JAN - 8 1992

MEMORANDUM FOR: Martin J. Virgilio, Director, Project Directorate IV-2
Office of Nuclear Reactor Regulation (NRR)

FROM: Samuel J. Collins, Director, Division of Reactor Safety

SUBJECT: LICENSEE REDEFINITION OF REACTOR COOLANT SYSTEM LEVEL AT WHICH REDUCED INVENTORY OPERATING REQUIREMENTS ARE IMPOSED

The purpose of this memorandum is to request technical assistance in determining the adequacy of a licensee's 10 CFR Part 50.59 evaluation in support of reducing the reactor coolant system level for entering reduced inventory operating restrictions from 3 to 5 feet below the reactor vessel flange. The 3 feet number was established in Generic Letter 88-17, "Loss of Decay Heat Removal." The licensee's motivation for making this change was Westinghouse Technical Bulletin NSD-TB-87-02, Revision 2, "Head 'O' Ring Leakage," dated July 13, 1990. This change was recommended in the bulletin to avoid wetting the reactor vessel head "O" rings during head installation for reactors with the Comanche Peak-type reactor vessel internals design. Westinghouse considers any wetting of the "O" rings to be potentially detrimental. By changing the definition, the licensee avoids going to reduced inventory operating restrictions during head installation. It should be noted, however, that the redefined reduced inventory level now applies at all times and is not limited to operations involving head installation.

The Attachment 1 sketch illustrates the physical effect of this change. Attachment 2 is the pertinent pages of NRC Inspection Report 50-423/89-08 for Millstone 3 dealing with a similar redefinition of reduced inventory. Acceptance of this redefinition at Millstone 3 was apparently based on verbal concurrence by someone in NRR. The technical basis appeared to be that residual-heat removal air entrainment would not occur at the lower reactor coolant system level. Attachment 3 is a series of letters between TU Electric and the NRC on the subject of revision of the reactor coolant system level for entering reduced inventory conditions. The final NRC letter (September 30, 1991) stated that a review of the 10 CFR Part 50.59 evaluation supporting the lower reactor coolant system level for reduced inventory operating restrictions would be considered. This review was completed and documented in NRC Inspection Report 50-445/91-61; 50-446/91-61 for Comanche Peak (Attachment 4). This issue was documented as Unresolved Item 445/9161-01 pending further review of the technical basis supporting reduction of the reactor coolant system level at which reduced inventory operating restrictions are applied. Attachment 5 is the licensee's 10 CFR Part 50.59 evaluation supporting its redefinition of reactor coolant system reduced inventory from 3 to 5 feet below the reactor vessel flange.

The technical basis given at both Millstone 3 and Comanche Peak, Unit 1, appears to be that air entrainment in the residual-heat removal system will not occur at the lower value for reactor coolant system level. Although we agree that avoidance of air entrainment in the residual-heat removal system is

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PDR ADOCK 05000423
P PDR

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a primary factor for establishing reduced inventory controls, we believe other factors should be considered when redefining the reduced inventory level. The licensee's 10 CFR Part 50.59 safety evaluation indicates that the minimum acceptable level to avoid air entrainment is only 5 inches above actual mid-loop. We believe the margin of safety associated with the time to boiling and core uncovery upon loss of decay heat removal capability should be considered. This time should be compared with the time required for containment closure to assure adequate margin exists. The results of this evaluation could affect the licensee's conclusions regarding no increase in probability of malfunction of equipment important to safety and no impact on the radiological consequences.

My staff has discussed this issue with certain NRR personnel and have received conflicting responses on the acceptability of redefining the reduced inventory level. We request that a Task Interface Agreement be developed to answer the following:

1. Does NRR find the redefined reduced inventory level acceptable (5 feet below the flange versus 3 feet)?

2. Does NRR agree with the licensee's conclusion that no unreviewed safety question was created by the change?

3. Does the licensee's 10 CFR Part 50.59 evaluation provide an adequate basis for the determination of no unreviewed safety question?

4. Does the acceptability of changing commitments made in response to generic letters without prior staff approval where the criteria of 10 CFR Part 50.59 are met apply to all generic letter responses?

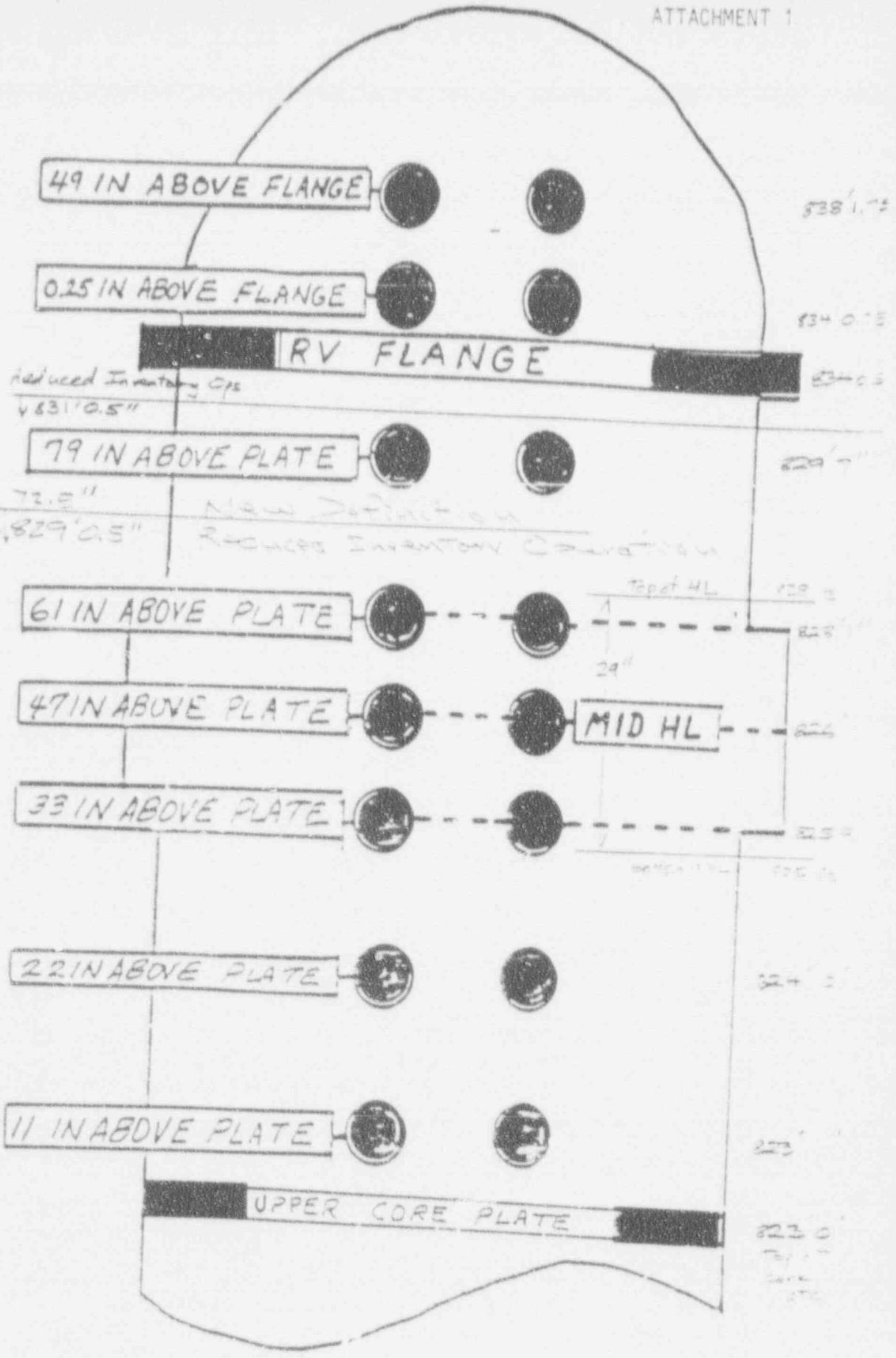
If you have any questions regarding this matter, please contact Howard Bundy (FTS 728-8172) or Jim Gagliardo (FTS 728-8270) of my staff.

Samuel J. Collins, Director
Division of Reactor Safety

Attachments: As stated

cc w/attachments:
E. Rossi, NRR
C. Grimes, NRR
M. Hodges, Region I
A. Gibson, Region II
H. Miller, Region III
R. Zimmerman, Region V

ATTACHMENT 1



RVLIS

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

VIOV ~~Ltr~~
Specifics related to our
Voluntary #88-17 letter
Mr. Rick
R. M. KACICH

JUL 17 1989

RECEIVED

Docket/License: 50-423/NPF-49 JUL 18 1989

Northeast Nuclear Energy Company
ATTN: Mr. Edward J. Mroczka
Senior Vice President - Nuclear
Engineering and Operations Group
P.O. Box 270
Hartford, Connecticut 06101-0270

Gentlemen:

Subject: Millstone 3 Routine Inspection 50-423/89-08 (5/15/89 - 6/12/89)

Ravi,
Not RNK's comment.

The enclosed report refers to the routine resident safety inspection conducted on May 15 through June 12, 1989 at the Millstone Nuclear Power Station, Unit 3. The results of the inspection are described in the NRC Region I Inspection Report enclosed with this letter and were discussed with Mr. C. H. Clement of your staff at the conclusion of the inspection.

Gen

Your cooperation with us is appreciated.

Sincerely,

Edward C. Wenzinger, Chief
Projects Branch No. 2
Division of Reactor Projects

Enclosure: NRC Region I Inspection Report 50-423/89-08

cc w/encl:
W. D. Romberg, Vice President, Nuclear Operations
R. M. Kacich, Manager, Generation Facilities Licensing
D. O. Nordquist, Director of Quality Services
S. E. Scace, Station Superintendent
C. H. Clement, MP3 Superintendent
D. B. Miller, Station Superintendent, Haddam Neck
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Senior Resident Inspector
State of Connecticut

8907200129

equipment, and training in this area. The expeditious actions were to be completed prior to entering reduced inventory operations. The program enhancements are to be completed prior to startup from the second refueling outage after issuance of the GL.

The licensee responded to this GL by letters dated December 23, 1988 and January 31, 1989. These letters described the actions to be taken in accordance with GL 88-17. The inspector reviewed these responses and conducted an inspection of the implementation of the expeditious actions. The program enhancements will be reviewed during a future inspection.

During February 1989, the licensee experienced an unplanned shutdown for repair of a hot leg loop stop valve leak. This repair required mid-loop operation. Special procedures were prepared and operator training was conducted prior to mid-loop operation. The repair effort and mid-loop operation are described in NRC Inspection Report 50-423/89-02.

The licensee will operate with reduced inventory and at mid-loop during the current refueling outage. Operation in this condition is required for Inservice Inspection of eight pressure isolation check valves in the Low Pressure Safety Injection and Safety Injection Accumulator discharge flow paths and to perform maintenance on the eight loop stop valves.

8.1 Redefinition of Reduced Inventory

The expeditious actions identified by the GL are to be implemented prior to entering into reduced inventory operations. Reduced inventory operations occur whenever the reactor vessel water level is more than three feet below the reactor vessel flange.

Millstone Unit 3 has elected to redefine the minimum reactor vessel level for reduced inventory operations from three feet to five feet below the reactor vessel flange. This is because of the inverted "top hat" design of the reactor upper internals package. The upper internals sit lower in the reactor vessel than is the standard design considered by the GL. The redefinition of reduced inventory will prevent overflow and possible introduction of debris and contaminants into the reactor vessel flange and stud holes when the upper internals are placed in the vessel.

The licensee elected to use two methods for determination of the minimum height at which air entrainment into the RHR (Residual Heat Removal) system can be avoided: the Harleman Equation and a scale model test.

The Harleman Equation calculates the minimum reactor water level as a function of RHR flow velocity and system dimensions. The licensee determined, based on this calculation, that a minimum water level of 19' 6" with the normal RHR flow of 4000 gpm would be sufficient to avoid air entrainment.

A scale model test of the Millstone 3 Reactor Coolant System (RCS) during mid-loop operation was conducted by Westinghouse Electric Co. The experiment concluded that a water level of at least 17' 6" is necessary to avoid RHR air entrainment.

The licensee elected to use the more conservative level (19' 6") as the redefined reduced inventory level. This is equivalent to five feet below the reactor vessel flange.

The inspector reviewed the calculation assumptions and results and the model test results. No discrepancies were identified. Additionally, the acceptability of redefinition of reduced inventory was discussed with the technical contact for this Generic Letter in NRC Headquarters. The inspector was informed that this is acceptable and that other sites with reactor upper internals designs similar to Millstone 3 were also redefining reduced inventory levels.

No inadequacies were identified. The inspector had no further questions regarding the definition of reduced inventory operations as it related to the GL guidance. NRC review of other licensee actions in response to GL 88-17 are discussed further below.

9.0 Review of Procedures for Reduced Inventory Operation and Other Actions for Generic Letter 88-17 (TI 2515/101)

The following three procedures are in effect for draining the RCS, operating with the reduced inventory, and recovering from a loss of shutdown cooling. The inspector reviewed the revisions in effect and discussed with the licensee several inadequacies and areas for improvement. At the close of the inspection period, the licensee was evaluating changes to improve the procedures. The inspector noted that these procedures were used without incident during the mid-loop operations in February, 1989.

9.1 OP 3270, Reduced Reactor Coolant System Inventory Operation

This procedure was initially written to support mid-loop operations for February, 1989. Its objective is to provide guidance and direction for RCS operation at reduced inventory and mid-loop levels.

The inspector reviewed Revision 1 which was scheduled for Plant Operation Review Committee (PORC) review during the inspection. The following areas for improvement were noted:

-- Minimum RCS venting requirements to prevent pressurization were not specified.

-- Reference points for vessel water level varied, potentially creating confusion.

ATTACHMENT 3

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 30, 1991

Docket Nos. 50-445
and 50-446

Mr. William J. Cahill, Jr.
Executive Vice President, Nuclear
TU Electric Company
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Dear Mr. Cahill:

SUBJECT: COMANCHE PEAK REVISION TO RCS WATER LEVEL FOR REDUCED INVENTORY CONDITIONS (TAC NO. 80235)

Your letter dated April 5, 1991, stated that TU Electric intended to revise the definition at which reactor coolant system (RCS) water level is considered to be at reduced inventory conditions. The new definition would establish reduced inventory at five feet below the reactor vessel flange, vice the current definition of three feet below the reactor vessel flange.

By letter dated June 11, 1991, the NRC staff notified you that since the current definition is part of your licensing basis and could affect the margins used to determine acceptability of operation of plant equipment during reduced inventory conditions, the staff would review your proposed change for acceptability. You were directed to retain the current definition of reduced inventory (three feet below the reactor vessel flange) until the staff completed its review.

Your letter dated July 29, 1991, stated that the intent of the April 5, 1991, letter was to inform the NRC of a commitment change and not to request a review and approval. Therefore, the April 5, 1991, letter was withdrawn, and a decision made by TU Electric to evaluate the commitment under 10 CFR 50.59.

The purpose of this letter is to acknowledge the withdrawal of the April 5, 1991, letter to revise the definition of reduced inventory condition for Comanche Peak

9110070287

bcc w/attachments:
R. Martin
L. Callan
A. Beach
D. Chamberlain
J. Gagliardo
H. Bundy
Region IV File

JAN - 8 1992

MEMORANDUM FOR: Martin J. Virgilio, Director, Project Directorate IV-2
Office of Nuclear Reactor Regulation (NRR)

FROM: Samuel J. Collins, Director, Division of Reactor Safety

SUBJECT: LICENSEE REDEFINITION OF REACTOR COOLANT SYSTEM LEVEL AT WHICH REDUCED INVENTORY OPERATING REQUIREMENTS ARE IMPOSED

The purpose of this memorandum is to request technical assistance in determining the adequacy of a licensee's 10 CFR Part 50.59 evaluation in support of reducing the reactor coolant system level for entering reduced inventory operating restrictions from 3 to 5 feet below the reactor vessel flange. The 3 feet number was established in Generic Letter 88-17, "Loss of Decay Heat Removal." The licensee's motivation for making this change was Westinghouse Technical Bulletin NSD-TB-87-02, Revision 2, "Head 'O' Ring Leakage," dated July 13, 1990. This change was recommended in the bulletin to avoid wetting the reactor vessel head "O" rings during head installation for reactors with the Comanche Peak-type reactor vessel internals design. Westinghouse considers any wetting of the "O" rings to be potentially detrimental. By changing the definition, the licensee avoids going to reduced inventory operating restrictions during head installation. It should be noted, however, that the redefined reduced inventory level now applies at all times and is not limited to operations involving head installation.

The Attachment 1 sketch illustrates the physical effect of this change. Attachment 2 is the pertinent pages of NRC Inspection Report 50-423/89-08 for Millstone 3 dealing with a similar redefinition of reduced inventory. Acceptance of this redefinition at Millstone 3 was apparently based on verbal concurrence by someone in NRR. The technical basis appeared to be that residual-heat removal air entrainment would not occur at the lower reactor coolant system level. Attachment 3 is a series of letters between TU Electric and the NRC on the subject of revision of the reactor coolant system level for entering reduced inventory conditions. The final NRC letter (September 30, 1991) stated that a review of the 10 CFR Part 50.59 evaluation supporting the lower reactor coolant system level for reduced inventory operating restrictions would be considered. This review was completed and documented in NRC Inspection Report 50-445/91-61; 50-446/91-61 for Comanche Peak (Attachment 4). This issue was documented as Unresolved Item 445/9161-01 pending further review of the technical basis supporting reduction of the reactor coolant system level at which reduced inventory operating restrictions are applied. Attachment 5 is the licensee's 10 CFR Part 50.59 evaluation supporting its redefinition of reactor coolant system reduced inventory from 3 to 5 feet below the reactor vessel flange.

The technical basis given at both Millstone 3 and Comanche Peak, Unit 1, appears to be that air entrainment in the residual-heat removal system will not occur at the lower value for reactor coolant system level. Although we agree that avoidance of air entrainment in the residual-heat removal system is

PIV:RI:TPS	C:TPS	D:DRS
FBundy/lb	JEGagliardo	SJCollins
01/ /92	01/ /92	01/ /92

a primary factor for establishing reduced inventory controls, we believe other factors should be considered when redefining the reduced inventory level. The licensee's 10 CFR Part 50.59 safety evaluation indicates that the minimum acceptable level to avoid air entrainment is only 5 inches above actual mid-loop. We believe the margin of safety associated with the time to boiling and core uncovery upon loss of decay heat removal capability should be considered. This time should be compared with the time required for containment closure to assure adequate margin exists. The results of this evaluation could affect the licensee's conclusions regarding no increase in probability of malfunction of equipment important to safety and no impact on the radiological consequences.

My staff has discussed this issue with certain NRR personnel and have received conflicting responses on the acceptability of redefining the reduced inventory level. We request that a Task Interface Agreement be developed to answer the following:

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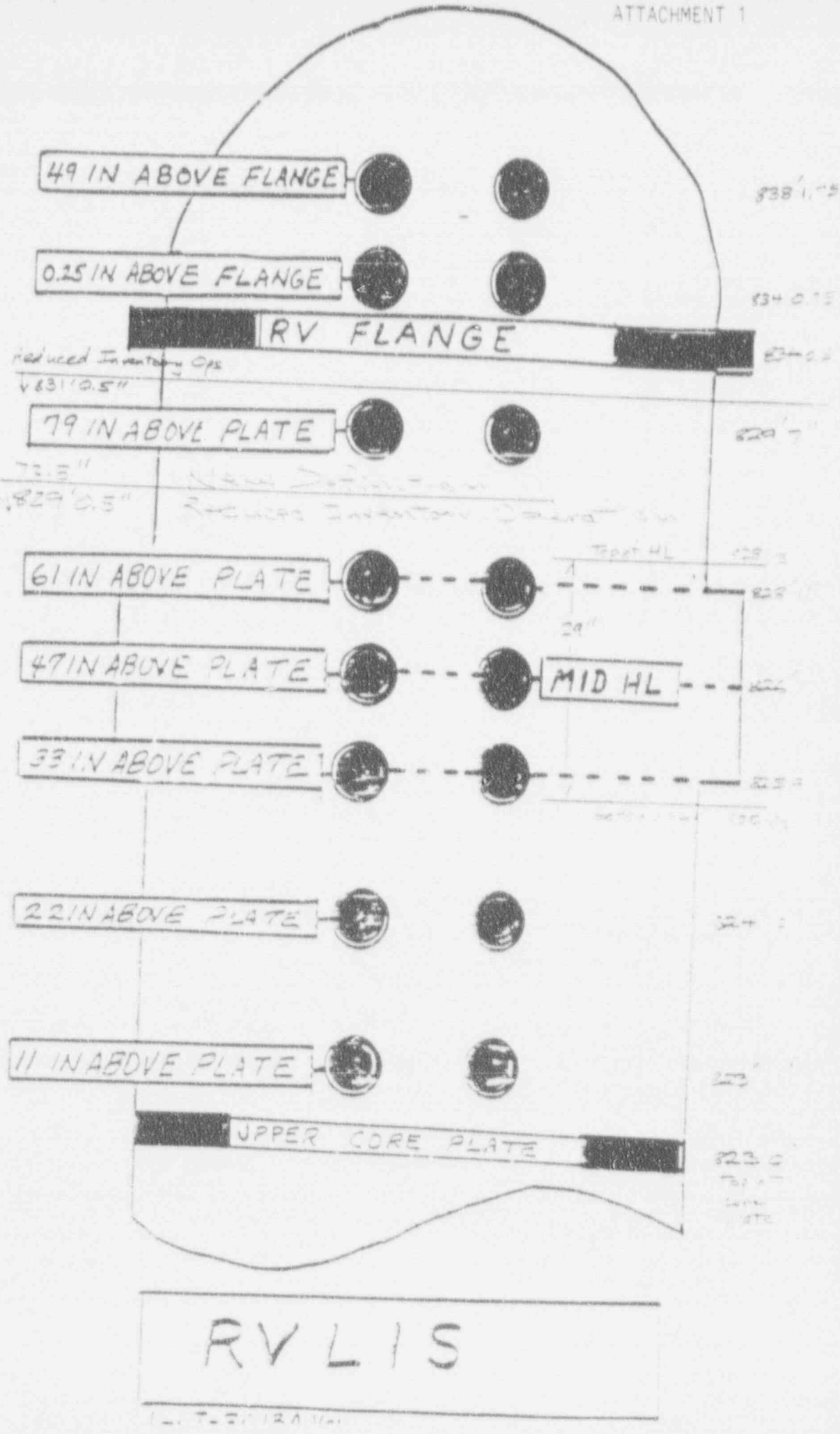
Samuel J. Collins, Director
Division of Reactor Safety

Attachments: As stated

cc w/attachments:
E. Rossi, NRR
C. Grimes, NRR
M. Hodges, Region I
A. Gibson, Region II
H. Miller, Region III
R. Zimmerman, Region V

ATTACHMENT 1



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

VIOU ~~Ltr~~
Specifics returned to our Voluntary #88-17 letter
here. Rick
R. M. KACICH
JUL 17 1989
RECEIVED
Rani
Not RNRS comment.

Docket/License: 50-423/NPF-49 JUL 12 1989

Northeast Nuclear Energy Company
ATTN: Mr. Edward J. Mroczka
Senior Vice President - Nuclear
Engineering and Operations Group
P.O. Box 270
Hartford, Connecticut 06101-0270

Gentlemen:

Subject: Millstone 3 Routine Inspection 50-423/89-08 (5/15/89 - 6/12/89)

The enclosed report refers to the routine resident safety inspection conducted on May 15 through June 12, 1989 at the Millstone Nuclear Power Station, Unit 3. The results of the inspection are described in the NRC Region I Inspection Report enclosed with this letter and were discussed with Mr. C. H. Clement of your staff at the conclusion of the inspection.

Your cooperation with us is appreciated.

Sincerely,

Edward C. Wenzinger, Chief
Projects Branch No. 2
Division of Reactor Projects

Enclosure: NRC Region I Inspection Report 50-423/89-08

cc w/encl:
W. D. Romberg, Vice President, Nuclear Operations
R. M. Kacich, Manager, Generation Facilities Licensing
D. O. Nordquist, Director of Quality Services
S. E. Scace, Station Superintendent
C. H. Clement, MP3 Superintendent
D. B. Miller, Station Superintendent, Haddam Neck
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Senior Resident Inspector
State of Connecticut

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No inadequacies were identified. The inspector had no further questions regarding the definition of reduced inventory operations as it related to the GL guidance. NRC review of other licensee actions in response to GL 88-17 are discussed further below.

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The following three procedures are in effect for draining the RCS, operating with the reduced inventory, and recovering from a loss of shutdown cooling. The inspector reviewed the revisions in effect and discussed with the licensee several inadequacies and areas for improvement. At the close of the inspection period, the licensee was evaluating changes to improve the procedures. The inspector noted that these procedures were used without incident during the mid-loop operations in February, 1989.

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-- Minimum RCS venting requirements to prevent pressurization were not specified.

-- Reference points for vessel water level varied, potentially creating confusion.

ATTACHMENT 3

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 30, 1991

Docket Nos. 50-445
and 50-446

Mr. William J. Cahill, Jr.
Executive Vice President, Nuclear
TU Electric Company
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Dear Mr. Cahill:

SUBJECT: COMANCHE PEAK REVISION TO RCS WATER LEVEL FOR REDUCED INVENTORY CONDITIONS (TAC NO. 80235)

Your letter dated April 5, 1991, stated that TU Electric intended to revise the definition at which reactor coolant system (RCS) water level is considered to be at reduced inventory conditions. The new definition would establish reduced inventory at five feet below the reactor vessel flange, ce the current definition of three feet below the reactor vessel flange.

By letter dated June 11, 1991, the NRC staff notified you that since the current definition is part of your licensing basis and could affect the margins used to determine acceptability of operation of plant equipment during reduced inventory conditions, the staff would review your proposed change for acceptability. You were directed to retain the current definition of reduced inventory (three feet below the reactor vessel flange) until the staff completed its review.

Your letter dated July 29, 1991, stated that the intent of the April 5, 1991, letter was to inform the NRC of a commitment change and not to request a review and approval. Therefore, the April 5, 1991, letter was withdrawn, and a decision made by TU Electric to evaluate the commitment under 10 CFR 50.59.

The purpose of this letter is to acknowledge the withdrawal of the April 5, 1991, letter to revise the definition of reduced inventory condition for Comanche Peak

9110070287

Steam Electric Station. Further review of this item may be considered by the NRC staff during an onsite review of the application of 10 CFR 50.59.

This completes all actions for TAC No. 80235.

Sincerely,

Thomas A. Bergman, Acting Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

cc: See next page

cc:
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 1029
Granbury, Texas 76048

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
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Arlington, Texas 76011

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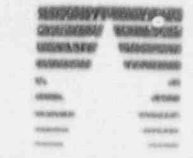
Chief, Texas Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, Texas 78756

Honorable Dale McPherson
County Judge
P.O. Box 851
Glen Rose, Texas 76043



TU ELECTRIC

Log # TXX-91253
File # 10110
10035 (GL 88-17)

July 29, 1991

William J. Cahill, Jr.
Executive Vice President

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
REVISION TO RCS WATER LEVEL FOR REDUCED
INVENTORY CONDITIONS
LETTER WITHDRAWAL

REF: 1) TU Electric letter from William J. Cahill, Jr., to NRC dated April 5, 1991
2) NRC letter from George F. Dick, Jr., to William J. Cahill, Jr., dated June 11, 1991

Gentlemen:

In reference (1), TU Electric informed the NRC of a commitment change. The Reactor Coolant System (RCS) water level at which reduced inventory conditions are set was being reduced. In reference (2), the NRC staff informed TU Electric that the commitment change was being reviewed for acceptability and that TU Electric should retain the existing definition for reduced inventory conditions until this review is complete.

The intent of reference (1) was to inform the NRC of the commitment change and not to request a review or approval. To avoid an unnecessary review, TU Electric withdraws reference (1) and submits its regrets for any inconvenience that reference (1) may have caused.

The change in RCS water level which defines reduced inventory conditions is being evaluated as prescribed by 10CFR50.59. The change will be made if the requirements of 10CFR50.59 are met. Since reference (1) has been withdrawn, the NRC will be informed of the change via the 10CFR50.59 annual summary report.

Sincerely,

William J. Cahill, Jr.

BSD/grp

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (2)
Mr. T. A. Bergman, NRR

9108020207

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

June 11, 1991

Docket No. 50-445

Mr. William J. Cahill, Jr.
Executive Vice President, Nuclear
TU Electric Company
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Dear Mr. Cahill:

SUBJECT: COMANCHE PEAK REVISION TO RCS WATER LEVEL FOR REDUCED INVENTORY CONDITIONS

Your letter dated April 5, 1991, stated that TU Electric intended to revise the definition at which reactor coolant system (RCS) water level is considered to be at reduced inventory conditions. The new definition would establish reduced inventory at five feet below the reactor vessel flange, vice the current definition of three feet below the reactor vessel flange.

Since the current definition is part of your licensing basis, and could affect the margins used to determine acceptability of operation of plant equipment during reduced inventory conditions, the NRC staff is reviewing your intended change for acceptability. We will provide you with the results of this review when complete. You should retain your current definition of reduced inventory (three feet below the reactor vessel flange) until the staff completes its review. If you have any questions, contact Jim Clifford, (301) 492-1323.

Sincerely,

George F. Dick, Jr., Acting Director
Project Directorate IV-2
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

cc: See next page

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TUELECTRIC

Log # TXX-91127
File # 10010
10035
Ref. # GL 88-17

William J. Cahill, Jr.
Executive Vice President

April 4, 1991

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
REVISION TO RCS WATER LEVEL FOR REDUCED INVENTORY CONDITIONS

REF: 1) Generic Letter 88-17, Loss of Decay Heat Removal, dated October 17, 1988

2) Millstone 3 NRC Region I Inspection Report 50-423/89-08, dated July 12, 1989

Gentlemen:

Generic Letter 88-17 (Reference 1) states that a "reduced inventory condition" exists when the Reactor Coolant System (RCS) water level is lower than three feet below the reactor vessel flange. The definition of reduced inventory condition was not specifically addressed in the TU Electric responses to the Generic Letter, thus indicating implicit acceptance. However, based on additional considerations described below, TU Electric has decided to change this definition to state that a reduced inventory condition exists when the RCS water level is lower than five feet below the reactor vessel flange.

Westinghouse Technical Bulletin, NSD-TB-87-02, Rev. 2, dated July 13, 1990, provides recommendations for prevention of reactor vessel head "O" ring leakage. One of the recommendations, for plants with the "inverted top hat" support plate upper internals design, is to reduce the reactor vessel water level during vessel head closure activities. The level recommended is lower than the level defined by Generic Letter 88-17 as reduced inventory conditions. Since entry into reduced inventory conditions imposes significant operational restrictions, the Westinghouse Bulletin suggests that an exception to the "three feet below the flange" GL 88-17 definition is justified. This is based on the low probability of losing decay heat removal capability due to air entrainment in the Residual Heat Removal (RHR) pumps when RCS level is above the top of the RCS hot legs (approximately six feet below the flange).

The results of the CPSES RHR vortex testing, conducted on CPSES Unit 1 in May, 1989, support this Westinghouse statement. During the vortex testing, RHR flow was increased to the point of excessive air entrainment based on a number of conservative criteria at each of four different levels within the RCS hot legs.

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The results demonstrate that at RHR pump vendor curve runout flow (5500 gpm) the minimum acceptable level is five inches above the actual mid-loop level (mid-loop is at 85.5 inches below the vessel flange). At RHR flows more representative of those expected during reduced inventory conditions, the minimum acceptable level to prevent excessive air entrainment is even lower. For example, at 2200 gpm, a level of 85.5 inches below the flange or higher is sufficient to prevent excessive air entrainment.

Based on the above, TU Electric has decided to revise the RCS water level at which reduced inventory conditions are set to lower than five feet below the reactor vessel flange. This level would provide a 20.5 inch margin above the level which vortex data indicate is acceptable to prevent excessive air entrainment for any RHR pump flow below vendor curve runout. Defining the reduced inventory level as lower than five feet below the vessel flange is also consistent with the definition accepted by the NRC for at least one other Westinghouse plant of similar design (Reference 2).

Should you have any questions in this matter please contact Bob Dacko at (214) 812-8223.

Sincerely,

William J. Cahill, Jr.

BSD/bsd

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (3)
Mr. J. N. Clifford, NRR
Mr. A. Fields, NRR

ATTACHMENT 4

DEC 17 1991

Docket Nos. 50-445
50-446
License No. NPF-87
Construction Permit No. CPPR-127

TU Electric
ATTN: W. J. Cahill, Jr., Executive
Vice President, Nuclear
Skyway Tower
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Gentlemen:

SUBJECT: NRC INSPECTION REPORT NOS. 50-445/91-61; 50-446/91-61

This refers to the inspection conducted by Mr. H. F. Bunay of this office on November 18-22, 1991. This inspection included a review of activities authorized for your Comanche Peak Steam Electric Station, Units 1 and 2, facilities. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

The area examined during the inspection dealt with review of programmed enhancements in response to Generic Letter 88-17, "Loss of Decay Heat Removal."

Within the scope of the inspection, no violations or deviations were identified. An unresolved item involving the licensee's redefinition of the reactor coolant system level for reduced inventory conditions is discussed in paragraph 2.2.2 of the Appendix.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Original Signed By
A. B. Beach

A. Bill Beach, Director
Division of Reactor Projects

RIV:RI:TPS	D:TPS	D:DRS	D:DRP	
HBunay/cjg	HSeidle	BCollins	ABBeach	
12/6/91	12/6/91	12/6/91	12/17/91	

9112240091

Enclosure:
Appendix - Inspection Report
50-445/91-61
50-446/91-61

cc w/enclosure:
TU Electric
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Honorable Dale McPherson
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Texas Radiation Control Program Director
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bcc w/enclosure:
bcc to DMB (IE01)

bcc distrib. by RIV:

*R. D. Martin
*DRP
*Section Chief (DRP/B)
*DRSS-RPEPS
*MIS System
*RIV Files
*M. Bunay
*J. E. Gagliardo

*Resident Inspector (2)
*DRS
*Project Engineer (DRP/B)
Lisa Shea, RM/ALF
*RSTS Operator
*W. G. Wyon, NRR (8E23)

*w/766

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report Nos. 50-445/91-61; 50-446/91-61

Operating License No. NPF-87

Construction permit No. CPPR-127

Licensee: TU Electric
400 North Olive Street, L.B. 81
Dallas, Texas 75201

Facility Name: Comanche Peak Steam Electric Station (CPSES)

Inspection At: CPSES, Glen Rose, Texas

Inspection Conducted: November 18-22, 1991

Inspector: H. F. Bundy, Reactor Inspector, Test Programs Section
Division of Reactor Safety

Approved: _____
J. E. Gagliardo, Chief, Test Programs Section
Division of Reactor Safety

_____
Date

Inspection Summary

Inspection Conducted November 18-22, 1991 (Report 50-445/91-61)

Area Inspected: Routine, announced inspection of the licensee's programmed enhancements in response to Generic Letter (GL) 88-17, "Loss of Decay Heat Removal."

Results: The licensee's actions were responsive to GL 88-17 programmed enhancement recommendations. The licensee's program exhibited the following strengths:

- Reactor coolant system (RCS) status and residual heat removal (RHR) performance monitoring instrumentation was user friendly in that it was mostly clustered on one panel in the main control room.
- The RCS level readings were noted by the inspector to be accurate while the RCS level was at mid-loop.
- The RCS status and RHR performance monitoring instrumentation was diverse and redundant with appropriate alarms available in the main control room.

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- Administrative procedures and controls were comprehensive and well organized.

- Sufficient equipment had been dedicated procedurally for emergency RCS makeup and core cooling.

- The analyses, which supported reduced inventory operating procedures and equipment configuration, were comprehensive and clear.

- The licensee's actions to minimize RCS perturbations during reduced inventory operations were comprehensive, particularly in the areas of training and outage management.

The following inspector observations were provided to the licensee for consideration for possible further improvement of the subject program:

- There was an apparent need for [illegible] administrative controls for the installation and maintenance of temporarily installed hoses based on a poorly routed Tygon vent hose identified during the plant walkdown.

- Consideration should be given to install trending capability for RHR pump motor current, RHR pump suction pressure, and RCS level as suggested by GL 88-17.

- The procedure for responding to RHR system malfunctions (ABN-103A) was complex and difficult to follow.

At the exit meeting, licensee representatives indicated that they would consider the above observations in completing their enhancement program. They had already taken some actions as discussed in paragraph 2.2. The inspector found the programmed enhancement actions completed by the licensee to be of high quality. No violations or deviations were identified. An unresolved item (445/9161-01) involving the licensee's redefinition of the RCS level for reduced inventory conditions is discussed in paragraph 2.2.2.

Inspection Conducted November 8-22, 1991 (Report 50-445/91-41)

Areas Inspected: No inspection of Unit 2 was performed.

Results: Not applicable.

DETAILS

1. PERSONS CONTACTED

TU ELECTRIC

*J. Donahue, Manager, Operations
*W. Guldemond, Manager, Site Licensing
*B. Lancaster, Manager, Plant Support
*J. LaMarca, Manager, Technical Programs
*D. Davis, Manager, Plant Analysis
*M. Palmer, Manager, Event Analysis
*S. Palmer, Stipulation Manager
*R. Cole, Manager, Reactor Engineering
*W. Rosette, Station Nuclear Engineering Supervisor
*J. Jank, Unit Supervisor
M. Oliver, Professional Staff Training Supervisor
R. Colde, Simulator Training Supervisor
*N. Harris, Senior Licensing Specialist
*J. Meyer, Principal Engineer, Plant Engineering
*O. Bhatty, Site Licensing

CASE

*O. Thero, Consultant

NRC

*W. Johnson, Senior Resident Inspector

The inspector also interviewed other licensee employees during the inspection.

*Denotes those attending the exit meeting on November 12, 1991.

2. PROGRAMMED ENHANCEMENTS IN RESPONSE TO GENERIC LETTER 88-17, LOSS OF DECAY HEAT REMOVAL, TI 2515/109

2.1 Generic Letter 88-17 Recommendations and Inspection Scope

Generic Letter (GL) 88-17 provided recommended licensee actions to prevent and, if necessary, to respond to loss of decay heat removal (DHR) during operations with the reactor coolant system (RCS) partially drained.

Recommendations were made by GL 88-17 in two categories:

- Expeditious actions, which were to be implemented prior to operating in reduced inventory conditions, and

- Programmed enhancements, which were to be developed in parallel with the expeditious actions and were to replace, supplement, or add to the expeditious actions.

The NRC's review of the licensee's expeditious actions was documented in NRC Inspection Report 50-445/89-90. The purpose of this inspection was to ascertain completion of programmed enhancements. For the purpose of future reference, the programmed enhancement recommendations are briefly paraphrased below (to avoid confusion, the numbers are identical to similar items contained in GL 88-17).

Programmed Enhancements

(1) Instrumentation

Provide reliable indications of parameters that describe the state of the RCS and the performance of systems normally used to cool the RCS for both normal and accident conditions. At a minimum, provide the following in the control room:

- Two independent RCS level indications;
- At least two independent temperature measurements representative of the core exit temperature whenever the reactor vessel (RV) head is located on top of the RV;
- The capability of continuously monitoring DHR system performance whenever a DHR system is being used for cooling the RCS; and
- Visible and audible indications of abnormal conditions in temperature, level, and DHR performance.

(2) Procedures

Develop and implement procedures that cover reduced inventory operation and that provide an adequate basis of entry into a reduced inventory condition. These include:

- Procedures that cover normal operation of the nuclear steam supply system (NSSS), the containment, and supporting systems under conditions for which cooling would normally be provided by DHR systems;
- Procedures that cover emergency, abnormal, off-normal, or the equivalent operations of the NSSS, the containment, and supporting systems if an off-normal condition occurs while operating under conditions for which cooling would normally be provided by DHR systems; and

- Administrative controls that support and supplement the procedures and all other actions identified in this communication, as appropriate.

(3) Equipment

- Provide equipment of high reliability for cooling the RCS and avoiding loss of RCS cooling;
- Maintain equipment available to mitigate loss of DHR or loss of RCS inventory should either occur, including at least one high-pressure injection pump and one other system, each sufficient to keep the core covered; and
- Provide adequate equipment for personnel communications involving activities related to the RCS or systems necessary to maintain the RCS in a stable and controlled condition.

(4) Analyses

Conduct analyses to supplement existing information and develop a basis for procedures, instrumentation installation and response, and equipment/NSSS interactions and response.

(5) Technical Specifications (TS)

TS that restrict or limit the safety benefit of the actions identified in this letter should be identified, and appropriate changes should be submitted.

(6) Reactor Coolant System (RCS) Perturbations

Reexamine item (5) of the expeditious actions and refine operations as necessary to minimize the likelihood of loss of DHR.

3.2 <u>Licensee's Actions in Response to GL 88-17 Programmed Enhancement Recommendations (TI 2515/103)</u>

The inspectors' comments on the licensee's actions are provided below.

The Attachment is a tabulation of related documents reviewed by the inspectors. The document numbers used in this section are those assigned to the document in the Attachment. In addition to reviewing the listed documents and interviewing appropriate personnel, the inspector walked down installed instrumentation and equipment. The terms DHR and residual heat removal (RHR) may be considered synonymous.

The inspector reviewed the licensee's responses to GL 88-17 and the NRC followup questions, which were reflected in Documents 1 to 9. The inspector found the licensee's actions to be responsive to the GL 88-17 program enhancement recommendations. The licensee's program exhibited strengths in the following areas:

- Instrumentation - The RCS status and RHR performance monitoring instrumentation was user friendly in that it was mostly clustered on one panel in the main control room. The instruments for measuring the significant parameters were diverse and redundant with appropriate alarms available in the main control room. The inspector noted that the RCS level indications were accurate when the RCS level was at mid-loop.

- Procedures - The procedures and administrative controls were comprehensive and well organized. The prerequisites and limitations in the procedure for reduced inventory operations (Document 15) were extensive and appropriate.

- Equipment - Sufficient equipment had been dedicated for emergency RCS makeup and core cooling. The flow paths had been adequately evaluated. The inspector noted that the centrifical charging pumps (CCPs), safety injection pumps (SIPs), safety injection (SI) accumulators, and the refueling water storage tank (RWST) were procedurally required to be available for emergency RCS makeup during reduced inventory operations.

- Analyses - The supporting analyses for operating procedures and equipment configuration were comprehensive and clear. They adequately supported all postulated operating configurations.

- Minimizing RCS Perturbations - The reduced inventory operating procedure appeared to be effective in minimizing RCS perturbations. As a part of outage planning, the licensee had established a risk assessment task force. They had made an assessment of the preliminary outage schedule and identified some unacceptable risks. The final schedule had been modified to remove these risks. A risk assessment team also reviewed the outage schedule and activities on a daily basis to identify unacceptable risks. The inspector noted that all personnel who might be involved in activities with the potential to perturb the RCS had received classroom training in mid-loop operations.

The inspector provided the following observations to licensee management for consideration for possible further improvement of the enhancement program:

- Installation and surveillance procedures for temporary vent hoses - During a walkdown, the inspector noted that the Tygon vent hose for the pressurizer had pinch points and a loop seal in which there was condensate. The licensee was notified and immediate action was taken to correct the routing. The licensee also issued

condition report (Document 10) to generate appropriate corrective action to prevent recurrence. There appeared to be no effect on the RCS level reading, because the pressurizer manway was removed at the time. At the exit meeting, a licensee representative stated that more stringent installation and surveillance procedures were being developed for temporary vent hoses.

- Trending of Mid-Loop Operating Parameters - The licensee could trend most mid-loop operating parameters with the process computer. However, it was unable to trend readings from recently installed instruments such as RHR pump motor current, RHR pump suction pressure, and RCS level. Trends of these parameters were considered as valuable information in GL 88-17. The operations manager stated at the exit meeting that trending of these parameters was being studied.

- Enhancement of Abnormal Operating Procedures - Although the inspector considered the procedure for responding to RHR system malfunctions (Document 17) adequate, it was complex and difficult to follow. The operator would have to make a partial assessment of the event before he would know which section of the procedure to enter. A licensee representative stated that enhancement of this procedure had been planned.

A more detailed discussion of the six areas of programmed enhancements is given in the following subparagraphs.

2.2.1 Instrumentation

2.2.1.1 Level Instrumentation

There were wide- and narrow-range digital instruments for RCS level on a panel in the main control room. In addition, RCS level could be determined from a Tygon hose sight gauge in containment. During a walkdown with the RCS at mid-loop level, the inspector observed that the level instrumentation was accurate. The control board instruments had identical readings. The Tygon hose sight gauge was reading approximately 1.5 inches lower. This was within the expected accuracy range. There were mimics, both in the procedure and on the control panel, to advise the operator of desired operating levels. The levels were referenced to both plant elevation and height above mid-loop of the hot leg. In addition, a heated junction thermocouple level indicating system gave discreet point level readings at heights of 11 inches above the upper core plate to 49 inches above the RV flange. The diversity and redundancy of these systems met the intent of GL 88-17 for RCS level indication.

The inspector found the installation of RCS level instruments was generally of high quality. However, he noted that a Tygon vent hose for the pressurizer had pinch points and a loop partially filled with condensate. Upon

notification, the licensee's operations staff took immediate action to reroute the hose and initiated a condition report (Document 10) to generate actions to prevent recurrence. The inspector observed that the RCS level readings were not affected because the pressurizer manway had been removed to provide a hot-leg vent path as required by the steam generator nozzle dam installation procedure. At the exit meeting, a licensee representative stated that improved installation and surveillance procedures for temporary vent hoses were being developed.

2.2.1.2 Core Exit Temperature (CET) Monitoring

The licensee's reduced inventory operating procedure required at least 2 CET monitors with the head on the RV. The readings were displayed on a CRT and had alarm setpoints. The licensee had made provisions for temporary hookups, if necessary. The procedure did not allow going to reduced inventory with the RV head removed. The inspector observed that the licensee should consider alternate temperature monitoring if it should decide to allow future reduced inventory operation with the head removed.

2.2.1.3 Residual Heat Removal (RHR) System Monitoring

Most RHR performance monitoring indications were available at one instrument panel in the main control room. Among the parameters monitored were flow, RHR pump suction and discharge pressure, RHR heat exchanger inlet and outlet temperature, hot-leg temperature, RHR pump motor current, and RHR valve misalignments. The inspector observed that these instruments should provide a good reflection of RHR system performance.

2.2.1.4 Visible and Audible Indications of Abnormal Conditions

There were visual and audible alarms clustered at the main control board for all important RCS status and RHR performance monitoring parameters. Among these alarms were RCS low level, RHR pump low-suction pressure, and RHR pump motor current fluctuation. The licensee could trend most other parameters, but did not have instrumented trending capability for these three parameters. The inspector pointed out that trends of these parameters is considered valuable information in GL 88-17. A licensee representative noted at the exit meeting that the trending of these parameters on the process computer was being studied.

2.2.2 Procedures

The administrative procedures and controls were comprehensive and well organized. The prerequisites and limitations in the procedure for reduced inventory operations (Document 3) were extensive and appropriate. It required refresher training for operations, maintenance, planning, work control, and test department personnel who would be involved in reduced inventory operations. Adequate communication equipment was required to be

operational. The shift relief review checklist required recording the time to reach saturation following a loss of RHR. Containment integrity was adequately monitored. Completion of a prerequisite checklist was required every 12 hours when the plant was at reduced inventory.

During review of the procedure for reduced inventory operations, the inspector noted that the RCS level defining reduced inventory conditions was approximately 5 feet below the RV flange. The RCS level specified in GL 88-17 for reduced inventory conditions is 3 feet below the RV flange. The licensee had redefined reduced inventory level because of a concern with potential wetting of the reactor vessel head "O" rings during installation of the head. This would allow head installation at a reduced level without instituting reduced inventory controls. The licensee had supported the lower RCS level by completion of a 10 CFR Part 50.59 evaluation (Document 12), which concluded that it would not impact nuclear safety. Several letters (Documents 6 to 9) had been exchanged between the licensee and the NRC on this issue. The final NRC letter (Document 9) acknowledged that the licensee would make this change to a previous commitment based on a 10 CFR Part 50.59 evaluation. Document 9 concluded that further review of this issue would be considered during this inspection.

Based on the available information, the inspector could not confirm the licensee's conclusion that the lower RCS level for entering reduced inventory controls had no impact on margin of safety or probability of malfunction of equipment important to safety. It appeared that the new level for reduced inventory controls had been instituted with NRC knowledge at one other facility. The acceptability of redefining the reduced inventory level is unresolved pending further review by the NRC. Also, the process for notifying the NRC when commitments are changed using the 10 CFR Part 50.59 program will be reviewed. These issues remain unresolved pending further review and inspection. (Unresolved Item 445,446/9161-01).

Although the inspector considered the procedure for responding to RHR system malfunctions (Document 17) adequate, it was complex and difficult to follow. The operator would have to make a partial assessment of the event before he would know which section of the procedure to enter. A licensee representative stated that enhancement of this procedure had been planned.

2.2.3 Equipment

Sufficient equipment had been dedicated for emergency RCS makeup and core cooling. The flow paths had been adequately evaluated. The inspector noted that the CCPs, SIPs, SI accumulators, and the RWST were procedurally required to be available for emergency RCS makeup during reduced inventory operations. The inspector noted that a considerable portion of the RWST inventory was unavailable for gravity feed because of the relatively low elevation of the RWST with respect to the RCS. The reduced inventory procedure required maintenance of an adequate liquid level in the RWST to provide gravity flow capability.

2.2.4 Analysis

The supporting analyses for operating procedures and equipment configuration were comprenensive and clear. They adequately supported all postulated operating configurations. The inspector noted that several recent analyses were actually prepared in response to NUREG 1410 (Vogtle event). However, they were responsive to GL 88-17 issues. To assess the adequacy of the licensee's calculations, the inspector reviewed portions of Documents 12 through 14, and 18 through 33.

2.2.5 Technical Specifications (TS) Changes

The only TS change made in response to GL 88-17 was transmitted from NRR by Document 34. It involved deletion of the automatic closure interlock (ACI) for the RHR system isolation valves. Consideration of this change was recommended in GL 88-17. It was supported by a generic Westinghouse technical evaluation.

2.2.6 Reactor Coolant System (RCS) Perturbations

The reduced inventory operating procedure appeared to be effective in minimizing RCS perturbations. As a part of outage planning, the licensee had established a risk assessment task force. They had made an assessment of the preliminary outage schedule and identified some unacceptable risks. The final schedule had been modified to remove these risks. A risk assessment team also reviewed the outage schedule and activities on a daily basis to identify unacceptable risks. The inspector noted that all personnel who might be involved in activities with the potential to perturb the RCS had received classroom training in mid-loop operations.

The inspector was aware that an apparent lapse in work controls occurred on November 8, 1991. As a result of removing a bonnet on a feedwater valve with the steam generator secondary manways removed, a containment breach occurred during core alterations. It was immediately closed. The inspector reviewed the condition report on this event (Document 11). The condition report should assure that appropriate corrective action is taken.

In reviewing the lesson plans and training records, the inspector observed that the operators had received simulator training on mid-loop operations. A scenario involving loss of offsite power while at mid-loop conditions should have been particularly instructive.

3. EXIT MEETING

The inspector met with licensee representatives denoted in paragraph 1 on November 22, 1991, and summarized the scope and findings of this inspection. The licensee did not identify, as proprietary, any of the material provided to, or reviewed by, the inspector during this inspection. Mr. D. D. Chamberlain (NRC) discussed Unresolved Item 445/9161-01 (paragraph 2.2.2) with Mr. R. D. Walker (TU Electric) on December 12, 1991, during a site visit.

ATTACHMENT

Documents Reviewed

1. Letter TXX-89041, TU Electric to NRC, "CPSES Response to GL 88-17 - Loss of DHR," dated February 10, 1989

2. Letter TXX-89282, TU Electric to NRC, "CPSES Updated Response to GL 88-17," dated June 1, 1989

3. Letter, NRC to TU Electric, "Comments on TU Electric Company Response to GL 88-17 with Respect to Expeditious Actions for Loss of DHR for CPSES," dated June 27, 1989

4. Letter TXX-89084, TU Electric to NRC, "CPSES Updated Response to GL 88-17," dated November 20, 1989

5. Letter TXX-90169, TU Electric to NRC, "Revised Response to GL 88-17, Loss of DHR," dated May 2, 1990

6. Letter TXX-91127, TU Electric to NRC, "Revision to RCS Water Level for Reduced Inventory Conditions," dated April 5, 1991

7. Letter, NRC to TU Electric, "Comanche Peak Revision to RCS Water level for Reduced Inventory Conditions," dated June 11, 1991

8. Letter TXX-91253, TU Electric to NRC, "Revision to RCS Water Level for Reduced Inventory Conditions Letter Withdrawal," dated July 29, 1991

9. Letter, NRC to TU Electric, "CPSES Revision to RCS Water Level for Reduced Inventory Conditions," dated September 30, 1991

10. ONE Form FX91-1535, "Vent Hose From Valve 1-RC-8009R Improperly Routed," dated November 20, 1991

11. ONE Form FX91-1440, "Breach of Containment During Core Alterations Caused by Repair Work on Valve CFW-0090," dated November 6, 1991

12. Evaluation SE-91-86 (10CFR50.59), "Redefinition of RCS Reduced Inventory From Three Feet to Five Feet Below RV Flange," dated September 11, 1991

13. Westinghouse Technical Bulletin NSD-TB-87-02, Revision 2, "Head "O" Ring Leakage," dated July 13, 1990

14. Procedure IPO-TP-89A-1, Revision 0, "RCS Mid-Loop Operations/Vortex Testing," completed May 29, 1989

15. Procedure IPO-010A, Revision 4, PCN 1, "RCS Reduced Inventory Operations," effective November 13, 1991

16. Form ODA-308-26, Revision 0, "Standard LOCAR Containment Integrity"

17. Procedure ABN-104A, Revision 4, PCN 3, "RHR System Malfunction," effective October 4, 1991

18. Calculation ME-CA-0250-2149, Revision 0, "Time to Core Uncovery Upon a Loss of DHR Capability During Mid-Loop Operations - Input to Procedure IPO-010A," prepared February 7, 1990

19. Memorandum CPSES-9119765, L. A. Wojcik to Dean Palmer, "NUREG 1410," dated August 12, 1991

20. Memorandum CPSES-9009301, D. Hiltbrand to File, "GL 88-17, Loss of DHR," dated April 9, 1990

21. Calculation ME-CA-0000-3111, Revision 0, "Containment Thermal Environment Due to a Loss of RHR During Mid-Loop Operations," approved August 27, 1991

22. Calculation ME-CA-0250-2155, Revision 0, "Radiological Consequences of a Loss of RHR, GL 88-17," approved April 6, 1990

23. Memorandum CPSES-9128798, J. A. Meyer to J. T. Jank, "Hot Leg Vent Path," November 8, 1991

24. Letter WPT-14019, Westinghouse Electric Corporation to TU Electric, "Loss of RHR Cooling in Reduced Inventory," dated October 17, 1991

25. Calculation ME-CA-0250-2139, "Requirements for Use of Hot Leg Vent Paths During Mid-Loop Operations With a Cold Leg Opening," approved March 13, 1990

26. Calculation 600, "Calculation of Loop and Density Errors During Mid-Loop Operation for the RV Level Measurement," reviewed August 3, 1989

27. Memorandum CPSES-9009504, R. C. Hagar to J. Donahue, "Calculations for Mid-Loop Operations," dated April 11, 1990

28. Calculation ME-CA-0250-2191, Revision 0, "SIP and CCP Flows Following a Loss of RHR Cooling During Mid-Loop Operations," approved April 9, 1990

29. Calculation ME-CA-0260-0079, Revision 0, "RWST Gravity Drain to RCS During Mid-Loop Operations," approved May 15, 1991

30. Letter WPT-11930, Westinghouse Electric Corporation to TU Electric, "CPSES Mid-Loop Calculations," dated August 25, 1989

31. Memorandum CPSES-9009308, R. C. Hagar to J. Donahue, "Calculations for Mid-Loop Operations," dated April 6, 1990

32. Memorandum CPSES-9028965, B. W. Wieland to D. Palmer, "Emergency Closure of Equipment Hatch," dated December 13, 1990

33. Technical Evaluation TE-MM-90-2671, "Technical Evaluation of Equipment Hatch Emergency Closure with Reduced Number of Bolts Installed," approved November 28, 1990

34. Letter, NRC to TU electric, "CPSES, Unit 1 - Amendment No. 4 to Facility Operating License No. NPF-87," dated October 8, 1991

35. Lesson Plan (LP) EM3B.D91.IR3, "Mid-Loop Operations (IPO-10A)," approved August 20, 1991, and presentation records for September 25 to October 3, 1991

36. LP MM3B.D91.IR1, "Continuing Training Third Quarter 91/Mid-Loop Operations," approved June 12, 1991, and presentation records for June 24 to July 29, 1991

37. LP GFI1.RHR.X01, "Reduced Inventory Operations Refresher," approved March 18, 1991, and presentation records for April 11 to September 19, 1991

38. LP L021.SM4.X01.LP001, "Mid-Loop Operations - Simulator Classroom," approved February 19, 1990, and presentation records for November 9, 1990, to November 8, 1991

39. LP L024.SM4MUB, "Mid-Loop Operations - Simulator Training," approved October 27, 1991, and presentation records for October 1 to November 8, 1991

40. LP L041A92.OP1, "Mid-Loop Operations," approved August 1, 1991, and presentation records for August 9 to September 12, 1991

41. LP L044A92AE2, "Mid-Loop Operations - Simulator Training," approved July 25, 1991, and presentation records for August 6 to September 9, 1991

42. LP ET2BMLOR1, "Mid-Loop Operations," approved August 1, 1991, and presentation records for August 12 to September 27, 1991

10CFR50.59 Screen

Activity (include the number and revision of the document being screened)

Redefinition of RCS reduced inventory from three feet to five feet below the RV flange.

I. Screening Questions

	YES	NO
1. Will implementation of the proposed activity result in a test or experiment not described in the Licensing Basis Documents?	____	✓
2. Will implementation of the proposed activity change the facility as described in the Licensing Basis Documents?	____	✓
3. Will implementation of the proposed activity change the procedures as described in the Licensing Basis Documents?	✓	____

If question 1, 2, or 3 is answered YES, then an evaluation is required.

SE No. SE-91-86

4. Will implementation of the proposed activity involve a change to the Technical Specification?	____	✓

If question 4 is answered YES, then process a Technical Specification Change in accordance with STA-120.

II. List the documents reviewed, including section or page numbers where relevant information was found.

TXX-89041 dated 2/10/89
Generic Letter 88-17, Enclosure 3, page 4
IAO-01CA, Reactor Coolant System Mid Loop Operations, Rev. 5, pgs. 1-3

III. If the conclusion of the screen is that an evaluation is not required, then provide an overall justification for that determination.

Not applicable.

IV. Review and Approval

Preparer: [signature] Date: 9/11/91

Reviewer: C.K. Smith CNS/FSAR Date: 9/11/91

10 CFR 50.59 EVALUATION

Evaluation No. SE-91-86 Rev. No. 0 CPSES Unit 1

Activity Title: Redefinition of RCS reduced inventory from three feet to five feet below the RV flange.

Summary: Currently, RCS reduced inventory is defined as three feet or more below the top of the Reactor vessel flange by GL 88-17 and Section 1.0 of EPO-010A. This activity involves revising this definition to five feet or more below the top of the flange which will slightly delay or eliminate entry into certain procedural requirements during certain plant evolutions such as Reactor Vessel assembly.

Based upon the results of this evaluation, implementation of the proposed activity:

✓ Does not involve an Unreviewed Safety Question.

_____ Involves an Unreviewed Safety Question.

_____ Requires an amendment to the Technical Specifications.

John W. Meyer Preparer	9/11/91 Date
P.K. Feist C.K. Feist 10 CFR 50.59 Reviewer	9/11/91 Date
91-067 SORC Meeting Number	9-11-91 Date
W.R. Bs SORC Chairman	9-11-91 Date

10 CFR 50.59 EVALUATION

Evaluation No. SE-91-86 Rev. No. 0 CPSES Unit 1

NOTE: A written response providing the basis for the answer to each line item in parts I, II, III, and IV below must accompany this form.

I. BACKGROUND INFORMATION

1. Describe the activity and explain why the activity is being proposed.
   See attachment.
2. Identify the structures, systems, or components and/or system parameters that could be affected by implementation of the activity.
   See attachment.
3. Identify the credible potential failure modes for the affected structure, system, or component, that could be introduced by implementation of the activity.
   See attachment.
4. List the documents from which information was taken to complete this evaluation.
   See attachment

II. EFFECT ON ACCIDENTS AND MALFUNCTIONS EVALUATED IN THE LICENSING BASIS DOCUMENTS

1. List the accidents and malfunctions of equipment important to safety described in the Licensing Basis Documents which involve structures, systems, or components and/or system parameters described in I.2 that could be affected by implementation of the activity (refer to FSAR Chapter 15 analyses and the Event Classification and Identification Section of the10CFR50.59 Review Guide).
   See attachment.
2. Explain how and why implementation of the proposed activity could or could not affect the radiological consequences of each accident listed in II.1.
   See attachment.
3. List the licensing basis accidents identified in II.1 for which the failure modes identified in I.3 could be the initiating event.
   See attachment
4. Explain how and why implementation of this activity will or will not affect the probability of occurrence of the accidents listed in II.3.
   See attachment.
5. For each of the structures, systems, or components listed in I.2, which can affect the events described in II.1 explain how and why the proposed activity will or will not affect the probability of failure of the structure, system, or component to perform its safety function(s).
   See attachment.
6. Explain how and why implementation of the proposed activity could or could not affect the radiological consequences of each equipment malfunction indentified in II.5.
   See attachment.

III. POTENTIAL FOR CREATION OF A NEW TYPE OF UNANALYZED EVENT

1. Compare the accident analyses listed in II.1 to the potential failures described in I.3, and explain how and why the failures identified in I.3 could or could not create the possibility of an accident different from any accident evaluated in the licensing basis documents.
   See attachment.
2. Compare the credible potential failures described in I.3 with the equipment malfunctions described in II.1, and explain how and why the failures identified in I.3 could or could not create the possibility of a malfunction of equipment important to safety different from any evaluated in the Licensing Basis Documents.
   See attachment.

10 CFR 50.59 EVALUATION

Evaluation No. SE-91-86 Rev. No. 0 CPSES Unit 1

IV. IMPACT ON THE MARGIN OF SAFETY

1. Identify the Technical Specifications associated with the systems, structures, components, and/or parameters listed in I.2 and briefly explain the basis for each Technical Specification. See attachment.

2. For each Technical Specification discussed in IV.1, identify the acceptance limit associated with the basis for the Technical Specification and the corresponding failure value. See attachment.

3. Explain how and why implementation of the proposed activity will or will not affect the acceptance limit(s) and the failure values identified in IV.2. See attachment

4. Based on the explanation in IV.3, explain how and why implementation of the proposed activity will or will not affect the margin(s) of safety associated with the Technical Specification(s) listed in IV.1. See attachment.

V. EVALUATION SUMMARY

NOTE: If the answer to any of the following questions is "YES", then the proposed activity involves an unreviewed safety question.

	YES	NO
1. Will implementation of the proposed activity increase the radiological consequences of a licensing basis accident (refer to II.2)?		✓
2. Will implementation of the proposed activity increase the probability of a licensing basis accident (refer to II.4)?		✓
3. Will implementation of the proposed activity increase the probability of a malfunction of equipment important to safety previously evaluated in the Licensing Basis Documents (refer to II.5)?		✓
4. Will implementation of the proposed activity increase the radiological consequences of a malfunction of equipment important to safety previously evaluated in the Licensing Basis Documents (refer to II.6)?		✓
5. Will implementation of the proposed activity create the possibility for an accident different from any already evaluated in the Licensing Basis Document (refer to III.1)?		✓
6. Will implementation of the proposed activity create the possibility of a malfunction of equipment important to safety different from any already evaluated in the Licensing Basis Documents (refer to III.2)?		✓
7. Will implementation of the proposed activity decrease the margin of safety as defined in the basis for any Technical Specification (refer to IV.3)?		✓

I. Background Information

I.1. This activity redefines a reduced inventory condition in the Reactor Coolant System (RCS) from three to five feet below the top of the reactor vessel (RV) flange. (Refer to Figure 1 for elevation diagram). The activity is proposed to limit the instances when the significant operational restrictions of reduced inventory operation must be imposed.

The definition of reduced inventory condition was originally provided by Generic Letter 88-17 (Reference 3, Enclosure 3) and implemented in Procedure IPO-010A (Reference 4) in response to the expeditious actions recommended in GL 88-17. Subsequently, Westinghouse recommended that the definition be revised because of the need to reduce water level below the three foot value during head closure activities to prevent overflow and potential degradation of the reactor vessel head "O" rings (Westinghouse Tech Bulletin 87-12, Reference 8).

Other plants (e.g., Millstone Unit 3) with similar design to CPSES have implemented the Westinghouse recommendation to redefine reduced inventory and the NRC found it acceptable (Reference 9).

The Appendix B to Reference 8 provides a discussion of the background behind the definition of reduced inventory and the intent to exclude flange cleaning evolutions. The acceptance criterion was to select a specific value above the loop piping but below that used for flange cleaning and reactor vessel reassembly.

A change analysis of the effect of the redefinition on the Licensing Basis Documents (i.e., TXX 89041, TXX 89282, and TXX-89804; References 2, 10 and 11, respectively) was performed and is included as Attachment 2.

This activity will be incorporated into IPO-010A.

I.2. The RHR pumps could be affected by implementation of this activity. Generic Letter 88-17, "Loss of Decay Heat Removal", directed licensees to take numerous actions to minimize the probability of a loss of decay heat removal due to excessive air entrainment while operating in a reduced inventory condition. The Generic Letter defined "reduced inventory" as three feet or more below the RV flange. This activity would allow certain procedural requirements of IPO-010A to be invoked at an RCS level two feet lower than the current value, or two feet closer to the point at which vortexing in the RHR hot leg suction "drop" lines could cause excessive air entrainment with resulting pump failure and loss of the normal sources of decay heat removal.

I.3. This activity involves no hardware modifications. As such, no new failure modes are associated with its implementation. Therefore, this evaluation will examine the impact of implementing existing controls closer to the level at which excessive air entrainment could cause a loss of normal decay heat removal.

I.4. Documents from which information was taken to complete this evaluation are as follows:

1. TE CP-91-1870
2. TXX-89041, dated 02/10/89
3. GL 88-17, "Loss of Decay Heat Removal"
4. IPO-010A, Rev. 3, Including PCNs 1 and 3
5. IPO-TP-89A-1, Vortex Test Results (05/89)
6. CBD-ME-260, RHR System
7. Comanche Peak SSER 22, 23, and 24
8. Westinghouse Tech Bulletin 87-02, Rev. 2, 07/13/89
9. NRC Letter from Wenzinger to Northeast Nuclear Energy Company dated 07/12/89
10. TXX-89232, dated 06/01/89
11. TXX-89804, dated 11/20/89
12. TXX-91253, dated 07/29/91
13. ABN-104A

II. Effect on Accidents and Malfunctions Evaluated in the Licensing Document Bases.

II.1 Implementation of this activity will neither initiate nor affect the progression of any accidents described in FSAR Chapter 6 or 15 analyses since it is limited to RCS and RHR system operation in Modes 5 and 6 only; the ECCS function of the RHR pumps is only required in Modes 1 through 4. The potential impact on decay heat removal by the RHR system discussed in I.2 above may be considered a malfunction of equipment important to safety.

II.2 This activity does not impact the radiological consequences of any accidents since it does not affect the progression of any accidents and does not introduce any new failure modes.

II.3 This question is not applicable since no licensing basis accidents were identified in II.1 above.

II.4 This question is not applicable since no accidents were identified in II.3 above.

II.5 As discussed in I.2. above, the RHR pumps could be impacted by this activity. When operating at sufficiently reduced RCS levels, vortexing can occur at the 12 inch RHR suction line in RCS hot leg 1 or 4 for the operating RHR train. As RCS level is further decreased, vortexing will increase and entrained air will be introduced into the RHR suction flowpath. If air entrainment is excessive, RHR pump damage may occur, leading to a loss of decay heat removal.

In response to Generic Letter 88-17, procedure ICP-IP-89A-1, "Reactor Coolant System Mid-Loop Operations/Vortex Testing", was performed on CPSES Unit 1 in May 1989 prior to initial fuel load. In this test, RHR flow was increased to the point of excessive air entrainment, based on a number of conservative criteria, at each of four different levels within the RCS hot legs. The results demonstrate that at RHR pump vendor curve runout flow (approximately 3500 gpm) the minimum acceptable level is only five inches above actual mid-loop (52 inches above the top of the upper core plate). As RHR pump flow is reduced, the minimum acceptable level to prevent excessive air entrainment becomes lower. For example, at 2200 gpm, a level at actual mid-loop or higher is sufficient to prevent excessive air entrainment. It should be noted that, based on test

instrumentation, the level versus flow limits discussed above represent absolute limits. This data was used as input to IPO-010A as well as development of alarm setpoints for narrow range and wide range level instruments L3615A and L3615B.

In general, IPO-010A, which was created in response to GL88-17, provides guidance for draining the RCS from the RV flange level into reduced inventory conditions and for maintaining reduced inventory conditions. Procedural controls for reduced inventory operation include completion of extensive prerequisite instructions prior to entering reduced inventory operation, specific instructions for sensitive plant operations such as shifting RHR pumps and charging RCS level, and completion of a checklist once every shift. This checklist includes the following actions:

1) Reviewing various logs to identify conditions which could impair the containment boundary, RHR operation, or RHR monitoring.

2) Verification that required hot leg vent paths exist.

3) Inspection of containment penetrations.

4) Verification that secondary systems breached in containment can be isolated.

5) Verification that RHR and equipment for mitigating a loss of RHR are operable/available.

6) Verification that RHR system monitoring instrumentation is operable.

The proposed activity involves revising the definition of "reduced inventory" to five feet below the top of the RV flange (72 1/2 inches above the top of the upper core plate). The revision to IPO-010A which implements this activity will:

1) Maintain the requirement to place level channels 3615A (narrow range) and 3615B (wide range) in service any time the RCS is drained to the RV flange elevation. This includes alarms which are designed to warn the operator that if RCS level is decreased below the alarm setpoint, maximum allowable RHR flow will be lower than vendor curve runout flow. Also effective at and below this level is a controlled drain rate, as well as a requirement to monitor RHR pump current continuously while draining. Draining methods are procedurally limited to either RCS loop drains to the Reactor Coolant Drain tank or RHR letdown. Catastrophic leakage at RCS levels below the RV flange is precluded by the low pressure nature of mode 5 and 6 operation and controls on the use of steam generator nozzle dams and flux thimble low pressure seals.

2) Require draining to be halted if level is drained to the 630 foot elevation (84 inches above the core plate). At this point, RHR pump suction pressure channels 601A and 602A with associated low pressure alarms will be placed in service. (Previously, these channels were placed in service at the RV flange elevation.) If level is to be reduced below 80 inches above the core plate, a shiftly checklist is performed. In addition, valves 8809A and B will be throttled to limit maximum possible RHR flow, as required, based on the ultimate expected RCS level.

3) Invoke the current reduced inventory entry prerequisite instructions and shiftly checklist discussed in the above paragraph at an indicated level of 80 inches above the core plate. This indicated level represents the new definition of reduced inventory (72 1/2 inches above the core plate) with wide range level instrument (3615B) uncertainty applied in the conservative direction. This compares to the previous definition of reduced inventory as 96 1/2 inches above the top of the upper core plate, which was procedurally implemented at an indicated level of 100 inches above the upper core plate.

These measures ensure that all reduced inventory procedural controls will be in place by the time actual RC_L level is at 72 1/2 inches above the core plate. This level is 20 1/2 inches above the actual level at which maximum allowable RHR flow is lower than vendor curve runout flow based on conservative, plant-specific vortex testing. Note that actual RHR flow is likely to be lower, with a lower corresponding minimum allowable RCS level.

The procedural changes associated with this redefinition are as follows:

1. RHR pump suction pressure instruments are placed in service at 84 inches above the core plate rather than at 133 inches. This level is at least 28 inches above the level at which suction pressure oscillations due to vortex induced air entrainment could occur.

2. Throttling of valves 8809A and B to limit maximum RHR flow, if required, is performed at 84 inches above the core plate rather than at 133 inches. This level is 28 inches above the level at which such controls are required.

3. Prerequisite instructions for reduced inventory entry and the shiftly checklist while in reduced inventory are implemented at 80 inches above the core plate rather than 133 inches. These requirements are not related to level measurement or control of drain rates, both of which are initiated at 133 inches, but are mainly associated with mitigation of a loss of RHR.

The above analysis demonstrates that redefining reduced inventory at a lower level will not impact the effectiveness of EPG-01CA in preventing a loss of decay heat removal. Therefore, the proposed activity will not affect the probability of failure of the RHR system to perform its decay heat removal function due to excessive air entrainment.

II.6 This activity does not impact the radiological consequences of any equipment malfunction since it does not affect the progression of any equipment malfunction or introduce any new failure modes.

III. Potential for Creation of a New Type of Unanalyzed Event

III.1 As discussed above, the potential impact of this activity is on decay heat removal by the RHR system during reduced inventory operation. This issue is documented in Section 5.4.3.3 of CPSES SSERs 22 and 23 which describe GL88-17 and CPSES responses to the generic letter. Therefore, this activity could not create the possibility of an accident different from any accident evaluated in the Licensing Basis Documents.

III.2 As discussed above, the potential impact of this activity is on decay heat removal by the RHR system during reduced inventory operation. This issue is documented in CPSES SSERs 22, 23, and 24. As a result, this evaluation addresses this potential impact as a malfunction of equipment important to safety evaluated in the Licensing Basis Documents. Therefore, this activity could not create the possibility of a malfunction of equipment important to safety different from any evaluated in the Licensing Basis Document.

IV. Impact on the Margin of Safety

IV.1 Technical Specifications associated with the RHR pumps in Modes 5 and 6 with loops not filled are as follows:

a. 3/4.4.1.4.2 Reactor coolant loops and coolant circulation (Mode 5 with RC loops not filled).

These Technical Specifications levy operating/ opetability requirements on the RHR system to ensure that sufficient decay heat removal capability is available and to provide adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during RCS boron concentration reductions.

b. 3/4.9.8 Residual Heat Removal and Coolant Circulation (Mode 6)

This Technical Specification levies operating/operability requirements on the RHR system to ensure that sufficient decay heat removal capacity is available and to ensure sufficient coolant circulation through the core to minimize the effect of a boron dilution accident and prevent boron stratification.

IV.2 For Technical Specification 3/4.4.1.4.2, the bases require two OPERABLE RHR loops to preserve the single failure criterion.

In the case of the boron dilution limit associated with 3/4.9.8, the acceptance limit for RHR flow is 1000 gpm minimum as required by surveillance requirement 4.9.8.2. This specification also requires two OPERABLE RHR Loops to preserve the single failure criterion.

IV.3 Implementation of this activity will not affect the acceptance limits or failure values associated with the above Technical Specifications since:

a. As described in II.1 above, this activity only impacts RHR system operation in Modes 5 and 6.

b. As described in II.5 above, the proposed activity will not affect the probability of failure of the RHR system to perform its decay heat removal function in Modes 5 or 6.

This evaluation also demonstrates that the revised definition of reduced inventory still meets the intent of GL 88-17.

IV.4 Since there is no impact on the Technical Specification acceptance limits, there is no impact on the associated margins of safety.

FIGURE 1

DISTANCE ABOVE TOP OF UPPER CORE PLATE		PLANT ELEVATION
132.5"	Top of RV Flange	834' 0.5"
131.0"	RV O-Ring Seating Surface	833' 11"
100.0"	Old Procedural Definition for Reduced Inventory (Indicated Level)	831' 4"
96.5"	Old Definition for Reduced Inventory (Absolute Level)	831' 0.5"
80.0"	New Procedural Definition for Reduced Inventory (Indicated Level)	829' 8"
72.5"	New Definition for Reduced Inventory (Absolute Level)	829' 0.5"
61.5"	Top of Hot Leg I.D.	828' 1.5"
52.0"	Minimum Acceptable Level for RHR Pump Vendor Curve Runout Flow	827' 4"
47.0"	Mid-Loop	826' 11"
0"	Top of Upper Core Plate	823' 0"

G.L. 88-17	TXX-89041 (Ref.2)	EFFECT OF REDEFINITION
Letter - Requested response under 10CFR50.54(f).	Complied.	Revision to TXX-89041 issued under 10CFR50.54(f) is not required if change is not an unreviewed safety question.
States "Individual deviations will be considered on a case basis provided compensatory measures are provided which will achieve a comparable level of protection."	No deviations identified.	Redefinition - a minor deviation from the definition in Enclosure 3. However, based on Westinghouse Technical Bulletin 87-02, Rev. 2, the intent was to implement measures above the loop piping. Therefore, there is no change in intent.
EXPEDITIOUS ACTIONS:		
Implemented prior to operating in a reduced inventory condition.	Complied.	None. Expeditious Actions have been implemented to reduce the likelihood of a release of radioactivity due to an accident.
RECOMMENDATION 1		
Training.	Complied.	None.
RECOMMENDATION 2		
Containment closure . . . . prior to the time at which a core uncovery could result from a loss of DHR . . . under procedures and Admin. controls active and in use prior to entering a reduced inventory condition. For Westinghouse the GI gives 30 minute and two hour closure time limits in lieu of analytically determined limits.	Complied. Commits to closure capability in less than two hours from loss of DHR during reduced inventory conditions. (Requires a vent path from the upper RV sized to prevent core uncovery due to pressurization resulting from boiling in the core.)	Delays or eliminates entering containment closure restrictions and controls for certain plant evolutions.

G.L. 88-17 RECOMMENDATION	TXX-89041 (Rel.2)	EFFECT OF REDEFINITION
Two independent, continuous temperature indications for core exit during reduced inventory conditions	Complied (with the exception of independence) including the use of heat up curves when head is removed during reduced inventory conditions.	Delays or eliminates entering procedural requirements for core exit temperature for certain plant evolutions.
RECOMMENDATION 4		
Two independent, continuous water level indications whenever in a reduced inventory condition	Committed to provide response by 06/01/89. Provided one wide range and one narrow range channel per TXX-89282(Ref.10).	None. CPSES procedural requirement continues to be implemented at the RV flange elevation and is not based on reduced inventory definition.
RECOMMENDATION 5		
Procedures and controls that avoid operations that lead to perturbations to the RCS and/or support systems.	Complied. Review of planned activities prerequisite for entering reduced inventory condition as part of outage planning. Also commits to periodic review of activities in progress while in reduced inventory.	Delays or eliminates the requirements for the associated actions for certain plant evolutions.
RECOMMENDATION 6		
Two additional means of adding inventory to RCS, including one high pressure injection pump, sufficient to keep the core covered.	Complied. Requires one CCP and one SIP during reduced inventory conditions. Also allows gravity feed as alternate.	Delays or eliminates the requirement for the availability of the two additional means for certain plant evolutions.
RECOMMENDATION 7		
Restrict use of nozzle dams unless vent path is provided in upper plenum of RV.	Complied. Uses hot leg vents in lieu of RV head vent.	None.
RECOMMENDATION 8		
Loop Stop Valves.	Not applicable to CPSES.	None.

G.L. 88-17 PROGRAMMED ENHANCEMENTS:	TXX-89041 (Ref.2)	EFFECT OF REDEFINITION
Programmed Enhancements "may be used to change expeditious actions as a result of better understanding or improved procedures".		Redefinition is a change to expeditious actions.
"Procedural and hardware modifications may be implemented without prior staff approval where the criteria of 10 CFR 50.59 are met...."	See TXX-91253(Ref.12) which commits to perform a 50.59 evaluation.	Must comply with 10 CFR 50.59.
Hardware installation by end of first RFO.	Prior to entry into reduced inventory conditions after 5% power for level.	None.
	Prior to end of RF01 for RHR inst.	None.
(1) INSTRUMENTATION		
(a) two independent RCS level indications.	TXX-89282 (Ref.10) o 30 inch narrow range to envelope 29" hot leg. o 150 inch wide range from bottom of H.L. to RV flange. Attaches to flux thimble guide tube. Requires RCS to be vented.	Changes third paragraph of TXX-89282 which equates reduced inventory operation to "three feet below the RV flange".
(b) two independent core exit temperature when RV head is on (recommends at all times)	Entry requires two core exit thermocouples.	Delays or eliminates requirements for certain plant evolutions.
(c) Continuous monitoring of DHR system performance whenever DHR is being used to cool the RCS.	See TXX-89804 (Ref.11).	None.
(d) Visible and audible indications of abnormal conditions: temperature level DHR performance	Complied TXX-89282 (Ref.10) TXX-89804 (Ref.11)	See b, above. See a, above. None.

G.L. 88-17	TXX-8V041 (Ref.2)	EFFECT OF REDEFINITION
(2) PROCEDURES that cover reduced inventory operation and that provide an adequate basis for entry.		
(a) Normal operation of NSSS, control and support systems for DHR.	Integrated Operating Procedure (IPO-010A) to cover entry into and operations at reduced inventory conditions.	Changes definition of reduced inventory condition from "three feet below..." to "five feet below..." in 1.0 and from "100 inches above the core plate" to 80 inches above the core plate" in Attachment 1.
(b) Emergency, abnormal, off normal, or the equivalent operation... if off-normal condition occurs when cooling normally provided by DHR system.	Abnormal Operating Procedure (ABN-104A ,Ref.13) Compliance committed.	None.
(C) Administrative Controls.	See TXX-89041 (Ref.2)	None.
(3) EQUIPMENT		
(a) For cooling the RCS and for avoiding a loss of RCS cooling.	Both trains of RHR required for reduced inventory conditions (one in standby)!!!!!!.	None. Technical Specification 3.9.8.2 requires two OPERABLE RHR Loops in the applicable MODE.
	Remove Autoclosure Interlock.	None.
(b) For mitigation of loss of DHR or loss of RCS inventory.	Two backup pumps (or gravity feed alt. for one) during reduced inventory operation.	See Recommendation 6, above.
(c) For personnel communications!!	monitoring from control room.	None.
	Plant page system!.	None.

G.L. 88-17 (4) ANALYSES	TXX-89041 (Ref.2)	EFFECT OF REDEFINITION
Develop a basis for procedures, instrumentation installation and response, and equipment/NSSS interactions and response.	WCAP-11916/Westinghouse generic guidelines.	None.
	Site vortex test.	None.
	RCS heatup (loss of RHR) curves.	None.
	Containment closure time available after loss of DHR.	None.
	RCS vent size and max drain rates to prevent erroneous level indications.	None.
	Containment hatch closure time.	None.
(5) TECHNICAL SPECIFICATIONS		
Submit changes to remove restrictions that limit the benefits of the G.I.	Investigate Autoclosure Interlock deletion.	None. (Action complete.)
	Change minimum RHR flow in MODE 6.	None. (Action complete.)
(6) RCS PERTURBATIONS		
Minimize likelihood of loss of DHR.	Prerequisite review of planned activities for entering reduced inventory condition.	Delays or eliminates the review for certain plant evolutions.