PSNH

Public Service of New Hampshire

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June 27, 1983

SBN- 525
T.F. B7.1.2

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. George W. Knighton, Chief
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Division of Licensing

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444
(b) USNRC Letter, dated May 12, 1983, "Issuance of Supplement No. 1 to the Safety Evaluation Report (Seabrook Station, Units 1 and 2)," G. W. Knighton to R. J. Harrison
(c) PSNH Letter, dated April 14, 1983, "Response to Generic Letter 82-33, Supplement No. 1 to NUREG-0737," J. DeVincentis to D. G. Eisenhut

Subject: Emergency Classification System

Dear Sir:

In response to the open item delineated in Supplement No. 1 to the Safety Evaluation Report (Reference (b)), we have enclosed a new Section 5.0 of the Seabrook Station Radiological Emergency Plan which provides a conceptual description of the Emergency Classification System.

Please note that the Emergency Action Level setpoints (Tables A.1-A.5) and Emergency Status Indicators (Tables A.1-A.5) color combinations are tentative (some also indicate that setpoints and color schemes will be provided later). Section 5.0 should be reviewed in light of its conceptual nature. The Westinghouse Owners Group, as of this writing, is continuing to revise its Emergency Response Guidelines (ERGs) in response to the NRC review. These ongoing changes to the ERGs are expected to effect the Emergency Action Level setpoints and Emergency Status Indicators color combinations.

Setpoints and color combinations will be provided subsequent to completion of the ERGs and Seabrook Station Emergency Operating Procedures (Reference (c) commits to December 1983 for completion of Emergency Operating Procedures).

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The enclosed Section 5.0 will be incorporated in OL Application Amendment 49.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

John DeVincentis
Project Manager

ALL/pf

Enclosure

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5.0 EMERGENCY CLASSIFICATION SYSTEM

5.1 Summary

An Emergency Classification System has been defined which categorizes a wide spectrum of component or system failures and other occurrences that could potentially reduce station safety margins. The incidents are categorized according to severity in the following four classes: Unusual Event, Alert, Site Area Emergency, and General Emergency.

These predetermined emergency classes are declared by Seabrook Station personnel. They assist emergency response organizations in determining the assessment, corrective and protective actions to be taken onsite and offsite.

Emergency classifications are based upon events identified by certain measurable and observable indications of station conditions. These indications of degrading station status are called Emergency Action Levels (EALs) and are listed in detail with their associated station conditions in Appendix A. These EALs aid the operator in emergency recognition and assure the first step is completed in emergency response. It must be recognized that if conditions warrant such action, the classification of the event may change as the incident increases or reduces in severity.

5.2 Symptomatic Approach to Classification

A symptomatic approach has been developed to assist the operator in emergency recognition and classification. In order to concentrate the amount of plant process data provided to the operator to that which is necessary for event classification, use is made of the color coded status trees that are associated with the sympton based Emergency Operating Procedures. These symptomatic status tree analyses allow the operator to recognize accident severity and concentrate on the appropriate corrective actions. Symptomatic status trees which relate to Seabrook Station EALs are provided along with a description of the approach in Appendix A.

5.3 Emergency Classes

5.3.1 Unusual Event

AN UNUSUAL EVENT INDICATES A POTENTIAL DEGRADATION OF STATION SAFETY MARGINS WHICH IS NOT LIKELY TO AFFECT PERSONNEL ON-SITE OR THE PUBLIC OFF-SITE OR RESULT IN RADIOACTIVE RELEASES REQUIRING OFF-SITE MONITORING.

Unusual Events are conditions which do not cause serious damage to the station and may not require a change in operational status. For a complete list of the Unusual Event conditions, refer to Appendix A, Table A.1.

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5.3.2 Alert

AN ALERT INDICATES A SUBSTANTIAL DEGRADATION OF STATION SAFETY MARGINS WHICH COULD AFFECT ON-SITE PERSONNEL SAFETY, COULD REQUIRE OFF-SITE IMPACT ASSESSMENT, BUT IS NOT LIKELY TO REQUIRE OFF-SITE PUBLIC PROTECTIVE ACTION.

Station response and off-site notification associated with this event classification assure that sufficient emergency response personnel, both on and off site, are mobilized and respond to event conditions. Actual releases of radioactivity which substantially exceed Technical Specification limits may be involved, and thus radiation monitoring and dose projection may be an integral portion of the emergency response required. For a complete list of Alert conditions refer to Appendix A, Table A.2.

5.3.3 Site Area Emergency

A SITE AREA EMERGENCY INDICATES AN EVENT WHICH INVOLVES LIKELY OR ACTUAL MAJOR FAILURES OF STATION FUNCTIONS NEEDED FOR THE PROTECTION OF THE PUBLIC.

The events included in this Site Area Emergency category represent a potential for off-site releases which could impact the public to the extent that protective actions may be necessary. For a complete list of Site Area Emergency conditions, refer to Appendix A, Table A.3.

5.3.4 General Emergency

A GENERAL EMERGENCY INVOLVES SUBSTANTIAL CORE DEGRADATION OR MELTING WITH POTENTIAL FOR LOSS OF CONTAINMENT INTEGRITY.

For a complete list of General Emergency conditions, refer to Appendix A, Table A.4.

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APPENDIX A

EMERGENCY CLASSIFICATION SYSTEM AND EMERGENCY ACTION LEVELS

Tables A.1 through A.4 represent the station conditions and associated Emergency Action Levels (EALs) that are categorized in accordance with the four emergency classes. The emergency conditions include a wide spectrum of events that represent varying degrees of threat to station personnel onsite or the public offsite. As the tables show, full use is made of the various degrees of challenge to the five Critical Safety Functions (CSFs);

1) Subcriticality,
2) Core Cooling,
3) Heat Sink,
4) RCS Integrity, and
5) Containment Integrity.

EALs relate levels of challenge to the CSFs and other numerous process parameter indicators of emergency conditions such as system pressures, liquid levels, radiation intensity, and temperatures, to appropriate emergency classifications.*

Symptom based status trees simplify the initial emergency classification process by relating the most critical safety parameter indicators directly to the EALs. The individual status trees for each of the five emergency conditions used in conjunction with Table A.5 assist the operator in emergency classification and also directs them to the appropriate Emergency Operating Procedures for mitigation of the incident. Symptomatic status trees indicating emergency conditions are available to the operator on the plant process computer and are displayed on SPDS. Hard copies of these status trees are also available.

The CSF status trees, Figures A.1 through A.5, are based on plant events which pose a threat to the safety status of the plant. Color coding is used to identify event priorities for the individual branches of the status trees as follows:

- GREEN - The Critical Safety Function is satisfied - no operator action is called for.
- YELLOW - The Critical Safety Function is not fully satisfied - operator action may eventually be needed.
- ORANGE - The Critical Safety Function is under severe challenge - prompt operator action is necessary.
- RED - The Critical Safety Function is in jeopardy - immediate operator action is required.

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Table A.5 provides a cross reference which correlates the CSFs by color priorities and other emergency conditions by category with their appropriate emergency classes. For example, if parameters of critical safety function Number 2., core cooling, complete an orange branch of the appropriate fault tree then according to Table A.5, a Site Area Emergency classification is reached. However, if an orange branch of the Core Cooling status tree is completed in conjunction with a 3 (Heat Sink) red or orange or a 5 (Containment Integrity) red, then a General Emergency is reached as shown in Column 3 CSF/Combinations of Table A.5. Combinations of CSFs and other emergency conditions are correlated with emergency classes in column 4. Column 5 lists emergency conditions which constitute emergency classifications independent of Critical Safety Functions.

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* Numbers which have been provided are tentative and will be operationally verified. Numbers which have not been provided are to be calculated and verified, and will be provided at a later time.

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TABLE A.1

UNUSUAL EVENT CLASSIFICATION

Critical Safety Function/ Emergency Condition	Emergency Action Level	Emergency Status Indicators*
Core Cooling	o Core exit TCs less than 1200°F, RCS subcooling less than (later)°F, at least one RCP is running and RVLIS wide range is greater than; (later) % 4 RCP (later) % 2 RCP (later) % 3 RCP (later) % 1 RCP	2 yellow
	o No RCPs running, RCS subcooling less than (later)°F, core exit TCs is less than 700° and RVLIS narrow range greater than (later)%;	2 yellow
RCS Integrity	o RCS Cold Leg temperature greater than (later)°F and less than (later)°F and RCS coolant system has exceeded 100°F per hour cooldown rate;	4 yellow
	o RCS pressure greater than cold overpressure limit, RCS temperature less than 305°F, and RCS temperature decrease less than 100°F per hour;	4 yellow
Heat Sink	o Pressure less than 1255 psig in all SGs but greater than 1185 psig.	3 yellow
	o Pressure less than 1255 psig in all SGs with narrow range level not less than 84.5% in all SGs.	3 yellow
	o Pressure less than 1185 psig in all SGs with narrow range level less than 20% in all SGs.	3 yellow
Containment	o Containment radiation levels greater than (later);	5 yellow
Loss of Plant Process Computer	o As indicated or observed;	13.
Loss of Offsite AC Power	o As indicated or observed;	9.
Radiological Releases	o Releases exceeding Technical Specifications	6a.
Fire	o Fire within the station protected area which requires outside fire-fighting assistance;	11a.
Control Room Evacuation	o With control remaining at remote safe shutdown panel;	12a.
Airplane crash, Train Derailment or Explosion Onsite	o By observation;	14.
Offsite Medical Assistance Required for Contaminated and Injured Worker at Local Support Hospital	o Emergency transport of the worker to local support hospital;	15.
Loss of Onsite AC Power Capability	o As indicated or observed;	16.
Severe or Natural Phenomenon	o Response spectrum seismic unit triggered;	17a.
	o 50-year flood or low water level by observation or receipt of warning from offsite authorities;	17d.
	o Tornado observed onsite;	17e.
	o Hurricane observed onsite (sustained winds of (later) for (later) period of time;	17f.
	o Security compromises;	17h.
	o Technical Specifications surpassed causing shutdown.	18.

* To be used with Table A.5 and Figures A.1-A.4.

TABLE A.2

ALERT CLASSIFICATION

Critical Safety Function/ Emergency Condition	Emergency Action Level	Emergency Status Indicators*
Subcriticality	o Intermediate range SUR is zero or positive in power range less than 5% when the reactor should be subcritical;	1 orange
RCS Integrity	o RCS cold leg temperature is less than (later)°F, RCS pressure-temperature point to right of limit A (see Figure A.4) and RCS temperature decrease greater than 100°F per hour;	4 orange
Core Cooling and Containment Integrity	o When containment radiation is greater than (later) and, either: No RCPs are running, core exit TCS are less than 700° and RVLIS narrow is greater than (later)%; or Core exit TCs less than 1200°F, RCS subcooling less than (later)°F at least one RCP is running, and RVLIS wide range is greater than: (later)% 4 RCP (later)% 2 RCP (later)% 3 RCP (later)% 1 RCP	5 yellow 2 yellow 2 yellow
Containment Integrity and Failure to Isolate Containment	o Failure to isolate containment as indicated by Phase A and Phase B isolation indication panels when containment radiation is greater than (later);	7 and 5 yellow
Radiological Releases	o 10 time Technical Specifications;	6b.
Fire	o Controlled fire which effects only one train of safety-related equipment with the potential for affecting the other train;	11a.
Severe or Natural Phenomenon	o Earthquake greater than containment foundation DBE alarm initiating a shutdown; o Tornado observed onsite which has degraded safety components.	17b. 17g.

* To be used with Table A.5 and Figures A.1-A.4.

TABLE A.3

SITE AREA EMERGENCY CLASSIFICATION

Critical Safety Function/ Emergency Condition	Emergency Action Level	Emergency Status Indicators*
Subcriticality	o Power range is greater than 5% power when reactor should be subcritical;	1 red
Core Cooling	o Core exit TCs less than 1200°F but greater than 700°F, RCS subcooling less than (later)°F, and no RCPs are running, and RVLIS narrow range is greater than (later)%;	2 orange
	o RCS subcooling less than (later)°F, no RCPs running, core exit TCs less than 700°, and RVLIS narrow range less than (later)%;	2 orange
	o Core exit TCs less than 1200°F, and RCS subcooling less than (later)°F, at least one RCP running, and RVLIS wide range less than; (later)% 4 RCP (later)% 2 RCP (later)% 3 RCP (later)% 1 RCP	2 orange
Heat Sink	o Wide range level less than top of U-tubes in all SGs and total feedwater flow to SGs less than 470 gpm;	3 red
	o Wide range level less than top of U-tubes in all SGs and total feedwater flow to SGs greater than 470 gpm and pressure greater than 1255 psig in all SGs;	3 orange
	o Wide range level greater than top of U-tubes in at least one SG and pressure greater than 1255 psig in all SGs;	3 orange
RCS Integrity	o RCS temperature decrease greater than 100°F in last 60 minutes and RCS Pressure-Temperature ratio exceeds Limit A (see Figure A.4)	4 red
Containment Integrity	o Containment pressure greater than 52 psig;	5 red
	o Containment pressure less than 52 psig, but greater than 5 psig;	5 orange
	o Containment pressure less than 52 psig and containment sump not less then (later);	5 orange
Radiological Releases	o Radiological releases exceed EPA PAGs at Site Boundary;	6c.
Loss of all AC Power	o As indicated or observed;	8.
Loss of all DC Power	o As indicated or observed;	10.
Fire	o Uncontrolled fire which affects safety-related equipment;	11b.
Control Room Evacuation	o Evacuation of control room without control at remote shutdown panel;	12b.
Severe or natural Phenomenon	o Earthquake with potential impact on SSE.	17c.

* To be used with Table A.5 and Figures A.1-A.4.

TABLE A.4

GENERAL EMERGENCY CLASSIFICATION

Critical Safety Function/ Emergency Condition	Emergency Action Level	Emergency Status Indicators*
Core Cooling	o Core exit TCs higher than 1200°F;	2 red
	o Core exit TCs less than 1200°F but greater than 700°F, RCS subcooling less than (later)°F, no RCPs running and RVLIS narrow range less than (later)%;	2 red
Core Cooling and Heat Sink	o Core exit TCs less than 1200°F, RCS subcooling less than (later)°F, no RCPs running, core exit TCs greater than 700°F and RVLIS narrow range greater than (later)% combined with heat sink wide range level less than top of U-tubes in all SGs and total feedwater flow to SGs less than 470 gpm; or	2 orange 3 red
	Combined with wide range level greater than top of U-tubes in at least one SG and pressure not less than 1255 psig in all SGs; or	3 orange
	Wide range level not greater than top of U-tubes in any SGs and total feedwater flow to SGs greater than 470 gpm, and pressure not less than 1255 psig in all SGs;	3 orange
	o Core exit TCs less than 1200°F, and RCS subcooling less than (later)°F, no RCPs running, core exit TCs less than 700°F, RVLIS narrow range less than (later)% combined with heat sink wide range level less than top of U-tubes in all SGs and total feedwater flow to SGs less than 470 gpm; or	2 orange 3 red
	Combined with wide range level greater than top of U-tubes in at least one SG and pressure not less than 1255 psig in all SGs; or	3 orange
	Wide range level not greater than top of U-tubes in any SGs and total feedwater flow to SGs greater than 470 gpm, and pressure no less than 1255 psig in all SGs;	3 orange
	o Core exit TCs less than 1200°F, and RCS subcooling less than (later)°F, at least one RCP running, RVLIS wide range less than: (later)% 4 RCP (later)% 2 RCP (later)% 3 RCP (later)% 1 RCP	2 orange
	Combined with heat sink wide range level less than top of U-tubes in all SGs and total feedwater flow to SGs less than 470 gpm; or	3 red
	Combined with wide range level greater than top of U-tubes in at least one SG and pressure not less than 1255 psig in all SGs; or	3 orange
	Wide range level not greater than top of U-tubes in any SGs and total feedwater flow to SGs greater than 470 gpm, and pressure not less than 1255 psig in all SGs;	3 orange
Core Cooling and Containment Integrity	o Containment pressure greater than 52 psig combined with core exit TCs less than 1200°F, RCS subcooling less than (later)°F, no RCPs running, core exit TCs greater than 700°F and RVLIS narrow range greater than (later)%; or	5 red and 2 orange
	o With core exit TCs less than 1200°F, RCS subcooling less than (later)°F, no RCPs running, core exit TCs less than 700°F, RVLIS narrow range less than (later)%; or	2 orange
	o With core exit TCs less than 1200°F, RCS subcooling less than (later)°F, at least one RC running and RVLIS wide range less than: (later)% 4 RCP (later)% 2 RCP (later)% 2 RCP (later)% 1 RCP	2 orange
Containment Integrity and Loss of all AC Power	o Containment pressure greater than 52 psig combined with loss of all ac power as indicated or observed;	5 red and 8.
	o Containment pressure less than 52 psig but greater than 5 psig combined with loss of all ac power as indicated or observed;	5 orange and 8.
Containment Integrity and Failure to Isolate Containment	o Containment pressure greater than 52 psig combined with loss of all ac power as indicated or observed;	5 red and 7.
Loss of All AC and DC Power	o As indicated or observed.	8 and 10.

* To be used with Table A.5 and Figures A.1-A.4.

TABLE A.5

EMERGENCY CLASS CROSS REFERENCE WITH CRITICAL SAFETY FUNCTIONS (CSFs)/EMERGENCY CONDITIONS

Emergency Class	CSF Singles	CSF/Combinations	Complications	Miscellaneous
General	2 red	2 orange/3 red 2 orange/3 orange 2 orange/5 red	5 red/8 5 orange/8 3 red/8 5 red/7	10+8
Site Area	1 red 2 orange 3 red 3 orange 4 red 5 red 5 orange			6c, 8, 10, 11b, 12b, 17c
Alert	1 orange, 4 orange	2 yellow/5 Yellow	5 yellow/7	6a, 6b, 9, 11a, 11c, 12a, 13, 14, 15, 16, 17a, 17b, 17d, 17e, 17f, 17g, 17h, 18
Unusual Event	2 yellow 3 yellow 4 yellow 5 yellow			

Critial Safety Functions

1. Subcriticality
2. Core Cooling
3. Heat Sink
4. RCS Integrity
5. Containment Integrity

Miscellaneous Emergency Conditions

6. Hi Releases
   a) Technical Specification
   b) 10 x Technical Specification
   c) Indications EPA PAGs will be exceeded at site boundary
7. Failure to isolate containment
8. Loss of all ac power
9. Loss of offsite ac power
10. Loss of all dc power
11. Fire:
    a) Controlled-affects only one train of safety-related equipment with the potential for affecting the other train
    b) Uncontrolled-affects safety-related equipment
    c) Within plant protected area which requires outside fire-fighting assistance
12. Control room evacuation
    a) With control at remote shutdown panel
    b) Without control at remote shutdown panel
13. Loss of plant process computer
14. Observation of aircraft crash, train derailment or explosion onsite
15. Emergency transport of contaminated and injured worker to local support hospital
16. Loss of onsite ac power capability
17. Severe or natural phenomenon
    a) Response spectrum seismic unit triggered
    b) Earthquake greater than containment foundation DBE alarm levels
    c) Earthquake with potential impact on SSE
    d) 50-year flood or low water level by observation or receipt of warning from offsite authorities
    e) Observation of tornado onsite
    f) Observation of hurricane onsite (sustained winds of (later) for (later) period of time)
    g) Tornado observed onsite which has degraded safety components
    h) Security compromises
18. Shutdown-Technical Specifications surpassed

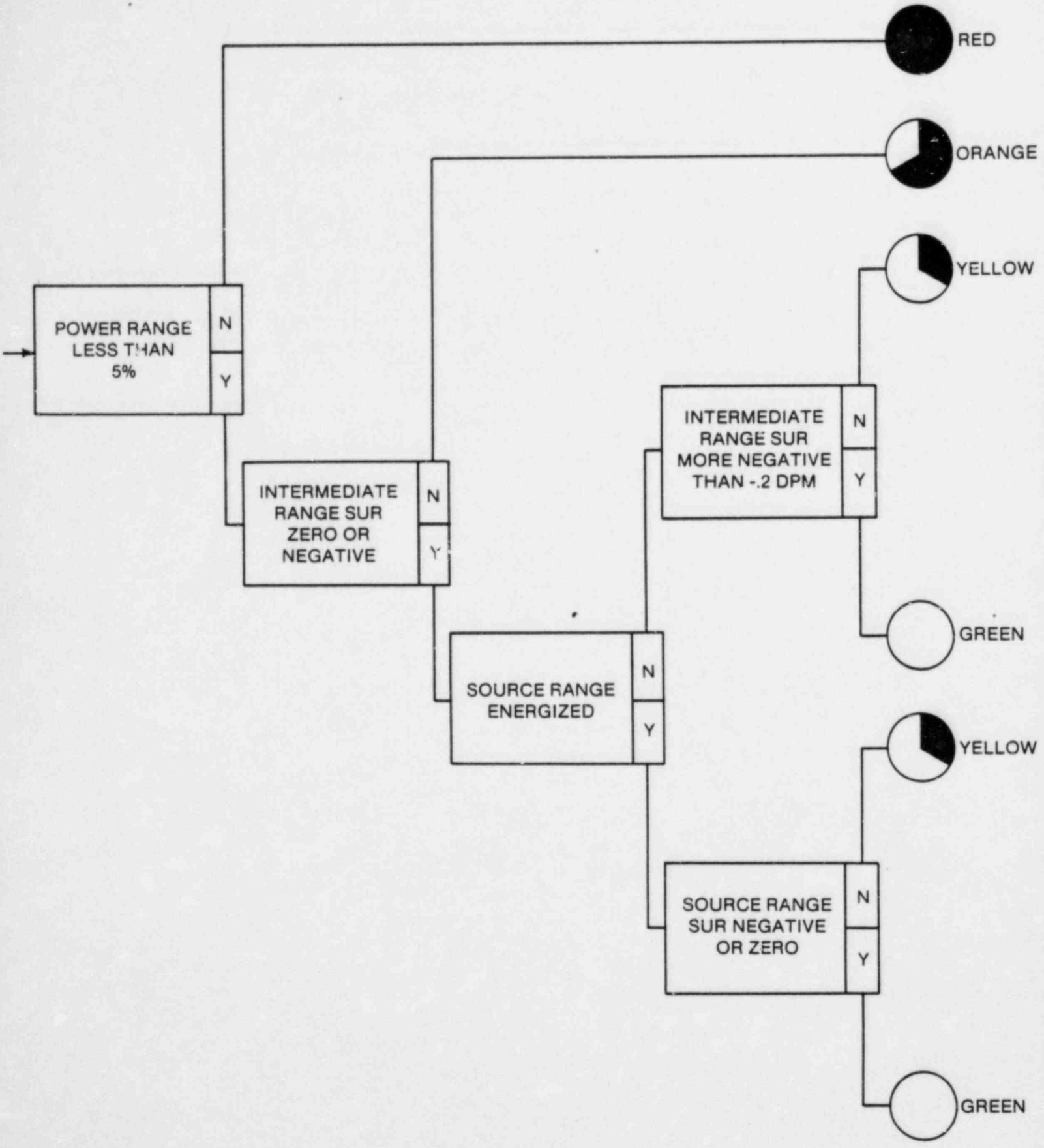


FIGURE A.1

STATUS TREE FOR CRITICAL SAFETY FUNCTION
NUMBER 1 - SUBCRITICALITY

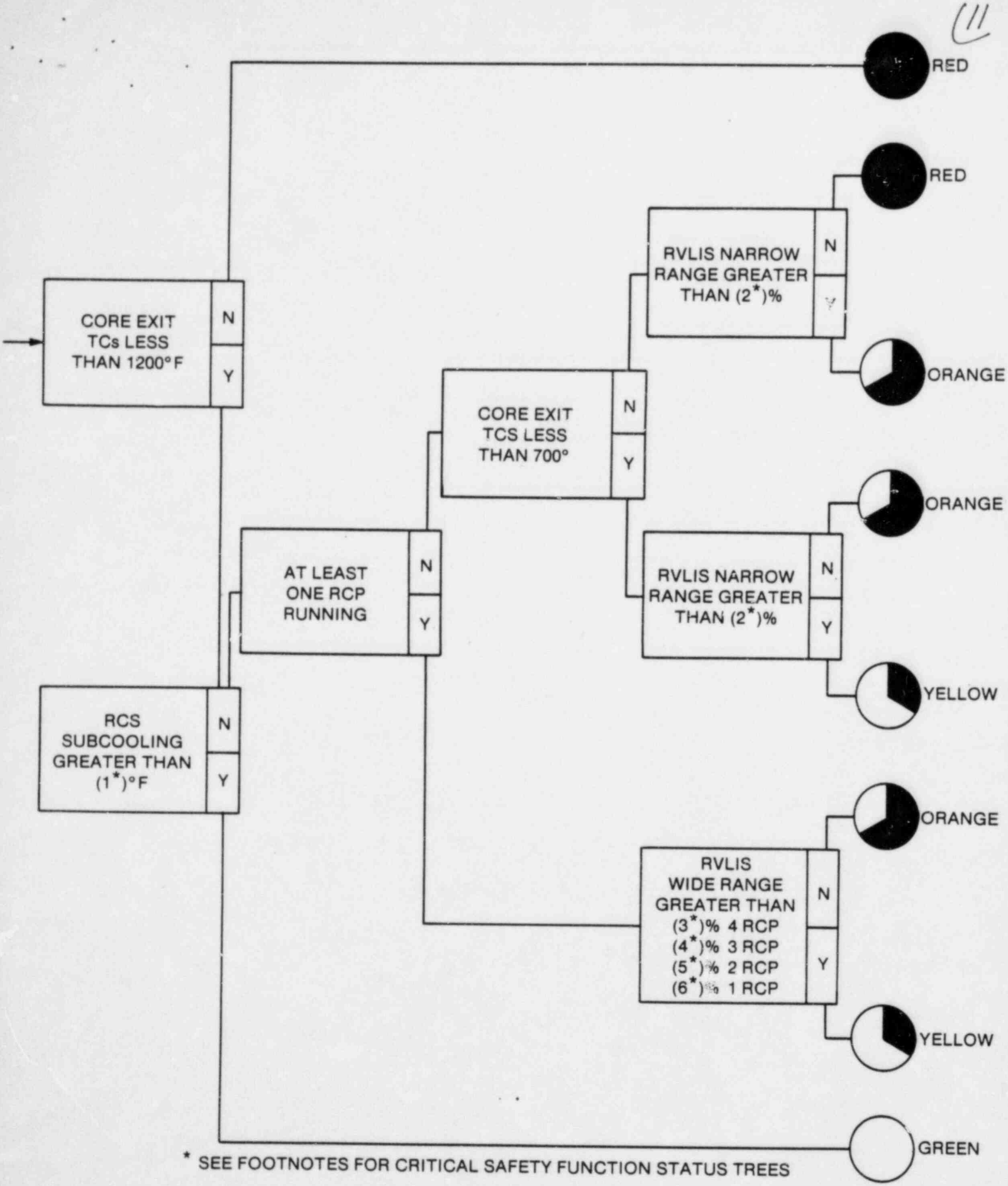
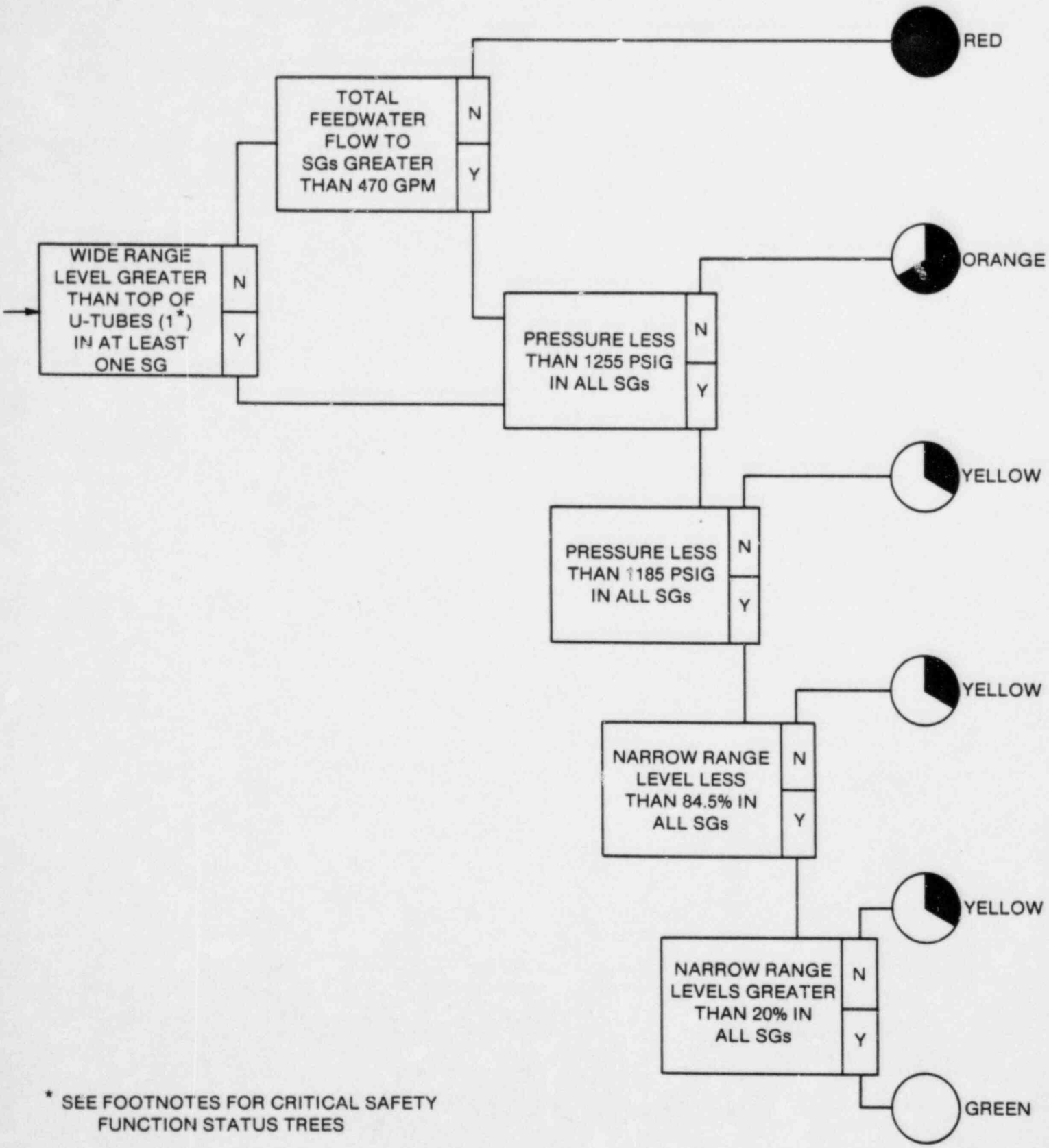


FIGURE A.2

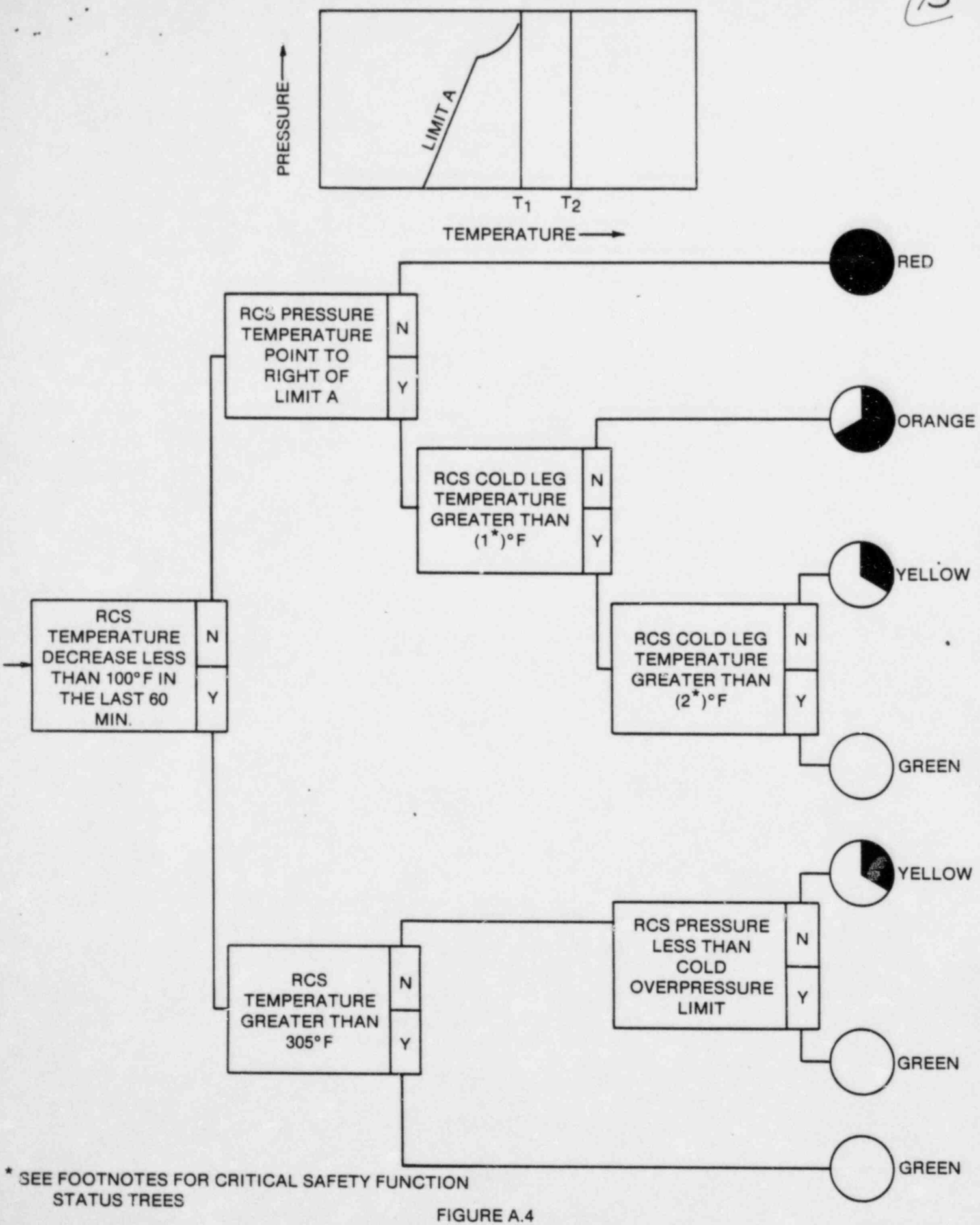
STATUS TREE FOR CRITICAL SAFETY FUNCTION
NUMBER 2 - CORE COOLING



* SEE FOOTNOTES FOR CRITICAL SAFETY FUNCTION STATUS TREES

FIGURE A.3

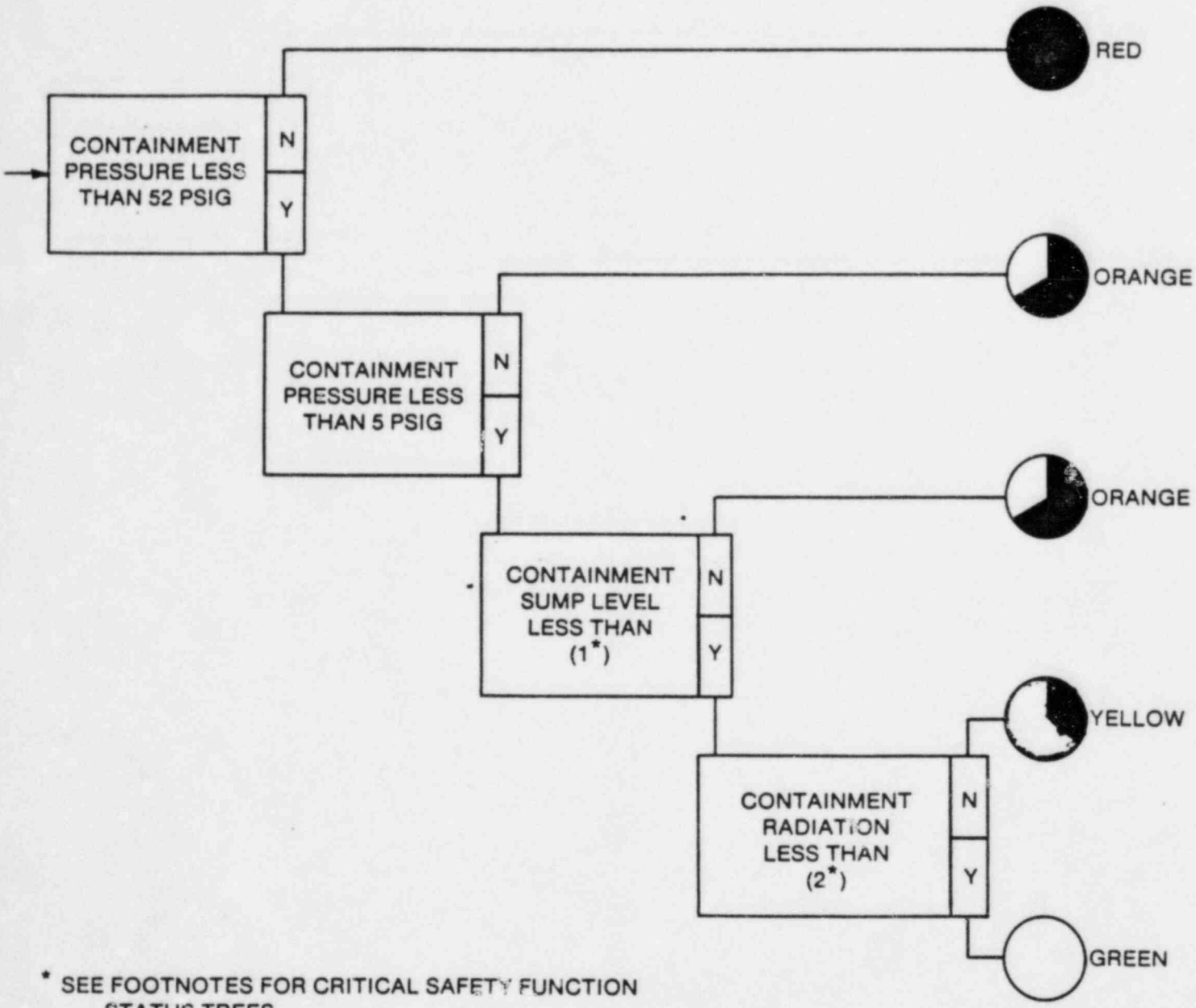
STATUS TREE FOR CRITICAL SAFETY FUNCTION NUMBER 3 - HEAT SINK



* SEE FOOTNOTES FOR CRITICAL SAFETY FUNCTION STATUS TREES

FIGURE A.4

STATUS TREE FOR CRITICAL SAFETY FUNCTION
NUMBER 4 - RCS INTEGRITY



* SEE FOOTNOTES FOR CRITICAL SAFETY FUNCTION STATUS TREES

FIGURE A.5

STATUS TREE FOR CRITICAL SAFETY FUNCTION
NUMBER 5 - CONTAINMENT

FOOTNOTES FOR CRITICAL SAFETY FUNCTION STATUS TREES

Figure A.2 Core Cooling

(1) Enter sum of temperature and pressure measurement system errors translated into temperature using saturation tables.

(2) Enter plant specific value which is 3-1/2 feet above the bottom of active fuel in core with zero void fraction, plus uncertainties.

(3) Enter plant specific value corresponding to an average system void fraction of 50 percent with 4 RCPs running.

(4) Enter plant specific value corresponding to an average system void fraction of 50 percent with 3 RCPs running.

(5) Enter plant specific value corresponding to an average system void fraction of 50 percent with 2 RCPs running.

(6) Enter plant specific value corresponding to an average system void fraction of 50 percent with 1 RCP running.

Figure A.3 Heat Sink

(1) Actual indicated level corresponding to top of U-tubes is dependent on calibration of wide range channel performed prior to startup.

Figure A.4 RCS Integrity

(1) Enter plant specific temperature corresponding to temperature T_1 (refer to FR-P.1 background document).

(2) Enter plant specific temperature corresponding to temperature T_2 (refer to FR-P.1 background document).

Figure A.5 Containment

(1) Enter plant specific level corresponding to the combined volumes of: RWST + Accumulators + RCS + 1/2 CST (to be calculated at a later date).

(2) Enter plant specific value corresponding to radiation level alarm setpoint for post accident containment radiation monitor (to be set prior to initial plant operation).