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ARTHUR E. LUNDVALL, JR.
VICE PRESIDENT
SUPPLY

October 30, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. J. R. Miller, Chief
Operating Reactors Branch #3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Calvert Cliffs Nuclear Power Plant
Units Nos. 1 & 2; Dockets Nos. 50-317 and 50-318
NUREG-0737 Item II.B.3, Post Accident Sampling System

References:
1. NRC Memorandum from W. Johnston to G. Lainas, "Safety Evaluation of Post-Accident Sampling System of Calvert Cliffs Nuclear Power Plant," dated June 24, 1983.
2. Combustion Engineering Report CE-NPSD-241, "Development of Comprehensive Procedure Guidelines for Core Damage Assessment," dated July 1983.

Gentlemen:

At your request, the following additional information is provided to assist you in your review of the Calvert Cliffs post-accident sampling system regarding conformance with system criteria #2 and #10 as evaluated in Reference 1:

Criterion 2

A core damage assessment procedure based on the generic guidelines developed for the CE Owners Group (Reference 2) is being written for Calvert Cliffs. We will submit a copy of the completed procedure for your information by December 31, 1984.

Criterion 10

The attached excerpts from the Calvert Cliffs Post-Accident Sampling System Technical Manual (Combustion Engineering Report CENTM-14) indicate the post-accident environmental conditions for which the system was designed. Also shown are the accuracies and ranges specified for the boron meter, the pH meter, the reactor coolant hydrogen meter and the oxygen meter.

Periodic system operability testing and operator refresher training will be performed in accordance with the technical specification proposed in our license amendment request dated June 29, 1984.

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The design of the post-accident sampling system, in conjunction with the procedures and training discussed above, provide reasonable assurance that the system will be available when required.

If you should have any questions concerning these matters, please do not hesitate to contact us.

Very truly yours,

AEL/BSM/vf

Attachment

cc: D. A. Brune, Esq.
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Mr. T. Foley, NRC

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APPENDIX A - ENVIRONMENTAL CONDITIONS

Valve List Category	Location	Condition	Temp.	Pressure	Time After Event Initiation	Humidity	Radiation
D	Aux. Bldg.	Post-LOCA	120°F	atmospheric	0-4 hrs	(a)	(b)
			104°F	atmospheric	4-24 hrs	(a)	(b)
C		Normal	60-104°F*	atmospheric	N/A	(a)*	(b)
A	Inside Containment	Post-LOCA	300°F (max)	60 psig (max)	(c)	saturated steam/air mixture	(d)
B		Normal	60-120°F	0-5 psig	N/A	(a)	(e)

Notes:

(a) 60-80°F: 95% RH

80°F to max. temperature: fixed moisture content equivalent to 95% RH @ 80°F

(b)

	Sample Station: Reactor Coolant **	Sample Station: Cont. Atmosphere	Control Panel
Dose Rate:	5×10^4 R/Hr @ t = 0	2×10^2 R/Hr @ t = 0	-
Decays to:	5×10^3 R/Hr @ t = 5 days	20 R/Hr @ t = 6 days	-
and Decays Further to:	5×10^2 R/Hr @ t = 40 days	2 R/Hr @ t = 20 days	-
Total Integrated Dose	7×10^5 Rads	1×10^4 Rads	1×10^4 Rads

(c) Environment conditions decay to normal by t=10 days after the event initiation.

(d) Total integrated dose is 10^8 rads.

(e) Total integrated dose is 10^7 rads.

*Containment Isolation Valve PS-230 has a specified environmental temperature of 220°F in a saturated steam/air mixture for a period of a week after a main steamline break.

**Also applicable to all PASS equipment outside the sample station in the auxiliary building.

APPENDIX B - CHEMISTRY LIMITS

Reactor Coolant Chemistry Limits

Parameter	Limit
pH	3.8-10.6
Hydrazine (N_2H_4)	0-50 ppm
Ammonia (NH_3)	0-50 ppm
Lithium	0-2.5 ppm
Dissolved Hydrogen	0-2000cc(STP) H_2/Kg H_2O
Dissolved Oxygen	Air Saturated (max)
Dissolved Nitrogen	0-100 cc (STP) N_2/kg H_2O
Suspended Solids	0-2 ppm
Chloride	0-.15 ppm Cl
Fluoride	0-.1 ppm F
Boron	0-5000 ppm B

Verified: Yes x No

INSTRUMENTATION REQUIREMENTS

1. Channel Number A-502
2. Channel Name Boron Meter (1)
3. Quantity 1
4. System Post Accident Sampling
5. P&ID's E-PAS-310-152
6. Instrument Function Indicate

   Parameter Measured Boron Concentration
   Parameter Controlled none
   Component (s) Controlled none
7. Performance:
   Accuracy ±2% (S.G. Sensitivity = ± .000025)
   Response -
8. Location:

	Control Room	Local	Remote S/D Location (s)	Local Panel
Indication				x
Alarm				
Totalize				
Record				

9. Scale:
   Range 0-5000 ppm (measured S.G.=0.98 to 1.015) See #19
   Linear x
   Logarithmic -
   Square Root -
10. Alarm/Trip Setpoints:

    HH Trip Above -
    H Trip Above -
    L Trip Below -
    LL Trip Below -
    Other Trip -
    HH Reset Below -
    H Reset Below -
    L Reset Above -
    LL Reset Above -
    Other Reset -
11. External Environment (see Appendix A)
    Sensor Auxiliary Bldg.
    Normal and LOCA
12. Sensor Working Fluid:

	Normal	Design
Pressure (psig)	80	100
Temperature (°F)	120	200

    Fluid Type Post-Accident Reactor Coolant
    Chemistry Appendix B
13. Normal Operating Range
    100-4400 ppm
14. Control (on/off or open/closed)
    Component -
    On (open Setpoint Above -
    Below -
    Off (closed) Setpoint Above -
    Below -
15. Control (Regulated)
    Component -
    Manual Range -
    Automatic Range -
    Auto Setpoint -
    Proportional -
    Integrated -
    Rate -
16. Pipe Run (size/schedule/end connection)
    3/8" O.D. in. / 16 BWG/Swagelok
    ASME III, Class none
17. Emergency Power none
18. Requirements for Abnormal Operation:

Post LOCA	Yes x	No
Post SLB	Yes	No x
Post Seismic Event	Yes	No x
Safe Shutdown	Yes	No x

    Other: -
19. Other Requirements: Sample flow rate = 1 gpm; temperature compensation is required between 80°F and 160°F; for calibr. @ 120°F, 0 ppm boron = .9915 S.G. 5000 ppm boron = 1.0017 S.G. (relation is linear)

Note (1) Plant Engineering recommends a "Dynatrol" specific gravity (S.G.) device for this application calibrated to boron concentration in ppm. After initiation of containment sump recirculation, interferring constituents will be accounted for by a Plant Engrg. supplied curve.

Verified: Yes x No

INSTRUMENTATION REQUIREMENTS

1. Channel Number A-503
2. Channel Name pH Meter
3. Quantity 1
4. System Post-Accident Sampling
5. P&ID's E-PAS-310-152
6. Instrument Function Indicate

   Parameter Measured pH
   Parameter Controlled none
   Component (s) Controlled none
7. Performance:
   Accuracy ± .5 units
   Response –
8. Location:

	Control Room	Local	Remote S/D Location (s)	Local Panel
Indication				x
Alarm				
Totalize				
Record				

9. Scale:
   Range 3 -12
   Linear x
   Logarithmic –
   Square Root –
10. Alarm/Trip Setpoints:
    HH Trip Above –
    H Trip Above –
    L Trip Below –
    LL Trip Below –
    Other Trip –
    HH Reset Below –
    H Reset Below –
    L Reset Above –
    LL Reset Above –
    Other Reset –
11. External Environment (see Appendix A)
    Sensor Aux. Building - Normal & LOCA
12. Sensor Working Fluid:

	Normal	Design
Pressure (psig)	80	100
Temperature (°F)	120	200

    Fluid Type Post-Accident Reactor Coolant
    Chemistry Appendix B
13. Normal Operating Range 4.5 - 10.0
14. Control (on/off or open/closed)
    Component –
    On (open Setpoint Above –
    Below –
    Off (closed) Setpoint Above –
    Below –
15. Control (Regulated)
    Component –
    Manual Range –
    Automatic Range –
    Auto Setpoint –
    Proportional –
    Integrated –
    Rate –
16. Pipe Run (size/schedule/end connection)
    3/8" O.D.in / 16 BWG/Swagelok
    ASME III, Class none
17. Emergency Power none
18. Requirements for Abnormal Operation:
    Post LOCA Yes x No
    Post SLB Yes No x
    Post Seismic Event Yes No x
    Safe Shutdown Yes No x
    Other: –
19. Other Requirements: Sample flow rate is 1 gpm

Verified: Yes x No

INSTRUMENTATION REQUIREMENTS

1. Channel Number A-504
2. Channel Name Reactor Coolant Hydrogen Meter
3. Quantity 1
4. System Post-Accident Sampling
5. P&ID's E-PAS-310-152
6. Instrument Function Indicate

   Parameter Measured Volume % H_2
   Parameter Controlled none
   Component (s) Controlled none

7. Performance:
   Accuracy ± 2%
   Response –

8. Location:

	Control Room	Local	Remote S/D Location (s)	Local Panel
Indication				x
Alarm				
Totalize				
Record				

9. Scale: 0-10 Volume %
   Range 0-100 Volume %
   Linear x
   Logarithmic –
   Square Root –

10. Alarm/Trip Setpoints:

    HH Trip Above –
    H Trip Above –
    L Trip Below –
    LL Trip Below –
    Other Trip –
    HH Reset Below –
    H Reset Below –
    L Reset Above –
    LL Reset Above –
    Other Reset –

11. External Environment (see Appendix A)
    Sensor Auxiliary Bldg. - Normal & LOCA

12. Sensor Working Fluid:

	Normal	Design
Pressure (psig)	5	100
Temperature (°F)	120	200

    Fluid Type *N_2, H_2, O_2 Fission Products
    Chemistry N/A

13. Normal Operating Range
    0-100 volume %

14. Control (on/off or open/closed)
    Component –
    On (open Setpoint Above –
    Below –
    Off (closed) Setpoint Above –
    Below –

15. Control (Regulated)
    Component –
    Manual Range –
    Automatic Range –
    Auto Setpoint –
    Proportional –
    Integrated –
    Rate –

16. Pipe Run (size/schedule/end connection)
    3/8" O.D. in / 16 BWG/Swagelok
    ASME III, Class none

17. Emergency Power none

18. Requirements for Abnormal Operation:

Post LOCA	Yes x	No
Post SLB	Yes	No x
Post Seismic Event	Yes	No x
Safe Shutdown	Yes	No x

    Other: –

19. Other Requirements: Sample flow rate is 50-350 cc/min

*R.H. = 0 - 100%

Verified: Yes x No ____

Appendix C (cont'd)

INSTRUMENTATION REQUIREMENTS

1. Channel Number A-505
2. Channel Name Oxygen Meter
3. Quantity 1
4. System Post-Accident Sampling
5. P&ID's E-PAS-310-152
6. Instrument Function Indicate

   Parameter Measured Volume % O_2
   Parameter Controlled None
   Component (s) Controlled None
7. Performance:
   Accuracy ± 2%
   Response –
8. Location:

	Control Room	Local	Remote S/D Location (s)	Local Panel
Indication				x
Alarm				
Totalize				
Record				

9. Scale:
   Range 0-5 Volume %
   0-25 Volume %
   Linear x
   Logarithmic –
   Square Root –
10. Alarm/Trip Setpoints:

    HH Trip Above –
    H Trip Above –
    L Trip Below –
    LL Trip Below –
    Other Trip –
    HH Reset Below –
    H Reset Below –
    L Reset Above –
    LL Reset Above –
    Other Reset –
11. External Environment (see Appendix A)

    Sensor Aux. Bldg.- Normal & LOCA

12. Sensor Working Fluid:

	Normal	Design
Pressure (psig)	5	100
Temperature (°F)	120	200

    Fluid Type *N_2, H_2, O_2, Fission Products
    Chemistry N/A
13. Normal Operating Range
    0-5 Volume %
14. Control (on/off or open/closed)
    Component –
    On (open Setpoint Above –
    Below –
    Off (closed) Setpoint Above –
    Below –
15. Control (Regulated)
    Component –
    Manual Range –
    Automatic Range –
    Auto Setpoint –
    Proportional –
    Integrated –
    Rate –
16. Pipe Run (size/schedule/end connection)
    3/8" O.D. in / 16 BWG / Swagelok
    ASME III, Class none
17. Emergency Power none
18. Requirements for Abnormal Operation:

Post LOCA	Yes x	No
Post SLB	Yes	No x
Post Seismic Event	Yes	No x
Safe Shutdown	Yes	No x

    Other: –
19. Other Requirements: Sample flow rate is 50-350 cc/min

*R.H. = 0-100%