Nebraska Public Power District

GENERAL OFFICE
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TELEPHONE (402) 564-8561

NLS8400242

September 12, 1984

Office of Nuclear Reactor Regulation
Operating Reactors Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Domenic B. Vassallo, Chief

Reference: 1) General Electric Service Information Letter (SIL) No. 402 Dated February 14, 1984. "Wetwell/Drywell Inerting"

Dear Mr. Vassallo:

Subject: Status of Implementing SIL No. 402 Recommendations on Wetwell/Drywell Inerting

Reference 1) provided five recommendations to be taken by BWR's to confirm proper operation of liquid-nitrogen-based inerting systems and that equipment damage had not occurred due to its malfunctioning. The actions taken to date at CNS on these recommendations are as follows:

1. Evaluate Inerting System Design - The orientation of the nitrogen ports with respect to equipment and structures in the wetwell and drywell was investigated with the information sent to General Electric and the BWR Owners' Group. In addition, inspections of the liquid nitrogen supply by District personnel and the nitrogen supply vendor are conducted on a periodic basis. It has been evaluated that the cold temperature shutdown switch is the main component whose failure could cause the problems as discussed in the SIL and that periodic inspections, calibrations, and yearly replacement satisfactorily insures the switch will operate as designed.

2. Evaluate Inerting System Operation - This is addressed above.

3. Test for Drywell/Wetwell Bypass Leakage - Vent system integrity was initially demonstrated by comparing start and stop times for the compressor units that maintain the pressure differential between the wetwell and drywell per the Mark I short-term program. These results had previously been verbally given to our NRC Project Manager.

50-298

4. Inspect Nitrogen Injection Line - An inspection was conducted by General Electric on all accessible welds, penetrations, and containment shell within close proximity as directed by the SIL with no deficiencies noted.

5. Inspect Containment - An inspection was conducted by General Electric during the earliest planned outage on various equipment in the containment as directed by the SIL with no deficiencies noted.

Should you have any questions on this response, please contact me.

Sincerely,

J. M. Pilant
Technical Staff Manager
Nuclear Power Group

JMP/jdw:cjb12/2

bc: NRC Distribution

Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

April 17, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Dresden Station Units 2 and 3
Containment Inerting System
Inspection Response to General
Electric (G.E.) SIL 402
NRC Docket Nos. 50-237 and 50-249

Reference (a): B. Rybak letter to H. R. Denton
dated February 10, 1984.

Dear Mr. Denton:

As requested by our NRC Project Manager, we are enclosing, in the form of an attachment to this letter, our response to the referenced G.E. SIL. That SIL was generated due to a recent event which resulted in a large crack in the torus vent header at another operating plant, attributed to brittle fracture caused by the inspection of cold nitrogen into the torus during inerting. Our review finds that that nitrogen inerting system design is such that the possibility of a similar event at Dresden Station is highly unlikely.

One signed original and forty (40) copies of this letter and its attachments are provided for your use.

Very truly yours,

B. Rybak

B. Rybak
Nuclear Licensing Administrator

lm

cc: NRC Resident Inspector - Dresden
R. Gilbert - NRR

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DRESDEN STATION UNITS 2 and 3

Response to General Electric SIL 402

Evaluation of Inerting System Design

The nitrogen port into the torus is a through a 1 1/2" nitrogen line connected to a 20" line which then penetrates the torus. This nitrogen connection is approximately 7' from the torus penetration. The entrance into the torus is approximately 7' from the vent header or any other equipment in the torus. The possibility of the introduction of cold nitrogen causing structural damage in the torus is unlikely.

The nitrogen line to the drywell is basically of the same design. A 4" nitrogen line connects to an 18" line which penetrates the drywell. The distance from the nitrogen entrance to the drywell penetration is approximately 8'. The penetration is located in the area where no major piping or equipment is nearby. Therefore, structural damage of the drywell and equipment located nearby is unlikely.

Evaluation of Inerting System Operation

The temperature monitoring device for the detection of a decreasing nitrogen temperature alarms at 75°F decreasing. This monitor is very reliable and will be calibrated on a yearly basis. According to operator experience the nitrogen vaporizer is very reliable with little if any maintenance being required. Only once in the plant's operating history has the temperature monitoring device failed. Since that incident an operator has been stationed by the vaporizer to record temperatures every fifteen minutes to insure the nitrogen temperature doesn't fall below 80°F. This monitoring is done when the vaporizer is in operation. Operating procedures contain specific limitations and actions for the operator if the nitrogen temperature should fall below 80°F and month valve operability checks of the system are conducted to insure the system could be isolated if need be.

In conclusion, being that the location of the nitrogen entrance to the drywell and the torus in relationship to vent headers and other equipment is far enough away not to render any damage, the reliability and yearly calibration of the temperature monitoring devices along with procedural limitations and actions instituted and the monthly valve operability surveillance of the system the introduction of cold nitrogen (less than 40°F) into the torus or drywell where it could cause damage is unlikely.

Drywell/Wetwell Bypass Leakage Tests

A bypass leakage test was conducted on Unit 3 on March 19, 1984 just prior to startup following its Fall 1983 Refueling Outage and yielded acceptable results giving indications that the vent system integrity is intact and that no gross failures exist. A bypass leakage test will be performed on Unit 2 during the next outage of sufficient length.

Inspection of Nitrogen Injection Line

As recommended, an ultrasonic test of all accessible welds in the nitrogen injection line on Units 2 and 3 from the last isolation valve to the torus and drywell penetrations and the torus shell at least 6" around the penetration will be completed by June 1, 1984. In addition, the feasibility and completion of the ultrasonic testing of the containment penetrations and the containment shell or steel liner for at least 6" around the nitrogen penetration will be accessed during the next refueling outage for each unit.

Inspection of Containment

The visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen was addressed in I.E. Bulletin 84-01. This bulletin was responded to for Unit 3 and the findings of this inspection showed no abnormalities. (See our response to I.E. Bulletin 84-01 dated February 10, 1984.) The visual inspection of the Unit 3 containment steel liner for at least 6" around the nitrogen penetrations was conducted on March 28, 1984 resulting in no indications of structural damage. The inspection of the Unit 2 containment steel liner and the areas addressed in I.E. Bulletin 84-01 will be completed during the next Unit 2 outage.

8449N

Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

April 18, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Quad Cities Station Units 1 and 2
Containment Inerting System
Inspection Response to General
Electric (G.E.) SIL 402
NRC Docket Nos. 50-254 and 50-265

Reference (a): P. L. Barnes letter to J. G. Keppler
dated February 10, 1984.

Dear Mr. Denton:

As requested by our NRC Project Manager, we are enclosing, in the form of an attachment to this letter, our response to the referenced G.E. SIL. That SIL was generated due to a recent event which resulted in a large crack in the torus vent header at another operating plant, attributed to brittle fracture caused by the inspection of cold nitrogen into the torus during inerting. Our review finds that that nitrogen inerting system design is such that the possibility of a similar event at Dresden Station is highly unlikely.

One signed original and forty (40) copies of this letter and its attachments are provided for your use.

Very truly yours,

B. Rybak

B. Rybak
Nuclear Licensing Administrator

lm

cc: NRC Resident Inspector - Quad Cities
R. Bevan - NRR

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8480N

QUAD CITIES STATION UNITS 1 and 2

Response to General Electric SIL 402

Evaluation of Inerting System Design

The drywell and suppression chamber are inerted utilizing liquid nitrogen that is vaporized and drawn into the containment using SBGTS or the Reactor Building Ventilation System. Liquid nitrogren from a bulk storage tank is normally vaporized by electric vaporizers, but steam vaporizer also exists. The vaporized nitrogen is piped via three-inch, four-inch, and eight-inch piping to an 18-inch header which will direct the nitrogen to either the drywell, or to the suppression chamber via a 20-inch line. A temperature monitor is located on this header, and alarms in the Control Room on a low temperature of 50°F. The 20-inch nitrogen purge line penetrates the suppression chamber at the top, which is located about seven feet above the vent header inside the suppression chamber. Based on our evaluation of the above design, the potential for introducing cold nitrogen into the suppression chamber is minimal.

Evaluation of Inerting System Operation

The electric vaporizers have been very reliable. Adequate temperature indication is provided. Work requests have been written to calibrate and functionally test the low nitrogen temperature alarm switches TS-1 and 2 - 8741-31. Procedures have been reviewed and found to be adequate; however, additional precautions will be added concerning the need to keep the nitrogen temperatures high so as not to introduce cold nitrogen into the containment.

Drywell/Wetwell Bypass Leakage Tests

In accordance with the Technical Specifications, a drywell-suppression chamber leak test is performed during each refueling outage. A satisfactory test was recently performed on Unit 2 in February 1984, and will be performed on Unit 1 prior to startup from the current refueling outage.

Inspection of Nitrogen Injection Line

The nitrogen purge piping has been visually inspected on both units. The inspection covered the piping runs from the vaporizer discharge lines in the 1/2 Diesel Generator Room to the drywell and suppression chamber nitrogen purge penetrations. No abnormalities were found during these inspections.

Inspection of Containment

In response to NRC I.E. Bulletin 84-01, the Unit 2 suppression chamber vent header was visually inspected. No abnormalities were identified. The same inspections will be conducted on Unit 1 during the current refueling outage.

Iowa Electric Light and Power Company

June 29, 1984
NG-84-2342

Mr. Harold Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Wetwell/Drywell Inerting

Dear Mr. Denton:

This letter is in response to our project manager's request for an expected completion date for each recommendation contained in General Electric's SIL #402, Wetwell/Drywell Inerting.

Recommendation #1:

1. Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

IELP Response:

In our evaluation of the nitrogen inerting system, documentation shows the vent header, downcommers and other equipment in the wetwell and drywell are not in the path of the injected nitrogen.

The nitrogen inerting system design at the DAEC is adequate to prevent the injection of cold nitrogen into the containment given the local alarms and the fact that inerting cannot take place without an operator at the local control panel. The DAEC contains no low temperature shutoff valve in the nitrogen inerting system.

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The operating instructions have been revised to require an operator to monitor the local alarms and to shutoff the nitrogen flow if one of the alarms is activated.

Recommendation #2:

2. Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance, and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

IELP Response:

We expect recommendation #2, Evaluate Inerting System Operation, to be completed by July 31, 1984.

Recommendation #3:

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

IELP Response:

A bypass leakage test, which is a regularly scheduled surveillance test, was conducted upon startup from a recent maintenance outage, which indicated that the vent system integrity is intact and no gross failure exists. Further, the Pump Back System used to maintain the differential pressure between the wetwell and the drywell, which is presently monitored on a once per shift basis, is sized such that any crack in the vent system would be detected due to the inability to maintain the proper differential pressure.

Recommendation #4:

4. Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

IELP Response:

We conducted a visual inspection of the nitrogen line, as outlined in Recommendation #4, and found no cracks. The basis for substituting a visual inspection for an ultrasonic test is that a crack initiated by cold nitrogen will cause a brittle fracture and produce a through wall crack.

Recommendation #5:

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

IELP Response:

We expect recommendation #5, Inspect Containment, to be completed prior to completion of our next refueling outage (Cycle 7/8).

Please inform us if you have any questions or comments concerning this response.

Very truly yours,

R. W. McDaughy

Richard W. McGaughy
Manager, Nuclear Division

RWM/TGD/dmb*

cc: T. Dalton
L. Liu
S. Tuthill
M. Thadani
NRC Resident Office
Commitment Control No. 84-0124

Wayne H. Jens
Vice President
Nuclear Operations

Detroit

2000 Second Avenue
Detroit, Michigan 48226
(313) 586-4150

September 27, 1984
EF2-72258

Director of Nuclear Reactor Regulation
Attention: Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Youngblood:

Reference (1) Fermi 2
NRC Docket No. 50-341
(2) NRC IE Bulletin 84-01, "Cracks in BWR Mark I Containment Vent Headers", February 3, 1984
(3) INPO Significant Event Report (SER) 14-84, "Cracks in the Torus Ringheader"
(4) NRC IE Information Notice 84-17, "Problems With Liquid Nitrogen Cooling Components Below Nil Ductility Temperature", March 5, 1984
(5) GE Service Information Letter (SIL) 402, "Wetwell/Drywell Temperature," February 14, 1984

Subject: Response to GE SIL 402

As per the request of the Fermi 2 Licensing Project Manager, this letter provides Detroit Edison's response to applicable recommendations provided in the subject SIL (Reference 5.) The SIL was initiated after an inspection at an operating BWR revealed a large crack in the vent header within the torus.

It should be noted that Detroit Edison has a comprehensive experience analysis program whereby experience documents (GE SIL's, INPO SER's, IE Bulletins, Notices, etc.) are assigned, tracked, and dispositioned. Consequently, the GE SIL and the other applicable documents (references (2), (3) and (4)) had been reviewed by Detroit Edison with respect to the Fermi 2 design and planned operation. It was concluded that the design and operation of the nitrogen system at Fermi 2 provides adequate assurance that the impingement of liquid or extremely cold nitrogen against vital plant components will not occur.

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SIL 402 made two recommendations applicable to Fermi 2. The recommendations and Edison's responses as requested by you are provided below:

Recommendation 1

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Edison Response

The Nitrogen Inerting System is described in FSAR Section 9.3.6 and Figure 9.3-12. The system includes a storage tank, steam vaporizer, electric heat exchanger, piping, valves and controls. The steam vaporizer is used for inerting the primary containment prior to plant operation per the Technical Specifications and provides high flow at low pressure. Liquid or gaseous nitrogen enters the steam vaporizer and is heated by steam from the auxiliary boiler. The electric heat exchanger is used for plant nitrogen distribution during normal operation which includes primary containment nitrogen make up and provides a low flow at high pressure. The inerting system supply and plant nitrogen distribution system are separate subsystems, each with its own dedicated equipment and controls, and have the nitrogen supply tank as their only shared component. The inerting flow is through both 20 and 24 inch valves, while the nitrogen make up flow is through one (1) inch valves.

System control and operation during both the initial inerting and normal operating modes of the Nitrogen Inerting System is described below:

Inerting Operation

In accordance with procedures, an operator is required, during inerting, to be stationed in the nitrogen equipment building next to the skid. This operator monitors the steam vaporizer operation. The control room

operator is responsible for valve alignment from secondary containment to primary containment. The pertinent information that is provided to these operators and the automatic trips for the inerting system are identified below:

a) Control Room

- o Secondary containment valve position
- o Primary containment valve position
- o Pressure control (hand/auto) station
- o System discharge pressure indicator/recorder

b) Nitrogen Equipment Building

- o Steam vaporizer outlet nitrogen temperature indicator
- o Steam vaporizer outlet nitrogen pressure indicator
- o Automatic trip of nitrogen supply on:

  1) outlet low nitrogen temperature; or
  2) outlet low nitrogen pressure

Normal Operation

The normal plant nitrogen distribution system is a continuous system which provides pressurized nitrogen to dual receivers. Control of the system is from the control room. Pertinent information available to operators and the automatic trip in the normal nitrogen distribution system is identified below:

a) Control Room

- o Secondary containment valve position
- o Receiver discharge valve position
- o Receiver pressure indicator
- o Electric heat exchanger outlet low nitrogen temperature alarm
- o Electric heat exchanger high temperature alarm
- o System pressure control station
- o Electric heat exchanger outlet nitrogen temperature indicator/recorder

b) Nitrogen Equipment Building

- o Electric heat exchanger outlet nitrogen pressure indicator
- o Electric heat exchanger temperature controller/indicator
- o Electric heat exchanger power indication
- o Automatic trip of nitrogen supply on low discharge temperature

Accordingly, operators are provided with adequate indication, alarm and control information to properly operate the Nitrogen Inerting System. Automatic trips are provided to isolate the supply of nitrogen. The instrumentation is checked, either singly or as part of its overall loop, every 18 months and, other than sensing elements, is located in the heated environment of the nitrogen equipment building or plant. There are no valves that can be operated to bypass the normal nitrogen flow and the associated automatic trips.

The orientation of the torus and drywell nitrogen injection ports was investigated relative to other equipment and structures within primary containment. The torus nitrogen injection lines are approximately seven feet above and slightly off center from the vent header. The inspection of drywell penetrations revealed that several items of safety related equipment are located in proximity to the inerting line penetrations. Accordingly, it can't be shown conclusively by inlet line orientation alone that liquid or extremely cold nitrogen wouldn't have a deleterious effect on safety related components. However, Detroit Edison feels that this is acceptable based on the following:

(1) The steam vaporizer as a source of nitrogen is only used during limited time periods (i.e., initial inerting of containment prior to operation.)

(2) During these periods, an operator is required to be present at the local nitrogen equipment station to monitor parameters and make necessary adjustments.

(3) During normal makeup, low volume electric heat exchangers are used.

(4) An automatic shutoff exists to stop the flow of nitrogen in either mode.

(5) Adequate instrumentation and alarms exist to monitor the system performance for either mode.

(6) There are no valves that can be operated to bypass the normal nitrogen flow path and the associated automatic trips.

Recommendation 2

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

Edison Response

Due to the construction status of Fermi 2, the Nitrogen Inerting System has not yet been operated, except as required to support preoperational tests. However, as stated in the response to Recommendation 1, the Fermi 2 Nitrogen Inerting System design and operating procedures provide sufficient assurance that cold nitrogen injection would be detected and prevented.

If you should have any further questions, please contact Mr. O. Keener Earle at (313) 586-4211.

Sincerely,

Wayne H. Jens

cc: Mr. P. M. Byron
Mr. M. D. Lynch
USNRC, Document Control Desk
Washington, D.C. 20555

bcc: F. E. Agosti
R. W. Barr
L. Bertani
J. D. Black
R. Close
W. F. Colbert
O. K. Earle
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Approval Control

O. K. Earle (Bethesda Office)
NRR Chron File
Secretary's Office (2412 WCB)

123 Main Street
White Plains, New York 10601
914 681-6200

NewYorkPower Authority

J. Davis
Vice President
Nuclear Operations

October 1, 1984
JPN-84-61

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Domenic B. Vassallo
Operating Reactors Branch No. 2
Division Of Licensing

Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
IE Bulletin No. 84-01
Mark I Containment Vent Headers

References: 1. NRC IE Bulletin No. 84-01, "Cracks In Boiling Water Reactor Mark I Containment Vent Headers," dated February 3, 1984.

Dear Sir:

On September 7, 1984, one week prior to a scheduled outage, we were notified that a written report on the subject Bulletin was required immediately.

Attachment I provides our response as requested. This response has been delayed due to the demands of the outage as well as of other current licensing activities.

It should be noted that on April 27, 1984 the Authority received a request for either an oral or a written report. We provided an oral report at that time, and submitted copies of visual inspection reports.

It should also be noted that while the FitzPatrick facility was not in cold shutdown when the Bulletin was issued, and no action was required, nevertheless, a review of the Bulletin and related documents was initiated, and various evaluations, procedure revisions and extensive visual inspections were undertaken.

A025 1/1 Add: IE/DEPER/EGCB 1 ENCL
IE/DEPER/EGCB/S

If there are any questions, please do not hesitate to call Mr. J.A. Gray, Jr. of my staff.

Very truly yours,

J.P. Bayne
First Executive Vice President
Chief Operations Officer

cc: Office of the Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 136
Lycoming, New York 13093

New York Power Authority
James A. FitzPatrick Nuclear Power Plant

Attachment I

JPN-84-61

A. IE Bulletin No. 84-01:
Actions to be taken by all BWRs having Mark I Containments and Currently Shutdown:

1. Plants that are currently in cold shutdown should visually inspect for cracks in the entire vent header and in the main vents in the region near the intersection with the vent header. To the extent practicable, the inspection should include the entire surfaces of the aforementioned components. The inspection should be completed within 36 hours of receipt of this bulletin.

2. If cracks are found, the containment should be declared inoperable.

3. The results of the inspection are to be reported by telephone to NRC Operations Center within 8 hours after the inspection has been completed. A written report describing the areas inspected and the results should be submitted within seven days of receipt of the bulletin.

Response to IE Bulletin No. 84-01

The James A. FitzPatrick Nuclear Power Plant was operating when IE Bulletin No. 84-01 (IEB-84-01) was issued. Accordingly, it was not practical to inspect the vent header or main vents in the region near the intersection with the vent header at that time.

B. Other inspection activities performed or planned:

While it was not practical to perform an immediate inspection of the vent header and related structures and components as suggested by IEB-84-01, the FitzPatrick plant staff initiated review and/or evaluation of IEB-84-01 and other related documents under the Plant Operating Experience Review Program shortly after they were received at the JAF plant. These related documents are IE Information Notice 84-17, INPO SER 14-84 and GE SIL 402.

As a result of the IEB-84-01 (and the related documents noted above), the following evaluations, inspections, and procedure revisions have been completed or will be completed by the indicated date.

1. An evaluation of drywell to suppression pool differential pressure was conducted to verify that no significant leakage from the drywell to the suppression pool was present.

2. On March 2, 1984, the JAF plant was shut down for scheduled maintenance and modification. During this shutdown period, a visual examination was conducted as indicated below:

Outside of Vent Header - The entire top surface of the vent header was inspected including girth and attachment welds. The nitrogen penetration is in the center of bay O, and bays P and A are adjacent to bay O. In bays P, O, and A, the pipe surface and all associated weldments were inspected approximately 220° around the vent header starting at 2 o'clock and moving counter-clockwise to 6 o'clock. One-half of the downcomer to vent header attachment welds in bays P, O, and A, were also inspected.

Inside of Vent Header - The entire inside surface of the vent header in bays P, O, and A were inspected. This included all girth welds and all downcomer to vent header attachment weldments.

Nitrogen Penetration - The suppression pool (wetwell) I.D. side of the nitrogen penetration to suppression pool shell weldment, and the suppression pool plate materials (approximately 12" all around the penetration) were inspected.

No evidence of cracking was discovered during any of the above inspections. Since none of the original (construction) examinations included ultra-sonic testing (UT), no UT baseline exists. Accordingly, no UT examinations are planned.

3. An evaluation of the inerting system has been conducted. As a result of this evaluation, the applicable procedures have been revised to provide assurance that cold gaseous (or liquid) nitrogen is not introduced into the inerting system or into containment components which are not designed for low temperature operation.

4. A surveillance procedure to test operation of the low temperature isolation function will be implemented by October 10, 1984.

5. Periodic calibration of temperature switches and indication to assure proper operation of the low temperature isolation, and provide the operator with reliable temperature indication, will be implemented by October 10, 1984.

6. During the next scheduled primary containment integrated leak rate test, a drywell to suppression pool (wetwell) bypass leakage test will be conducted. The test is currently scheduled for the end of the 1985 Refueling Outage.

James A. FitzPatrick
Nuclear Power Plant
PO Box 41
Lycoming, New York 13093
315 342 3840

New York Power Authority

Corbin McNeill
Resident Manager

MARCH 8, 1984
JAF-QF-84-030

MEMORANDUM TO: Superintendent of Power

FROM: R. Patch

SUBJECT: JAFNPP
Quality Assurance
Visual Inspection of Torus Ring Header

REFERENCE: JOC-84-006 (2/23/84) Visual Inspection of Torus Ring Header

As requested in the referenced memorandum, a visual inspection of the torus ring header was performed on 3/4/84. The inspections were performed by C. Krok, P. Morris, and R. Patch. The areas inspected are as follows:

- Outside of Ring Header - The entire top surface of the ring header was inspected including girth and attachment welds. In bays P, O, and A, the pipe surface and all associated weldments were inspected approximately 220° around the header starting at 2 o'clock and moving counter-clockwise to 6 o'clock. One-half of the downcomer to ring header attachment welds in bays P, O, and A, were also inspected.

- Inside of Ring Header - The entire inside surface of the ring header in bays P, O and A were inspected. This includes all girth welds and all downcomer to ring header attachment weldments.

- Nitrogen Penetration - The torus I.D. side of the nitrogen penetration to torus shell attachment weldment and the torus plate materials approximately 12" all around the penetration.

Conclusion: No evidence of cracking was discovered during any of the above inspections.

Miscellaneous Observations: During the above inspections it was noted that tools and other loose debris were laying inside the vent header piping. The outside of the vent header piping in the area adjacent to the nitrogen penetration entrance to the torus is exhibiting considerable surface rusting.

5007333

MEMORANDUM TO: SUPERINTENDENT OF POWER — MARCH 8, 1984
FROM: R. PATCH — JAF-QF-84-030
SUBJECT: VISUAL INSPECTION OF TORUS RING HEADER — PAGE TWO

The inspection will be formally documented in an Inspection Report to be issued in accordance with the requirements of the Nondestructive Examination Procedures, but this memo is being written to advise you that the results of the inspection were satisfactory.

If you have any questions regarding this memo, please contact the writer.

Richard L. Patch

Richard L. Patch
QA Supt. in Training

cc: M. Cosgrove
J. Kerfien
T. Butler
R. Liseno
File 3.0.2

RLP:cp

James A. Fitzpatrick Nuclear Power Plant

WORK REQUEST/EVENT/DEFICIENCY/FORM 1. 27 / Nº 24580 (Sys. No.)

2. Comp. No. RIG HEADER 3. Q.C. Cat. I 4. Safety Rel. (Yes)/No 5. Date 2/24/84 6. Time 11:30

7. Equip. Title: RING HEADER & ATTACHMENT PIPING (TORUS)

8. Work Req. Event or Def. Description: PERFORM VISUAL INSPECTION OF WELDS (and location) MADE AS SET FORTH IN JOG-84-006. THIS INSPECTION MUST BE PERFORMED AS THE RESULT OF PLANT MATERIAL PROBLEM.

9. Cause: UNKNOWN

(Sign Line 34)

OCCURRENCE REPORT

PART I 10. ☐ YES (see AP 8.2) ☒ NO 42. OR No. _____ 49. LER No. _____

11. Operating Occurrence ☐ Basic Component Defect ☐ Security Infraction ☐

12. Means of Discovery: a. Testing _____ Proc No. _____
b. Normal Ops. _____ c. Sys/Equip - S/U or S/D _____ d. Maint _____
e. NRC Insp No. _____ Name _____ f. Other _____

13. Power Level MWT _____ MWe _____ 14. Mode Switch Position _____

15. Plant Status _____ 16. Tech. Spec. Yes/No Para No. _____

17. a) Surv. Test Req. YES/NO 18. Surv. Test Comp. YES/NO ____ Date ____ Time ____
b) Surv. Test No. _____ 19. Redundant Sys. Avail. YES/NO/NA

20. Initial Corrective Action: _____

21. Preliminary Classification: a. Reportable Yes ___ No ___
b. 10 CFR 21 Yes ___ No ___

22. Notification: Date/Time
Ops. Supt. ___/___ Res. Manager ___/___ Date/Time
Supt. of Power ___/___ Other ___/___
23. Completed By _____ (SS/Mtg. Supv.) Date _____ Time _____

WORK REQUIRED: 24: (Yes)/No

25. Priority: (1) 2 3 4 26. Outage: (Yes)/Refuel/No 27. Dept: (Maint)/I&C/ Q.C. (Other)

NPRD: 28. Yes/(No)

29. Stat. Time Fail.	30. Eff. Fail. on Sys. (2)	31. Eff. Fail. Plnt. OPS (3)	32. Failure Detection (2)	33. Mode of Failure
A System in Service	A Loss of Syst. Function	A Reduced Power Operat.	A Operational Abnormal	AA Leak
B System in Test	B Degraded Syst. Oper.	B Unit Off-Line	B Inservice Inspection	AB Crack
C System in Maintenance	C Loss of Redundancy	C Reactor Trip	C Surveillance Testing	AC Breach
D System Out of Service	D Loss of Subsyst./Chan.	D Personnel Injury	D Preventive Maintenance	AD Physical Distortion
E Subsyst./Chan. in Service	E No Significant Effect	E Excess. Off-Site Radiat.	E Special Inspection	AE Physical Displacement
F Subsyst./Chan. in Test		F Damage to Other Equip	F Audio Alarm	AF Collapse
G Subsyst./Chan. in Maint.		G No Significant Effect	G Visual Alarm	AG Fracture/Break
H Subsyst./Chan. Out of Serv			H Routine Surveillance	AH Won't Start/Move
			J Incidental Observation	AJ Won't Stop
			X Other	AK Won't Close
				AL Won't Open
				AM Won't Hold
				AN Won't Release
				AP Out of Limits
				AH Out of Adjustment
				AS Spurious Operation
				AT False Response
				XX Other

INITIATION & REVIEW

34. Originator _____ 35. Management Supv. _____ / 2/24/84 Date 36. SS Mgr. _____ / 2/24/84 Date

37. Q.C. Inspection Req. (Yes)/No/NA _____ (Q.C.) 2/27/84 Date

POST WORK CLEARANCE (If Work Tracking Form Not Used)

38. Man Hours: M _____ E _____ IC _____
Other _____

39. Work Comp/Def. Corr. _____ / _____ 40. _____ / _____
Worker Date Discipline Date

41. System Restored _____

Sys. No. 27 Nº 24580

Fig A-1

POWER AUTHORITY OF THE STATE OF NEW YORK
QUALITY CONTROL INSPECTION REPORT 1.0 QCIR # 84-0057

2.0 SITE LOCATION JAFNPP 6.0 W.R.E.D. 27/24580

3.0 SYSTEM NAME/NO. Containment Purge 7.0 QA CLASSIFICATION 1

3.1 COMPONENT NAME/NO. Torus Ring Header 8.0 MAT. REPLACEMENT REQ'D N/A

4.0 RESPONSIBLE DEPT./GROUP QC 8.1 MAT. CERTIFICATION REQ'D N/A

5.0 ACTIVITY LOCATION Torus 8.2 MAT. PURCH. ORDER NO. N/A

9.0 PROCEDURE TITLE/NO. NDEP 9.5.1

10.0 PREREQUISITES ACCOMPLISHED YES X NO ____ (IF NO, EXPLAIN UNDER REMARKS)

11.0 REASONS FOR ACTIVITY: Perform visual inspection of torus ring header in accordance with JOC-84-006, and G.E. SIL No. 402.

11.1 QC INSPECTION REQUIREMENTS:

Visual Inspection for cracks only in accordance with NDEP 9.5.1

12.0 WORK DESCRIPTION (INCLUDE MATERIAL AND COMPONENTS USED):

Inspection Only

13.0 POST WORK TEST REQUIREMENTS: None

14.0 POST WORK TEST(S) PERFORMED: N/A

15.0 TEST DATA: (Where filed) Attached

16.0 REMARKS: This inspection was limited to examining the Torus Ring Header and Torus Nitrogen Penetration for cracks only. The examination was limited to Torus bays P, O, & A only however other areas were inspected.

17.0 QC INSPECTOR: Richard L. Patch DATE/TIME: [illegible]

JAFNPP QUALITY CONTROL CHECKLIST

SYSTEM: 27

SUBSYSTEM:

COMPONENT: Torus Ring Header

WREQ: 84/24580

APPROVAL: J. H. Korkow
QC Supervisor

1-6-83
Date

CHECKLIST ATTRIBUTES:	SAT.	UNSAT	N/A	QC INSP.	DATE
1. QC Inspection (Prerequisites)					
* a) QC Inspector has approved checklist on job and has discussed it with personnel performing the work.	✓			R.P	3-4-84
* b) Ensure administrative procedure prerequisites, including initiation of work request, system mark-up, etc., are completed prior to commencement of work.	✓			R.P	3-4-84
* c) Ensure appropriate procedures and/or instructions have been developed, reviewed, and properly approved prior to commencement of activity.	✓			R.P	3-4-84
Note 1 d) Procedure and/or instruction manual available at work location.			✓	N/A	
e) Proper documentation for replacement parts on file.			✓	N/A	

* Shall be verified by Inspection Coordinator.

Procedures reviewed prior to performance of test. Due to climate in torus + ring header procedures were not available.

VISUAL DATA SHEET

UNIT: JAFNPP SYSTEM: 27 Instrument Piping COMPONENT: Recirc Ring Header

DESCRIPTION: Inspection of Header Piping welds, Downcomer attachment Welds

WELD ID: various PROCEDURE: UDCP 9.5.1 MATERIAL: C/S THICKNESS: varies TEST SURFACE: painted & first seam

NO. POSITIONS: 1 VT#: 1 [X] 2 [ ] 3 [ ] 4 [ ] 18% NEUTRAL GRAY CARD: YES [ ] NO [X]

GOVERNING CODE: B31.1 (1967) BOROSCOPE: YES [ ] NO [X]

ATTACHMENTS: YES [ ] NO [X] AUXILIARY LIGHTING: YES [X] NO [ ]

#1 REFERENCE: N/A SURFACE PREPARATION: YES [ ] NO [X]

INSULATED [ ] NON-INSULATED [X]

PREFORMED BY: Richard L. Patel ID#: B1182 LEVEL: II

PREFORMED BY: Chris Fiore ID#: C0636 LEVEL: III

LIMITED EXAMINATION: [ ] NO [X] YES (IF SO WHY) limited access to one side of OD torus ring Header.

POSITION A	POSITION B	COMPONENT NUMBER	DIRECT VISUAL EXAMINATION	REMOTE VISUAL EXAMINATION	INDICATION (INCHES) DISTANCE FROM A	INDICATION (INCHES) DISTANCE FROM B	INDICATION (INCHES) DISTANCE FROM 1	INDICATION (INCHES) DISTANCE FROM 2	SURFACE	DIMENSIONING CW / IN: DISTANCE FROM SURFACE IN.	DIMENSIONING CW / IN: POSITION (IN.) 1 A	DIMENSIONING CW / IN: POSITION (IN.) 2 B	DIMENSIONING CCW / OUT: DISTANCE FROM SURFACE IN.	DIMENSIONING CCW / OUT: POSITION (IN.) 1 A	DIMENSIONING CCW / OUT: POSITION (IN.) 2 B	REMARKS
		Ring header ID bags P.C.N	X													No Cracks
																No Cracks
		Ring header OD in bags P.C.N	X													No Cracks
		Nitrogen location inside of torus	X													
		Examination Results							Satisfactory							No Cracks Found.

REVIEWED BY: C. Kent LEVEL: III DATE REVIEWED: 3-8-84 FIGURE NO.: Not

WRED NO.: 27/2458Q DATA SHEET NO.:

SH-JAF-82-003

Georgia Power Company
333 Piedmont Avenue
Atlanta, Georgia 30308
Telephone 404 526-6526

Mailing Address
Post Office Box 4545
Atlanta, Georgia 30302

L. T. Gucwa
Manager Nuclear Engineering
and Chief Nuclear Engineer

John Z - for your info -
George Rivenbark
4/20/84

Georgia Power
the southern electric system

NED-84-177

April 5, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
EDWIN I. HATCH NUCLEAR PLANT UNITS 1, 2
STATUS OF SIL 402, "WETWELL/DRYWELL INERTING"

Gentlemen:

The purpose of this letter is to report the status of Plant Hatch with respect to the recommendations of Service Information Letter (SIL) 402, which was issued by General Electric in response to the vent header cracking discovery at Hatch Unit 2. The specific recommendations of SIL 402, as well as the actions taken at Plant Hatch, are as follows:

Recommendation 1 - Evaluate Inerting System Design

"Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment."

Status

An evaluation of the Plant Hatch nitrogen inerting system design has been performed. In order to prevent the injection of cold nitrogen (less than 50°) into the Unit 1 or Unit 2 containment, a redundant temperature switch controlling the low temperature shutoff valve was added. The nitrogen ports in the Units 1 and 2 drywell and the Unit 1 wetwell (torus) are presently oriented such that no essential equipment is in the path of injected nitrogen. The nitrogen port in the Unit 2 torus is being relocated to a point where injected nitrogen will not impinge on essential equipment.

8405220204

This modification will be complete by the end of the current Unit 2 outage.

Recommendation 2 - Evaluate Inerting System Operation

"Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented."

Status

Operating experience and plant procedures related to use of the nitrogen inerting system have been reviewed. Operating experience indicates that malfunctions of the nitrogen inerting system have occurred. The modifications being made will eliminate future malfunctions. Plant procedures have been verified to contain adequate instructions for calibration, maintenance, and operation of the nitrogen inerting system. Cold nitrogen injection would be detected and prevented by the automatic shutoff feature of the inerting system. Operators would be alerted to the low nitrogen temperature condition by an annunciator. Plant personnel will monitor local nitrogen temperature indicators during future inerting operations to provide further assurance that a malfunction would be promptly detected.

Recommendation 3 - Test for Drywell/Wetwell Bypass Leakage

"Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure; pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists."

Status

Immediately following discovery of the vent header cracking in Unit 2, a bypass leakage test was performed on Unit 1 in accordance with the existing plant procedure. Leakage was found to be within the Technical Specification limit, indicating that no gross failure of the vent system existed. A similar test will be performed on Unit 2 at the end of the outage which is currently in progress in accordance with Unit 2 Technical Specifications.

Recommendation 4 - Inspect Nitrogen Injection Line

"Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen."

Status

Visual inspection and limited magnetic particle testing have been performed on all accessible welds of the Units 1 and 2 nitrogen injection lines from the containment penetrations to the inboard isolation valves. No indication of cracking was found. Ultrasonic testing of these welds and the containment shell in the vicinity of the penetration were not performed due to a lack of base line examination data. Alternative inspection techniques are under consideration.

Recommendation 5 - Inspect Containment

"During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration."

Georgia Power

Status

Visual inspections of Hatch Units 1 and 2 have been performed. All equipment which could be affected by the injection of cold nitrogen, including the vent headers (inside and outside), downcomers, and the containment shell in the vicinity of the nitrogen penetrations, was inspected. No cracking was found other than that on the Unit 2 torus vent header. The extent of the damage, as well as the plans for repair, have been communicated to the NRC. The repairs will be complete by the end of the current outage.

Please contact this office if there are any questions.

Very truly yours,

L. T. Gucwa

JH/mb

xc: H. C. Nix, Jr.
J. P. O'Reilly (NRC- Region II)
Senior Resident Inspector

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-4502

JOHN S. KEMPER
VICE-PRESIDENT
ENGINEERING AND RESEARCH

SEP 26 1984

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Docket Nos.: 50-352
50-353

Subject: Limerick Generating Station, Units 1 & 2
Liquid Nitrogen Inerting System

References: 1) I.E. Bulletin No. 84-01, dated 2/3/84
2) GE Service Information Letter No. 402, dated 2/14/84
3) I.E. Information Notice No. 84-17, dated 3/5/84

File: GOVT 1-1 (NRC)

Dear Mr. Schwencer:

The reference documents discuss concerns over the use of liquid nitrogen type inerting systems at BWR plants with Mark I and II containment designs. These concerns were generated by events at Georgia Power Company's Hatch Unit 2, when very cold nitrogen (either liquid or gaseous) was injected into the torus air space. The injection stream impinged directly upon the torus vent header, initiating brittle failure of the steel used in the header. The portions of the reference documents that are applicable to Limerick recommend evaluation of the liquid nitrogen vaporization system design and operation.

The Limerick design specifically included consideration of the potential hazards of handling liquid nitrogen as discussed in FSAR Section 9.4.5.1. The liquid nitrogen vaporization and containment inerting systems at Limerick are essentially identical to those in use at Peach Bottom Atomic Power Station. A detailed review of the Limerick design and relevant Peach Bottom operating experience has been completed. As a result of this review, the following modifications have been identified for completion prior to the inerting of the Limerick containment (6 months after initial criticality per Technical Specification 3.10.5):

- replace and relocate the existing low temperature switch to improve response time and eliminate the adverse impact of cold outdoor ambient temperatures

- remove existing manual bypass around low temperature shutoff valves

8410020402

- provide an automatic low temperature isolation signal to the inerting line containment isolation valves
- provide an ambient vaporizer and a topping heater to eliminate dependence on auxiliary steam for low flow operation
- provide control room indication of the temperature of the nitrogen gas being supplied to the containment.

The completion of these modifications will provide added assurance that liquid nitrogen related failures will not occur at Limerick.

Sincerely,

John S. Kemper

JHA/cmv/09248405

cc: See Attached Service List

cc: Judge Lawrence Brenner
Judge Peter A. Morris
Judge Richard F. Cole
Judge Christine N. Kohl
Judge Gary J. Edles
Judge Reginald L. Gotchy
Troy B. Conner, Jr., Esq.
Ann P. Hodgdon, Esq.
Mr. Frank R. Romano
Mr. Robert L. Anthony
Ms. Maureen Mulligan
Charles W. Elliot, Esq.
Zori G. Ferkin, Esq.
Mr. Thomas Gerusky
Director, Penna. Emergency Management Agency
Angus R. Love, Esq.
David Wersan, Esq.
Robert J. Sugarman, Esq.
Martha W. Bush, Esq.
Spence W. Perry, Esq.
Jay M. Gutierrez, Esq.
Atomic Safety & Licensing Appeal Board
Atomic Safety & Licensing Board Panel
Docket & Service Section
Mr. James Wiggins
Mr. Timothy R. S. Campbell

Paulette 5449

Shea

NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 666-6911

May 8, 1984

Docket No. 50-245
A03807

Director of Nuclear Reactor Regulation
Attn: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

References: (1) R. C. DeYoung letter to All Boiling Water Reactor nuclear power reactors, dated February 3, 1984 (IE BULLETIN NO. 84-01)

(2) T. J. Dente letter to BWR Owners' Group Primary Representatives, dated February 15, 1984.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 1
Containment Vent Header Cracks

N2 purge

In Reference (1) the Staff notified owners of Boiling Water Reactors (BWRs) of actions to be taken in response to the through wall crack which appeared in the vent header within the containment torus at Hatch Unit 2. Since Millstone Unit No. 1 was operating at the time no action was required of Northeast Nuclear Energy Company (NNECO). Nonetheless, we did review plant data on differential pressure between the wetwell and drywell. No anomalies indicative of cracks were found. We also reviewed the orientation of the nitrogen injection line with respect to the vent header. The penetration that provides nitrogen injection to the torus is not located directly above the vent header but is about 10 feet offset from the vertical centerline of the 29.5 foot diameter suppression chamber and therefore is not configured the same as Hatch Unit 2.

In Reference (2) the Regulatory Response Group suggested informing the Staff of the expected completion dates for each of the General Electric SIL No. 402 recommended action items. These are given below.

1) Evaluate Inerting System Design

NNECO plans to complete this item by January 1, 1985.

2) Evaluate Inerting System Operation

NNECO plans to complete this item by October 1, 1984.

8405210155

3) Test for Drywell/Wetwell Bypass Leakage

Millstone Unit No. 1 maintains a drywell to wetwell differential pressure during normal operation. A review of plant operating data reveals no anomalies and very little leakage from the drywell to wetwell. This clearly indicates there has been no failure similar to that described in Reference (1).

4) Inspect Nitrogen Injection Line

NNECO will be performing a visual inspection of the nitrogen injection line and conducting Integrated Leak Rate Test of the containment during the 1984 refueling outage. Several years ago Millstone Unit No. 1 experienced an incident where liquid nitrogen caused cracking of the welds in the atmosphere control piping that serves as the torus nitrogen injection point. The nitrogen injection system was subsequently redesigned to prevent the injection of cold nitrogen, the welds were repaired, and the system welds were UT inspected. We therefore take the position that a UT of this sytem is unnecessary at this time.

5) Inspect Containment

During the 1984 refueling outage NNECO will be performing a visual inspection of the vent header, downcomers, and other equipment in the containment which might be affected by the injection of cold nitrogen.

Should you have any questions please feel free to contact us.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

W. G. Counsil
Senior Vice President

Northern States Power Company

414 Nicollet Mall
Minneapolis, Minnesota 55401
Telephone (612) 330-5500

September 14, 1984

Director
Office of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Implementation of Recommendations in General Electric Service Information Letter No. 402

The purpose of this letter is to provide, for the information of the NRC Staff, a description of actions taken to implement recommendations contained in General Electric Service Information Letter (SIL) No. 402 related to vent header cracking. All applicable recommendations of this SIL will be implemented by Northern States Power Company.

The following actions have been taken, or are planned, with respect to the recommendations in SIL No. 402:

1. Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40° F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperaure shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Status

The orientation of the nitrogen port relative to the vent header downcomers, and other equipment in the wetwell and drywell has been investigated (Figures 1,2,3). We believe existing plant design is adequate in this area.

Evaluation of the temperature monitoring devices, low temperature shutoff valve and the overall system design is underway. This evaulation will be completed and documented prior to plant startup (i.e. prior to inerting system operation).

The nearest structure to the torus nitrogen injection penetration is the torus monorail at a distance of

sixteen inches below the penetration.

The torus catwalk handrail is the next closet structure at a distance of seven feet-four inches. The vent header is a distance of approximately eight feet.

Monticello also has nitrogen injection into the drywell. The attached sketch show the drywell injection port location. The nearest structure to the drywell injection penetration is a drywell fan unit housing. The fan unit housing is located five inches to the side of the nitrogen injection penetration and does not obstruct the flow from the penentration. The drywell fan motor support is the next closest structure to the penetration. This vertical I-beam support is at a distance of approximately one foot from the penetration opening.

2. Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evalulate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

Status

Preliminary investigation and discussions with operations personel has revealed that during early plant operation the inerting system vaporizer discharge line has frozen on several occasions during inerting system operation. Design Change 76M017 was completed in 1976 to correct deficiencies in the vaporizer temperature control. The design change and adherance to the inerting procedure appears to have eliminated this problem.

A complete investigation of plant calibration records, maintenance and operating procedures will be completed and documented prior to plant startup.

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. The test should be conducted during plant operation following normal plant procedures. If no procedures exist, the followng is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the

drywell-wetwell pressure difference. This will provide an indicaton that the vent system integrity is intact and that no grosse failure exists.

Status

The Monticello Nuclear Generation Plant was in the process of shutting down for a planned refueling/maintenance outage when IE Bulletin 84-01 was telecopied to the plant. Monticello performed a visual inspection of the vent header, downcomers, and other equipment in the containment which could be affected by the injection of cold nitrogen. Because Monticello was in cold shutdown and visual inspection was performed, a bypass leakage test was not necessary.

4. Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetrations. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Status

Ultrasonic inspection of all welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations, including a 6-inch diameter around the penetrations, was performed. No signs or indications of low temperature induced defects were found. However, two non-related indications were found. One appears to be a pipe manufacturing defect on a 6-inch combustible gas control system (CGCS) return line. This piping is being replaced prior to plant startup. The other defect is in the drywell purge penetration (X-26) weld. The defect appears to be lack of fusion on the initial root pass. This defect is currently being analyzed to determine required actions. In addition to the recommendation UT examination, a visual inspection of all accessible welds and piping of the inerting system was conduted. No signs or indications of any low temperature induced defects were found.

5. Inspect Containment

During the next planned outuage, perform a visual inspection of the vent header, downcomer and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside Also inspect the containment shell or steel liner for at least 6 inches

around the nitrogen penetration.

Status

As stated in recommendation 3 status, a visual inspection of the vent header, downcomers, and all other equipment in the containment which might be affected by the injection of cold nitrogen was conducted. No indication of cracking was found.

Please contact us if you have any questions related to the actions we have taken in response to this issue.

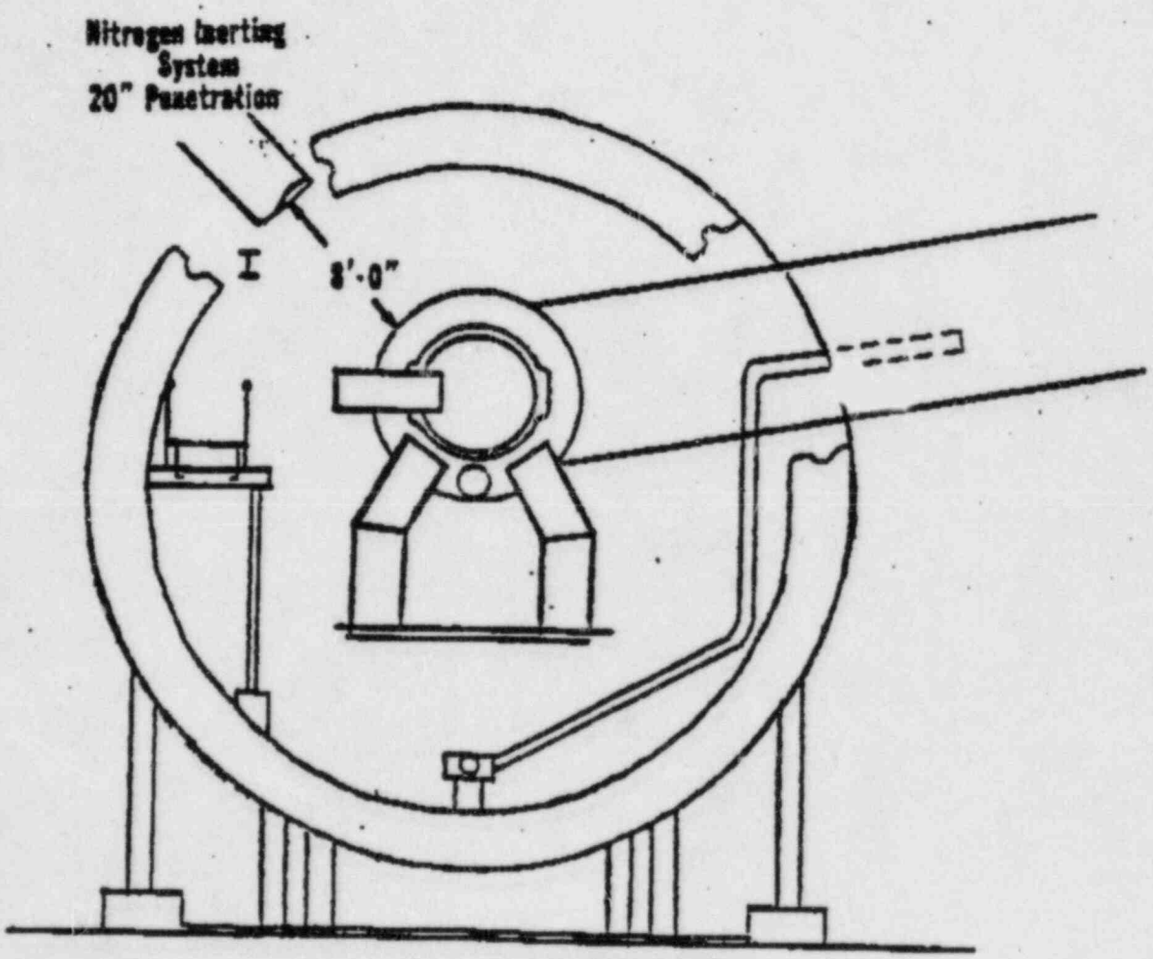
David Musolf
Manager - Nuclear Support Services

DMM/le

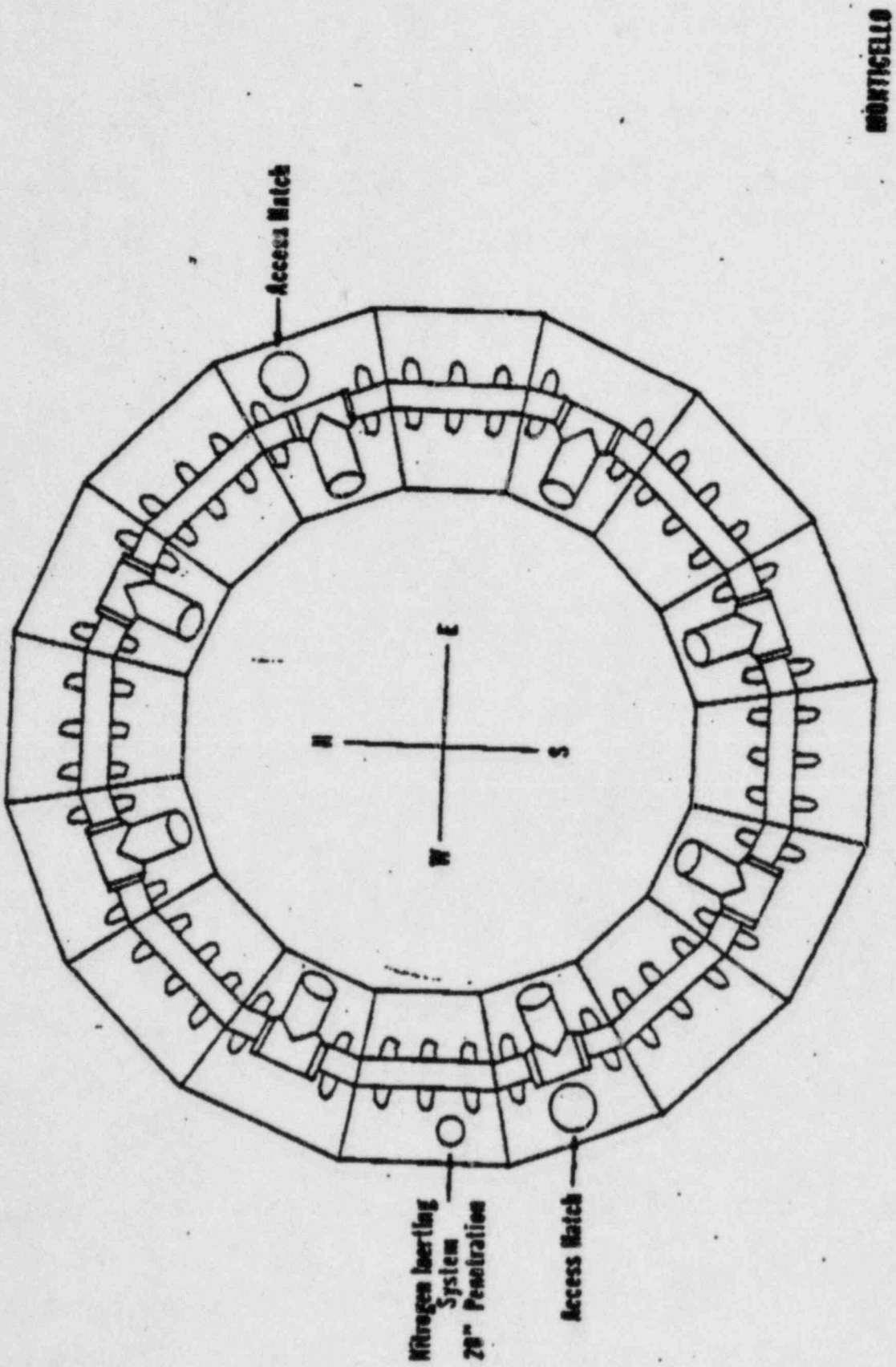
cc: J G Keppler
G Charnoff
NRR Project Manager, NRC
NRC Resident Inspector

Attachment

Director of NRR
September 14, 1984
Figure 1

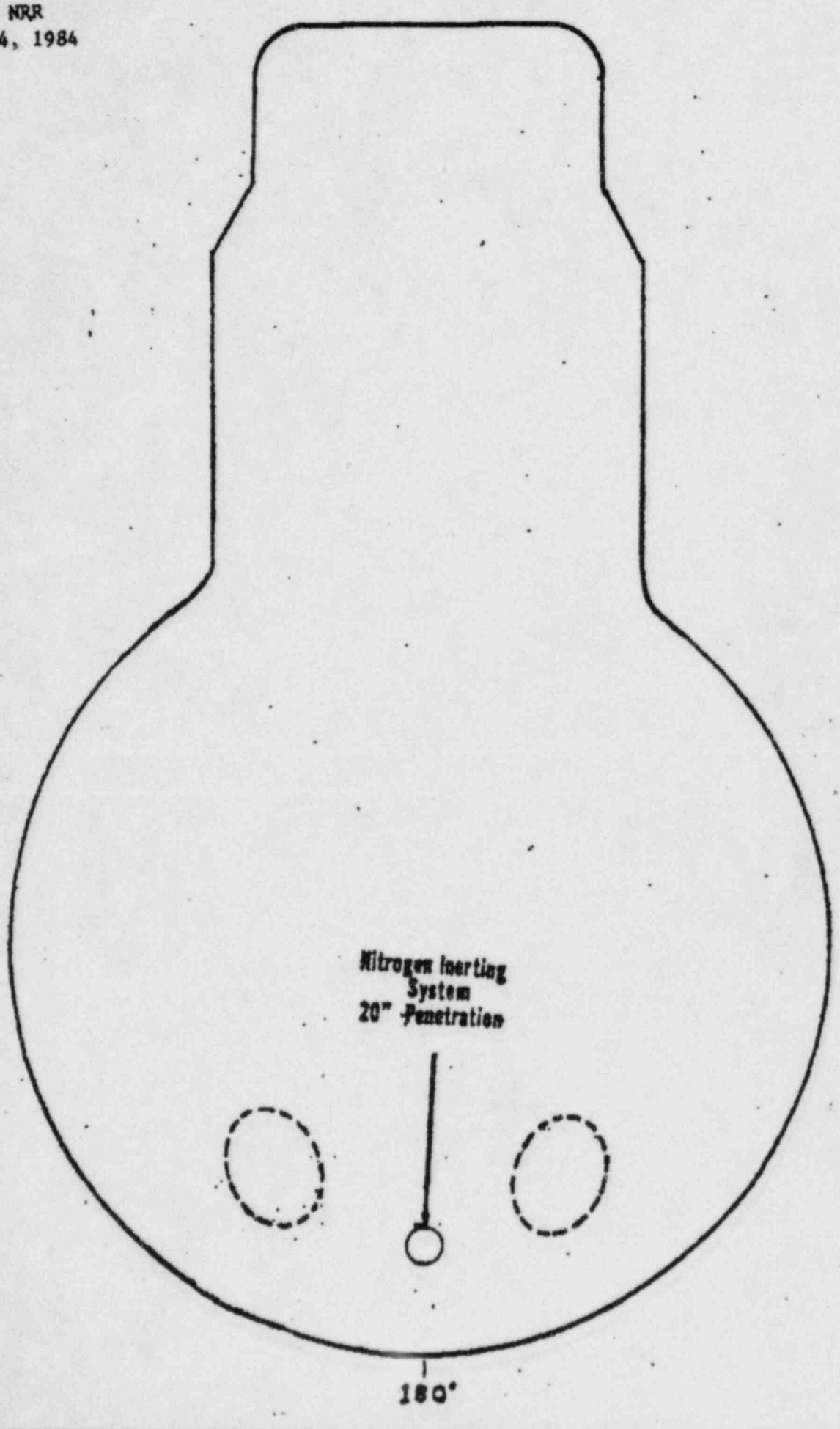


MONTICELLO


MONTICELLO
Access Hatch
E
N
S
W
Nitrogen Inerting System 28" Penetration
Access Hatch

MONTICELLO

Director of NRR
September 14, 1984
Figure 3



NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST SYRACUSE N.Y. 13202/TELEPHONE (315) 474-1511

September 17, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Dear Mr. Vassallo:

As previously discussed with members of your staff, Niagara Mohawk has completed the recommendations of I.E. Bulletin 84-01, "Cracks in Boiling Water Reactor Mark I Containment Vent Headers" and General Electric Service Information Letter (SIL) Number 402, "Wetwell/Drywell Inerting." Our responses to recommendations contained in these documents are presented in Attachment 1.

Sincerely,

NIAGARA MOHAWK POWER CORPORATION

C. V. Mangan
Vice President
Nuclear Engineering and Licensing

RJP/bd
Attachment

8409240227

ATTACHMENT 1

Specific Actions To Address
I.E. Bulletin 84-01 "Cracks in Boiling Water
Reactor Mark I Containment Vent Headers" and
General Electric Service Information Letter (SIL)
Number 402, "Wetwell/Drywell Inerting"

I. I.E. Bulletin 84-01, "Cracks and Boiling Water Reactor Mark I Containment Vent Headers."

A. Recommendation:

"Although not a requirement of this bulletin, Boiling Water Reactor plants that are currently operating which have Mark I type containments should review their plant data on differential pressure between the wetwell and drywell for anomalies that could be indicative of cracks. Any such anomalies should be reported to the NRC in accordance with 10CFR50.72 and 10CFR50.73."

Response:

Following receipt of the bulletin, the Plant Technical Staff evaluated plant data as requested. Chart recordings of drywell and wetwell pressures during the past several years were reviewed. The results of that evaluation indicated no anomalies.

II. General Electric Service Information Letter (SIL) Number 402, "Wetwell/Drywell Inerting."

A. Recommendation 1 - Evaluate Inerting System Design:

"Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment."

Response:

A system evaluation was performed by a consultant. The evaluation was performed to determine the system's ability to prevent an inadvertent discharge of liquid nitrogen into the containment and included a review of operating and maintenance experience. The evaluation included all nitrogen lines penetrating the primary containment.

Containment Make-up and Atmosphere Dilution System

The results of this evaluation indicated that, the system design has no automatic means of shutting off nitrogen flow. But, low temperature alarms alert the control room operators of system abnormal conditions.

The report further evaluated system performance using minimum normal ambient conditions and the system design flow rate of 100 scfm. It showed the heat transferred to the nitrogen from surrounding ambient air, and containing pipe would maintain nitrogen temperature above 40°F for approximately twenty-two (22) minutes.

The evaluation further recommended adding the capability to shut off nitrogen flow in these lines upon detection of low temperature either automatically or with administrative controls. This recommendation is currently under review.

Nitrogen Inerting System

This system is designed to inert the primary containment atmosphere during start-up operations. The system evaluation indicated that the system design has neither automatic means of shutting off nitrogen flow or low temperature alarms. The usual practice of continuously monitoring the nitrogen temperature locally at the nitrogen panel during inerting operation has been incorporated in the operating procedure for the system. The operator is instructed to secure via a manual valve nitrogen flow if the indicated temperature falls below 50°F. The report concludes that this operational procedure is sufficient to safeguard against injection of cold nitrogen into the containment during containment inerting.

Other Lines

The report indicated nitrogen flows in the other lines were low enough that low nitrogen temperature effects were negligible, but recommended monitoring the temperature of the nitrogen used for purging and operating the Traveling In Core Probe system to confirm this conclusion. This monitoring is unnecessary because the nitrogen purge of the Traveling In Core Probe tubing within the primary containment is supplied from gaseous nitrogen bottles and therefore no cold nitrogen is present. Finally, although the liquid nitrogen system is used to purge the Traveling In Core Probe cabinets located in the reactor building, the system is vented so there is low probability of liquid nitrogen reaching the containment penetration.

Recommendation 2 - Evaluate Inerting System Operation:

"Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented."

Response:

In addition to the system evaluation discussed above, plant applicable data was reviewed by the Plant Technical Staff. No abnormal maintenance or operational activities were noted.

Recommendation 3 - Test for Drywell/Wetwell Bypass Leakage:

"Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists."

Response:

See Bulletin 84-01 response I.A. above.

Recommendation 4 - Inspect Nitrogen Injection Line:

"Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen."

Response:

Ultrasonic tests of accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations were performed during the 1984 refueling outage. No cracks were found.

Recommendation 5 Inspect Containment:

"During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration."

Response:

A visual inspection of the vent header was performed during the 1984 refueling outage. This inspection included the inside and outside of the vent header and the containment shell around the nitrogen penetration. No cracks were found.

GPU Nuclear Corporation
Post Office Box 388
Route 9 South
Forked River, New Jersey 08731-0388
609 971-4000
Writer's Direct Dial Number:

September 14, 1984

Dr. Thomas E. Murley, Administrator
Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Dr. Murley:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
IE Bulletin 84-01 Supplemental Information

Our letter to you dated February 10, 1984 provided a response to the subject Bulletin concerning"Cracks in Boiling Water Reactor Mark I Containment Vent Headers". In that letter we indicated, based upon inspection results, that cracks in potentially affected piping were not evident at Oyster Creek. The purpose of this letter is to inform you of the program we have initiated to address the concerns of General Electric Co. (GE) SIL No. 402 and our implementation schedule. Responses to the five (5) recommendations made in the GE SIL are as follows:

1. Evaluate Inerting System Design

An evaluation of the nitrogen inerting system design has been initiated. The potential for introducing cold nitrogen gas or liquid into the drywell and wetwell will be investigated. Completion of this evaluation is expected during cycle 10 operation and any modifications identified will be performed during the Cycle 11 refueling outage. We have previously determined that the nitrogen injection port (vacuum breaker line) for the wetwell is offset from the wetwell centerline.

2. Evaluate Inerting System Operation

Difficulty has been experienced with nitrogen inerting system operation in the past. The operational difficulties resulted in the inability to achieve adequate nitrogen gas flow rate for timely inerting immediately prior to power operation on several occasions. During the summer of 1982 system problems were diagnosed and corrective actions implemented which have greatly improved its operation. In addition, additional terms and conditions were included in the purchase order for the nitrogen supply system which is vendor-owned and maintained.

1/0

Tnese include a quarterly inspection and service coordinated and verified by GPU Nuclear personnel. A report of as-found and as-left equipment condition, parts changed and modifications installed during servicing is required. An annual statement of the working condition of the nitrogen supply equipment is also required.

Appropriate temperature limits for nitrogen injection into containment are incorporated in plant procedures. Nitrogen inerting system monitoring instrumentation (temperature, pressure and flow rate) are calibrated and maintained by plant personnel in accordance with plant procedures. These indications are provided in the control room.

3. Test for Drywell/Wetwell Bypass Leakage

A bypass leakage test will be performed prior to startup from the current outage in conjunction with the Integrated Leak Rate Test.

4. Inspect Nitrogen Injection Line

A total of fifty-two (52) out of sixty (60) welds have been inspected from the last isolation valve up to the drywell and wetwell penetrations. Two of the welds were radiographed while the remainder were inspected ultrasonically. The eight (8) remaining welds were either inaccessible or could not be adequately tested using these methods (these were one inch and smaller socket weld pipe fittings). The inspection results were found acceptable.

5. Inspect Containment

Visual inspection of applicable components in the wetwell has been performed as described in our February 10, 1984 letter.

If you should have any questions regarding the above, please contact the undersigned or Paul F. Czaya at (609)971-4893.

Very truly yours,

Peter B. Fiedler
Vice President and Director
Oyster Creek

PBF/dam

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

Mr. Walter A. Paulson, Acting Chief
Operating Reactors Branch No. 5
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

NRC Resident Inspector
Oyster Creek Nuclear Generating Station
Forked River, NJ 08731

PHILADELPHIA ELECTRIC COMPANY

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PHILADELPHIA, PA. 19101

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SHIELDS L. DALTROFF
VICE PRESIDENT
ELECTRIC PRODUCTION

March 30, 1984

Docket No. 50-277
50-278

Dr. Thomas E. Murley
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

SUBJECT: Information Relative to I.E. Bulletin 84-01, Entitled Cracks in Boiling Water Reactor Mark I Containment Vent Headers

Dear Dr. Murley:

On February 5, 1984, as a result of a report from Georgia Power that a complete, circumferential, through wall crack had been found in the Hatch Unit 2 vent header, Philadelphia Electric Company performed primary containment drywell to torus bypass tests on Peach Bottom Unit 2 and Unit 3. On February 17, 1984, in a letter to all BWR Owners, the Regulatory Response Group (RRG) distributed a General Electric Company SIL No. 402, Wetwell/Drywell Inerting, and recommended that the utilities take action on the SIL recommendations. This letter will give results of the drywell to torus bypass tests performed and provide information as to the status of each of the GE SIL No. 402 recommended actions.

The General Electric SIL No. 402 recommended that five actions be taken. The five recommendations and the current status of each are listed below.

Recommendation 1

Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40 degrees F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response

The design of the Peach Bottom liquid nitrogen facility is similar to that employed at Hatch and is typical of systems which are in widespread commercial use. These systems utilize a water bath vaporizer heated by auxiliary steam. Water bath temperatures are regulated by a temperature control valve in the steam supply line.

At Peach Bottom all liquid nitrogen supply equipment is located outdoors. A temperature switch (TS-6536) is provided in the vaporizer discharge line to protect downstream equipment from high or low temperatures (setpoints 50 degrees F and 150 degrees F). This temperature switch controls shutoff valves in the supply lines.

The outdoor installation of TS-6536 has occasionally caused operational problems which have the potential to compromise the protective function provided by this switch. During cold weather operation, the system cannot be started without bypassing the automatic shutoff valve and/or adjustment of the low temperature setpoint. On at least one occasion (Winter 1976-77, with ambient temperature below freezing), the 6" carbon steel piping downstream of TS-6536 failed as a result of liquid nitrogen entering the piping. This failure occurred in the piping near the vaporizing equipment approximately 400 feet from the Unit 2 primary containment and 600 feet from the Unit 3 primary containment. We have found no evidence of adverse low temperature effects on the containment isolation valves or piping in our review of integrated and local leak rate test results.

The physical arrangement of Peach Bottom torus inerting penetrations is such that liquid nitrogen and/or cold gases

would not impinge directly on any downcomer or the vent header, as was the case at Hatch 2. The 20-inch diameter inerting penetrations have recently been provided with debris screens supported by carbon steel structures. If very cold gases (on the order of minus 50 degrees F) were introduced through these lines, it is likely that these carbon steel structures would fail. The continued use of the current low temperature setpoint of TS-6536 (i.e., 50 degrees F) will preclude any low temperature failure problems.

A detailed review of system reliability and alternatives for improvement will be completed by the Mechanical Engineering Division of the Engineering and Research Department of PECo within three months. Schedules for completion of any additional system improvements, if required, will be developed as part of this effort.

Recommendation 2

Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

Response

The system has had operating problems in the past as identified in Response 1 above. During the week of March 26, 1984, the vaporizer, low temperature shutoff valve, and the low temperature switch were verified to be functioning properly. To assure that this system operates properly in the future, the system will be functionally tested once a year.

The operating procedures for this system are under review and they will be updated if necessary by April 30, 1984. The operator requalification training program will be updated to include instructions on proper operation of this system. Assurance that cold nitrogen injection will be detected and prevented is under the scope of the design review referenced in Response 1 above.

Recommendation 3

Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell/wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

Response

On February 5, 1984, drywell to torus bypass tests were successfully performed on both Peach Bottom Units 2 and 3 using existing surveillance tests 12.6-1 and 12.6-2. These tests verified that the total leakage area that would allow drywell atmosphere to enter the torus free air volume directly (without passing through the torus water) was less than a one-inch diameter hole. The applicable technical specification 4.7.A.4.d limit at Peach Bottom is a one-inch diameter hole.

Recommendation 4

Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also, UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Response

On February 24 and 25, 1984, Maintenance Division personnel visually inspected the containment inerting piping from the outer isolation values to the purge nozzles (which connects to the torus and drywell) at Peach Bottom Units 2 and 3. The visual inspection revealed no evidence of leakage or cracks.

The Licensee has reviewed the above recommendation to perform a UT inspection on both the drywell and torus injection lines. At Peach Bottom, containment inerting is performed almost entirely through the torus injection line. It is believed that if a problem exists at Peach Bottom with the nitrogen injection piping, it would most likely occur in the torus injection line and not in the drywell injection portion of this piping. The Licensee, in an effort to reduce man rem exposure and dollars associated with the complete recommended inspection, has chosen to perform an ASME, Section XI, examination of all welds in the nitrogen injection line from the last isolation values to the torus penetration, the containment penetration and the containment shell within 6 inches of the penetration. The scope of this inspection will be increased to include the drywell injection portion of this piping if any welds fail the planned Section XI examination. This inspection will be completed on Unit 3 by April 30, 1984, and on Unit 2 by the end of the refueling outage scheduled to begin April 27, 1984. During the Unit 2 outage, portions of this pipe will be replaced under the scope of a modification unrelated to this issue. Only welds in the section of pipe not being replaced will be examined under the scope of this review.

Recommendation 5

Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least six inches around the nitrogen penetration.

Response

An inspection of the Unit 2 torus ring header was performed by the site test engineer group on February 20, 1984.

The ring header internals were inspected first. A 360 degree visual inspection was performed. The ring header and downcomers were found to be intact with no evidence of structural deterioration due to cold nitrogen.

In addition, entry was made into the torus proper for inspection of the external portion of the ring header. Again, a 360 degree inspection was performed. The ring header and downcomers were found to be intact with no evidence of structural deterioration.

Finally, a visual inspection was performed of the nitrogen injection penetration into the torus. The area around the injection line were found to be intact with no evidence of deterioration. The injection line terminates in the torus airspace at approximately two o'clock on the circumference of the torus and 9 feet above normal water level. Any liquid coming through the line would spill into the torus water through the catwalk grating, avoiding any other structural components.

As a result of this inspection, a discrepancy associated with Mark I containment modifications made in March of 1982 was uncovered. During the inspection of the inside of the primary containment vent header, a gouge was discovered at the first downcomer pair in torus bay 4, just above the inboard (reactor side) downcomer. The gouge measured approximately 3/4" long and 3/8" wide; and, although it was through the wall of the vent header, it did not open into the torus airspace due to the presence of a pad plate welded to the outside of the vent header. The gouge was repaired by grinding down to sound metal and weld repairing. Surface and volumetric examinations were performed.

It was concluded, based on the location of the gouge relative to the pad plate, that the vent header was gouged due to a welder error when the pad plate was installed on the vent header in March, 1982, as part of a modification to the torus.

As a result of this finding, a 100% visual inspection was performed of weld areas at other downcomer locations. Minor surface defects at 4 locations were found. The visual survey confirmed that the original gouge was an isolated occurrence.

Bechtel Power Corporation has completed a structural analysis of the vent header at the gouge location and has concluded that the integrity of the header was not degraded for either the normal operating or accident conditions. Bechtel has also confirmed that the minor surface defects found on the inside of the vent header are also not a structural concern.

The recommended inspection will be performed on Unit 3 during the next planned outage of sufficient duration that requires the containment to be de-inerted.

If you have any further questions, please do not hesitate to contact us.

Very truly yours,

cc: A. R. Blough, Site Inspector

T. J. Dente, Chairman
Regulatory Response Group
Northeast Utilities
P.O. Box 270
Hartford, CT 06101

BOSTON EDISON COMPANY
800 BOYLSTON STREET
BOSTON, MASSACHUSETTS 02199

WILLIAM D. HARRINGTON
SENIOR VICE PRESIDENT
NUCLEAR

September 14, 1984
BECo 84-150

Dr. Thomas E. Murley
Regional Administrator
Office of Inspection and Enforcement
Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

License No. DPR-35
Docket No. 50-293

Dear Sir,

In actions related to the event described in IE Bulletin No. 84-01 "Cracks in Boiling Water Reactor Mark I Containment Vent Headers" Boston Edison Company (BECo) hereby endorses the recommendations of General Electric Service Information Letter (SIL) No. 402. The SIL No. 402 recommendations are reproduced below followed by our specific responses.

1. Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the nitrogen plume. Assure that the temperature monitoring devices, the low temperature cutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response

Plant design documents were reviewed to determine the adequacy of the nitrogen inerting system design. The evaluation shows that the design is adequate for temperature regulation and control of nitrogen entering the torus. The liquid nitrogen supply valve to the nitrogen vaporizer will close on low heating water outlet temperature from the vaporizer or low nitrogen outlet temperature. Nitrogen outlet temperature is maintained at 70°F. The evaluation further shows that there is a potential for nitrogen to impact the torus wall only. Inspections of the affected torus wall are addressed in Recommendation No. 4.

The design for the emergency makeup mode does not have any low temperature cutoff valves for the portion of the system through which the emergency makeup nitrogen would be injected to the drywell and torus. Plans will be formulated to evaluate whether system design changes are warranted. But, the small amount ($\approx$60 cfm) of nitrogen that will be injected in this mode, factored with the frequency that this mode of injection will be required, reduces the potential for damage to plant components, as described in SIL No. 402.

2. Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature cutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

Response

Inerting system operation is controlled by approved plant procedures. Our evaluation shows that adequate procedural controls existed to assure proper system operation prior to the time of the events described in SIL No. 402. The operations procedures required temperature control of the nitrogen at the outlet of the nitrogen vaporizer to be greater than or equal to 70°F when inerting. During the present refuel outage system modifications were made which were planned prior to the events described in SIL No. 402 and were approved for implementation by the NRC as part of the Long Term Program. Subsequently, these modifications were evaluated in response to Recommendation No. 1 above to assure that the temperature monitoring device, low temperature cutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment. Pre-operational testing prior to system turnover will demonstrate the adequacy of the calibration, maintenance and operating procedures to assure that the modified system functions properly.

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this pressure difference and measure the makeup flow required to do so. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the makeup flow rate and the drywell-wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

Response

During normal operation Pilgrim Station operates with a ΔP of 1.2 psi between the drywell and torus. Any significant changes in the makeup to the drywell and venting from the torus would be noted by surveillance procedures.

Furthermore, drywell to torus leak rate tests are required by our Technical Specifications to be conducted on a quarterly basis as well as during every refueling outage. These tests also confirm the integrity of the vent system. Successful test results in the past obviate the need to conduct a special bypass leakage test. The periodic Technical Specification required tests provide reasonable assurance that any indications of gross failure of the vent system would be identified in the future.

4. Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Response

All welds in the nitrogen injection lines from the innermost isolation valves to the drywell and torus penetrations were UT examined. The 20 inch piping between the innermost and outermost isolation valves was not UT examined. This piping was replaced during the current refueling outage due to a system modification. The remaining welds in the nitrogen injection lines between the innermost and outermost isolation valves were UT examined with one exception. The welds in the 1 inch normal makeup lines were not UT examined because these welds are socket welds which do not facilitate UT examination. In lieu of UT examination these welds were visually examined. The torus shell was UT examined from the nitrogen inlet nozzle to a distance of 6 inches below the nozzle. The drywell liner was not UT inspected based on the results of the visual inspection of the inlet deflector, as described in Recommendation No. 5. The inlet deflector, because of its design orientation, is subject to the most severe conditions resulting from nitrogen injection. The results show that no indications were found which could be attributed to a faulty nitrogen inerting system.

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

Response

A visual inspection of the outside of the vent header and the main vent lines adjacent to the nitrogen injection lines was conducted to satisfy the requirements of IE Bulletin No. 84-01. All surfaces and welds were found to be acceptable. It is BECo's position that an internal visual inspection of the vent header is not warranted unless cracking in the inlet piping was found. The inlet deflector for the nitrogen injection line to the drywell was visually inspected and found to be in acceptable condition. Inspection of the torus shell and drywell lines have been previously addressed in Recommendation No. 4.

BECo feels that our responses to each of the above items confirm that equipment damage has not occurred and that inerting system operation is proper. Should you have any further questions on this issue, please contact us.

Very truly yours,

W D Harrington

TFF/ns

VERMONT YANKEE
NUCLEAR POWER CORPORATION

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REPLY TO:
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TELEPHONE 617-872-8100

September 14, 1984
FVY 84-110

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

Attention: Office of Nuclear Reactor Regulation
Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
Division of Licensing

References:
(a) License No. DPR-28 (Docket No. 50-271)
(b) Letter, T. J. Dente (BWROG) to D. G. Eisenhut (USNRC), BWROG-8408, dated April 6, 1984
(c) General Electric SIL No. 402, dated February 14, 1984
(d) IE Bulletin 84-01, dated February 3, 1984

Subject: Documentation of Vermont Yankee Actions- In Response To General Electric SIL No. 402

Dear Sir:

Reference (b) provided documentation of the Regulatory Response Group's (RRG) investigation into the cause of the Hatch-2 torus vent header crack. Vermont Yankee provided information verbally to the RRG to support that investigation and later to the NRC to confirm that the issue was being addressed by Vermont Yankee. In addition, Reference (d) requested that certain inspections be performed relative to the Hatch event, and the requirements of that Reference have been fulfilled by Vermont Yankee.

We have recently been contacted by your Staff and requested to provide written documentation of our actions taken in response to the General Electric SIL related to the Hatch event [Reference (c)]. This information is provided in the attachment to this letter. It should be noted that the scope of actions described in the attachment were discussed with your Staff prior to our 1984 refueling outage.

We trust that this information will be sufficient for your needs; however, should you need additional information, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

R. W. Capstick
R. W. Capstick
Licensing Engineer

RWC/RLS/ds

Attachment

A001
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ATTACHMENT

Vermont Yankee Response to General Electric SIL No. 402

1. **Evaluate Inerting System Design**

Evaluate the design of the Nitrogen Inerting System. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response

Vermont Yankee's Inerting System design utilizes large ambient vaporizers (as opposed to a steam vaporizer) and long feed lines as passive protection features to assure complete vaporization of liquid nitrogen. The potential for introduction of cold (less than 40°F) nitrogen is remote and would require multiple system failures including the failure of both primary and secondary temperature cutoff valves.

At Vermont Yankee, the 20" nitrogen supply line enters the torus at a 90° angle from horizontal but 9'-6" off the torus centerline (torus radius is 13'-8"). This means that the ring header and downcomers do not line up with the nitrogen injection port and therefore are not subject to direct impingement of low temperature nitrogen as was the case with Hatch-2.

Vermont Yankee has reviewed its Inerting System design and concludes that it is adequate to prevent the injection of cold nitrogen into the containment.

2. **Evaluate Inerting System Operation**

Review the operating experience of the Inerting System to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the Inerting System. Assure that cold nitrogen injection would be detected and prevented.

Response

A review of system maintenance records has been conducted showing that no significant maintenance has been required since system startup. This indicates that all system components have functioned properly. An evaluation of the associated calibration, maintenance, and operating procedures has been completed. We conclude that the procedures are adequate and that cold nitrogen injection would be detected and prevented using the existing procedures.

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the Vent System. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the Vent System integrity is intact and that no gross failure exists.

Response

Vermont Yankee contacted General Electric to discuss this recommendation, and was informed that, for plants which maintain a drywell to torus pressure differential, an alternative action would be suitable. This action entailed reviewing the amount of nitrogen required to be added to the drywell to maintain the pressure differential required by the Technical Specification during operation. A change in the make-up rate would indicate increased drywell to torus leakage (possibly a crack). Such a review was conducted and no abnormal changes were noted. We believe this action meets the intent of the above recommendation.

It should be noted that to conduct the recommended test would have entailed violating Vermont Yankee Technical Specifications, which require that the drywell to torus pressure differential be maintained at greater than 1.7 psi during operation.

4. Inspect Nitrogen Injection Line

Conduct an Ultrasonic Test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Response

Liquid N_2, if entrained in the flowing stream, would warm up as it traveled down the piping system. Any entrained liquid would impinge at the first elbow (or next elbow) encountered. Therefore, the last place to find carbon steel embrittlement damage would be at the torus penetration.

VY's Inerting System is located outdoors and approximately 200' or more away from any safety class piping. The 6" purge line connecting the inerting skid with the safety class piping is carbon steel. Therefore, any one of the carbon steel elbows before the torus penetration would better represent embrittlement damage than at the torus itself and would be a more severe test.

For the above reasons, Vermont Yankee performed a visual inspection of an elbow upstream of the torus penetration. A boroscope was used to inspect the inside of the elbow, and a regular visual inspection of the outer surface was performed. No evidence of liquid nitrogen carryover was found. A visual inspection of the containment penetration (inside and out) and the containment shell within six inches of the penetration was performed. Again, no evidence of liquid nitrogen carryover was found. In addition, Appendix J leak rate testing of the valves in the inerting feed line showed no abnormal leakage.

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers, and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also, inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

Response

An inspection of the area surrounding the penetration was performed during Vermont Yankee's 1984 refueling outage. No evidence of liquid nitrogen carryover was found. Because the nitrogen point does not impinge on the ring header or downcomers as discussed in the response to Item 1 above, the detailed inspection of the ring header and downcomers was not conducted.

Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

September 17, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station Units 1 and 2
Response to General Electric SIL
No. 402
Docket Nos. 50-373 and 50-374

Reference: SIL No. 402, dated February 14, 1984
I.E. Information Notice 84-17

Dear Mr. Denton:

The attached information is submitted in response to a telephone conversation with Dr. A. Bournia of your staff. It constitutes Commonwealth Edison's plans with regard to SIL No. 402 and I.E. Information Notice 84-17.

One signed original and 15 copies of this letter and attachments are provided for your use.

Please direct any questions you may have concerning this matter to this office.

Very truly yours,

J. G. Marshall
Nuclear Licensing Administrator

lm

cc: Dr. A. Bournia - NRR
Region III Inspector - LSCS

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COMMONWEALTH EDISON COMPANY

LASALLE COUNTY STATION UNITS 1 and 2

ATTACHMENT

1. Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

RESPONSE 1

A modification proposal is under investigation to install a nitrogen inerting "Low Temperature" alarm in the main control room. This would alert operating personnel of a potential line freeze and preclude the possibility of admitting "Cold" nitrogen into the containment.

The orientation of the nitrogen inlet ports relative to other equipment has been investigated. It was shown that the introduction of liquid nitrogen to the containment would not impinge on any equipment.

2. Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

RESPONSE 2

To date, the inerting system has been closely monitored by station personnel whenever it has been in use. All system components, including the temperature control shutoff valves operate satisfactorily. A procedure change proposal is being made to include a periodic check for frost on the inerting lines during initial inerting for unit startup.

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure; pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell/wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

RESPONSE 3

LSCS is not a BWR-4 and does not intend to perform a bypass leakage test at the next planned outage. An integrated leak test (ILRT) will be performed at the first refuel outage.

4. Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the site of the metal in contact with cold nitrogen.

RESPONSE 4

The drywell inerting system to date, has had relatively little use. Station personnel are confident that pipe temperatures less than 40°F have never been reached, in fact N_2 delivery temperatures are maintained at approximately 90°F. LSCS does not intend to perform UT testing.

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

RESPONSE 5

A primary containment inspection per LTS-600-3 will be conducted prior to the next integrated (ILRT) leak test which will be performed at the first refuel outage.

[redacted]

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

300 ERIE BOULEVARD WEST
SYRACUSE, N Y 13202

B. G. HOOTEN
EXECUTIVE DIRECTOR
NUCLEAR OPERATIONS

September 14, 1984
(NMP2L 0162)

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Schwencer:

Re: Nine Mile Point Unit 2
Docket No. 50-410

I.E. Bulletin No. 84-01 identified a potential for cracking in boiling water reactor vent headers using nitrogen inerting systems. Although not specifically requiring a response for Nine Mile Point Unit 2, we are providing the attached report for your use and information regarding this matter.

Additionally, we have addressed the recommendations identified in the General Electric Service Information Letter no. 402. Each of the five recommendations in that report are addressed in the attachment to this letter.

Very truly yours,

B. G. Hooten
Executive Director
Nuclear Operations

NLR:ja
Attachment
xc: Project File (2)

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Response to I.E. Bulletin No. 84-01

Question 1

Plants that are currently in cold shutdown should visually inspect for cracks in entire vent header and in the main vents in the region near the intersection with the vent header. To the extent practical, the inspection should include the entire surfaces of the aforementioned components. The inspection should be completed within 36 hours of receipt of this bulletin.

Response

Niagara Mohawk has not utilized the nitrogen inerting system for Nine Mile Point Unit 2; therefore, the effects of the nitrogen inerting system to cause cracks does not exist at Nine Mile Point Unit 2. At this time, we feel no inspection is required.

Question 2

If cracks are found, the containment should be declared inoperable.

Response

This section is not applicable as discussed in response to Question 1 above.

Question 3

The results of the inspection are to be reported by telephone to the NRC Operations Center within eight hours after the inspection has been completed. A written report describing the areas inspected and the results should be submitted within seven days of receipt of this bulletin.

Response

The inspection was not performed, therefore, a written report is not required as discussed in response to Question 1.

Question 4

Although not a requirement of this bulletin, boiling water reactor plants that are currently operating which have Mark I type containment should review their plant data and differential pressure between the wetwell and drywell for anomalies that could be indicative of cracks. Any such anomalies should be reported to the NRC in accordance with 10CFR50.72 and 10CFR50.73.

Response

Nine Mile Point Unit 2 does not utilize a Mark I type containment nor a differential pressure between the wetwell and drywell, and therefore, this evaluation is not required.

Response to SIL No. 402

Question 1

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response

The following paragraph will be added to Section 9.3.1.5.3 of the FSAR.

To prevent introducing cold (less than 40°F) nitrogen into the primary containment, the nitrogen temperature for normal inerting is controlled to 70°F and monitored upstream of the normal vent and purge lines. Low nitrogen temperature (55°F) is alarmed in the Control room. Should the temperature continue to fall to 40°F at the outlet of the vaporizer, an independent temperature device will trip the outlet control valve closed. The nitrogen supply to the instrument nitrogen system fed from nitrogen storage bottles and the ambient vaporizer is followed by trim heaters to hold the temperature at 70°F. The supply is fed to an accumulator prior to any containment penetration, thus essentially precluding any cold nitrogen from entering the containment. In addition, a temperature device sensing just downstream of the trim heater will trip the downstream valve closed if temperature drops below 40°F. In addition, there is no equipment or piping in the direct path of the injected nitrogen in either the drywell or wetwell, and the nitrogen system is normally isolated from the primary containment. Inerting is administratively controlled and the valves are returned to a close position after inerting.

Question 2

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators are functioning properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting systems. Assure that the cold nitrogen injection would be detected and prevented.

Response

Nine Mile Point Unit 2 does not have any operating experience with the inerting system, since it has not been preoperational tested at this time. However, as part of the preoperational test, the inerting system will be evaluated to ensure that the vaporizer, the low temperature shutoff valve and the temperature indications function properly. Additionally, the guidance relative to plant calibration, maintenance and operating procedures will be incorporated into plant procedures to ensure that nitrogen injection would be detected and/or prevented below 40°F.

Question 3

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation for

normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

Response

Niagara Mohawk has committed to perform a bypass leakage test as described in the FSAR. Bypass leakage rates will be measured as part of this test.

Question 4

Conduct an ultrasonic test as soon as convenient of all accessible welds in a nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also, UT the containment penetrations and the containment shell within six inches of the penetration. UT is recommended because cracks could be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Response

Since nitrogen inerting system has not been in use at Nine Mile Point Unit 2, an ultrasonic test to confirm that nitorgen has not affected metal in the area of the nitrogen injection point is not required.

Question 5

Inspect the containment during the next plant outage. Perform a visual inspection of the vent header downcomers and other equipment and containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or the liner steel for at least six inches around the nitrogen penetration.

Response

Vent headers are not used in the Unit 2 design. As discussed in response to the above questions, Niagara Mohawk believes the system design and subsequent testing will ensure proper operation of the nitrogen system. Therefore, a visual inspection of the vent downcomers and equipment in the containment is not considered necessary.

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
215/770-7501

SEP 25 1984

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
COMPLIANCE WITH GE SIL 402
ER 100450 FILE 841-4 Docket Nos. 50-387
FLA-2313 50-388

Dear Mr. Schwencer:

As suggested by the Boiling Water Reactor Regulatory Response Group chairman in his letter of February 17, PP&L verbally described our status with regard to the recommendations in GE SIL 402, "Wetwell/Drywell Inerting" to our project manager on March 13, 1984. The following documents the actions PP&L has taken to respond to the five recommended actions in SIL 402. These responses are applicable to both the nitrogen inerting and nitrogen makeup systems.

1. Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response: A cursory design review of the inerting systems on both Unit 1 and Unit 2 was performed. The SSES systems utilize an atmospheric vaporizer, thus preventing the injection of nitrogen colder than the ambient temperature. The uninsulated system piping is approximately 500 feet from the vaporizer to the containment, thus the nitrogen is further heated as it travels through the plant buildings. Additionally, the nitrogen makeup system is equipped with a low temperature shutoff valve. The SSES nitrogen ports in our Mark II containment design are not near nor do they adversely impinge on any equipment in the wetwell or drywell.

2. Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

Response: Operation of the Unit 1 inerting system was performed to assure that the vaporizer, low temperature shutoff valve and other system components have functioned properly. Proper operation was verified. Plant calibration, maintenance and operating procedures for the nitrogen systems were also reviewed. The design, operation, and maintenance of these systems assures that the injection of cold nitrogen does not occur.

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedures: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

Response: A drywell/wetwell bypass test was performed on Unit 1 on May 6, 1983. The next test is planned prior to 3/23/85.

4. Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Response: We hydro-tested all of the nitrogen injection lines just prior to the occurrence at Hatch. We are therefore convinced that these lines, which have only been in service for a short period of time, exhibit adequate structural strength to rule out the existence of significant cracking. As visual inspection of the piping indicated no question which would indicate that volumetric examination of the injection line welds is desirable, we decided not to pursue this recommendation further.

SEP 25 1984

SSES FLA-2313
ER 100450 File 841-4
Mr. A. Schwencer

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

Response: On March 15, 1984, a visual inspection was performed of the Unit 1 nitrogen injection lines within the drywell. Also inspected was surrounding equipment and the containment liner plate for approximately 2 feet around the penetrations. The SSES Mark II containment design has no vent header. No suspicious indications or signs of cracking were found as a result of this inspection.

We hope you find the above satisfactory.

Very truly yours,

W. W. Curtis

W. W. Curtis
Vice President-Engineering & Construction-Nuclear

cc: R. L. Perch - NRC

[redacted]

Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

September 14, 1984
G02-84-512

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PLANT NO. 2
EVALUATION OF INERTING SYSTEM DESIGN/OPERATION

Reference: General Electric Service Information Letter Number 402 (SIL No. 402) dated February 14, 1984

In the reference document (SIL No. 402) an event at an operating BWR/4 (Hatch 2) resulted in a large crack in the vent header in the torus (Mark I containment) which was attributed to brittle fracture caused by the injection of cold nitrogen into the torus during inerting. As a result of this, General Electric (GE) recommended that certain actions be taken by all BWR owners with Mark I and II containment systems. The purpose of these actions was to confirm that:

1) Equipment damage had not occurred; and
2) Inerting system operation was proper; and
3) Damage will not occur in the future.

Of the five recommendations contained in GE's SIL, only 1 and 2 apply to WNP-2 because the system has not yet been used to inert containment. With regards to Recommendation No. 1, the Supply System has evaluated the inerting system design and determined that the system is adequately designed to prevent the injection of cold nitrogen into the containment.

With regard to Recommendation No. 2, the Supply System has not had any operating experience to date, but the pre-operational testing of the system was satisfactorily performed and accepted with only minor modifications. As the result of an internal review of procedures related to this system, Operations has committed to revise two procedures to provide added assurance that the system remains above $0^{\circ}F$. In addition, during the first few inerting operations, a representative from the Nuclear Safety and Assurance Group (NSAG) will be present, and will work with Operations in evaluating the need for local alarms on low temperature in the N_2 piping. At this time the Supply System does not plan to take any actions other than those identified above.

Should you have any questions, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,

G. C. Sorensen, Manager
Regulatory Programs

tmh

cc: R Auluck - NRC
WS Chin - BPA
JB Martin - NRC RV
AD Toth - NRC Site

TO: R. Caruso 1 of 2
From: B. R. McCaffrey

LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

September 18, 1984

SNRC-1082

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Wetwell/Drywell Inerting
Nitrogen Cooling of Components
Below Nil Ductility Temperature
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

References:
1. IE Information Notice 84-17, "Problems with Liquid Nitrogen Cooling Components Below the Nil Ductility Temperature", dated March 5, 1984
2. GE Service Information Letter SIL-402, "Wetwell/ Drywell Inerting", dated February 14, 1984

Dear Mr. Denton:

This letter provides the status of LILCO's evaluation of the referenced notice and SIL-402.

Reference 1 identifies potential problems with liquid nitrogen systems utilized to inert primary containment. The basic concern involves the introduction of cold N_2 gas into the containment, resulting in thermal shock to equipment local to the point of N_2 entry including the associated N_2 containment penetrations. In addition, SIL-402 (Reference 2) has been issued regarding the potential problems and presents recommendations for corrective action. The following lists the recommendations of SIL 402 and how Shoreham is implementing them:

1) Evaluate Inerting System Design - Specifically, General Electric recommends that the system design be reviewed to assure that injection of cold nitrogen into the containment would be detected and prevented. Shoreham's Nitrogen

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Inerting System has been reviewed and continues to be evaluated in light of this concern, and LILCO is currently awaiting recommendations from the vendor of the Nitrogen Inerting System. Consequently, final nitrogen system design and operating procedure modifications, if any, will be determined upon evaluation of these recommendations. Vendor recommendations are expected within two weeks, with the LILCO evaluation scheduled to be completed within thirty (30) days

2) Evaluate Inerting System Operation - Since Shoreham is not yet operational and the primary containment has not been inerted, no operating experience has been accumulated.

3) Test for Drywell/Wetwell Bypass Leakage - Since Shoreham is not yet operational, and the primary containment has not been inerted, no need exists to perform a bypass test to confirm the integrity of the vent system. Bypass leakage tests will be performed during operation per Shoreham Technical Specifications.

4) Inspect Nitrogen Injection Line - Since Shoreham is not yet operational and the primary containment has not been inerted, there exists no need to perform an ultrasonic test to inspect for the initiation of cracking of the nitrogen injection line.

5) Inspect Containment - Since Shoreham is not yet operational and the primary containment has not been inerted, there is no need at this time to visually inspect the containment to determine if it has been affected by the injection of cold nitrogen.

LILCO trusts this is responsive to Mr. Ralph Caruso's questions regarding LILCO's intent to implement the recommendations of SIL-402. If you require additional information, please contact this office.

Very truly yours,

John D. Leonard, Jr.
Vice President - Nuclear Operations

NRL:ck

cc: P. Eselgroth
C. Petrone