In addition, any criteria that satisfies the definition of a General Emergency in the ECG Introduction Section, also warrants declaration under this EAL. A General Emergency is intended to be anticipatory of fission product barrier failure, and permits maximum offsite intervention time.

Barrier Analysis

This EAL is intended for EC judgement for declaration at the General Emergency level. Additional guidance on EC judgement for Fission Product Barriers is found on the Fission Product Barrier Table, Section 3.0.

ESCALATION CRITERIA

N/A

BNE

DISCUSSION

Radiological release rates during a General Emergency may exceed the EPA Protective Action Guidelines, i.e., >1000mRem TEDE, for more than the immediate site area. ECG Section 6, Radiological Releases/Occurrences should be consulted for releases of this magnitude.

DEVIATION

- None

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REFERENCES

NUMARC NESP-0007, HG2, Section 3.7. EPA-400

EAL - 4.1.4 Rev. 00

6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.a

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 Times the Radiological Technical Specifications for 60 minutes or longer

EAL

Dose Assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

TEDE 4-Day Dose of \geq 2.0E-01 mRem Thyroid-CDE Dose of \geq 6.8E-01 mRem based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine Ratio

<u>AND</u>

Release is ongoing for \geq 60 minutes

OPERATIONAL CONDITION - All

BASIS

Dose Assessment at or beyond the MEA exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 2 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of dose assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built-in inaccuracies because ODCM default Meteorological data is used. As long as dose assessment is available, this EAL should be used in place of EAL 6.1.1.d.

EAL - 6.1.1.a Rev. 00 It is not intended that the release be averaged over 60 minutes, but <u>exceed</u> 2 times the Technical Specification limit for 60 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when the effluent release concentration increases to 200 times the Technical Specification limit.

DISCUSSION

Prorating the 500 mRem/yr criterion for the TEDE 4-day dose: time (8766 hr/yr); the 2 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 0.057 mRem/hr.

TEDE 4-Day MEA Dose Rate =
$$\left(\frac{500m\text{Rem}/yr}{8766hr/yr}\right)(2)(.5)=0.057\text{mRem/hr}$$

This is rounded to .05 mRem/hr.

The TEDE 4-day Dose is based on a 4 hour release duration. Therefore .05 mRem/hr*4 hours = 0.2 mRem.

Prorating the 1500 mRem/yr criterion for the Thyroid-CDE Dose: time (8766 hr/yr); the 2 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 0.17 mRem/hr.

Thyroid-CDE MEA Dose Rate = $\left(\frac{1500m\text{Rem}/yr}{8766hr/yr}\right)(2)(.5)=0.17\text{mRem/hr}$

The Thyroid-CDE Dose is based on a 4 hour release duration. Therefore 0.17 mRem/hr*4 hours = 0.68 mRem.

DEVIATION

None

EAL - 6.1.1.a Rev. 00

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REFERENCES

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NUMARC NESP-007, AU1.4 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.b

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 Times the Radiological Technical Specifications for 60 minutes or longer

EAL

Dose Rate measured at the Protected Area Boundary or beyond <u>EXCEEDS</u> .05 mRem/hr above normal background

<u>AND</u>

Release is ongoing for ≥ 60 minutes

OPERATIONAL CONDITION - All

BASIS

Measured Dose Rate at or beyond the Protected Area Boundary exceeding the EAL threshold can result from a Gaseous Radiological Release in excess of 2 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 60 minutes, but exceed 2 times Tech. Spec. limits for 60 minutes or longer. Further, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when effluent release concentration increases to 200 times the Technical Specification limit.

DISCUSSION

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Prorating the 500 mRem/yr criterion for: time (8766 hr/yr); the 2 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary (MEA) dose rate would be 0.057 mRem/hr.

Protected Area Boundary Dose Rate = $\left(\frac{500m\text{Rem}/yr}{8766hr/yr}\right)(2)(.5)=0.57\text{mRem/hr}$

This is rounded to .05 mRem/hr

DEVIATION

None

REFERENCES

NUMARC NESP-007, AU1.3 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.c

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 Times the <u>10CFR20, Appendix B limitsRadiological-Technical Specifications</u> for 60 |BNE minutes or longer

EAL

Total gaseous effluent release sample analysis for <u>ANY</u> one of the following indicates a concentration of:	
FRVS: <u>> 5.651.13</u> E-03 μCi/cc Total Noble Gas <u>> 8.002.71</u> E-06 <u>7</u> μCi/cc I-131	BNP.
NPV: <u>> 1.212.43</u> E-0 <u>34</u> μCi/cc Total Noble Gas <u>> 1.725.81</u> E-0 <u>68</u> μCi/cc I-131	BNE
SPV: <u>> 1.132.27</u> E-04 <u>5</u> μCi/cc Total Noble Gas <u>> 1.615.44</u> E-07 <u>9</u> μCi/cc I-131	BNE
AND	D uBL
Dose Assessment results NOT available	
Release is ongoing for \geq 60 minutes	

OPERATIONAL CONDITION - All

BASIS

Total gaseous effluent release sample analysis exceeding the EAL threshold for any of the plant vents listed (FRVS, NPV, SPV), can result from a Gaseous Radiological Release in excess of 2 times <u>10CFR20</u>, <u>Appendix B limits</u><u>Technical Specifications</u>. This condition results

EAL - 6.1.1.c Rev. 00 from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. The HTV is not included under this EAL since there are no provisions for collecting a HTV grab sample. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 60 minutes, but <u>exceed</u> 2 times the -10CFR20, <u>Appendix BTechnical Specification</u> limit for 60 minutes or longer. In addition, it is |BNE| intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert when the effluent release concentration increases to 200 times the <u>10CFR20</u>, <u>Appendix BTechnical Specification</u> limit.

BNE

BNE

DISCUSSION

Refer to Basis Section for EAL 6.1.1.d for the 10CFR20, Appendix B Noble Gas and Thyroid committed Dose release rate calculations.

Calculation of the threshold sample concentrations are as follows: 2.40 6+0 4 millsec FRVS Noble Gas Sample Concentration = $\frac{4.80 + 03\mu Ci / \sec}{472x9000cfm} = 5.651.13 E-03\mu Ci/cc$ +0 BNP 4.80 6+03 16-15ec 3.46+01 $\frac{1.15E + 00\,\mu\text{C}i\,/\,\text{sec}}{472\,x9000cfm} = \frac{8.002.71}{472} E \cdot \frac{1000}{100} E \cdot \frac{100$ m 6-1526 FRVS I-131 Sample Concentration = 1.156+0 6-1500 NPV Noble Gas $\frac{4.80E + 03\mu Ci / \sec}{472x4.19E + 4cfm} = \frac{1.212.43}{1.212.43}E - 0.34\mu Ci / cc$ Sample Concentration = 4.806+3 stilser $\frac{1.15E + 00\,\mu\text{Ci} / \sec}{472\,x4.19E + 04\,cfm} = \frac{1.725.81}{1.725.81} E - 068\,\mu\text{Ci/cc}$ 3.000001 *NPV I-131 Sample Concentration* = MG1400 BNE 10 115600 AG1580 EAL - 6.1.1.c Rev. 00

HCGS EAL/RALTechnical Basis

SPV Noble Gas Sample Concentration =
$$\frac{4.80E + 03\mu Ci / \sec}{472x4.48E + 5cfm} = \frac{1.132.27E}{\mu G / 5eC} = \frac{1.132.27E}{\mu$$

Where: $472 = \text{conversion factor } (28,317 \text{ cc/ft}^3 \text{ x 1 min.}/60 \text{ sec.})$ 9000 cfm = FRVS Vent Flow (maximum) 4.19E+04 cfm = NPV Vent Flow (maximum) 4.48E+05 cfm = SPV Vent Flow (maximum)The noble gas release rate of $2.404.80\text{E}+043 \mu\text{Ci/sec}$ is obtained by multiplying the <u>10CFR20</u>, <u>Appendix B limit</u>Technical Specification release rate of $1.202.40\text{E}+043 \mu\text{Ci/sec}$ times 2. The iodine release rate of $3.401.15\text{E}+010 \mu\text{Ci/sec}$ is obtained by multiplying the <u>10CFR20</u>, <u>Appendix B limit</u>Technical Specification release rate of $1.705.75\text{E}+-01 \mu\text{Ci/sec}$ times 2.

DEVIATION

None The value for EAL 6.1.1.c is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a TEDE Dose which would require an Alert classification or not meet the Unusual Event classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.1.c would not be used unless EAL 6.1.1.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential uncertainty of this "default" EAL.

Two times the 10CFR20, Appendix B limits for noble gas and Iodine 131 are being used for this EAL, due to concerns that the State of New Jersey have pertaining to this EAL and Based on the above mentioned uncertainties.

REFERENCES

NUMARC NESP-007, AU1.2<u>, AU1.1, AU1.4</u> Off-Site Dose Calculation Manual, Section 2.0 NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1 IPS

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

UNUSUAL EVENT - 6.1.1.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 2 <u>t</u>Fimes the Radiological Technical Specifications 10CFR20, Appendix B for 60 minutes |BNFor longer

EAL



NPV Noble Gas (Grid 1/3; 9RX590) SPV Noble Gas (Grid 1/3; 9RX580) HTV Noble Gas (Grid 1/3; 9RX518)

<u>AND</u>

Total Plant Vent release rate <u>EXCEEDS</u> one of the following limits: <u>4.80E+03</u>2.40E+04 μ Ci/sec Total Noble Gas 1.15E+003.40E+01 μ Ci/sec I-131 (USE FOR NPV & SPV ONLY)

<u>AND</u>

Dose Assessment isresults NOT available

<u>AND</u>

Release is ongoing for ≥ 60 minutes

OPERATIONAL CONDITION - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 2 times <u>10CFR20</u>, <u>Appendix B</u> <u>limitsTechnical Specifications</u>. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control

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EAL - 6.1.1.d Rev. 00 implied by a radiological release of this magnitude that was not isolated within 60 minutes. The final integrated dose is very low and is not the primary concern. Valid is defined as the High alarm <u>actuating specifically</u> due to a Gaseous Release exceeding <u>Technical Specification</u> <u>10 CFR 20</u>, <u>Appendix B</u> limits, thus precluding unwarranted event declaration as the result of spurious actuation. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.1.a for classification.

It is not intended that the release be averaged over 60 minutes, but <u>exceed</u> 2 times Technical Specification-10 CFR20, Appendix Blimits for 60 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 2 times the limit for 60 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will be escalate to an Alert when the effluent release concentration increases to 200 times the Technical Specification <u>10CFR20</u>, Appendix B limits.

DISCUSSION

The release rate thresholds for this EAL are obtained by multiplying the Technical Specification release rates of $\frac{1.2E+04}{2.4E+03}\mu \text{Ci/sec}$ and $\frac{1.70E+01}{5.78E-01}\mu \text{Ci/sec}$, for $|\mathcal{P}^{N\mathcal{E}}|$ Noble Gases and Iodine-131 respectively, times 2. Total Noble Gas release rate is the summation of all plant vent release rates.

This EAL includes Iodine Release <u>R</u> ates for the NPV and SPV, since these vents have an Iodine monitor. Determination of the Iodine Release Rate from the Iodine monitor is accomplished by multiplying the Iodine reading (in uCi/cc) by the applicable vent flow rate, and 472 (Conversation factor). Iodine Release rates for FRVS and the HTV are excluded since these vents do not include an Iodine detector. The SPDS Total Iodine Offsite Release Rate does not provide useful information because this is based on a default value of 1000 times less than the Total Noble Gas Offsite Release Rate, which could be grossly inaccurate.

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HCGS EAL/RALTechnical Basis

Release rates for FRVS and the HTV are not included since these vents <u>d</u>to not have an Iodine detector. A gaseous effluent sample is needed to accurately quantify the Iodine Release rate. The SPDS Total Iodine Offsite Release Rate should not be used, as this is based <u>on</u> a default value of 1000 times less than the Total Noble Gas Offsite Release Rate. The Technical Specification-10CFR20, Appendix B limits are based on ODCM calculations.

Technical Specification 10CFR20, Appendix B Calculation for Noble Gas

$$uCi/Second = \frac{(100 \text{ mRem / year})*(Allocation Factor)}{(ODCM X/Q)*(ODCM DRCF)} / 00 \text{ mRom/yn}$$

COD HRan /V.

WHERE:	uCi/Second	=	Total Noble Gas Release Rate from Salem (Unit 1 & Unit 2)	
			or Hope Creek (all Vents; NPV, SPV, FRVS, and HTV)	
			which would result in a TEDE Dose Rate of 250	BUR

mrem/year.

ODCM X/Q = Site Specific (Salem or Hope Creek) dispersion factor at the Site Boundary in sec/m^3 .

ODCM DRCF = Site Specific (Salem or Hope Creek) dose rate conversion factor in mrem/year/uCi/m³.

ODCM X/Q = $2.67E-06\underline{sec/m^3}$ ODCM DRCF = 7.80E+03 mrem/yr/uCi/m³ Allocation Factor = 5.00E-01

1.20E + 04 - 2.40E + 03 uCi/Second =

 $\frac{(100 \text{ mRem}/\text{yr})*(5.00E-01)}{(2.67E-06 \text{ sec}/\text{m}^3)*(7.80E+03\text{ mRem}/\text{yr}/\mu\text{Ci}/\text{m}^3)} \int_{00}^{00} \frac{100 \text{ mRem}/\text{yr}}{100 \text{ mRem}/\text{yr}}$

1.20E+04-2.40E+03uCi/Second *2 = EAL value. is the Hope Creek Technical Specification
value. $\mathcal{B} \mathcal{N} =$ $4.80E+03\mu$ Ci/sec is the EAL value. $\mathcal{B} \mathcal{N} =$ Technical Specification 10CFR20, Appendix B Calculation for Thyroid Committed Dose $\mathcal{B} \mathcal{N} =$ uCi/Second = $\frac{1500 \text{ mrem/year * (Allocation Factor)}}{(ODCM X/Q) * (ODCM THY DRCF)}$ $\mathcal{B} \mathcal{N} =$

EAL - 6.1.1.d Rev. 00

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WHERE: uCi/Second = Total Iodine 131 release rate from Salem (Unit 1 or 2) or Hope Creek (all Vents; NPV, SPV, FRVS and HTV).

ODCM X/Q = Site Specific (Salem or Hope Creek) dispersion factor at the Site Boundary in sec/m³.

ODCM DRCF = is the most limiting potential pathway (inhalation, child, thyroid I-131) dose rate conversion factor in

mrem/year/uCi/m³.

ODCM X/Q = 2.67E-06ODCM DRCF THY = 1.62E+07 mrem/yr/uCi/m³ Allocation Factor = 5.00E-01

 $\frac{1.73E+01-5.78E-01}{value.}$ uCi/Second * 2 = EAL value. is the Hope Creek Technical Specification value. $1.15E+00\mu Ci/sec is the EAL value.$

DEVIATION

The value for EAL 6.1.1.d is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a TEDE Dose which would require an Alert classification or not meet the Unusual Event classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.1.d would not be used unless EAL 6.1.1.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential uncertainty of this "default" EAL.None

Two times the 10CFR20, Appendix B limits for noble gas and Iodine 131 are being used for this EAL, due to concerns that the State of New Jersey have pertaining to this EAL and based on the above mentioned uncertainties.

The time limit has been increased from 15 minutes to 30 minutes, to allow additional time to perform dose assessment, since the threshold for this EAL is only 20% of the value allowed per NESP-007 and we do not wish to use this default EAL unless absolutely necessary.

REFERENCES

NUMARC NESP-007, AU1.1, AU1.4 HC.OP-AB.ZZ-126(Q), Abnormal Releases of Gaseous Radioactivity BNZ

HCGS EAL/RALTechnical Basis

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HC.RP-AR.SP-0001(Q), Radiation Monitoring System Alarm Response Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

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6.0 Radiological Releases/Occurrences

6.1 Gaseous Effluent Release

ALERT - 6.1.2.a

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 Times Radiological Technical Specifications for 15 minutes or longer

EAL

Dose Assessment indicates <u>EITHER</u> of the following at the MEA or beyond as calculated on the SSCL:

TEDE 4-Day Dose of \geq 2.0E+01 mRem; Thyroid-CDE Dose of \geq 6.8E+01 mRem based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine Ratio

<u>AND</u>

Release is ongoing for \geq 15 minutes

OPERATIONAL CONDITION - All

BASIS

Dose Assessment at or beyond the MEA exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 200 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in significantly elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 15 minutes.. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of dose assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built-in inaccuracies because ODCM default Meteorological data is used. As long as dose assessment is available, this EAL should be used in place of EAL 6.1.2.d.

EAL - 6.1.2.a Rev. 00 PS

It is not intended that the release be averaged over 15 minutes, but <u>exceed</u> 200 times the Technical Specification limit for 15 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 15 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when the effluent release concentration increases to a level that would cause a 100 <u>mRemmrem</u> dose at the Protected Area Boundary.

P5

DISCUSSION

Prorating the 500 mRem/yr criterion for the TEDE 4-day dose: time (8766 hr/yr); the 200 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 5.7 mRem/hr.

TEDE 4-Day MEA Dose Rate = $(\frac{500m\text{Rem}/yr}{8766hr/yr})(200)(05)=5.7\text{mRem/hr}$

This is rounded to 5.0 mRem/hr.

The TEDE 4-day Dose is based on a default (assumed) 4 hour release duration. Therefore 5.0 mRem/hr*4 hours = 20 mRem.

Prorating the 1500 mRem/yr criterion for the Thyroid-CDE Dose: time (8766 hr/yr); the 200 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 17 mRem/hr.

Thyroid-CDE MEA Dose Rate = $\left(\frac{1500 \text{mRem}/\text{yr}}{8766 \text{hr}/\text{yr}}\right)(200)(.5)=0.17 \text{mRem/hr}$

The Thyroid-CDE Dose is based on a 4 hour release duration. Therefore 17 mRem/hr*4 hours = 68 mRem.

DEVIATION

None
REFERENCES

NUMARC NESP-007, AA1.4 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-95, 9-10-94. Technical Specification 3.11.2.1

6.1 Gaseous Effluent Release

ALERT - 6.1.2.b

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 Times Radiological Technical Specifications for 15 minutes or longer

EAL

Dose Rate measured at the Protected Area Boundary or beyond EXCEEDS 5 mRem/hr

<u>AND</u>

Release is ongoing for \geq 15 minutes

OPERATIONAL CONDITION - All

BASIS

Measured Dose Rates at or beyond the MEA exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 200 times Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in significantly elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was not isolated within 15 minutes.. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. **Unplanned** is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 15 minutes, but <u>exceed</u> 200 times the Technical Specification limit for 15 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 15 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when effluent release concentration increases to a level that would cause a 100 <u>mRemmrem</u> dose at the Protected Area Boundary.

PS

DISCUSSION

Prorating the 500 mRem/yr criterion for: time (8766 hr/yr); the 200 x Tech. Spec. multiplier; and, Artificial Island's Allocation Factor of 0.5 (50% per site), the associated site boundary dose rate would be 5.7 mRem/hr.

Protected Area Boundary Dose Rate = $(\frac{500m\text{Rem}/yr}{8766hr/yr})(200)(.5)=5.7\text{mRem/hr}$

This is rounded to 5.0 mRem/hr

DEVIATION

None

REFERENCES

NUMARC NESP-007, AA1.3 Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

6.1 Gaseous Effluent Release

ALERT - 6.1.2.c

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 Times the 10CFR20, Appendix B limits for 30Radiological Technical Specifications for 15 minutes or longer

EAL

Total gaseous effluent release sample analysis for <u>ANY</u> of the following indicates a concentration of:	
FRVS: <u>> 5.651.13</u> E-01 μCi/cc Total Noble Gas <u>> 8.002.71</u> E-04 <u>5</u> μCi/cc I-131	BNE
NPV: <u>> 1.212.43</u> E-012 μCi/cc Total Noble Gas <u>> 5.81</u> 1.72E-04 <u>6</u> μCi/cc I-131	BNE
SPV:: <u>> 1.132.27</u> E-0 <u>23</u> μCi/cc Total Noble Gas <u>> 1.615.44</u> E-0 <u>7</u> 5 μCi/cc <u>I</u> I-131	BNE
AND Dose Assessment results NOT available	NRC
AND Release is ongoing for \geq 3015 minutes	BNÉ

OPERATIONAL CONDITION - All

BASIS

Total gaseous effluent release sample analysis exceeding the EAL threshold for any of the plant vents listed (FRVS, NPV, SPV), can result from a Gaseous Radiological Release in excess of 200 times <u>10CFR20</u>, <u>Appendix B limits</u>Technical Specifications. This condition

BNE

EAL - 6.1.2.c Rev. 00 results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a radiological release of this magnitude that was BUE not isolated within <u>3015</u> minutes. The final integrated dose is very low and is not the primary concern. Classification is based on an ongoing release that does not comply with a license condition. The HTV is not included under this EAL since there are no provisions for collecting a HTV grab sample. Unplanned is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

It is not intended that the release be averaged over 3015 minutes, but exceed 200 times the 10CFR20, Appendix BTechnical Specification limit for 3015 minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for 3015 minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when effluent release concentration increases to a level that would cause a 100 mRem dose or Thyroid-CDE of 500mRem for I-131 at the Protected Area Boundary.

DISCUSSION

Refer to Basis Section for EAL 6.1.2.d for the 10CFR20, Appendix B Noble Gas and Thyroid Committed Dose release Rate Calculations.

Calculation of the threshold sample concentrations are as follows:

FRVS Noble Gas Sample Concentration =
$$\frac{4.80E + 05\mu Ci / \sec}{472 \times 9000 cfm} = \frac{4.80E + 05\mu Ci / \sec}{4.80E + 05\mu} = \frac{5.651.13E}{1.13E} = \frac{5.651.12E}{1.13E} = \frac{5.651.12E}{1.$$

01µCi/cc

$$FRVS I-131 \ Sample \ Concentration = \frac{1.15E + 02\,\mu Ci \, / \, sec}{472 x 9000 c fm} = \frac{1.15E + 02\,\mu Ci \, / \, sec}{u \, c^{-} \, / \, sec} = \frac{8.002.71}{e^{-1}} E^{-1}$$

04<u>5</u>μCi/cc

EAL - 6.1.2.c Rev. 00

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HCGS EAL/RALTechnical Basis

$$NPV Noble Gas Sample Concentration = \frac{4.80E + 05\mu Ci / sec}{472x4.19E + 4cfm} \begin{bmatrix} 2.4 & 0E + 06\\ \pi G & /5ec \\ +0 \\ +8 & 0E + 05 \\ \pi G & /5ec \end{bmatrix} = \frac{1.212.43E}{1.212.43E} = \frac{1.212}{1.212} = \frac{1.21$$

$$NPV I-131 \text{ Sample Concentration} = \frac{1.15E + 02\mu Ci / \sec}{472x4.19E + 04cfm} = \frac{1.725.81}{\omega L^2/sec} = \frac{1.725.81}{\omega L^2/sec}$$

04<u>6</u>µCi/cc

SPV Noble Gas Sample Concentration =
$$\frac{4.80E + 05\mu Ci / \sec}{472x4.48E + 5cfm} = \frac{4.40E + 06}{4.66E + 05} = \frac{1.132.27E}{1.132.27E} = \frac{1.132.27E}{1.132.27E}$$

023µCi/cc

$$SPV I-131 \ Sample \ Concentration = \frac{1.15E + 02\,\mu Ci \, / \, sec}{472x4.48E + 05cfm} \left| \begin{array}{c} 3.40E + 0.2 \\ -\mu 6 \, / \, 5ec \\ + 0 \\ 1.15E + 0.2 \\ -\mu 6 \, / \, 5ec \\ -\mu 6 \, / \, 5e$$

Where: 472 = conversion factor
$$(28,317 \text{ cc/ft}^3 \text{ x 1 min.}/60 \text{ sec.})$$

9000 cfm = FRVS Vent Flow (maximum)
4.19E+04 cfm = NPV Vent Flow (maximum)
4.48E+05 cfm = SPV Vent Flow (maximum)
The noble gas release rate of $2.404.80E+065 \mu \text{Ci/sec}$ is obtained by
multiplying the 10CFR20, Appendix B limitTechnical Specification release rate
of $1.202.40E+043 \mu \text{Ci/sec}$ times 200.
The iodine release rate of $3.401.15E+032 \mu \text{Ci/sec}$ is obtained by multiplying
the 10CFR20, Appendix B limitTechnical Specification release rate of
 $1.705.75E+01 \mu \text{Ci/sec}$ times 200.

DEVIATION

None The value for EAL 6.1.2.c is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a

EAL - 6.1.2.c Rev. 00

TEDE Dose which would require a General Emergency classification or not meet the Alert classification, depending on the meteorological conditions and isotopic mixture. EAL 6.1.2.c would not be used unless EAL 6.1.2.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential uncertainty of this "default" EAL.

Two hundred times the 10CFR20, Appendix B limit noble gas and Iodine 131 are being used for this EAL, due to concerns that the State of New Jersey had pertaining to this EAL and based on the above mentioned uncertainties.

The time limit has been increased from 15 minutes to 30 minutes, to allow additional time to perform dose assessment, since the threshold fore this EAL is only 20% of the value allowed per NESP-007 and we do not wish to use this "default" EAL, unless absolutely necessary.

REFERENCES

NUMARC NESP-007, AA1.2, <u>AA1.1, AA1.4</u> Off-Site Dose Calculation Manual, Section 2.0 NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1 BNE

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6.1 Gaseous Effluent Release

ALERT - 6.1.2.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that exceeds 200 Times Radiological <u>10 CFR20</u>, Appendix B Limits for <u>30Technical Specifications for</u> 15 minutes or longer

EAL

	Valid High Alarm received from ANY of the following Effluent RMS Channels:	
	FRVS Noble Gas (Grid 1/3; 9RX680)NPV Noble Gas (Grid 1/3; 9RX590)SPV Noble Gas (Grid 1/3; 9RX580)HTV Noble Gas (Grid 1/3; 9RX518)	
	AND Total Plant Vant release rate EXCEEDS one of the following limits:	1
•	$\frac{4.80E+05}{\mu \text{Ci/sec I-131 (use foe NPV & SPV only)}}$	BNE.
	AND	
	Dose Assessment isresults NOT available	MRC
	AND	
	Release is ongoing for \geq 1530 minutes	BNE

OPERATIONAL CONDITION - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, can result from a Gaseous Radiological Release in excess of 200 times <u>10CFR20</u>, <u>Appendix B limits</u> Technical Specifications. This condition results from an uncontrolled release of radioactivity to the environment, resulting in elevated offsite dose rates. The threshold for this EAL is NOT based on a specific offsite dose rate, but rather on the loss of plant control implied by a

BNE

EAL - 6.1.2.d Rev. 00

HCGS EAL/RALTechnical Basis

radiological release of this magnitude that was not isolated within 15 minutes. The final integrated dose is very low and is not the primary concern. Valid is defined as the High alarm <u>actuating specifically</u> due to a Gaseous Release exceeding Technical Specification limits, thus precluding unwarranted event declaration as the result of spurious actuation. Classification is based on an ongoing release that does not <u>comply</u> with a license condition. Unplanned is defined as any release for which a radioactive discharge permit was not prepared, or a release that exceeds the conditions on the applicable permit.

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.2.a for classification.

The Total Plant Vent release rate can be obtained from SPDS or by adding up NPV, SPV, FRVS and HTV noble gas readings.

It is not intended that the release be averaged over 3015 minutes, but <u>exceed</u> 200 times <u>10CFR20</u>, <u>Appendix B Technical Specification</u> limits for <u>3015</u> minutes or longer. In addition, it is intended that the event be declared as soon as it is determined that the release will exceed 200 times the limit for <u>3015</u> minutes or longer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when effluent release concentration increases to a level that would cause a 100 mRem dose at the Protected Area Boundary

DISCUSSION

The release rate thresholds for this EAL are obtained by multiplying the <u>10CFR20</u>, <u>Appendix</u> <u>B Limit Technical Specification</u> release rates of <u>2.4E+03</u><u>1.2E+04</u> μ Ci/sec and <u>5.78E-01</u> <u> μ Ci/sec</u>-for Noble Gases and Iodine 131 respectively, times 200. Total Noble Gas release rate is the summation of all plant vent release rates.

This EAL <u>includes</u>does not utilize an Iodine Release rate for NPV & SPV since these vents <u>have Iodine monitors</u>. because the corresponding Alert threshold for Iodine is above the upper range of the NPV and SPV Iodine monitoring channels. Iodine Release rates for FRVS and the HTV are excluded since these vents do not include an Iodine detector. A gaseous effluent BNZ

BNG

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-	sample is needed to accurately quantify the Iodine Release rate (Refer to EAL 6.1.2.c). The SPDS Total Iodine Offsite Release Rate does not provide useful information because this is based on a default value of 1000 times less than the Total Noble Gas Offsite Release Rate, which could be grossly inaccurate. Determination of the Iodine Release Rate from the Iodine monitor is accomplished by multiplying the Iodine reading (in μ Ci/cc) by the applicable vent flow rate and 472 (conversion factor). Iodine Release Rates for FRVS and HTV are excluded since these vents do not include an Iodine detector. The SPDS Total Iodine offsite Release Rate does not provide useful information, since this based on a default value of 1000 times less than the Total Noble Gas offsite Release Rate , which could be grossly inaccurate. A gaseous effluent sample is needed to accurately quantify the Iodine Release Rate.	BNE
	<u>IUCFR20, Appendix B Limit teennical Specification</u> Calculation for Noble Gas	
	$uCi/Second = \frac{1500 \text{ mRemmrem/year } * (Allocation Factor)}{(ODCM X/O)} * (ODCM DRCF)$	SN-
	WHERE:uCi/Second= Total Noble Gas Release Rate from Salem (Unit 1 & Unit 2) or Hope Creek (all Vents; NPV, SPV, FRVS, and HTV) which would result in a TEDE Dose Rate of 250mRemmrem/year.ODCM X/Q = Site Specific (Salem or Hope Creek) dispersion factor at the Site Boundary in sec/m ³ .	BNB
	ODCM DRCF = Site Specific (Salem or Hope Creek) dose rate conversion factor in <u>mRemmrem</u> /year/uCi/m ³ .	BNZ
	ODCM X/Q = $2.67E-06$ ODCM DRCF = $7.80E+03 \text{ mRemmrem/yr/uCi/m}^3$ Allocation Factor = $5.00E-01$	BNE
	$\frac{2.40E+031.20E+04}{(2.67E-06 \text{ sec/m}^3) * (7.80E+03 \underline{\text{mRem}}/\text{yr/uCi/m}^3)}$	BNG
	2.40E+031.20E+04 uCi/Second * 200 = EAL valueis the Hope Creek Technical Specification value. $4.80E+05\mu Ci/sec = EAL$ value	BNE
	10CFR20, Appendix B Limit Calculation for Thyroid Committed Dose μ Ci/Second = 50 mRem/Year * (Allocation Factor)ODCM χ/Q * (ODCM THY DRCF)	BNE

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Where:	<u>uCi/Second = Total Iodine 131 release rate from Salem (Unit 1 or 2) or Hope</u>	
	Creek (all Vents; NPV, SPV, FRVS, and HTV).	

ODCM γ/Q = Site Specific (Salem or Hope Creek) dispersion factor at the Site Boundary in Sec/m³.

 $\frac{\text{ODCM DRCF} = \text{ is the most limiting potential Pathway (inhalation, child}}{\text{thyroid I-131) dose rate conversion factor in}}$ $\frac{\text{mRem/year/}\mu\text{Ci/m}^3}{\text{mRem/year/}\mu\text{Ci/m}^3}.$

 $\frac{\text{ODCM } \chi/\text{Q} = 2.67\text{E-}06}{\text{ODCM } \text{DRCF } \text{THY} = 1.62\text{E} + 07\text{mRem/yr/}\mu\text{Ci/m}^3}$ Allocation Factor = 5.00E-01

 $\frac{5.78E-01 \ (\mu Ci/Second = (50mRem/year) * (5.00E-01)}{(2.67E-06Sec/m^3) * (1.62E+07 mRem/yr/\mu Ci/m^3)}$ $\frac{5.78E-01\mu Ci/sec * 200 = EAL \ value.}{1.15E+02\mu Ci/sec = EAL \ value.}$

DEVIATION

The value for EAL 6.1.2d is based on one meteorological case and one isotopic mixture found in the ODCM. A radiological release based on this specific release rate could produce a TEDE Dose which would require a General Emergency classification or not meet the Alert classification, depending on the meteorological conditions and the isotopic mixture. EAL 6.1.2.d would not be used unless EAL 6.1.2.a (Dose Assessment) can not be used to determine the classification, if any, due to the potential uncertainty of this "default" EAL.

Two hundred times the 10CFR20, Appendix B limits of 100 mRem/year noble gas and 50 Iodine 131 are being used for this EAL, due to concerns that the State of New Jersey had pertaining to this EAL and based on the above mentioned uncertainties.

The time limit has been increased from 15 minutes to 30 minutes, to allow additional time to perform dose assessment, since the threshold for this EAL is only 20% of the value allowed per NESP-007 and we do not wish to use this "default" EAL, unless absolutely necessary. None

REFERENCES

NUMARC NESP-007, AA1.1, AA1.4 OP-AB.ZZ-126(Q), Abnormal Releases of Gaseous Radioactivity Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1 BNG

2.0 AUTOMATIC ACTIONS

2.1 Reactor Building Ventilation System isolates and FRVS System will start upon receipt of the following signals:

RB Exhaust Hi Hi Rad $1.0 \times 10^{-3} \mu$ Ci/cc Refuel Floor Exhaust Hi Hi Rad $2.0 \times 10^{-3} \mu$ Ci/cc

2.2 Control Room Emergency Filter System will start upon receipt of the following signal.
 Outside Air Intake Hi Rad
 2.0 x 10⁻⁵ µCi/cc

3.0 IMMEDIATE OPERATOR ACTIONS

None

- 4.0 SUBSEQUENT OPERATOR ACTIONS
 - 4.1 Ensure that all appropriate automatic actions are complete.
 - 4.2 Verify the RMS "Hi Alarm" by identifying the applicable channel(s) from the RM-11 CRT.
 - 4.3 Contact Radiation Protection and ensure they have entered HC.RP-AR.SP-0001(Q), Radiation Monitoring System Alarm Response. (This abnormal should not be exited until Radiation Protection has exited their Alarm Response)
 - 4.4 If the South Plant Vent is alarming, perform the following:
 - A. Stop the mechanical vacuum pumps if running.
 - B. Stop the Radwaste Decon Solution Evaporator.
 - C. Terminate Drywell Purge if in progress.
 - D. Place FRVS in service and isolate RBVS.

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- Consider if a change in plant operational status, as well as operation of plant equipment, associated with the monitor/monitors, may have impacted the monitor. Consult the Control Room for plant operational status and the attachments for equipment to monitor association.
- Evaluate the affected areas/equipment of the increased radiological levels. The severity of the alarm may constitute a plant emergency if the affected area(s)/equipment are:
 - Outside the plant (effluent release),
 - Occupied by personnel without protective equipment, or
 - The alarm is indicative of failed safety equipment/fuel (Tech Spec items).
- Notify RP supervision and the SNSS/NSS if the alarm could indicate an effluent release. Consider surveys of areas down wind of the release point.
 - Notify the SNSS/NSS of the results of the performance of Section 5.2.

Initial Protective Action Responses

- In the case of a HIGH alarm for the North Plant Vent (NPV), South Plant Vent (SPV), Filtration, Recirculation and Ventilation System Vent (FRVSV) noble gas effluent monitors, Hardened Torus Vent, or any duct monitor, the <u>total plant</u> gaseous/ iodine release (effluent dose assessment) shall be evaluated and documented to assist the SNSS/NSS in making notifications and the determination of the applicability of declaring a plant emergency IAW the Hope Creek Event Classification Guide (ECG).
 - a. Initiate a Station Status Checklist for the time period after the alarm, using EPIP 309H, Dose Assessment and the associated Station Status Checklist.

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6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.a

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mRem Total Effective Dose Equivalent (TEDE) or 500 mRem Thyroid CDE Dose for the actual or projected duration of the release

EAL

Dose Assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

TEDE 4-Day Dose of \geq 1.0E+02 mRem Thyroid-CDE Dose of \geq 5.0E+02 mRem

based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine Ratio

OPERATIONAL CONDITION - All

BASIS

The TEDE 4-Day Dose of 100 mRem corresponds directly to the NUMARC dose of 100 mRem.

The Thyroid-CDE Dose of 500 mRem corresponds directly to the NUMARC dose of 500 mRem.

Dose Assessment using actual meteorological data provides an accurate indication of release magnitude. The use of dose assessment based EALs is therefore preferred over the use of Release Rate based EALs which utilize calculations which have built-in inaccuracies because ODCM default Meteorological data is used. Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification escalates to a General Emergency when actual or projected doses exceed EPA Protective Action Guidelines.

DISCUSSION

This value provides a desirable gradient (one order of magnitude) between the Site Area Emergency and General Emergency classifications. No site allocation factor (.5) is used in this calculation due to the assumption that releases of this magnitude will be from one site.

The dose projection code assumes a 4 hour release utilizing current 15 minute average release rate data. For the TEDE 4-Day Dose, 100 mRem/hr*4 hr = 400 mRem. For the Thyroid-CDE Dose, 500 mRem/hr*4 hr = 2000 mRem.

DEVIATION

<u>NONE</u> NUMARC EAL AS1.1 (Classification based on noble gas release rate) is not desirable per the NUMARC Draft White Paper dated 7/25/94 and 9/10/94. The classification could be under conservative if it were made on the basis of noble gas release rate. Since dose assessment would continue in either case and the classification escalated if necessary, the impact from not having this EAL would be a delay in reaching the appropriate classification. This delay was deemed to be acceptable since in significant release situations, the plant condition EALs should provide the anticipatory classifications necessary for the implementation of offsite protective measures.

REFERENCES

NUMARC NESP-007, AS1.3 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents NUMARC Draft White Paper, 7-25-94, 9-10-94 NRC

6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.b

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mRem Total Effective Dose Equivalent (TEDE) or 500 mRem Thyroid CDE Dose for the actual or projected duration of the release

EAL

Dose Rate measured at the Protected Area Boundary or beyond EXCEEDS 100 mr/hr

AND

expected to Continue Release is ongoing for > 15 minutes

OPERATIONAL CONDITION - All

BASIS

An actual dose rate of 100 mRem/hr which is expected to continue for 15 minutes indicates a substantial radiological release which could exceed the 10CFR20 average annual population exposure limit of 100 mRem TEDE, using the assumption of a one hour release duration. **Imminent** is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a General Emergency when actual or projected doses exceed EPA Protective Action Guidelines.

DISCUSSION

An actual dose of 100 mRem Total Effective Dose Equivalent (TEDE) is based on the 10CFR20 annual average population exposure limit. Unless otherwise indicated, the

EAL - 6.1.3.b Rev. 00 75

conversion from whole body dose to TEDE is 1:1. Measured dose rates will be taken at the Protected Area Boundary, and a 15 minute threshold will be applied to be conservative.

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DEVIATION

None

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REFERENCES

NUMARC NESP-007, AS1.4

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

NUMARC Draft White Paper, 7-25-94, 9-10-94

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6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.c

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mRem Total Effective Dose Equivalent (TEDE) or 500 mRem Thyroid CDE Dose for the actual or projected duration of the release

EAL

Analysis of field survey samples at the Protected Area Boundary indicates <u>EITHER</u> one of the following:

- <u>>4.36E+02-5.24E+02</u> CCPM
- $> 3.85E-07-4.63E-07 \ \mu \text{Ci/cc I-131}$

OPERATIONAL CONDITION - All

BASIS

The Corrected Counts per Minute (CCPM) value is based on reading(s) obtained using a radiation count rate meter such as a RM-14 or E-140N with an HP260 probe attached. The Iodine-131 field survey sample concentration threshold is based on I-131 dose conversion factors from EPA-400. The thresholds are based on a Thyroid-CDE dose rate of 500 mRem/hr thyroid for I-131. Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a General Emergency when actual or projected doses exceed EPA Protective Action Guidelines.

DISCUSSION

The release sample concentration calculations are as follows.

BNB

The sample concentration is calculated using the I-131 Dose Conversion Factor from EPA-400:

Solving the following equation for μ Ci/cc:

mRem/hr =
$$(\mu Ci/cc)$$
(Dose Conversion Factor)

Then;

 $I-131 \text{ Sample Concentration} = \left(\frac{500m \text{Rem}/hr}{1.30E + 09m \text{Rem}/\mu\text{Ci}/cc/hr}\right) = 4.633.85\text{E}-BME$

 $07\mu Ci/cc$

Where $1.3008E+09mRem/\mu Ci/cc/hr$ is the Dose Conversion Factor from EPA-400, Table 5-4 | BNE and includes the EPA-400 breathing rate.

The Corrected Counts per Minute reading is calculated using the I-131 Sample concentration, and factors for using an RM-14 or E-140N with an HP260 probe.

Solving the following equation for CCPM:

 μ Ci/cc =___

(Detector Efficiency)(Collection Efficiency)(Conversion Factor - DPM to μ Ci)(Volume - ft³)(Conversion Factor - cc to ft³)

CCPM

Then;

 $CCPM = (4.633.85E-07\mu Ci/cc)(0.9)(2.22E+06DPM/\mu Ci) (2.00E-03CCPM/DPM) (10ft^3)(2.832E+04cc/ft^3) = 5.244.36E+02 CCPM$

BNE

Where:

2.00E-03 =	Detector Efficiency	- CCPM/DPM
$0.9 \ (or \ 90\%) =$	Collection Efficience	ТУ Т
2.22E + 06 =	Conversion factor -	DPM/µCi
$10 ft^3 =$	Volume	
2.832E + 04 =	Conversion factor - cc to ft^3	
	$CCPM = \cdot$	Corrected Counts per Minute
	using an RM-14 or	r E-140N with an HP260 probe.
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DEVIATION

None

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REFERENCES

NUMARC NESP-007, AS1.4

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

FEMA REP-2, Rev. 1, 7/87, Guidance on Offsite Emergency Radiation Measurement Systems, Phase-1 Airborne Release

SORC Summary 07/10/89

RPCS Thyroid Dose Commitment Factor Paper (NRP-94-0557), 11/22/94

6.1 Gaseous Effluent Release

SITE AREA EMERGENCY - 6.1.3.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 100 mRem TEDE 4-Day Dose for 30 minutes or longer

<u>EAL</u>

Valid High Alarm received from ANY of the following Effluent RMS Channels:

 FRVS Noble Gas (Grid 1/3; 9RX680)

 NPV Noble Gas (Grid 1/3; 9RX590)

 SPV Noble Gas (Grid 1/3; 9RX580)

 HTV Noble Gas (Grid 1/3; 9RX518)

AND

Total Plant Vent release rate EXCEEDS 4.21E+07 µCi/sec Total Noble Gas

AND

JesuHS Dose Assessment is NOT available

AND

Release is ongoing for > 30 minutes

OPERATIONAL CONDITION - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, indicates a substantial Gaseous Radiological Release which could exceed the 10CFR20 average annual population exposure limit of 100 mRem TEDE, using the assumption of a one hour release duration.

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not

> EAL - 6.1.3.d Rev. 00

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be utilized if Dose Assessment is available. Dose Assessment will take in account actual meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.3.a for classification.

The Total Plant Vent release rate can be obtained from SPDS or by adding up NPV, SPV, FRVS and HTV noble gas readings.

It is not intended that the release be averaged over 30 minutes but that the Release Rate exceed the EAL value for > 30 minutes.

Barrier Analysis

<u>N/A</u>

ESCALATION CRITERIA

Emergency Classification will escalate to a General Emergency when effluent release concentration increases to a level that would cause a 1000 mRem dose at the Protected Area Boundary

DISCUSSION

To obtain a site specific value to trigger the performance of dose assessment is not necessary, since this will be done when the UE value is reached. This value will supply a set point to classify a Site Area Emergency (SAE), if dose assessment has not been performed within 30 minutes.

The ODCM methodology calculates yearly values. To be consistent with the ODCM methodology the SAE classification trigger point of 100 mRem/hour needs to be converted to a yearly dose. This is done in the following manner;

365 days/year * 24 hours/ day = 8760 hours/year.

100 mRem/hour * 8760 hours/year = 8.76E+05 mRem/year.

<u>ODCM Dose Rate Conversion Factor = $7.80E + 0.3mRem/year/\muCi/m^3$ </u>

 $\underline{ODCM \ \chi/Q} = 2.67 \underline{E} - 06 \ \underline{Sec/m^3}$

No allocation factor is used for SAE.

<u>8.76E+05 mRem/year</u> 2.67E-06 Sec/m³ * 7.80E+03mRem/year/μCi/m³ = $4.21E + 07 \mu Ci/Sec$

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4.21E+07 µCi/Sec is the SAE Total Noble Gas Release Rate.

DEVIATION

This EAL is based on default meteorological and isotopic mixture assumption as found in the ODCM. Depending on actual meteorological conditions and isotopic mixture, the Release Rate used as the threshold value in this EAL could produce TEDE value which could be within Alert ranges of as high as the General Emergency threshold. This potential to overclassify or underclassify this event is not desirable. To preclude/limit this possibility, PSE&G has used 30 minutes instead of 15 as in AS1.1. This extra 15 minutes would allow personnel to obtain dose assessment projections from a second onsite computer should the primary location computer fail. In Addition events that result in a release of this magnitude would required degradation of multiple fission product barriers and should be classified per Section 3, Fission Product Barriers.

REFERENCES

NUMARC NESP-007, AS1.1, AS1.4 OP-AB.ZZ-126(Q), Abnormal Releases of Gaseous Radioactivity Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

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6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.a

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mRem Total Effective Dose Equivalent (TEDE) or 5000 mRem Thyroid CDE Dose for the actual or projected duration of the release

EAL

Dose Assessment indicates <u>EITHER</u> one of the following at the MEA or beyond as calculated on the SSCL:

TEDE 4-Day Dose of \geq 1.0E+03 mRem Thyroid-CDE Dose of \geq 5.0E+03 mRem based on Plant Vent effluent sample analysis and not on a default Noble Gas to Iodine Ratio

OPERATIONAL CONDITION - All

BASIS

The TEDE 4-Day Dose of 1000 mRem corresponds directly to the NUMARC dose of 1000 mRem which exceeds EPA Protective Action Guideline criteria for a General Emergency.

The Thyroid-CDE Dose or 5000 mRem corresponds directly to the NUMARC dose of 5000 mRem which exceeds EPA Protective Action Guideline criteria for a General Emergency.

Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

N/A

DISCUSSION

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No site allocation factor (.5) is used in this calculation due to the assumption that releases of this magnitude will be from one site. **DEVIATION**

<u>NONE NUMARC EAL AG1.1 (Classification based on noble gas release rate) is not desirable</u> per the NUMARC Draft White Paper dated 7/25/94 and 9/10/94. The classification could be under conservative if it were made on the basis of noble gas release rate. Since dose assessment would continue in either case and the classification escalated if necessary, the impact from not having this EAL would be a delay in reaching the appropriate classification. This delay was deemed to be acceptable since in significant release situations, the plant condition EALs should provide the anticipatory classifications necessary for the implementation of offsite protective measures.

REFERENCES

NUMARC NESP-007, AG1.3 EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents NUMARC Draft White Paper 7-25-94, 9-10-94

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6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.b

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mRem Total Effective Dose Equivalent (TEDE) or 5000 mRem Thyroid CDE Dose for the actual or projected duration of the release

EAL

Dose Rate measured at the Protected Area Boundary or beyond EXCEEDS 1000 mRem/hr

AND

expected to continue Release is ongoing for ≥ 15 minutes

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OPERATIONAL CONDITION - All

BASIS

An actual dose rate of 1000 mRem/hr indicates the EPA Protective Action Guide may be exceeded for the general public. Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

N/A

DISCUSSION

An actual projected dose of 1000 mRem Total Effective Dose Equivalent (TEDE) is based on the EPA protective action guidance which indicates that public protective actions are indicated if the dose exceeds 1 Rem whole body. This is consistent with the emergency class description for a General Emergency. A release rate equivalent to 1000 mRem/hr boundary dose rate may also be used if TEDE projections are not available. Unless otherwise indicated, the conversion from whole body dose to TEDE is 1:1.

> EAL - 6.1.4.b Rev. 00

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DEVIATION

None

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REFERENCES

NUMARC NESP-007, AG1.4

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

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6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.c

IC Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mRem Total Effective Dose Equivalent (TEDE) or 5000 mRem Thyroid CDE Dose for the actual or projected duration of the release

EAL

Analysis of field survey samples at the Protected Area Boundary indicates <u>EITHER</u> one of the following:

> 5.24<u>4.36</u>E+03 CCPM
 > 4.63<u>3.85</u>E-06 μCi/cc I-131

OPERATIONAL CONDITION - All

BASIS

The Corrected Counts per Minute (CCPM) value is based on reading(s) obtained using a radiation count rate meter such as a RM-14 or E-140N with an HP260 probe attached. The Iodine-131 field survey sample concentration threshold is based on I-131 dose factors from EPA-400. The thresholds are based on a dose rate of 5000 mRem/hr Thyroid-CDE for I-131. Imminent is defined as expected to occur within 2 hours.

Barrier Analysis

N/A

ESCALATION CRITERIA

N/A

DISCUSSION

No site allocation factor (.5) is used in this calculation due to the assumption that releases of this magnitude will be from one site.

BNY-

The release sample concentration calculations are as follows.

EAL - 6.1.4.c Rev. 00 The sample concentration is calculated using the I-131 Dose Factor from EPA-400:

Solving the following equation for μ Ci/cc:

mRem/hr =
$$(\mu Ci/cc)$$
(Dose Conversion Factor)

Then;

$$I-131 \text{ Sample Concentration} = \left(\frac{5000m \text{Rem}/hr}{1.30E + 09m \text{Rem}/\mu Ci/cc/hr} + \frac{1.08E + 09m \text{Rem}}{1.30E + 09m \text{Rem}/\mu Ci/cc/hr}\right) = 4.633.85E-$$

06µCi/cc

Where 1.3008E+09 mRem/ μ Ci/cc/hr is the Dose conversion factor from EPA-400, Table 5-4 $\beta \sqrt{\beta}$ and includes the EPA-400 breathing factor.

The Corrected Counts per Minute reading is calculated using the I-131 Sample concentration, and factors for using an RM-14 or E-140N with an HP260 probe.

Solving the following equation for CCPM:

μCi/cc =______

(Detector Efficiency)(Collection Efficiency)(Conversion Factor - DPM to μ Ci)(Volume - ft³)(Conversion Factor - cc to ft³)

Then;

 $CCPM = (4.633.85E-06\mu Ci/cc)(0.9)(2.22E+06DPM/\mu Ci)(2.00E-03CCPM/DPM)(10ft^{3})$ $(2.832E+04cc/ft^{3}) = 5.244.36E+03 CCPM$

Where:

2.00E-03 =	Detector Efficiency - CCPM/DPM	
0.9 (or 90%) =	Collection Efficiency	
2.22E + 06 =	Conversion factor - $DPM/\mu Ci$	
$10 ft^3 =$	Volume	
2.832E + 04 =	Conversion factor - cc to ft^3	
CCPM =	Corrected Counts per Minute using an RM-14 or E-140N	
	with an HP260 probe.	



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None

REFERENCES

NUMARC NESP-007, AG1.4

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

FEMA REP-2, Rev. 1/July 1987, Guidance on Offsite Emergency Radiation Measurement Systems, Phase-1 Airborne Release – SORC Summary 07/10/89

RPCS Thyroid Dose Commitment Factor paper NRP-94-0557, 11-22-94

6.1 Gaseous Effluent Release

GENERAL EMERGENCY - 6.1.4.d

IC Any Unplanned Release of Gaseous Radioactivity to the Environment that Exceeds 1000 mRem TEDE 4-Day Dose for 30 minutes or longer

<u>EAL</u>

Valid High Alarm received from ANY of the following Effluent RMS Channels:

 FRVS Noble Gas (Grid 1/3; 9RX680)

 NPV Noble Gas (Grid 1/3; 9RX590)

 SPV Noble Gas (Grid 1/3; 9RX580)

 HTV Noble Gas (Grid 1/3; 9RX518)

AND

Total Plant Vent release rate EXCEEDS 4.21E+08 µCi/sec Total Noble Gas

AND

Dose Assessment is NOT available

AND

Release is ongoing for > 30 minutes

OPERATIONAL CONDITION - All

BASIS

Valid High alarm and effluent release rate values exceeding the EAL threshold, indicates a substantial Gaseous Radiological Release which could exceed the EPA Protective Action Guide exposure of 1000 mRem TEDE, using the assumption of a one hour release duration.

The EAL value for Total Plant Vent release rate was determined using default X/Q values from the ODCM which provides a less accurate method of evaluation release magnitude then using dose assessment with real time meteorological data. For that reason, this EAL should not be utilized if Dose Assessment is available. Dose Assessment will take in account actual

> EAL - 6.1.4.d Rev. 00

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meteorological conditions, plant vent flows and plant vent effluent concentrations to provide a more accurate assessment of a radiological release. If Dose Assessment is available than refer to EAL 6.1.4.a for classification.

The Total Plant Vent release rate can be obtained from SPDS or by adding up NPV, SPV, FRVS and HTV noble gas readings.

It is not intended that the release be averaged over 30 minutes but that the Release Rate exceed the EAL value for > 30 minutes.

Barrier Analysis

<u>N/A</u>

ESCALATION CRITERIA

<u>NONE</u>

DISCUSSION

To obtain a site specific value to trigger the performance of dose assessment is not necessary, since this will be done when the UE value is reached. This value will supply a set point to classify a General Emergency (GE), if dose assessment has not been performed within 30 minutes.

The ODCM methodology calculates yearly values. To be consistent with the ODCM methodology the GE classification trigger point of 1000 mRem/hour needs to be converted to a yearly dose. This is done in the following manner;

<u>365 days/year * 24 hours/ day = 8760 hours/year.</u>

1000 mRem/hour * 8760 hours/year = 8.76E+06 mRem/year.

<u>ODCM Dose Rate Conversion Factor = $7.80E + 03mRem/year/\muCi/m^3$ </u>

ODCM $\chi/Q = 2.67E-06$ Sec/m³

No allocation factor is used for GE.

 $\frac{8.76E+06 \text{ mRem/year}}{2.67E-06 \text{ Sec/m}^3 * 7.80E+03 \text{ mRem/year/} \mu \text{Ci/m}^3}$ $\frac{4.21E+08 \mu \text{Ci/sec is the General Emergency Total Noble Gas Release Rate}{2.67E-06 \text{ Sec/m}^3 * 7.80E+03 \text{ mRem/year/} \mu \text{Ci/m}^3}$



DEVIATION

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This EAL is based on default meteorological and isotopic mixture assumptions as found in the ODCM. Depending on actual meteorological conditions and isotopic mixture, the Release Rate used as the threshold value in this EAL could produce TEDE values which could be within Alert or Site Area Emergency thresholds. This potential to underclassify this Event is not desirable. To preclude/limit this possibility, PSE&G has used 30 minutes instead of 15 as in AS1.1 This extra 15 minutes would allow personnel to obtain Dose Assessment projections from a second computer should the primary location computer fail. In addition events that result in a release of this magnitude would require degradation of multiple Fission Product Barriers and should be promptly classified.

REFERENCES

NUMARC NESP-007, AG1.1, AG1.4 OP-AB.ZZ-126(Q), Abnormal Releases of Gaseous Radioactivity Off-Site Dose Calculation Manual, Section 2.0 - Gaseous Effluents NUMARC Draft White Paper, 7-25-94, 9-10-94. Technical Specification 3.11.2.1

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6.3 In-Plant Radiation Occurrences

UNUSUAL EVENT - 6.3.1.c

IC Unplanned Increase in Plant Radiation

EAL

Uncontrolled water level decrease in the Spent Fuel Pool as indicated by <u>-EITHER</u> one of the following:

Valid Fuel Pool Low Level Alarm Condition

<u>AND</u>

Visual Observation Valid Fuel-Pool Low-Level-Alarm Condition

OPERATIONAL CONDITION - All

BASIS

An Uncontrolled decrease in Spent Fuel Pool Level represents a condition which can result in increased radiation levels, due to the loss of radiation shielding, if the Spent Fuel Pool level decrease can not be terminated. This event has a long lead time relative to potential for radiological release outside the site boundary, thus the impact to public health and safety is very low. Uncontrolled means that the level decrease can not be terminated.

Determination of an **uncontrolled** level decrease is made through <u>receipt of the Spent Fuel</u> <u>Pool Low Level Alarm in the Main Control Room eitherand</u> Visual Observation or receipt of the Spent Fuel Pool Low Level Alarm in the Main Control Room. Visual Observation is the preferred method, whenever possible, however it is <u>NOT</u> intended that an individual must be dispatched for classification purposes, if the existing radiation level increase trend prevents personnel from accessing the Refuel Floor, or if cameras are available to remotely verify the condition. In the event visual observation is not available by any means, then Main Control Room indication should be used.

Barrier Analysis

N/A

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6.0 Radiological Releases/Occurrences

6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.a

IC Release of Radioactive Material or increases in Radiation Levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain Cold Shutdown

EAL

Unplanned increase in radiation levels inside the Protected Area \geq 1000 times normal

as indicated by **EITHER** one of the following:

Permanent or portable Area Radiation Monitors General Area Radiological Survey

<u>AND</u>

Unplanned Dose Rates \geq -2000 mRem/hr in <u>ANY</u> area of the plant which require <u>ACCESS</u> to maintain plant safety functions (EXCLUDING the Main Control Room and CAS)

OPERATIONAL CONDITION - All

BASIS

An Unplanned Dose Rate of 2000 mRem/hr or greater in <u>ANY</u> area of the plant which requires <u>ACCESS</u> to maintain plant safety functions, warrants declaration of an Alert, due to the impaired ability to operate the required plant equipment. Unplanned is defined as those events or conditions which are not associated with a planned evolution, such that radiation levels are increasing in an uncontrolled manner. The Dose Rate threshold of **2000 mRem/hr** was chosen based upon NC.NA-AP.ZZ-0024, Radiation Protection Program Administrative Dose Limits and Extension criteria which requires Senior Radiation Protection Supervisor approval prior to exceeding 2000 mRem/yr. This value is low enough to ensure classification of an Alert before personnel access is severely hampered and high enough to allow any increase in normal radiation level, by a factor of 1000, to be classified as an Unusual Event per EAL 6.3.1.a. Radiation levels could be indicated by ARM or radiological survey.

Barrier Analysis

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Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when loss of control of radioactive materials causes significant offsite doses.

DISCUSSION

Emergency Coordinator judgement must be used, based on existing plant conditions, to determine areas that contain systems that are required to be operated manually, or require local surveillances to assure reliable support of safe plant operation for the conditions that exist. Areas having equipment that must be operated locally during an accident and areas along associated access routes that require HP coverage and continuous update of changing radiological conditions satisfy the definition of this condition.

Areas of the Plant which require access following an accident to maintain plant Safety functions-and-vital-areas-include but are not limited to:

Post Accident Sample Station & transport Path Controlled Hot Chemist Lab Stendby Liquid CONTROL (510) 545 For GREES NRC ERVS RMS Post Amillion Child and International States Diesel Generator and Adjacent Areas Residual Near Removal (Rose) System erea FRVS RMS Post Accident Skid & Sample Transport Path-Stavice WOTLA SYSTEM QREAS STATION AUXILIARY COOLING (Soc) System aces **DEVIATION** Areas covered in the HC. DP. EO. 22-3005 (SOO Series EOPS)

None

REFERENCES

NUMARC NESP-007, AA3.2 NC.NA-AP.ZZ-024(Q) Radiation Protection Program UFSAR Table 12.3-3

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NEC

6.0 Radiological Releases/Occurrences

6.3 In-Plant Radiation Occurrences

ALERT - 6.3.2.d/<u>6.3.2.e</u>

IC Events that have or may result in uncovering Irradiated Fuel outside the Reactor Vessel

EAL

EITHER one of the following:

• Unplanned increase on <u>ANY</u> one of the following Area Rad Monitors or general area rad survey indicates <u>> 2000 mRem/hr</u>:

Spent Fuel Storage Pool Area (9RX707) New Fuel Criticality Storage Channel A (9RX612) New Fuel Criticality Storage Channel B (9RX613)

• Visual observation of Irradiated Fuel uncovered

OPERATIONAL CONDITION - All

BASIS

An Unplanned Dose Rate of 2000 mRem/hr as indicated on any of the Refuel Floor Area Radiation Monitors warrants declaration of an Alert, as dose rates of this magnitude could be the result of a loss of shielding of irradiated Fuel Bundles or possible damage to an irradiated Fuel Bundle. Offsite doses during these accidents would be well below the EPA Protective Action Guidelines and the classification as an Alert is therefore appropriate. The intent of this EAL is to classify those events that result in increased Dose Rates on the Refuel Floor. Specifically, those events that result in increased radiation levels due to shine, as a result of decreased shielding, but do not involve a release of fission products should be classified under this EAL. Those events that result in physical damage to an irradiated and are accompanied by increasing radiation levels should not be classified under this EAL, but should be classified EAL 6.3.2.c, when those conditions exist.

Unplanned is defined as those events or conditions which are not associated with a planned evolution, such as lifting of the Reactor Vessel Internals, that results in radiation levels are increasing in an uncontrolled manner. The Dose Rate threshold of 2000 mRem/hr was chosen based upon NC.NA-AP.ZZ-0024, Radiation Protection Program Administrative Dose Limits

EAL - 6.3.2.d Rev. 00

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and Extension criteria which requires Senior Radiation Protection Supervisor approval prior to exceeding 2000 mRem/yr. This value is low enough to ensure classification of an Alert before personnel access is severely hampered and high enough to allow any increase in normal radiation level, by a factor of 1000, to be classified as an Unusual Event per EAL 6.3.1.a. Radiation levels could be indicated by ARM or radiological survey.

Visual observation of irradiated fuel uncovered will result in onsite dose levels changing significantly.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a Site Area Emergency when loss of control of radioactive materials causes significant offsite doses.

DISCUSSION



DEVIATION

None

REFERENCES

NUMARC NESP-007, AA2.3, AA2.4 HCGS Technical Specifications, 3.3.7.1, Table 3.3.7.1-1 HC.RP-AR.SP-0001(Q), Radiation Monitoring System Alarm Response, Att. 41, 42, 77 NUREG-1229, Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions For Nuclear Incidents NRC Information Notice - 90-08



EAL - 6.3.2.d Rev. 00

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7.0 Electrical Power

7.1 Loss of AC Power Capabilities

GENERAL EMERGENCY - 7.1.4.b

IC Prolonged Loss of All Offsite and Onsite AC Power to All Vital AC Buses

EAL

ALL 4.16 KV Vital Buses are deenergized

<u>AND</u>

A-Loss of any 2 Fission Product <u>Barriers has</u>Barriers occurred or is imminent-with the Potential Loss of the third Barrier

OPERATIONAL CONDITION - 1, 2, and 3

BASIS

A-Loss of <u>ALL</u> 4.16 KV Vital Buses may result in Safety System Losses and Fission Product Barrier degradation.that results in a Loss of any 2 Fission Product Barriers with the Potential Loss of the third. The intent of this EAL is to classify degraded AC power events that result in a Loss of offsite power source (1AX501 AND 1BX501) to the 4.16 KV Vital Buses, along with a Loss of Onsite power sources (EDGs). Prolonged loss of Vital AC power may cause Core uncovery and the inability to remove heat from the containment. Reactor injection capability may no longer be available, and degradation in core cooling will commence.; however, a General Emergency should be declared before the loss of the fission product barriers are imminent. Indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with emphasis on EC Judgement as it relates to imminent loss of Fission Product Barrier and because abilities to monitor the barriers is degraded. I HA INFERT 15 descret AS expected TO DECEMENT A to MORE.

Barrier Analysis

Although not directly related to Fission Product Barriers, these events will eventually result in the loss of all three barriers if power cannot be restored. In addition, the extent of the loss of power will result in degraded monitoring capability. It is therefore important is such events to closely monitor the Fission Product Barriers and use judgement related to the IMMINENT Loss or Potential Loss of barriers as directed in EAL Section 3.0

EAL - 7.1.4.b Rev. 00

ESCALATION CRITERIA

N/A

DISCUSSION

10 CFR 50.2 defines a station blackout (SBO) as complete loss of AC power to Vital <u>AND</u> Non-Vital buses. Loss of all AC power to the Vital Buses compromises all plant safety systems requiring AC electric power including RHR, ECCS, Spent Fuel Pool Cooling and Service Water. Depending on the status of power supplies to non-vital buses, some Balance of Plant systems that would assist in maintaining plant conditions (i.e. RWCU, condensate, etc.) may be unavailable. Thus, the ability to remove decay heat and control containment parameters is severely challenged.

During a Loss of all AC power to the Vital Buses, all Class 1E System Instruments remain powered from Class 1E Uninterruptable Power Supplies (UPS), which are powered by DC power via inverters. The 125 VDC Battery Buses will continue to supply DC power from the batteries. Battery power is limited depending on the discharge rate and predischarge condition of the battery. The ability to restore power to AC buses may eventually be threatened as battery power (DC) is depleted due to the lack of DC (control power) for AC power circuit breakers.

Under a Loss of Vital AC Power condition, operation and control of plant systems is guided by the Station Blackout//Loss of Offsite Power//Diesel Generator Malfunction Abnormal Operating Procedure. Successful coping maintains the following key parameters within given acceptable limits:

- 1. Reactor water level > (TAF)
- 2. Suppression pool level low enough to prevent HPCI and/or RCIC steam exhaust line flooding
- 3. Reactor pressure high enough to maintain HPCI and RCIC operable
- 4. Containment pressure < design limit
- 5. Torus temperature < design limits (HPCI/RCIC lube oil temperature concern when suction aligned to suppression pool)
- 6. Drywell temperature below design limits

RCIC and HPCI operability is dependent on the availability of 125/250 VDC power. The parameters listed above can be maintained as long as battery power remains available. Battery power is limited depending on the discharge rate and predischarge condition of the battery. Additionally, the loss of ventilation to the HPCI and RCIC turbine areas may result in a system isolation due to elevated temperatures.

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Other than HPCI and/or RCIC, additional inventory makeup may be possible by using the diesel driven fire pump to inject water (at low pressure), to the RPV via, the RHR/LPCI system. This may require RPV depressurization using the SRVs, which also require 125 VDC power.

The likelihood of Potential-loss of the third-second Barrier should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions. In addition, under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, and the potential-loss may be mitigated, it is necessary to give the Emergency Coordinator a reasonable idea of how quickly he may need to declare a General Emergency based on these conditions.

It is estimated that several hours are required to fully evacuate the 10 mile EPZ. Taking into consideration the above factors, declaring a General Emergency leaves sufficient time for the offsite authorities to implement Protective Actions well before a radioactive release would occur while providing sufficient time for on-site and off-site mitigation activities to restore AC power.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, SG1 HC.OP.EO.ZZ-0100 (Q)-FC, Reactor Scram HC.OP.EO.ZZ-0102 (Q)-FC, Primary Containment Control HC.OP.EO.ZZ-0104 (Q)-FC, Radioactive Release Control HC.OP-AB.ZZ.0135 (Q), Station Blackout / Loss of Offsite Power / Diesel Generator Malfunction HCGS Technical Specifications Section 3/4.8, Electrical Power Systems HCGS Individual Plant Evaluation, Section 3.1.1.4.6, 3.1.2.1.6

> EAL - 7.1.4.b Rev. 00

8.0 System Malfunctions

8.2 Loss of Assessment Capability

UNUSUAL EVENT - 8.2.1.a

IC Unplanned Loss of All Onsite or Offsite Communications Capabilities

EAL

Unplanned Loss of <u>ALL ONSITE</u> communications as evidenced by the loss of <u>ALL</u> of the following systems:

Station Page System (Gaitronics)

Station Radio System

Direct Inward Dial System (DID)

Essex (Centrex) Phone System

----- Nuclear Emergency Telephone System (NETS)

OPERATIONAL CONDITION - All

BASIS

An **Unplanned** loss of communication ability significantly degrades the operating crews ability to perform tasks necessary for plant operations and/or the ability to communicate with offsite authorities, warrants declaration of an Unusual Event. The loss of off-site communications capability is more comprehensive than that addressed by 10CFR50.72.b. **Unplanned** is defined as the loss of communication capabilities not being the result of planned maintenance activities, where compensatory measures would be taken.

Barrier Analysis

N/A

ESCALATION CRITERIA

None

DISCUSSION

None

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DEVIATION

None

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REFERENCES

NUMARC NESP-0007, SU6

EAL - 8.2.1.a Rev. 00

8.0 System Malfunctions

8.2 Loss of Assessment Capability

UNUSUAL EVENT - 8.2.1.c

IC Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes

EAL

Unplanned Loss of > 75% of Main Control Room Overhead Annunciators

<u>AND</u>

- for ≥ 15 minutesEITHER one of the following:
- 15 minutes have elapsed since the loss of OHAs
- <u>A significant transient** is in progress</u>

OPERATIONAL CONDITION - 1, 2, 3

BASIS

A Unplanned Loss of > 75% of all Main Control Room Overhead Annunciators without a plant transient in Operational Conditions 1, 2 or 3 for greater than 15 minutes warrants a heightened awareness by Control Room Operators. Qualification of > 75% is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss. CRIDS is available to provide compensatory indication. 15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes but the annunciators were available at the time of discovery, classification is not required under this EAL but a review of the "After The Fact" RAL must be completed. Unplanned loss of annunciators excludes scheduled maintenance and testing activities.

Significant transients include response to automatic or manually initiated actions such as:

BNB

EAL - 8.2.1.c Rev. 00 <u>Reactor Scram</u> <u>Load Rejection > 25% Power</u> <u>ECCS Injection</u> <u>Thermal Power oscillations of 10%</u>



N/A

ESCALATION CRITERIA

Emergency classification will be escalate to an Alert if a transient is in progress or if CRIDS AND SPDS becomes unavailable and 15 minutes have elapsed since the loss of OHAs.-

DISCUSSION

Without Control Room annunciators, there may be difficulty initially recognizing changing plant conditions, as well as, monitoring conditions associated with normal plant operations. SNSS judgement of the severity of the loss should also be based on the need to initiate increased or continuous plant equipment monitoring. Also, specific annunciator loss should be judged against those needed for by the operating staff for operation in abnormal and emergency operating procedures.

Most alarm conditions for the annunciator system have CRIDS digital alarm points as well. By monitoring the CRIDS screens, most alarm conditions can be observed and responded to independent of the overhead annunciators.

A loss of plant inverter 1BD483 will result in a loss of all overhead annunciators, as well as a loss of feedwater level control. If the loss of overhead annunciators was not due to the loss of 1BD483, stable plant operations should continue.

This EAL is not required in modes 4 or 5 due to the limited number of safety systems required for operation.

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DEVIATION

None. A section for declaring an UE has been added if a transient is in progress when the loss of annunicators occurs. Two independent events occurring at the same time warrants a expeditious notification and not waiting 15 minutes for the Unusual Event declaration.

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REFERENCES

NUMARC NESP-0007, SU3

EAL - 8.2.1.c Rev. 00 HC.OP.AB.ZZ-0143 (Q), Loss of Overhead Annunciators / Loss of CRIDS HC.OP.EO.ZZ-0100 (Q)-FC, Reactor Scram

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EAL - 8.2.1.c Rev. 00

8.0 System Malfunctions

8.2 Loss of Assessment Capability

ALERT - 8.2.2.a

IC Unplanned Loss of Control Room Annunciators and a Significant Transient is in Progress or Compensatory Indicators are Unavailable

EAL

Unplanned Loss of > 75% of Main Control Room Overhead Annunciators - for \geq 15 minutes

<u>AND</u>

A significant transient<u>**</u> is in progress

AND

15 minutes have elapsed since the loss of OHAs

OPERATIONAL CONDITION - 1, 2, 3

BASIS

An Unplanned Loss of > 75% of Main Control Room Overhead Annunciators with a significant transient in progress significantly hampers operator response. Qualification of > 75% is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss. **Significant transients include response to automatic or manually initiated actions such as:

- Reactor Scram
- Load Rejection > 25% Power
- ECCS Injection
- Thermal Power oscillations of 10%

15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification must be made under this EAL regardless of time

EAL - 8.2.2.a Rev. 00 BNB

required for restoration. If it is determined that the annunciators were lost for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL but a review of the "After The Fact" RAL must be completed. Unplanned loss of annunciators excludes scheduled maintenance and testing activities.

Barrier Analysis

N/A

ESCALATION CRITERIA

AlteRNOTE IN PICATIONS ARE NOT A VOILable with

Emergency Classification will escalate to a <u>Site Area Emergency based on a loss of control</u> room annunciators with both a failure of CRIDS and a plant transient in progress.

DISCUSSION

Without Control Room annunciators, it may be difficult to monitor conditions associated with normal plant operations. During transient event such as those listed in the EAL, the difficulty becomes more acute.



This EAL is not required in modes 4 or 5 due to the limited number of safety systems required for operation.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, SA4 HC.OP.AB.ZZ-0143 (Q), Loss of Overhead Annunciators / Loss of CRIDS HC.OP.EO.ZZ-0100 (Q)-FC, Reactor Scram



8.0 System Malfunctions

8.2 Loss of Assessment Capability

ALERT - 8.2.2.b

IC Unplanned Loss of Control Room Annunciators and a Significant Transient is in Progress or Compensatory Indicators are Unavailable

EAL

Unplanned Loss of > 75% of Main Control Room Overhead Annunciators for \geq 15 minutes

• <u>AND</u>

- <u>BOTH</u> of the following:
 - — CRIDS
 - — SPDS
 - -___are <u>NOT AVAILABLE</u>
- AND

15 minutes have elapsed since the loss of OHAs

OPERATIONAL CONDITION - 1, 2, 3

BASIS

An Unplanned Loss of > 75% of Main Control Room Overhead Annunciators with loss of backup control room monitoring significantly hampers operator response. Qualification of > 75% is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss.

15 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification must be made under this EAL regardless of time required for restoration. If it is determined that the annunciators were lost for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL but a review of the "After The Fact" RAL must be completed.

EAL - 8.2.2.b Rev. 00 BNE

Unplanned loss of annunciators excludes scheduled maintenance and testing activities. The fifteen minutes also allows for attempting to restore the CRIDS computer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Alternate Indications are not aloss of control room annunciators with both a failure of CRIDS and a plant transient in progress

DISCUSSION

The Control Room Integrated Display System (CRIDS) is not essential for the safe shutdown or operation of the plant. However, with the loss of control room annunciators the loss of CRIDS significantly reduces the ability of the operations staff to monitor and evaluate plant conditions. SNSS judgement of the severity of the loss should also be based on the need to initiate increased or continuous plant equipment monitoring. Most alarm conditions for the annunciator system have CRIDS digital alarm points as well. By monitoring the CRIDS screens, most alarm conditions can be observed and responded to, independent of the overhead annunciators.

The safety parameter display system (SPDS) also provides information and indication related to selected plant parameters during a plant transient. Loss of this assessment tool may hamper operators attempt to comply with directions provided in EOPs or may limit the recognition of significant parameter values called out in the EOPs. It is not included in the threshold for this EAL because of the limited scope of the parameters it monitors.

This EAL is not required in modes 4 or 5 due to the limited number of safety systems required for operation.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, SA4 HC.OP.AB.ZZ-0143 (Q), Loss of Overhead Annunciators / Loss of CRIDS HC.OP.EO.ZZ-0100 (Q)-FC, Reactor Scram



PS

PS

P5

PS

8.0 System Malfunctions

8.2 Loss of Assessment Capability

SITE AREA EMERGENCY - 8.2.3

IC Inability to Monitor a Significant Transient in Progress

EAL

Unplanned Loss of > 75% of Main Control Room Overhead Annunciators
 for <u>> 15 minutes</u>

<u>AND</u>

A significant transient** is in progress

AND

BOTH of the following: <u>CRIDS</u> <u>SPDS</u> are NOT AVAILABLE

<u>AND</u>

Main Control Room Board Indications are <u>NOT AVAILABLE</u> to monitor <u>ANY</u> of the following:

RCS Status Reactivity Control ECCS Containment Parameters

-<u>AND</u>

<u>BOTH</u> of the following: CRIDS SPDS are <u>NOT AVAILABLE</u>

> EAL - 8.2.3 Rev. 00

PS

PS

OPERATIONAL CONDITION - 1, 2, 3

BASIS

An Unplanned-Loss of > 75% of Main Control Room Overhead Annunciators with loss of backup control room monitoring, AND while a transient is in progress represents a major loss of ability to properly respond to a transient condition. Qualification of > 75% is left to the discretion of the Senior Nuclear Shift Supervisor (SNSS), and is considered approximately 75%. It is not intended that a detailed count be performed, but that a rough approximation be used to determine the severity of the loss. Backup monitoring from CRIDS compounds the ability to monitor the progress of the transient. In addition, a Loss of Main Control Room indications for one of the systems listed in the EAL must also occur. <u>**Significant transients</u> include response to automatic or manually initiated actions such as:

<u>Reactor Scram</u> <u>Load Rejection > 25% Power</u> <u>ECCS Injection</u> <u>Thermal Power oscillations of 10%</u>

A5 minutes is used as a threshold to exclude transient or momentary power losses. The 15 minutes clock starts when the annunciators have been lost, or are determined to have been lost. If upon time of discovery it is determined that the annunciators have been lost for at least 15 minutes prior to discovery, classification must be made under this EAL regardless of time required for restoration. If it is determined that the annunciators were lost for at least 15 minutes with the annunciators available at the time of discovery, classification is not required under this EAL but a review of the "After The Faet" RAL must be completed. Unplanned loss of annunciators excludes scheduled maintenance and testing activities. The fifteen minutes also allows for attempting to restore the CRIDS computer.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a General Emergency based on either the Loss of Fission Product Barriers; increased plant radiation levels or releases; or EC judgement.

DISCUSSION

Without Control Room annunciators, it may be difficult to monitor conditions associated with normal plant operations. During transient event such as those listed in the EAL, the difficulty becomes more acute. Compounding these, a concurrent loss of control room backup monitoring will further hinder operations staff decision making needed to respond to the transient.

EAL - 8.2.3 Rev. 00 The safety parameter display system (SPDS) also provides information and indication related to selected plant parameters during a plant transient. Loss of this assessment tool may hamper operators attempt to comply with directions provided in EOPs or may limit the recognition of significant parameter values called out in the EOPs. It is not included in the threshold for this EAL because of the limited scope of the parameters it monitors.

This EAL is not required in modes 4 or 5 due to the limited number of safety systems required for operation.

DEVIATION

None

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REFERENCES

NUMARC NESP-0007, SS6 HC.OP.AB.ZZ-0143 (Q), Loss of Overhead Annunciators / Loss of CRIDS HC.OP.EO.ZZ-0100 (Q)-FC, Reactor Scram

9.0 Hazards - Internal/External

9.1 Security Threats

ALERT - 9.1.2

IC Security Event in a Plant Protected Area

EAL

Confirmed hostile intrusion or malicious acts as evidenced by ANY one of the following:

- Discovery of an intruder(s), armed and violent, within the Protected Area, resulting in **SCP-6** implementation
- Hostage held on-site in a non-vital area, resulting in SCP-8 implementation
- Malicious acts or destructive device discovered in a Vital Area, resulting in SCP-10 implementation

NRC

OPERATIONAL CONDITION - All

BASIS

Security events classified under this EAL represent an escalated threat to the level of safety of the plant. The EAL threshold is satisfied if physical evidence supporting the hostile intrusion or assault exists. The intent of this EAL is to classify security events which represent an actual intrusion into the Plant Protected Area. The SNSS/EC should declare an Alert upon consulting with the Security to determine the validity of the entry conditions. Security Contingency Procedure (SCP) numbers are referenced following each EAL threshold. Since some SCP numbers appear in more than one EAL, the on-duty PSE&G Security Supervisor will provide information concerning the specific event to aid in classification.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will be escalate to a Site Area Emergency based upon a hostile intrusion or act in Plant Vital Areas.

EAL - 9.1.2 Rev. 00

INRC

DISCUSSION

The following is an index of Security Contingency Procedures referenced by this event:

SCP-6 "Discovery of Intruders or Attack"

SCP-8 "Hostage Situation"

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA4.1, HA4.2 Safeguards Contingency Plan

9.0 Hazards - Internal/External

9.1 Security Threats

SITE AREA EMERGENCY - 9.1.3

IC Security Event in a Plant Vital Area

EAL

Confirmed hostile intrusion or malicious acts in Plant Vital Areas as evidenced by :

- Discovery of an intruder(s), armed and violent, within a Vital Area, resulting in SCP-6 implementation
- <u>Malicious acts or destructive device discovered in a Vital Area resulting in SCP-10</u> implementation

OPERATIONAL CONDITION - All

BASIS

Security events classified under this EAL represent an escalated threat to plant safety above that contained in an Alert in that a hostile intrusion or assault has progressed from the Protected Area to a Plant Vital Area. These areas contain vital equipment which includes any equipment, system, device or material, the failure, destruction or release of could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect health and safety following such failure, destruction or release are also considered vital. Security Contingency Procedure (SCP) numbers are referenced following each EAL threshold. Since some SCP numbers appear in more than one EAL, the on-duty PSE&G Security Supervisor will provide information concerning the specific event to aid in classification.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to a General Emergency based upon the actual loss of physical control of the Main Control Room or Remote Shutdown Panel.

EAL - 9.1.3 Rev. 00

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NRC

DISCUSSION

Plant Vital Areas are within the Protected Area and are generally controlled by card key readers. A hostile intrusion into a Plant Vital Area could represent a situation that threatens the safety of plant personnel and the general public.

The following is an index of the Security Contingency Procedure referenced by this event:

SCP-6 "Discovery of Intruders or Attack"
 SCP-10 "Discovery of Destructive Device or Evidence of Malicious Acts"

NRC

DEVIATION

None

REFERENCES

NUMARC NESP-007, HS1.1, HS1.2 Safeguards Contingency Plan

9.0 Hazards - Internal/External

9.2 Fire

ALERT - 9.2.2

IC Fire Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL

Fire within <u>ANY</u> one of the following Plant Vital Structures:

- Reactor Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Rad Waste Building

<u>AND</u>

The Fire is of a magnitude that it <u>SPECIFICALLY</u> results in Damage to <u>ANY</u> one of the following:

- <u>TWO OR MORE</u> subsystems of a Safety System
- MORE THAN ONE Safety System
- Any plant Vital Structure which renders the structure incapable of performing its Design Function

<u>AND</u>

Damaged Safety System(s) or Plant Vital Structure is required for the present Operating Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the fire and the effects on safety systems required for the present Operating Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the fire has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching, blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or

otherwise incapable of performing it's design function. A Safety System is defined as any system or component included in Technical Specifications. In those cases where it is believed that the fire may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for the present Operating Condition.

For example, a fire that has been confirmed to be localized to a single piece of equipment, like a 4.16 KV Breaker, with no potential to spread to adjacent equipment, does not warrant classification as an Alert. In the event, however, that the fire has spread or is believed to be spreading to other 4.16 KV Breakers for component(s) required for the present operating condition, then an Alert is warranted.

Fire is defined as combustion characterized by the generation heat and smoke. Sources of smoke such as overheated electrical equipment and slipping drive belts, for example, do not constitute fires. Observation of a flame is preferred but is NOT required if large quantities of smoke and heat are observed.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency</u> <u>Coordinator Discretion and escalate the classification to SAE based on the nature of the fire.</u>

DISCUSSION

No lengthy and timely assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any safety system but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the fire. In short, if the fire is big enough that it has damaged more than one safety system, or more than one subsystem of a safety system, then the fire is big enough to justify an Alert declaration. Damage to Plant Vital Structures must be to the extent that EC judgement must be used to determine if the structure is still capable of performing its design function. Electrical failures (such as shorts, grounds, arcing, etc.) should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

BNG

9.0 Hazards - Internal/External

9.3 Explosion

ALERT - 9.3.2

IC Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL



OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the explosion and the effects on safety systems required for the present Operating Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the explosion has caused component malfunction (pump trip, breaker trip, etc.) that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system or component included in Technical Specifications. In those cases where it is believed that the explosion may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this

EAL if the structure houses or otherwise supports safety systems required for the present Operating Condition.

A confirmed explosion is defined as visual evidence that a rapid, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to damage or potentially damage permanent plant structures, systems or components.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency</u> <u>Coordinator Discretion and escalate the classification to SAE based on the nature of the explosion.</u>

DISCUSSION

No lengthy and timely assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any safety system but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the explosion. In short, if the explosion is big enough that it has damaged more than one safety system, or more than one subsystem of a safety system, then the explosion is big enough to justify an Alert declaration. Damage to Plant Vital Structures must be to the extent that EC judgement must be used to determine if the structure is still capable of performing its design function. Electrical failures (such as shorts, grounds, arcing, etc.) should not be considered an explosion; however, they should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA2 HCGS Fire & Medical Emergency Response; HC.FP-EO.ZZ-0001(Z)

> EAL - 9.3.2 Rev. 00

BNE

9.0 Hazards - Internal/External

9.4 Toxic Gases

ALERT - 9.4.2.a

IC Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown Conditions

EAL

Uncontrolled Toxic Gas release within ANY one of the following Plant Structures

Reactor Building Turbine Building Control/Aux Building Service Water Intake Structure Service/Rad Waste Building

<u>AND</u>

Toxic Gas concentrations result in ANY one of the following:

An IDLH atmosphere Plant personnel report severe adverse health reactions, including burning eyes, nose, throat, or dizziness The Lower Toxicity Limit being <u>EXCEEDED</u>

<u>AND</u>

Plant personnel are unable to perform actions necessary to complete a Safe Shutdown of the plant without appropriate personnel protection equipment

OPERATIONAL CONDITION - All

BASIS

An uncontrolled Toxic Gas release entering any of the plant structures listed in the EAL, that threatens the ability of plant personnel to perform actions required for safe shutdown of the plant, warrants declaration of an Alert. The EAL threshold includes those conditions that present a significant challenge to plant personnel. This EAL specifically addresses only those

EAL - 9.4.2.a Rev. 00 plant structures that either contain safe shutdown equipment or are contiguous to those areas. Release classified under this EAL include those that originate both onsite and offsite. A **Toxic Gas** is considered to be any substance that is dangerous to life or limb by reason of inhalation or skin contact. **Uncontrolled Toxic Gas** releases are considered to be those releases that can not be isolated / confined to a single compartment or area, or are not as the result of a designed plant safety feature. For example, an **uncontrolled release** of chlorine/ammonia into the Turbine Building that directly effects plant personnel, warrants declaration of an Alert. A Cardox discharge inside any area that contains this safety feature (i.e. Diesel Bays) does not warrant Alert declaration, unless personnel injuries have occurred as a direct result of the discharge.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalated based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency</u> <u>Coordinator Discretion and escalate the classification to SAE based on the nature of the toxic gas release.</u>

DISCUSSION

Access is considered impeded if the Toxic Gas concentrations are life threatening, i.e. require the use of personnel protective equipment. Use of protective equipment also limits the mobility and vision. The cause or magnitude of the gas concentration is not the major concern in this EAL, but rather that access required to an area that may be impeded. An IDLH atmosphere is any atmosphere that is determined to be Immediately Dangerous to Life and Health.

This EAL should not be construed to include confined spaces that must be ventilated prior to entry or situations involving Site Protection personnel who are using respiratory equipment during the performance of their duties unless it also affects personnel not involved with Site Protection activities. These areas include the Drywell (when inerted) and <u>ALL</u> Confined Spaces. In addition, those situations that require personnel to wear respiratory protection equipment as the result of airborne contamination as required by Radiation Protection personnel do not meet the intent of this EAL.

An offsite event (such as a tanker accident or a barge accident) may place the Protected Area within the evacuation area. The evacuation is determined from the DOT Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

DEVIATION

EAL - 9.4.2.a Rev. 00 BNE

None

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REFERENCES

NUMARC NESP-0007, HA3.1 and HA3.2

HC.OP-AB.ZZ-0129 (Q), High Radiation, Smoke, or Toxic Gases in the Control Room Air Supply

HCGS Technical Specifications Section 3/4 7-6, Control Room Emergency Filtration System

9.0 Hazards - Internal/External

9.4 Toxic Gases

ALERT - 9.4.2.b

IC Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown Conditions

EAL

Uncontrolled Flammable Gas release within ANY one of the following Plant Structures

Reactor Building Turbine Building Control/Aux Building Service Water Intake Structure Service/Rad Waste Building

<u>AND</u>

Flammable Gas concentrations <u>EXCEED</u> 50% of the LEL

AND

Plant personnel are unable to perform actions necessary to complete a Safe Shutdown of the plant without appropriate personnel protection equipment

OPERATIONAL CONDITION - All

BASIS

An uncontrolled Flammable Gas release entering any of the plant structures listed in the EAL, that threatens the ability of plant personnel to perform actions required for safe shutdown of the plant, warrants declaration of an Alert. The EAL threshold includes those conditions that present a significant challenge to plant personnel. This EAL specifically addresses only those plant structures that either contain safe shutdown equipment or are contiguous to those areas. Release classified under this EAL include those that originate both onsite and offsite. A Flammable Gas is considered to be any substance that is capable of being easily ignited or burning quickly. Uncontrolled Flammable Gas releases are considered to be those releases that can not be isolated / confined to a single compartment or area, or are

EAL - 9.4.2.b Rev. 00 not as the result of a designed plant safety feature. For example, an **uncontrolled release** of hydrogen into the Turbine Building in concentration exceeding 50% of the LEL (Lower Explosive Limit) warrants declaration of an Alert. In comparison, a controlled release of Hydrogen during Generator purging does not warrant event declaration, as this evolution is controlled.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalated based on subsequent damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use</u> <u>Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the flammable gas release.</u>

DISCUSSION

For Hydrogen Gas, the explosive limit is 4%. Hence, a threshold of 50% of the LEL equates to 2% Hydrogen. This EAL should not be construed to include those controlled evolutions that may discharge a Flammable Gas within the Protected Area, but present no danger to plant safety, since the evolution is planned and controlled.

An offsite event (such as a tanker accident or a barge accident) may place the Protected Area within the evacuation area. The evacuation is determined from the DOT Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA3.1 and HA3.2 HC.OP-AB.ZZ-0129 (Q), High Radiation, Smoke, or Toxic Gases in the Control Room Air Supply HCGS Technical Specifications Section 3/4 7-6, Control Room Emergency Filtration System

> EAL - 9.4.2.b Rev. 00

BNE

NRC

| NRC

9.0 Hazards - Internal/External

9.5 Seismic Event

UNUSUAL EVENT - 9.5.1<u>a / 9.5.1.b</u>

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

EITHER one of the following conditions:

• —Seismic Event felt by personnel within the Protected Area

---<u>AND</u>

- —Valid Actuation of the Seismic Trigger (>0.01g) has occurred as verified by the
 ____ SMA-3 Event Indicator (flag) being WHITE on Panel 10-C-673 in the Upper
 ____ Relay Room
- **OPERATIONAL CONDITION All**

BASIS

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert -if the a subsequent seismic event -occurred in excess of the Operating Basis Earthquake level -(0.1g).

EAL - 9.5.1 Rev. 00 PS

DISCUSSION

An earthquake of a magnitude equivalent to 0.01g is not expected to affect the capability of plant safety functions. This threshold value is well below the Operating Basis Earthquake level of 0.1g.

An approximate relationship between acceleration and magnitude is as follows:

An Acceleration of:	is approx. equal to a Richter Scale Magnitude of:
0019	4,0
0.02g	4.5
0.1g	5.5
0.2g	6.5

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HU1.1 HC.OP-AB.ZZ-0139 (Q), Acts of Nature HCGS Technical Specification Section 3/4.3.7.2, Seismic Monitoring Instrumentation HC.OP-SO.SG-0001 (Z), Seismic Instrumentation System Operation HC.OP-AR.ZZ-0011 (Q), Overhead Annunciator Window Box C6



9.0 Hazards - Internal/External

9.5 Seismic Event

ALERT - 9.5.2

IC Natural and Destructive Phenomena Affecting the Plant Vital Area

EAL

Seismic Event felt by personnel within the Protected Area

<u>ORAND</u>

Valid Actuation of the Seismic Trigger (>0.01g) has occurred as verified by the SMA-3 Event Indicator (flag) being WHITE on Panel 10-C-673 in the Upper Relay Room

<u>AND</u>

Valid Actuation of the Seismic Switch (>0.1g) has occurred as verified by <u>EITHER</u> one of the following:

Valid Actuation of Main Control Room Overhead Annunciator C6-C4 AMBER Alarm light on the Seismic Switch Power Supply Drawer is lit on Panel 10-C-673 in the Upper Relay Room

OPERATIONAL CONDITION - All

BASIS

A Valid Actuation of the Seismic Switch indicates that a Seismic Event of a magnitude greater than 0.1g (Operating Basis Earthquake) has occurred. <u>The Salem SNSS must be informed of this information immediately.</u> At this level, plant safety systems are designed to remain functional and within design stress and deformation limits. Thus, an earthquake of this magnitude is not expected to affect the capability of plant safety functions required to shut down the plant and place it in a cold shutdown condition.

This threshold warrants declaration of an Alert. **Valid** -is defined as the Seismic Switch actuation -being the direct -result of a Seismic Event. The condition that the Seismic Event has been felt by personnel within the Protected Area, along with Seismic Trigger actuation provides further confirmation that an event has occurred. Classification should be based on a **Valid** actuation of the Seismic Switch as verified in the Upper Relay Room. Additional

INFL

EAL - 9.5.2 Rev. 00 information can be obtained by contacting the National Earthquake Center in Denver, -Colorado at (303) 273-8500._ However, it is important to realize that it will take the Earthquake Center approximately 30 minutes to provide the requested information._ The time required to obtain this additional information should not result in a delay of event classification for a valid actuation.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate if the seismic event caused additional damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC</u> may use Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the event.

DISCUSSION

Seismic Event annunciation on panel 10C673 would alert operators to this event and the active seismic monitoring instrumentation would begin to monitor the event. This threshold value associated with this EAL is well below the Design Basis Earthquake of 0.2g that is the maximum seismic event that is expected to occur based on local geological and seismological factors.

An approximate relationship between acceleration and magnitude is as follows:

Acceleration:	Richter Scale Magnitude (approximate):		
0.09	4.0		
0.02g	4.5		
0.1g		5.5	
_ 0.2g		6.5	

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA1.1 HC.OP-AB.ZZ-0139 (Q), Acts of Nature HCGS Technical Specification Section 3/4.3.7.2, Seismic Monitoring Instrumentation HC.OP-SO.SG-0001 (Z), Seismic Instrumentation System Operation HC.OP-AR.ZZ-0011 (Q), Overhead Annunciator Window Box C6 BNE
9.6 High Winds

UNUSUAL EVENT - 9.6.1.b

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

Sustained wind speeds \geq 75 MPH for 15 minutes, measured at <u>ANY</u> elevation of the Met Tower

OPERATIONAL CONDITION - All

BASIS



Sustained wind speeds of 75 MPH or greater are of sufficient velocity to have the potential to cause damage to Plant Vital Areas. These conditions are indicative of unstable weather conditions and represent a potential degradation in the level of safety of the plant. The windspeed threshold is well below the structure design basis of 108 mph, and is set at the value used to characterize Hurricane force winds. The EAL threshold is set 5 MPH ABOVE the Salem High Wind Speed threshold (70 MPH) to prevent simultaneous event classification. Sustained wind speed means winds in excess of the threshold value for greater than 15 minutes.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert if the high winds cause damage to Plant Vital Structures or affects the operability of Technical Specification required equipment.

DISCUSSION

Verification of sustained wind speed will be by observation of meteorological tower data. The Wind Speed indication from the Met Tower instrumentation is full scale at 100 mph.

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

EAL - 9.6.1.b Rev. 00 NRC

PS

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602

DEVIATION

None

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REFERENCES

NUMARC NESP-0007, HU1.2 and HU1.7 HC.OP-AB.ZZ-0139 (Q), Acts of Nature HCGS Technical Specification Section 3/4, 3.7.3, Meteorological Monitoring Instrumentation HCGS UFSAR Sections 2.3, 3.3.1

9.6 High Winds

ALERT - 9.6.2

IC Natural and Destructive Phenomena Affecting the Plant Vital Area

EAL

EITHER one of the following: Report of a Tornado <u>TOUCHING DOWN</u> within the Protected Area **Sustained** wind speeds \geq 75 MPH for 15 minutes, measured at <u>ANY</u> elevation of the Met Tower

<u>AND</u>

The Wind Speed is of a magnitude that it <u>SPECIFICALLY</u> results in **Damage** to <u>ANY</u> one of the following:

TWO OR MORE subsystems of a Safety System

MORE THAN ONE Safety System

Rendering <u>ANY</u> of the following structures incapable of performing its Design Function:

- * Reactor Building
- * Control/Aux Building
- * Service Water Intake Structure
- * Service/Radwaste Building

<u>AND</u>

Damaged Safety System(s) or Plant Vital Structure is required for the present Operating Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the high winds and the effects on safety <u>functionssystems</u> required for the present Operating Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system **damage** is not required prior to classification. The term "**Damage**" is defined as evidence that the high winds has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching, blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A **Safety System** is defined as any system of component required for Safe Shutdown of the structure of the term is believed that the high is defined as any system of component required for Safe Shutdown of the structure of the term is believed that the high is the high is defined as any system of component required for Safe Shutdown of the structure of the term is believed that the high is the high is defined in Technical Specifications.

WRC

NRC

EAL - 9.6.2 Rev. 00

NRC

BNE

winds may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for the present Operating Condition.

It is not intended that a lengthy engineering analysis be performed to determine if damage has affected structural design but EC judgement must determine whether to exclude minor exterior damage which does not affect the structural design capability. The EAL threshold is set 5 MPH ABOVE the Salem High Wind Speed threshold (70 MPH) to prevent simultaneous event classification. Sustained wind speed means winds in excess of the threshold value for greater than 15 minutes. A Safety System is defined as any system or component included in the Technical-Specification.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. <u>The EC may use Emergency</u> <u>Coordinator Discretion and escalate the classification to SAE based on the nature of the winds.</u>

DISCUSSION

The windspeed threshold is well below the structure design basis of 108 mph, and is set at the value used to characterize Hurricane force winds. The Wind Speed indication from the Met Tower instrumentation is full scale at 100 mph.

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA1.2 and HA1.3 HC.OP-AB.ZZ-0139 (Q), Acts of Nature HCGS Technical Specification Section 3/4, 3.7.3, Meteorological Monitoring Instrumentation HCGS UFSAR Sections 2.3, 3.3.1

> EAL - 9.6.2 Rev. 00

9.7 Flooding

ALERT - 9.7.2

IC Internal Flooding Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL



OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the internal flooding and the effects on **safety systems** required for the present Operating Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system **damage** is not required prior to classification. The term "**Damage**" is defined as evidence that the internal flooding has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching, blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system or component flooding may have caused damage to Safety Systems, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure **damage**, classification is required under

EAL - 9.7.2 Rev. 00

BNB

this EAL if the structure houses or otherwise supports safety systems required for the present Operating Condition.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on damage to plant systems, loss of fission______ product barriers, or abnormal radiological releases. <u>The EC may use Emergency coordinator</u> <u>Discretion and escalate the classification to SAE based on the nature of the flooding.</u>

DISCUSSION

Degraded system performance or observation of potential for damage that could degrade system performance is used as the indicator that the safety system operability was actually affected. A report of damage should not be interpreted as mandating a lengthy and timely assessment prior to justification; there is no inference in this EAL that the actual magnitude of damage be qualified or quantified.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA1.7 HCGS Technical Specifications

9.8 Turbine Failure / Vehicle - Missile Impact

UNUSUAL EVENT - 9.8.1.a

IC Natural and Destructive Phenomena Affecting <u>Certain Structures Within</u> the Protected $|\beta^{\nu}\rangle$ Area

EAL

Catastrophic damage to the Main Turbine as evidenced by <u>EITHER</u> one of the following:

Main Turbine casing penetration Main Turbine/Generator Damage potentially releasing Lube Oil or Hydrogen Gas to the Turbine Building

OPERATIONAL CONDITION - 1,2,3

BASIS

Main Turbine failure of sufficient magnitude to cause damage to the turbine casing or generator seals increases the potential for leakage of combustible/explosive gases and of combustible liquids to the Turbine Building, warrants declaration of an Unusual Event. The presence of H_2 gas in sufficient quantities may present a flammable/explosive hazard. Oil may also be present which may contribute to the flammability hazard.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert based upon damage done by missiles generated by the failure or by any subsequent fire.

DISCUSSION

Turbine rotating component failures may also result in other direct damage to plant systems and components. Damage may rupture the turbine lubricating oil system, which would release flammable liquids to the Turbine Building. Potential rupture of the condenser and condenser

> EAL - 9.8.1.a Rev. 00

tubes may cause flooding in the lower levels of the Turbine Building. This damage should be readily observable.

Escape of hydrogen gas from the generator due to a loss of seal oil pumps or turbine lube oil without a turbine rotating component failure should not be classified under this event.

DEVIATION

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Modes 1,2,3 are the only Operational Conditions where Main Steam pressure is high enough to allow for Main Turbine operation.

REFERENCES

NUMARC NESP-007, HU1.6



9.8 Turbine Failure / Vehicle - Missile Impact

UNUSUAL EVENT - 9.8.1.b

IC Natural and Destructive Phenomena Affecting <u>Certain Structures Within</u> the Protected | ^R^ル G Area

EAL

Vehicle Crash / Missile Impact with or within <u>ANY</u> one of the following Plant Structures:

Reactor Building Control/Aux Building Service Water Intake Structure Service/Radwaste Building Low Level Radwaste Interim Storage Facility

OPERATIONAL CONDITION - All

BASIS

A Vehicle Crash / Missile Impact with or within a listed Plant Structure represents a potential challenge to plant safety. Events classified under this EAL include those of a magnitude and extent that may be a potential precursor to damage to Safety Systems, and hence has safety significance. Vehicle Crash includes Aircraft, Helicopters, Ships, Barges, or any other vehicle types of sufficient size to potentially damage the structure. Missile Impact includes flying objects from <u>both offsite and</u>; onsite, rotating equipment or turbine failure causing turbine casing penetration.

Bre

BNO

Barrier Analysis

None

ESCALATION CRITERIA

Emergency Classification will escalate to Alert if the vehicle crash or missile impact causes damage to Plant Vital Structures.

DISCUSSION

EAL - 9.8.1.b Rev. 00

9.8 Turbine Failure / Vehicle - Missile Impact

ALERT - 9.8.2

IC Natural and Destructive Phenomena Affecting <u>Certain Structures Within</u> the Plant Vital | ^{βルラ} Area

EAL



OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the vehicle crashes / missile impact and the effects on safety systems required for the present Operating Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "Damage" is defined as evidence that the vehicle crashes / missile impact has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching, blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing it's design function. A Safety System is defined as any system of component included in Sefere Technical Specifications. In those cases where it is believed that the vehicle crashes / missile impact as any have caused damage to Safety Systems, then an Alert declaration is warranted,

BNE

since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports safety systems required for the present Operating Condition.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, fission product barriers, or abnormal radiation releases in other EAL sections. <u>The EC may use</u> <u>Emergency Coordinator Discretion and escalate the classification based on the nature of the damage.</u>

DISCUSSION

This EAL is intended to address the threat to safety related equipment imposed by vehicle of missile impacts. No attempt should be made to assess the magnitude of damage to Safety Systems or Plant Vital Structures prior to classification. The evidence of damage is sufficient for declaration.

DEVIATION

None

REFERENCES

NUMARC NESP-0007, HA1.5 and HA1.6 NUMARC Questions and Answers, June 1993, "Hazards Question #6"

> EAL - 9.8.2 Rev. 00

ATTACHMENT 5

PUBLIC SERVICE ELECTRIC & GAS

NJBNE LETTER OF AGREEMENT ON SALEM & HOPE CREEK PROPOSED EALs

ATTACHMENT 5

PUBLIC SERVICE ELECTRIC & GAS

NJBNE LETTER OF AGREEMENT ON NUMARC EALs

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Christine Todd Whitman Governor

Cummissioner

Division of Environmental Safety, Health and Analytical Programs Radiation Protection Programs Bureau of Nuclear Engineering CN 415 Trenton, New Jersey 08625-0415 Tel (609) 984-7700 Fax (609) 984-7513

June 21, 1996

Mr. Craig Banner, Administrator Nuclear Onsite Emergency Preparedness Public Service Electric and Gas Company Nuclear Department P.O. Box 236 Hancocks Bridge, N.J. 08038

Dear Craig,

The BNE has completed the review of the proposed EALs submitted by PSE&G for State approval. The proposed EALs, based upon NUMARC guidance, are acceptable to the State of New Jersey provided the items discussed during the June 20, 1996 meeting between our organizations are included in the final draft. Also, we will be looking forward to receiving a copy of the final draft submitted to the NRC for approval. One issue that remains unresolved is the development of a formal procedure for 50.72 non-emergency event reportability. The BNE and PSE&G need to finalize an acceptable method for reporting non-emergency events at Salem and Hope Creek that is convenient for both groups involved. I believe that the development of this procedure will bring closure to the EAL issue.

The BNE would also like to request formally that PSE&G provide training for the Duty Officers in the use of the new EAL manual. I recognize that training your own staff is a priority at this time. I am satisfied to wait until your training program is completed before training my staff. With the proper training and continued use of the manual, I am confident that the BNE will find that the EAL manual is a useful tool for nuclear emergency response.

Thank you for the opportunity to review and comment on the draft EALs. I appreciate

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your cooperation and willingness to compromise throughout the review process. The commitment of the BNE and PSE&G to work together as a team to produce a quality document has been a success. As a result, the final document submitted for approval is an example of the commitment of the State and PSE&G to protect the health and safety of the citizens of New Jersey. As the BNE becomes more familiar with the new EALs through repeated use, I hope that we can provide more insights for improving the document. If you have any questions, please feel free to contact me at (609) 984-7700.

Sincerely

1 DSCA

Kent Tosch, Manager Bureau of Nuclear Engineering

Assistant Director Lipoti Nick DePierro Jon Christiansen John Polyak, PSE&G Gabriel Soloman, PSE&G