Entergy

**Entergy Nuclear Northeast**
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249
Tel 914 734 6700

**Fred Dacimo**
Site Vice President
Administration

July 26, 2004
NL-04-090

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Indian Point Nuclear Generating Units No. 2 and No. 3
Docket No. 50-247, and 50-286
Response to NRC Bulletin 2004-01 Regarding Inspection of Alloy 82/182/600 Materials Used In Pressurizer Penetrations and Steam Space Piping Connections

References: 1. NRC letter dated May 28, 2004, NRC Bulletin 2004-01: Inspection of Alloy 82/182/600 Materials Used In the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors.

Dear Sir or Madam:

On May 28, 2004, the Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2004-01, *Inspection of Alloy 82/182/600 Materials Used In the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors.* The NRC requested that all pressurized water reactor addressees provide description of their pressurizer heater and steam space penetrations and inspection plans for the forthcoming and subsequent refueling outages.

Entergy Nuclear Operations, Inc is providing the response to Bulletin 2004-01 in Attachment 1 for Indian Point Nuclear Generating Units No. 2 (IP2) and No. 3 (IP3). There are no new commitments made in this letter regarding NRC question number 2 as it is not applicable to either IP2 or IP3.

If you have any questions, please contact Mr. Pat Conroy at 914-734-6668.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on July 26, 2004.

Very truly yours,

Fred R. Dacimo
Site Vice President
Indian Point Energy Center

cc: next page

A110

cc:
Mr. Hubert J. Miller
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. Patrick D. Milano, Sr. Project Manager
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop O-8-C2
Washington, DC 20555-0001

Resident Inspector's Office
Indian Point Unit 3
U.S. Nuclear Regulatory Commission
P.O. Box 337
Buchanan, NY 10511-0337

Senior Resident Inspector's Office
Indian Point Unit 2
U.S. Nuclear Regulatory Commission
P.O. Box 59
Buchanan, NY 10511-0038

Mr. Paul Eddy
New York State Department
of Public Service
3 Empire State Plaza
Albany, NY 12223

Mr. Peter R. Smith, President
New York State Energy, Research,
and Development Authority
17 Columbia Circle
Albany, NY 12203

Attachment 1 to NL-04-090

**Response to NRC Bulletin 2004-01, Inspection of Alloy 82/182/600 Materials Used In Pressurizer Penetrations and Steam Space Piping Connections**

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNITS 2 AND 3
DOCKETS 50-247 AND 50-286

**Response to Bulletin 2004-01 for Indian Point Units 2 and 3**
**Inspection of Alloy 82/182/600 Materials Used In Pressurizer**
**Penetrations and Steam Space Piping Connections**

On May 28, 2004, the Nuclear Regulatory Commission (NRC) issued Bulletin 2004-01, *Inspection of Alloy 82/182/600 Materials Used In the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors.* The 60-day response to the bulletin for Indian Point Units 2 (IP2) and 3 (IP3)is provided below.

**NRC Request 1(a):**

*A description of the pressurizer penetrations and steam space piping connections at your plant. At a minimum, this description should include materials of construction (e.g., stainless steel piping and/or weld metal, Alloy 600 piping/sleeves, Alloy 82/182 weld metal or buttering, etc.), joint design (e.g., partial penetration welds, full penetration welds, bolted connections, etc.), and, in the case of welded joints, whether or not the weld was stress-relieved prior to being put into service. Additional information relevant with respect to determining the susceptibility of your plant's pressurizer penetrations and steam space piping connections to PWSCC should also be included.*

**Entergy Response to Request 1(a):**

The IP2 and IP3 pressurizers are low alloy steel vessels internally clad with austenitic stainless steel (type 304 or equivalent). The shells consist of SA 320 Grade B material while the upper and lower heads consist of SA 216, Grade WCC. Each pressurizer was furnished with six 3/4", stainless steel level instrument nozzles, two ¾" stainless steel temperature instrument nozzles and one 1", stainless steel sample nozzle. Three level and one temperature 3/4" nozzles are located in the upper head and three level and one temperature nozzle in the lower head. The 1" sample nozzle is located in the lower head. The SA-182, F316 stainless steel nozzles are welded with a partial penetration stainless steel weld to the inside of the pressurizer and allowed to thermally expand radially through the vessel wall as the RCS heats up. Stainless steel materials in the IP2 and IP3 pressurizer nozzles and welded joints are not susceptible to the same PWSCC mechanism as the Alloy 82/182/600 materials.

The following table provides the pressurizer heater and steam space penetration descriptions for IP2 and IP3.

## IP2/IP3 Pressurizer Nozzle Description

| Penetration/ Description (#) | Penetration Size | Joint Design | Materials (safe end material/weld material)[Note 1] |
|---|---|---|---|
| Pzr Heater (78) | N/A | PP | SS/SS |
| Surge Line (1) | 14", Sched. 140 | FP | SS/SS |
| Spray Nozzle (1) | 4", Sched. 160 | FP | SS/SS |
| Relief Nozzle (1) | 4", Sched. 160 | FP | SS/SS |
| Safety Nozzle (3) | 3.5" Special | FP | SS/SS |
| Level Inst. Nozzle (6) | ¾", Sched. 160 | PP | SS/SS |
| Temp. Inst. Nozzle (2) | ¾", Sched 160 | PP | SS/SS |
| Sample Nozzle (1) | 1 inch, Sched 160 | PP | SS/SS |
| Manway (1) | 16 inch | Bolted | CS |

PP = Partial Penetration; FP = Full Penetration

Note 1: base/safe end material is SA-182, F316

**NRC Request 1(b):**

*A description of the inspection program for Alloy 82/182/600 pressurizer penetrations and steam space piping connections that has been implemented at your plant. The description should include when the inspections were performed; the areas, penetrations and steam space piping connections inspected; the extent (percentage) of coverage achieved for each location which was inspected; the inspection methods used; the process used to resolve any inspection findings; the quality of the documentation of the inspections (e.g., written report, video record, photographs); and, the basis for concluding that your plant satisfies applicable regulatory requirements related to the integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections were found, indicate what follow-up NDE was performed to characterize flaws in the leaking penetrations.*

**Entergy Response to Request 1(b):**

As provided in the table above, the IP2 and the IP3 Pressurizer nozzles are stainless steel base material and stainless steel weld material. Since stainless steel materials in PWR environment are not susceptible to the same PWSCC mechanism as the Alloy 82/182/600 materials, neither IP2 nor IP3 have implemented any augmented inspection programs for Alloy 82/182/600 materials for the pressurizer. The Inservice inspections of the IP2 and the IP3 pressurizers have been performed in accordance with the ASME Section XI ISI program, the risk based ISI program and approved relief requests, which also includes piping welds on the Pressurizer safety, spray, surge and relief lines. Currently, piping welds on the surge line are selected for inspection. In addition, the system pressure tests of piping are performed during regular intervals of every refueling outage for Class 1 piping.

Generic Letter (GL) 88-05, *Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants*, required four areas to be considered for ensuring that licensees boric acid inspection processes were adequate to identify reactor coolant pressure boundary (RCPB) leakage that could degrade carbon steel piping and components. This includes the following actions:

(1) A determination of the principal locations where leaks can cause degradation of the primary pressure boundary by boric acid corrosion.

(2) Establishing procedures for locating coolant leaks.

(3) Establishing methods for conducting examinations and performing engineering evaluations to establish the impact on the RCPB when leakage is located, and

(4) Establishing corrective actions to prevent recurrences of boric acid corrosion.

The IP2 and the IP3 boric acid program has also been established under procedural control for compliance to our commitments for GL 88-05 as well as site wide improvements in boric acid identification and control. Although neither the IP2 nor the IP3 pressurizers contain Alloy 82/182/600 materials, visual inspections under the pressurizer (i.e. pressurizer heaters) were performed during each of the last refueling outages for both IP2 and for IP3. These inspections were performed without insulation removal. No boron deposits were identified during these inspections.

Previous IP2 and IP3 Pressurizer Inspection Findings and Repairs – As discussed above, the IP2 and the IP3 pressurizers have been inspected by visual, surface and volumetric methods as required by ASME XI, IWB-2000, 1989 Edition with no Addenda, and NRC approved relief requests. No degradation has been identified during any of these inspections.

Basis for Concluding that Your Plant Will Satisfy Applicable Regulatory Requirements: Since the IP2 and the IP3 pressurizer nozzles and penetrations were fabricated with stainless steel materials which are resistant to PWSCC and these nozzles and penetrations have been inspected in accordance with the ASME Section XI requirements, it is concluded that the IP2 and the IP3 pressurizers are in full compliance with the applicable regulatory requirements.

**NRC Request 1(c):**

*A description of the Alloy 82/182/600 pressurizer penetration and steam space piping connection inspection program that will be implemented at your plant during the next and subsequent refueling outages. The description should include the areas, penetrations and steam space piping connections to be inspected; the extent (percentage) of coverage to be achieved for each location; inspection methods to be used; qualification standards for the inspection methods and personnel; the process used to resolve any inspection indications; the inspection documentation to be generated; and the basis for concluding that your plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections are found, indicate what follow-up NDE will be performed to characterize flaws in the leaking penetrations. Provide your plans for expansion of the scope of NDE to be performed if circumferential flaws are found in any portion of the leaking pressurizer penetrations or steam space piping connections.*

**Entergy Response to NRC Request 1(c):**

IP2 and IP3 will continue to implement the ASME Section XI inspection requirements for the pressurizer nozzles and penetrations. Stainless steel materials in the IP2 and IP3 pressurizer nozzles and welded joints are not susceptible to the same PWSCC mechanism as the Alloy 82/182/600 materials. However, IP2 and IP3 will also continue to monitor industry experience relative to cracking of these components and will enhance these inspection programs in the future if it warranted to address any emerging degradation mechanism.

**NRC Request 1(d)**

*In light of the information discussed in this bulletin and your understanding of the relevance of recent industry operating experience to your facility, explain why the inspection program identified in your response to item (1)(c) above is adequate for the purpose of maintaining the integrity of your facility's RCPB and for meeting all applicable regulatory requirements which pertain to your facility.*

**Entergy Response to NRC Request 1(d):**

The proposed actions by Entergy for IP2 and for IP3 meet the expectations requested by Bulletin 2004-01 and are considered appropriate for maintaining the integrity of IP2's and IP3's RCPB and meet applicable regulatory requirements which pertain to IP2 and IP3.

**NRC Request 2:**

*Within 60 days of plant restart following the next inspection of the Alloy 82/182/600 pressurizer penetrations and steam space piping connections, the subject PWR licensees should either:*

*(a) submit to the NRC a statement indicating that the inspections described in the licensee's response to item (1)(c) of this bulletin were completed and a description of the as-found condition of the pressurizer shell, any findings of relevant indications of through-wall leakage, follow-up NDE performed to characterize flaws in leaking penetrations or steam space piping connections, a summary of all relevant indications found by NDE, a summary of the disposition of any findings of boric acid, and any corrective actions taken and/or repairs made as a result of the indications found,*

*or*

*(b) if the licensee was unable to complete the inspections described in response to item (1)(c) of this bulletin, submit to the NRC a summary of the inspections performed, the extent of the inspections, the methods used, a description of the as-found condition of the pressurizer shell, any findings of relevant indications of through-wall leakage, follow-up NDE performed to characterize flaws in leaking penetrations or steam space piping connections, a summary of all relevant indications found by NDE, a summary of the disposition of any findings of boric acid, and any corrective actions taken and/or repairs made as a result of the indications found. In addition, supplement the answer which you provided to item (1)(d) above to explain why the inspections that you completed were adequate for the purpose of maintaining the integrity of your facility's RCPB and for meeting all applicable regulatory requirements which pertain to your facility.*

*For lines attached directly to the pressurizer, with the exception of the surge line, the information requested in (1) and (2) above should be provided for any locations, including those remote from the pressurizer shell, which contain Alloy 82/182/600 materials which are exposed to conditions similar to those of the pressurizer environment.*

**Entergy Response to NRC Request 2:**

Since neither the IP2 nor the IP3 pressurizers contain Alloy 82/182/600 components, this requirement is not applicable to IP2 or to IP3.