WOLF CREEK
NUCLEAR OPERATING CORPORATION

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CO 94-0007

U. S. Nuclear Regulatory Commission
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References: Letter WO 94-0075, dated June 20, 1994, from O. L. Maynard, WCNOC, to U. S. Nuclear Regulatory Commission

Subject: Docket No. 50-482: Requested Changes to Final Emergency Action Levels

Gentlemen:

This letter submits additional replacement page changes to the Emergency Action Levels (EALs) submitted in the Reference. These changes are a result of commitments from the review of the final version of the EALs. These change were discussed with Mr. W. D. Reckley and Mr. S. A. Boynton, NRC on July 7, 1994 and with Mr. W. D. Reckley on July 11, 1994.

If you have any questions concerning this submittal, please contact me at (316) 364-8831, extension 4001 or Mr. Richard D. Flannigan at extension 4500.

Very truly yours,

Richard N. Johannes

Richard N. Johannes

RNJ/jra

Attachments

cc: L. J. Callan (NRC)
M. A. Miller (NRC)
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G. A. Pick (NRC)
W. D. Reckley (NRC)

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A045

Radioactive Effluent Release

RER1

Rapidly increasing readings or HI HI Alarm on any of the following Process Rad Monitors:
GT RE 21 A or B (Channel 211-213)
GH RE 10 A or B (Channel 101-103)
BM RE 52 (Channel 526)
LE RE 59 (Channel 596)
HF RE 45 (Channel 456)
HB RE 18 (Channel 186)
HF RE 95 (Channel 956)

Yes → RER2; No → RER5

RER2

Unplanned release of airborne or liquid radioactivity > 200 times the HI HI Setpoint of the following Process Rad Monitors ≥ 15 minutes**
GT RE 21A or B (Channel 211-213)
GH RE 10A or B (Channel 101-103)
BM RE 52 (Channel 526)
LE RE 59 (Channel 596)
HF RE 45 (Channel 456)
HB RE 18 (Channel 186)
HF RE 95 (Channel 956)
<u>OR</u>
As indicated by Chemistry Sample analysis

Yes → RER3; No → RER6

RER3

<u>ANY</u> of the following monitors exceed limit listed ≥ 15 min **
GT RE 21B (Channel 213) ≥ 1.9E+06 uCi/sec
GH RE 10B (Channel 103) ≥ 1.9E +06 uCi/sec
GT RE 21A (Channel 212) ≥ 5.7E-03 uCi/ml
GH RE 10A (Channel 102) ≥2.9E-02 uCi/ml
<u>OR</u>
Field team results indicate dose rate at site boundary >100 mr/hr TEDE or 500 mr/hr thyroid
<u>OR</u>
Valid dose assessment indicates a dose >100mr TEDE or 500 MR thyroid

Yes → RER4; No → ALERT

RER4

<u>ANY</u> of the following monitors exceed limit listed ≥ 15 min **
GT RE 21B (Channel 213) ≥1.9E+07 uCi/sec
GH RE 10B (Channel 103) ≥1.9E+07 uCi/sec
GT RE 21A (Channel 212) ≥5.7E-02 uCi/ml
GH RE10A (Channel 102) ≥2.9E-01 uCi/ml
<u>OR</u>
Field team results indicate dose rate at site boundary >1R/hr TEDE or 5 R/hr thyroid
<u>OR</u>
Valid dose assessment indicates a dose > 1 REM TEDE or 5 REM thyroid

Yes → GENERAL EMERGENCY; No → SITE AREA EMERGENCY

RER5

Control Room Area Rad Monitor Valid reading > 15 mr/hr (SD RE 33)
<u>OR</u>
Unplanned or unexplained Area Rad Monitor increases by a factor of 1000 over normal* levels

Yes → ALERT; No → RER6

RER6

Unplanned release of airborne or liquid radioactivity > 2 times the HI HI setpoint of the following process rad monitors ≥ 60 min.**
GT RE 21A or B (Channel 211-213)
GH RE 10A or B (Channel 101-103)
BM RE 52 (Channel 526)
LE RE 59 (Channel 596)
HF RE 45 (Channel 456)
HB RE 18 (Channel 186)
HF RE 95 (Channel 956)
<u>OR</u>
As indicated by chemistry sample analysis.

Yes → NOTIFICATION OF UNUSUAL EVENT; No → NO ACTION THIS CATEGORY

GENERAL EMERGENCY

SITE AREA EMERGENCY

ALERT

NOTIFICATION OF UNUSUAL EVENT

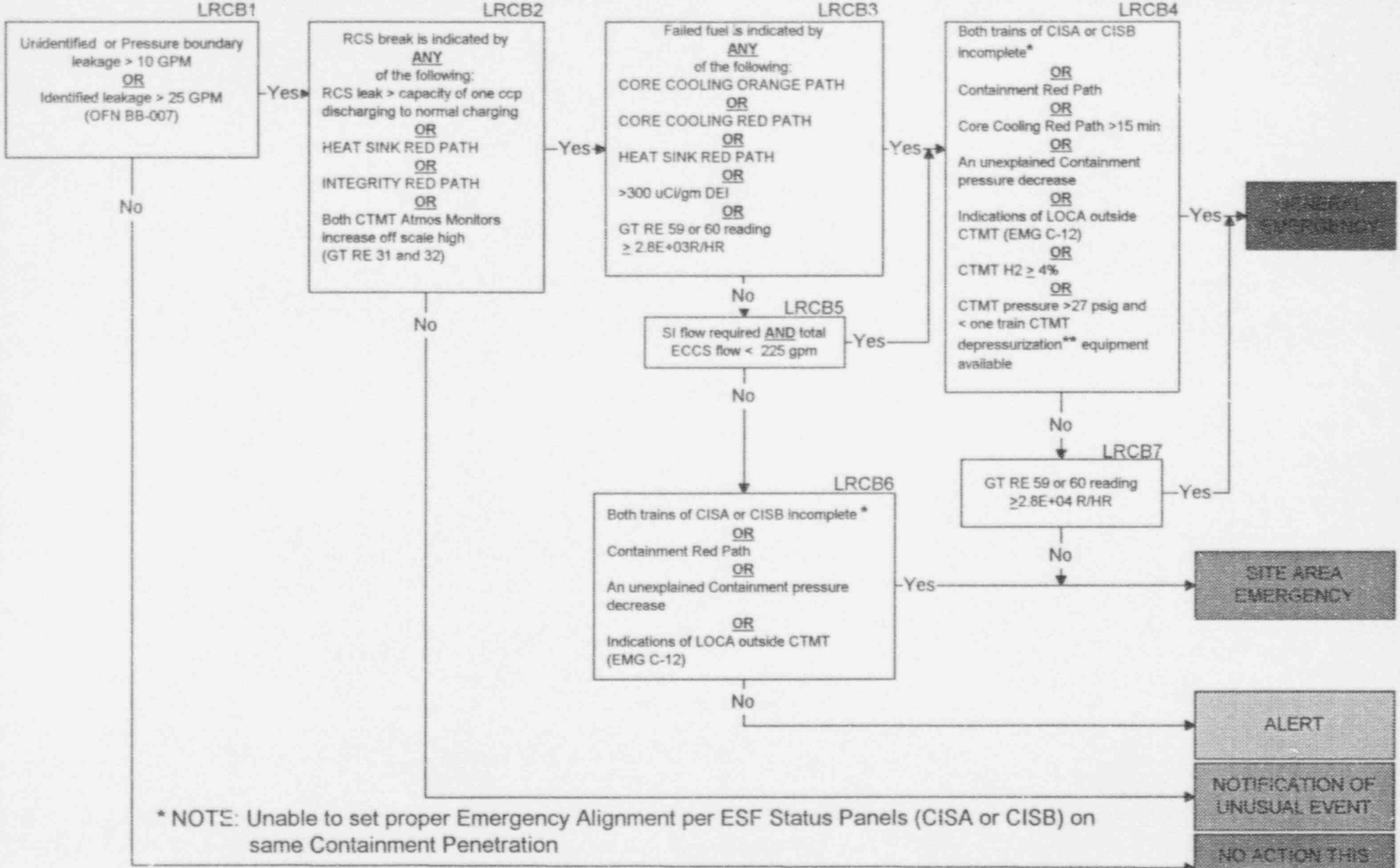
NO ACTION THIS CATEGORY

* NOTE: Normal levels can be considered as the highest reading in the past 24 hr excluding the current value. Readings obtained from NPIS.

** NOTE: If the monitor reading(s) is sustained for longer than the time allowed and the required assessments cannot be completed within this period then the declaration must be made based on the valid reading

Loss of Reactor Coolant Boundary

NOTE: This chart shall not be used if Steam Generator Tube Rupture Failure is the only event. Go to "Steam Generator Tube Failure."

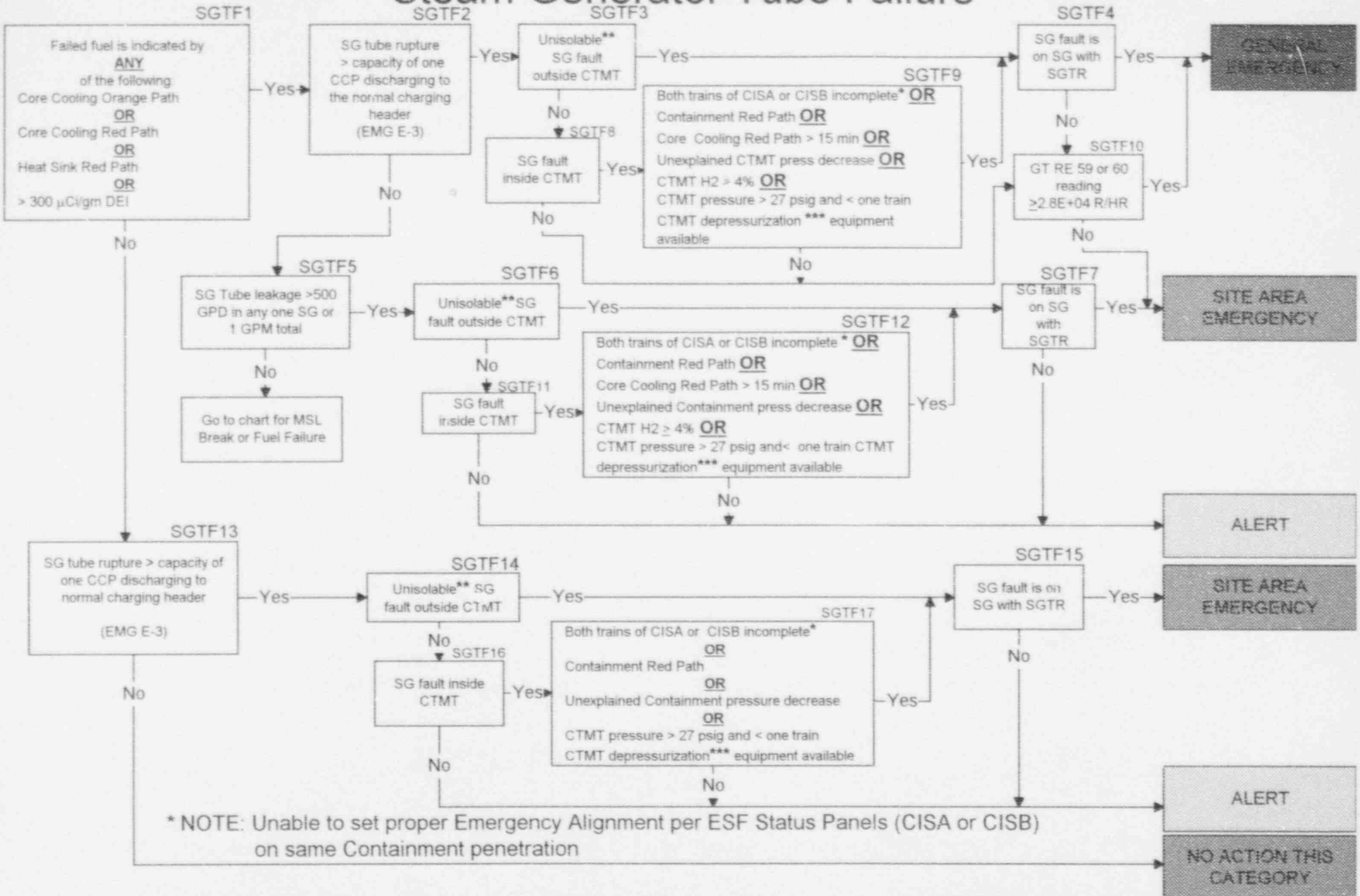


* NOTE: Unable to set proper Emergency Alignment per ESF Status Panels (CISA or CISB) on same Containment Penetration

** NOTE: One train CTMT depressurization is defined as one train CTMT Spray **AND** one train CTMT Coolers

Attachment 1 (page 3 of 13)

Steam Generator Tube Failure

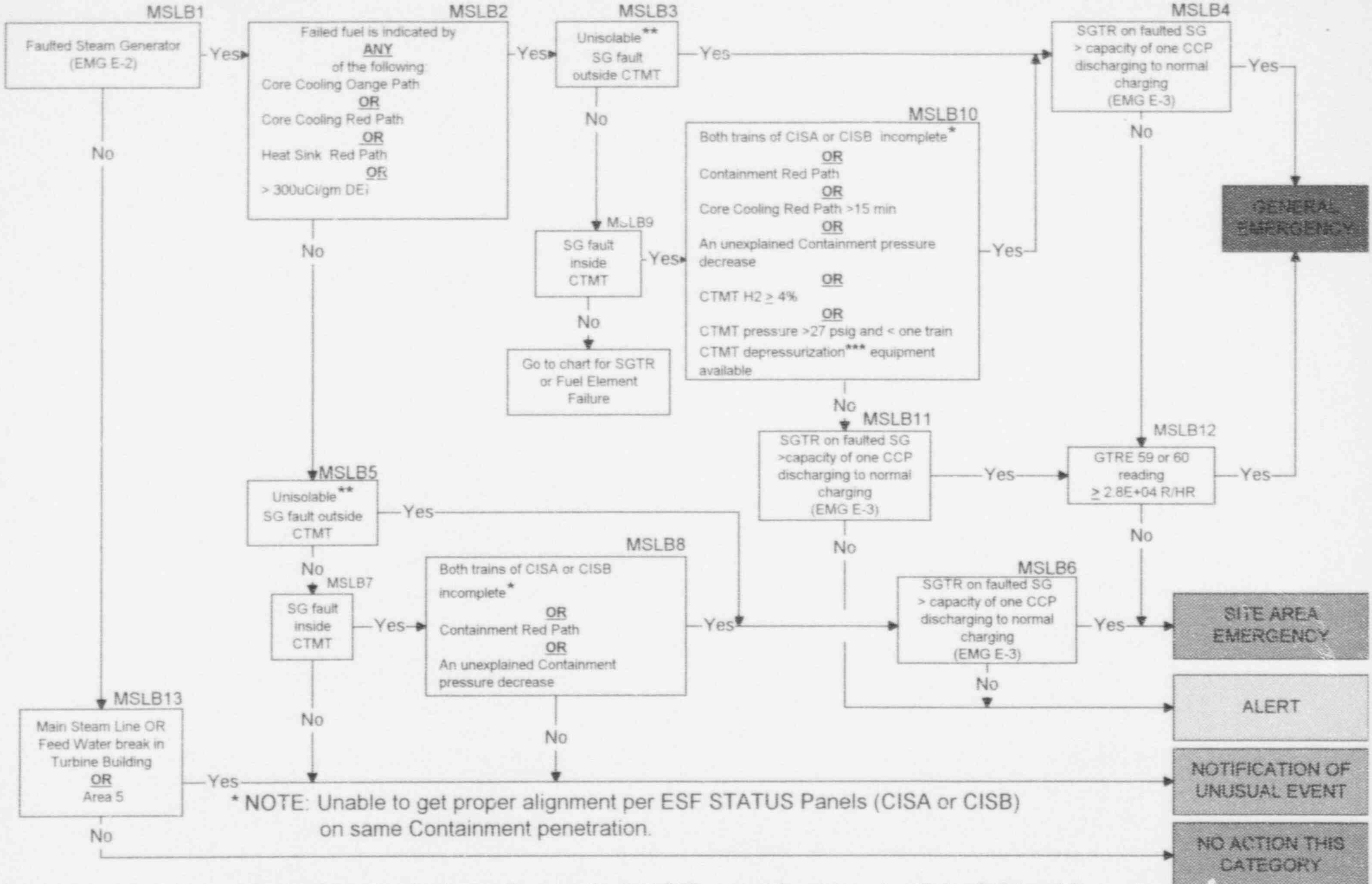


* NOTE: Unable to set proper Emergency Alignment per ESF Status Panels (CISA or CISB) on same Containment penetration

** NOTE: Unisolable means that the steam release from faulted S/G can not be stopped until the S/G has blown dry

*** NOTE: One train CTMT depressurization is defined as one train CTMT Spray **AND** one train CTMT Coolers

Main Steam Line Break

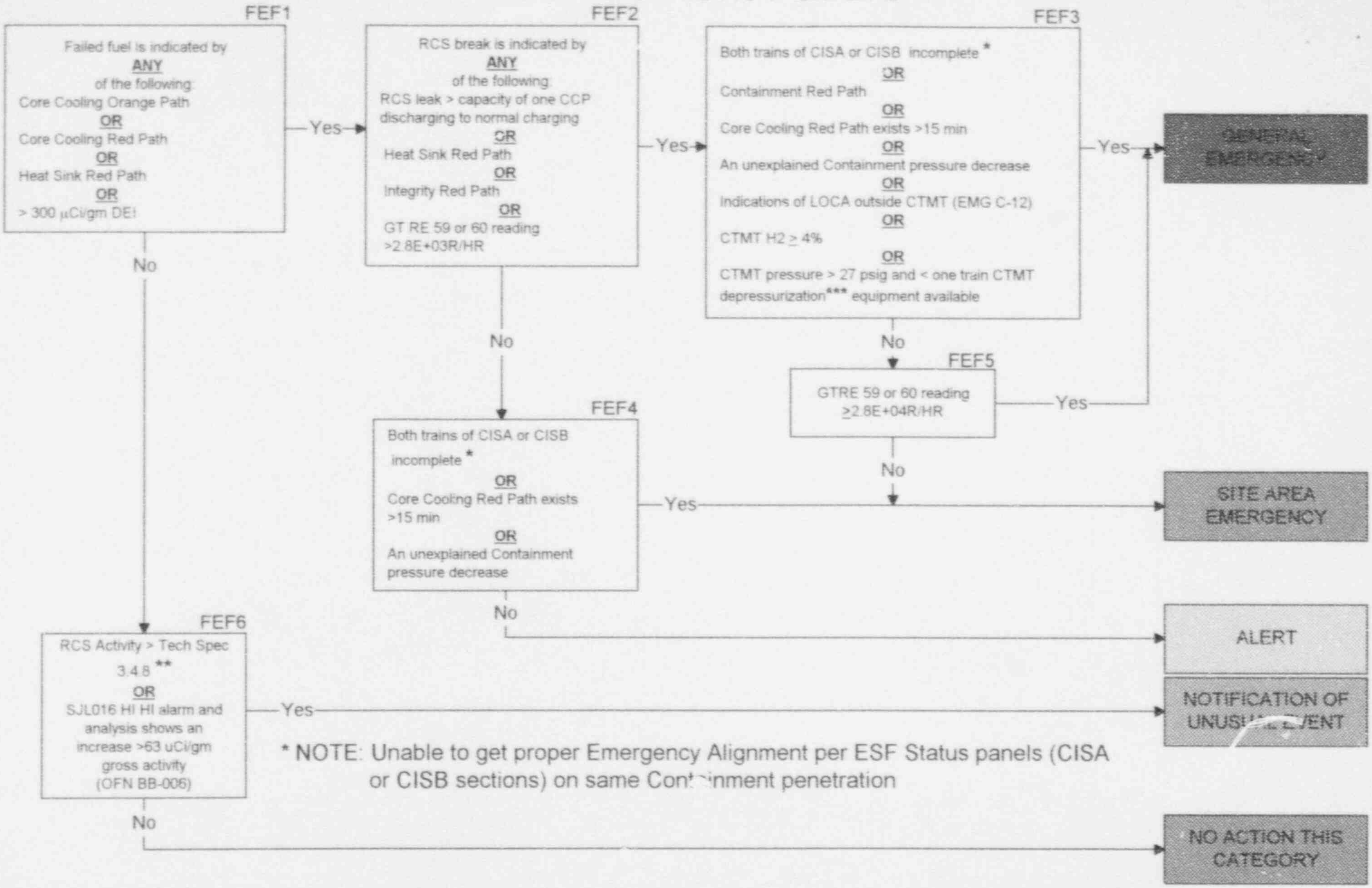


* NOTE: Unable to get proper alignment per ESF STATUS Panels (CISA or CISB) on same Containment penetration.

** NOTE: Unisolable means that the steam release from the faulted S/G cannot be stopped until the S/G has blown dry.

*** NOTE: One train CTMT depressurization is defined as one train CTMT Spray **AND** one train CTMT Coolers

Fuel Element Failure

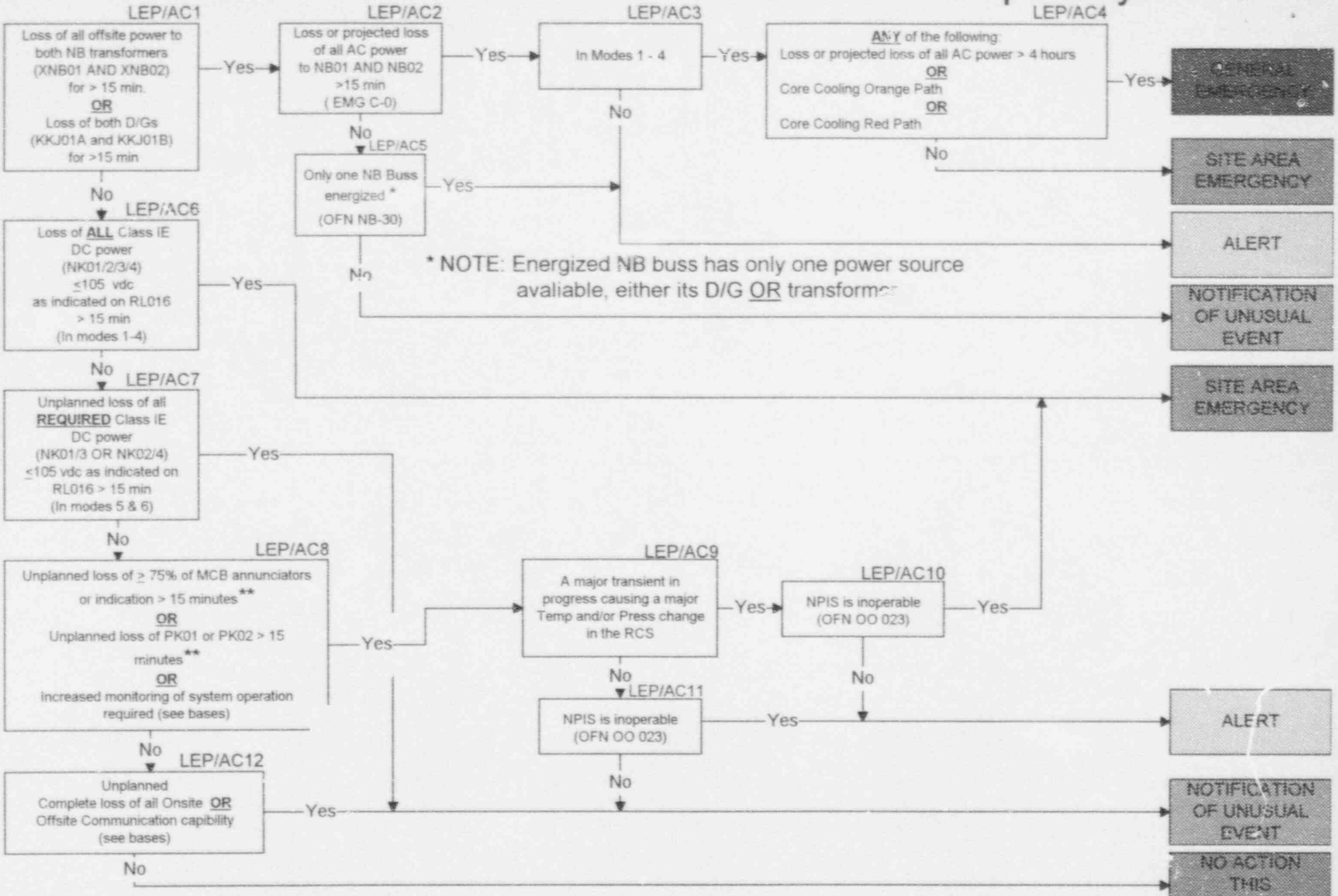


* NOTE: Unable to get proper Emergency Alignment per ESF Status panels (CISA or CISB sections) on same Cont-inment penetration

** NOTE: When DEI exceeds limit for >48 hr during one continuous interval **OR** exceeds the limit line on Figure 3.4-1 of TS 3.4.8 **OR** gross activity >100/E BAR

*** NOTE: One train CTMT depressurization is defined as one train CTMT Spray **AND** one train CTMT Coolers

Loss of Electrical Power / Assessment Capability



** NOTE: If a major transient is in progress the 15 min time limit is not applicable.

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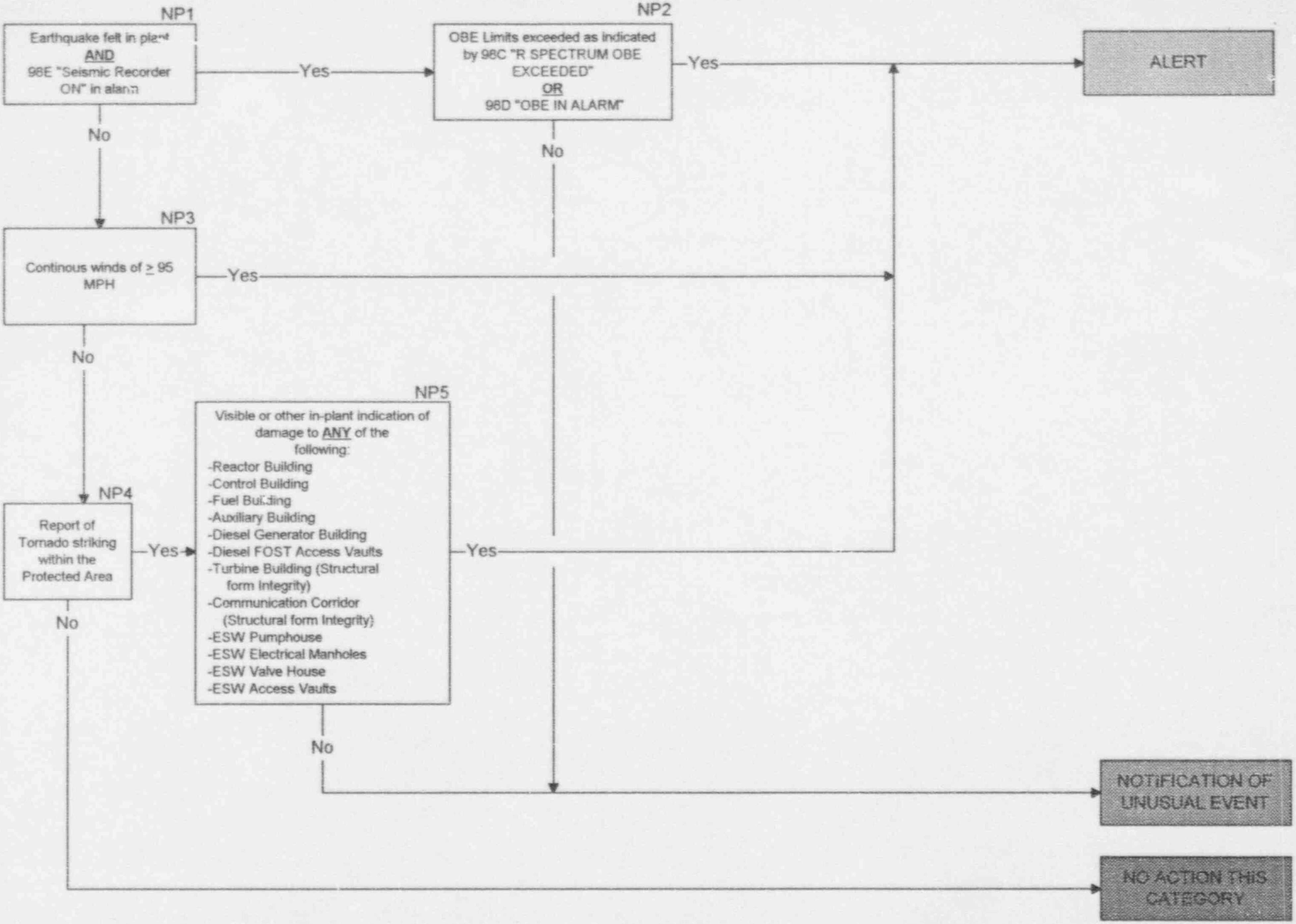
Natural Phenomena



EXPLANATIONS/BASES
CHART - LOSS OF REACTOR COOLANT BOUNDARY

LRCB 4 - MODES: 1 THROUGH 4 Containment Isolation Valve Status After Containment Isolation : This EAL is for using Critical Function Status Tree (CSFST) monitoring and functional recovery procedures. RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment. Conditions leading to a containment RED path result from RCS barrier and /or Fuel Clad Barrier Loss. Thus, this EAL is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.
In this EAL, the function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel level is increasing.
The conditions in this potential loss EAL represent imminent melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the core exit thermocouple EALs in the Fuel and RCS barrier columns, this EAL would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.
Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. Whether or not the procedures will be effective should be apparent within 15 minutes. The Duty Emergency Director/Duty Emergency Manager should make the declaration as soon as it is determined that the procedures have been, or will be ineffective. The reactor vessel level chosen should be consistent with the emergency response guides applicable to the facility.
Existence of an explosive mixture means an H2 Concentration greater than 4% and the potential for an explosive and possible damage to Containment exists.
A loss of one train of Containment Depressurization System is a potential loss of Containment in that the heat removal/depressurization system (i.e. Containment Spray and Containment Coolers) are either lost or performing in a degraded manner, as indicated by Containment pressure greater than 27 PSIG (setpoint at which the equipment was suppose to operate). The Depressurization Systems do not need to be on the same train.

LRCB 5 - MODES: 1 THROUGH 4 This IC used to determine if any ECCS System is capable of delivering sufficient volume of water to the core. 225 gpm was chosen because it is conservatively larger then Tech Spec delta P requirement of ≈210 gpm at 2400 PSID.

LRCB 6 - MODES: 1 THROUGH 4 See **LRCB 4.**

LRCB 7 - MODES: 1 THROUGH 4 This reading is a value which indicates significant fuel damage well in excess of the EALs associated with both loss of Fuel Clad and loss of RCS Barriers. As stated in Section 3.8 of Reference 5.11, a major release of radioactivity requiring offsite protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant. Regardless of whether Containment is challenged, this amount of activity in Containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of Containment, such that a General Emergency declaration is warranted. NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%. Reading was taken from EPP 01-2.4, "Fuel Damage Assessment Methodology" Attachment 1.0.

EXPLANATIONS/BASES
CHART - STEAM GENERATOR TUBE RUPTURE

SGTF 1 - MODES: 1 THROUGH 4 1. This EAL is for using Critical Safety Function Status Tree (CSFST) monitoring and functional recovery procedures. RED path indicates an extreme challenge to the safety function. ORANGE path indicates a severe challenge to the safety function.
Core Cooling- ORANGE indicates subcooling has been lost and that some clad damage may occur. Heat Sink- RED indicates the ultimate heat sink function is under extreme challenge and thus these two items indicate potential loss of the Fuel Clad Barrier.
Core Cooling- RED indicates significant superheating and core uncovery and is considered to indicate loss of the Fuel Clad Barrier.
2. Primary Coolant Activity Level: The 300 μCi/cc DEI assessment by the NUMARK EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. This amount of clad damage indicates significant clad heating and thus the Fuel Clad Barrier is considered lost.

SGTF 2.- MODES: 1 THROUGH 4 RCS Leak Rate EAL is based on the inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System which is considered as one centrifugal charging pump discharging to the charging header.

SGTF 3. - MODES: 1 THROUGH 4 A check for S/G fault is made to determine if the next fission product boundary is under challenge or lost. The release path looked for is either a faulted, ruptured S/G or a faulted S/G to a challenged Containment. Unisolable means that the steam release from the faulted S/G cannot be stopped until the S/G has blown dry.

SGTF 4. - MODES: 1 THROUGH 4 Once a faulted S/G has been determined, a release path via a faulted, ruptured S/G is checked.

SGTF 5. - MODES: 1 THROUGH 4
SG Tube leakage in excess of Tech Spec limits (Tech Spec 3.4.6.2)

SGTF 6. - MODES: 1 THROUGH 4 See SGTF 3

EXPLANATIONS/BASES
CHART - STEAM GENERATOR TUBE RUPTURE

SGTF 7. - **MODES: 1 THROUGH 4** See SGTF 4

SGTF 8. - **MODES: 1 THROUGH 4** This box checks for an unisolable secondary side steam release to the Containment atmosphere.

SGTF 9. - **MODES: 1 THROUGH 4** See LRCB 4

SGTF 10. - **MODES: 1 THROUGH 4** See LRCB 7

SGTF 11. - **MODES: 1 THROUGH 4** See SGTF 5

SGTF 12. - **MODES: 1 THROUGH 4** See LRCB 4

SGTF 13. - **MODES: 1 THROUGH 4** See SGTF 2

EXPLANATIONS/BASES
CHART - STEAM GENERATOR TUBE RUPTURE

SGTF 14. - **MODES: 1 THROUGH 4** See SGTF 3

SGTF 15. - **MODES: 1 THROUGH 4** See SGTF 4

SGTF 16. - **MODES: 1 THROUGH 4** See SGTF 5

SGTF 17. - **MODES: 1 THROUGH 4** See LRCB 4

EXPLANATIONS/BASES
CHART - NATURAL PHENOMENA

NP 1. - MODES: ALL NP 1 was developed on WCGS basis. Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. Method of detection can be based on instrumentation, validated by a reliable source, or operator assessment. As defined in the EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of Control Room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated. At Wolf Creek these seismic switches are set at an acceleration of 0.01g.

NP 2. - MODES: ALL NP 2 based on WCGS USAR design basis. Seismic events of this magnitude can cause damage to safety functions.

NP 3. - MODES: ALL NP 5 is based on WCGS USAR Section 3.3.1.1. Wind loads of this magnitude can cause damage to safety functions.

NP 4. - MODES: ALL NP 6 is based on the assumption that a tornado striking (touching down) within the protected boundary may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

NP 5. - MODES: ALL This EAL specifies structure containing systems and functions required for a safe shutdown of the plant. This list was obtained from WCGS USAR Table 3.3-1.