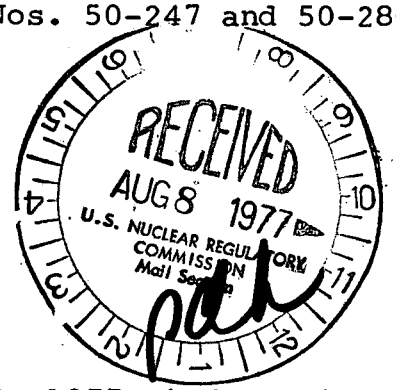
William J. Cahill, Jr.
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-3819

July 26, 1977
Re: Indian Point Unit Nos. 2 and 3
Docket Nos. 50-247 and 50-286

Regulatory File Cy



Director of Nuclear Reactor Regulation
ATTN: Mr. Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr Reid:

In response to your letter of May 18, 1977, information concerning the reactor vessel material surveillance programs at Indian Point Units No. 2 and 3 is provided as Attachments A and B to this letter.

Some of the data requested in your letter concerning the welds & plate material in the reactor vessel beltline region is not immediately available to Con Edison. We have asked Westinghouse for this information and they expect to provide it within 90 days. As soon as the information is available, we will prepare a supplementary response to you.

Should you or your staff have any further questions, we will be pleased to discuss them with you.

Very truly yours,

William J. Cahill, Jr.
Vice President

Attachments
cc: Mr. George T. Berry
General Manager and Chief Engineer
Power Authority of the State of New York
10 Columbus Circle
New York, N. Y. 10019

ATTACHMENT A

INFORMATION REQUESTED CONCERNING THE INDIAN POINT UNIT NO. 2 REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM

Question (1)

Provide the estimated maximum fluence (E>1 Mev) at the inner surface of the reactor vessel wall as of March 31, 1977.

Answer (1)

As of March 31, 1977, estimated maximum fast neutron fluence in this region with energies greater than 1 Mev was 8.51×10^{17} neutrons per square centimeter.

Question (2)

Provide the effective full power years (EFPY) of operation accumulated as of March 31, 1977.

Answer (2)

Accumulated effective full power years of operation as of March 31, 1977 was 1.74 EFPY.

Question (3)

Identify the firm or firms that fabricated your reactor vessel.

Answer (3)

The Indian Point Unit No. 2 reactor vessel was fabricated by Combustion Engineering, Inc.

Question (4)

a. Provide a sketch of the reactor vessel showing all materials welds, in the beltline region* and provide an identification number for each material.

b. Provide the following information for each of the welds in the beltline region:

(1) Shop control number or procedure qualification number;

(2) Filler metal and heat number;

(3) Type of flux and batch number;

(4) Welding process (sub arc, electroslag, manual metal arc, etc.)

(5) Post-weld heat treatment;

(6) Chemical composition (particularly Cu, P and S content);

(7) Drop weight T_{NDT};

(8) RT_{NDT};

(9) Charpy upper shelf energy (unirradiated);

(10) Tensile properties (unirradiated);

(11) Firm performing weld if more than one firm participated in welding;

(12) The maximum end-of-life fluence at the vessel inner wall.

c. Provide the following information for each of the plates or forgings in the beltline region:

(1) Plate or forging serial number;

(2) Plate or forging heat number;

(3) Plate or forging material specification number;

* As defined in 10 CFR 50, Appendix G, Section II.H.

Question (4) c. (continued)

(4) Plate or forging supplier;

(5) Plate or forging heat treatment;

(6) Chemical composition (particularly Cu, P and S content);

(7) Drop weight T_{NDT};

(8) RT_{NDT} (unirradiated);

(9) Charpy upper shelf energy (unirradiated);

(10) Tensile properties (unirradiated);

(11) The maximum end-of-life fluence at the vessel inner wall.

Answer (4)

We are in the process of obtaining the answers to these questions from the Westinghouse Electric Corporation. This data will be supplied in a supplementary letter.

Question (5a)

List the weld, plate and forging materials included in the vessel material surveillance program.

Answer (5a)

The vessel material surveillance program uses samples from the three intermediate shell course plates: B2002-1, B2002-2 and B2002-3, from the heat affected zone of plate B2002-3, from the weld metal and from U.S. Steel Corporation SA 302 Grade B correlation monitor material.

Question (5b)

For each weld listed in (5a), provide the information requested in items (1) through (11) of question (4) b.

Answer (5b)

This requested data will be provided as part of a supplementary letter to the Commission.

Question (5c)

For each plate or forging specimen listed in (5a), provide the information listed in items (1) through (10) of question (4) c.

Answer (5c)

Refer to the attached table for this information.

INDIAN POINT UNIT NO. 2
SURVEILLANCE SPECIMEN MATERIAL INFORMATION

(1) Plate Serial Number	B2002-1	B2002-2	B2002-3	Correlation Monitor
(2) Plate Heat Number	B4688-2	B4922-1	B4922-1	-
(3) Plate Number Material Specification	SA302 Grade B Modified	SA302 Grade B Modified	SA302 Grade B Modified	SA302 Grade B
(4) Plate Supplier	Lukens Steel Co.	Lukens Steel Co.	Lukens Steel Co.	U.S. Steel
(5) Plate Heat Treatment	1550°F to 1650°F, 4 hours, Water quenched 1225°F ± 25°F, 4 hours, Air cooled 1150°F ± 25°F, 40 hours, Furnace cooled to 600°F.			This plate was charged into a furnace at 1100°F, heated at a maximum rate of 63°F per hour to 1650°F held at that temperature for four hours, and water quenched to 300°F. The plate was then recharged into a furnace operating at 700°F to 750°F and heated at a maximum rate of 63°F per hour to 1200°F for 6 hours.

Plate Serial Number		B2002-1	B2002-2	B2002-3	Correlation Monitor
(6) Chemical Composition	C %	0.20	0.22	0.22	0.24
	Mn %	1.28	1.30	1.29	1.34
	P %	0.010	0.014	0.011	0.011
	S %	0.019	0.018	0.020	0.023
	Si %	0.25	0.22	0.25	0.23
	Ni %	0.58	0.46	0.57	-
	Mo %	0.46	0.50	0.46	0.51
	Cu %(1)	0.25	0.14	0.14	-
	Cu %(2)	0.16	0.17	0.25	0.25
	Cu %(3)	0.21	0.13	0.09	-
(7) Drop Weight T_{NDT}		-20°F	-30°F	-10°F	-
(8) RT_{NDT} (unirradiated)		28°F	23°F	50°F	15°F
(9) Charpy Upper Shelf Energy (unirradiated)		99.5 Ft-lbs.	103 Ft-lbs.	88 Ft-lbs.	68 Ft-lbs.

Notes: (1) Letter, Westinghouse to Con Edison dated May 16, 1975.

(2) South West Research Institute, Reactor Vessel Material Surveillance Analysis of Capsule T, June 30, 1977 - C_v specimen

(3) Ibid, from tensile specimen

(10) Tensile Properties (unirradiated)

Plate No.	Test Temp., °F	0.2% Yield Strength, psi	Tensile Strength, psi	Total Elongation %	Reduction In Area, %
B2002-1	Room	68,500	89,000	25.1	67.8
B2002-1	Room	65,850	87,800	25.3	67.4
B2002-1	200	61,550	79,900	24.1	68.6
B2002-1	200	67,950	89,400	23.8	67.6
B2002-1	400	57,900	79,900	23.1	64.7
B2002-1	400	59,800	82,200	22.2	67.8
B2002-1	600	56,750	80,550	21.9	64.3
B2002-1	600	57,750	85,700	22.9	64.2
B2002-2	Room	62,350	83,800	27.1	70.0
B2002-2	Room	66,750	90,500	28.2	69.6
B2002-2	200	63,650	84,450	24.8	70.5
B2002-2	200	63,200	83,800	25.5	67.3
B2002-2	400	53,800	77,900	23.1	68.5
B2002-2	400	52,650	73,150	22.4	67.6
B2002-2	600	53,500	78,800	22.7	64.4
B2002-2	600	54,700	81,450	24.7	64.4
B2002-3	Room	65,650	87,300	27.6	67.3
B2002-3	Room	65,000	87,350	24.8	66.7
B2002-3	200	67,800	88,900	23.4	68.6
B2002-3	200	67,700	89,150	22.1	64.9
B2002-3	400	57,950	79,550	22.3	68.7
B2002-3	400	55,350	77,100	23.2	64.9
B2002-3	600	57,750	83,850	24.9	68.2
B2002-3	600	58,350	86,500	24.9	64.7

Question (5d)

Provide a copy of the report which describes the surveillance program for your reactor vessel(s), if available.

Answer (5d)

This report will be supplied in a supplementary letter to the Nuclear Regulatory Commission.

ATTACHMENT B

INFORMATION REQUESTED CONCERNING THE INDIAN POINT UNIT NO. 3 REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM

Question (1)

Provide the estimated maximum fluence (E>1 Mev) at the inner surface of the reactor vessel wall as of March 31, 1977.

Answer (1)

As of March 31, 1977, estimated maximum fast neutron fluence in this region with energies greater than 1 Mev was 3.19×10^{17} neutrons per square centimeter.

Question (2)

Provide the effective full power years (EFPY) of operation accumulated as of March 31, 1977.

Answer (2)

Accumulated effective full power years of operation as of March 31, 1977 was 0.57 EFPY.

Question (3)

Identify the firm or firms that fabricated your reactor vessel.

Answer (3)

The Indian Point Unit No. 3 reactor vessel was fabricated by Combustion Engineering, Inc.

Question (4)

a. Provide a sketch of the reactor vessel showing all materials welds, in the beltline region* and provide an identification number for each material.

b. Provide the following information for each of the welds in the beltline region:

(1) Shop control number or procedure qualification number;

(2) Filler metal and heat number;

(3) Type of flux and batch number;

(4) Welding process (sub arc, electroslag, manual metal arc, etc.)

(5) Post-weld heat treatment;

(6) Chemical composition (particularly Cu, P and S content);

(7) Drop weight T_{NDT};

(8) RT_{NDT};

(9) Charpy upper shelf energy (unirradiated);

(10) Tensile properties (unirradiated);

(11) Firm performing weld if more than one firm participated in welding;

(12) The maximum end-of-life fluence at the vessel inner wall.

c. Provide the following information for each of the plates or forgings in the beltline region:

(1) Plate or forging serial number;

(2) Plate or forging heat number;

(3) Plate or forging material specification number;

* As defined in 10 CFR 50, Appendix G, Section II.H.

Question (4) c. (continued)

(4) Plate or forging supplier;

(5) Plate or forging heat treatment;

(6) Chemical composition (particularly Cu, P and S content);

(7) Drop weight T_{NDT};

(8) RT_{NDT}(unirradiated);

(9) Charpy upper shelf energy (unirradiated);

(10) Tensile properties (unirradiated);

(11) The maximum end-of-life fluence at the vessel inner wall.

Answer (4)

We are in the process of obtaining the answers to these questions from the Westinghouse Electric Corporation. This data will be supplied in a supplementary letter.

Question (5a)

List the weld, plate and forging materials included in the vessel material surveillance program.

Answer (5a)

The vessel material surveillance program uses samples from the three intermediate shell course plates: B2802-1, B2802-2 and B2802-3, from the lower core course plate B2803-3, from the heat affected zone of plate B2803-3, from the weld metal and from SA 533 Grade B correlation monitor material.

Question (5b)

For each weld listed in (5a), provide the information requested in items (1) through (11) of question (4) b.

Answer (5b)

This requested data will be provided as part of a supplementary letter to the Commission.

Question (5c)

For each plate or forging specimen listed in (5a), provide the information listed in items (1) through (10) of question (4) c.

Answer (5c)

Refer to the attached table for this information.

INDIAN POINT UNIT NO. 3
SURVEILLANCE SPECIMEN MATERIAL INFORMATION

	INTERMEDIATE SHELL COURSE PLATE			LOWER SHELL COURSE PLATE	CORRELATION MONITOR
(1) Plate Serial Number	B2802-1	B2802-2	B2802-3	B2803-3	HSST Plate 02
(2) Plate Heat Number					
(3) Plate Material Specification Number	------SA 302, Grade B, Modified------				A533 Grade B, Class 1
(4) Plate Supplier	---------Lukens Steel Company---------				
(5) Plate Heat Treatment	1550° - 1650°F, 4 hours, Water Quenched 1225° ± 25°F, 4 hours, Air Cooled 1150° ± 25°F, 40 hours, Furnace Cooled to 600°F				1675° ± 25°F, 4 hours, air cooled 1600° ± 25°F, 4 hours, water quenched 1225° ± 25°F, 4 hours, furnace cooled 1150° ± 25°F, 40 hours, furnace cooled to 600°F
(6) Chemical Composition (%)					Ladle / Check
C	0.22	0.19	0.20	0.22	0.22 / 0.22
Mn	1.41	1.33	1.32	1.30	1.45 / 1.48
P	0.010	0.015	0.011	0.012	0.011 / 0.012
S	0.023	0.019	0.025	0.024	0.019 / 0.018
Si	0.28	0.21	0.26	0.28	0.22 / 0.25
Ni	0.50	0.53	0.49	0.52	0.62 / 0.68
Cr	0.08	0.09	0.08	0.08	--- / ---
Mo	0.46	0.48	0.50	0.45	0.53 / 0.52
Cu	0.18	0.20	0.19	0.24	--- / 0.14
Al	0.036	0.027	0.042	0.03	--- / ---

INDIAN POINT UNIT NO. 3
SURVEILLANCE SPECIMEN MATERIAL INFORMATION

	INTERMEDIATE SHELL COURSE PLATE			LOWER SHELL COURSE PLATE	CORRELATION MONITOR	
(1) Plate Serial Number	B2802-1	B2802-2	B2802-3	B2803-3	HSST Plate 02	
V	<0.01	<0.01	<0.01	<0.01	---	---
Sn	0.014	0.017	0.014	<0.01	---	---
Cb	<0.01	<0.01	<0.01	<0.01	---	---
Zr	<0.01	<0.01	<0.01	<0.01	---	---
Ti	<0.01	<0.01	<0.01	<0.01	---	---
(7) Drop Weight T_{NDT}	-50°F	-50°F	-40°F	-10°F	---------	
(8) RT_{NDT} (unirradiated)	-5°F	-35°F	-15°F	55°F	55°F	
(9) Charpy Upper Shelf Energy (unirradiated)	101 Ft-lbs.	104 Ft-lbs.	97 Ft-lbs.	70 Ft-lbs.	120 Ft-lbs.	

INDIAN POINT UNIT NO. 3
SURVEILLANCE SPECIMEN MATERIAL INFORMATION

(10) Tensile Properties (unirradiated)

Plate Material	Orientation	Temp (°F)	0.2% Yield Strength (Psi)	Tensile Strength (Psi)	Total Elongation (%)	Uniform Elongation (%)	Reduction In Area (%)
B2802-1	Long.	75	59,900	78,950	27.0	17.2	68.4
B2802-1	Long.	75	59,550	79,550	27.2	14.9	71.5
B2802-1	Long.	300	53,700	72,100	24.2	12.0	72.0
B2802-1	Long.	300	55,400	73,100	23.3	12.8	71.3
B2802-1	Long.	600	51,500	76,100	19.0	12.4	50.9
B2802-1	Long.	600	51,800	76,100	21.7	13.2	64.7
B2802-2	Long.	75	57,700	78,250	27.6	14.9	70.8
B2802-2	Long.	75	60,300	81,300	27.0	15.7	71.1
B2802-2	Long.	300	54,000	71,700	24.6	13.6	69.0
B2802-2	Long.	300	55,650	74,150	24.5	12.7	70.5
B2802-2	Long.	600	48,250	76,600	23.8	14.5	65.7
B2802-2	Long.	600	52,250	78,550	23.5	14.1	64.6
B2802-3	Long.	75	56,700	79,100	27.0	15.9	71.3
B2802-3	Long.	75	57,800	77,300	28.0	16.1	71.6
B2802-3	Long.	300	52,400	69,300	24.0	13.3	71.6
B2802-3	Long.	300	50,750	69,650	25.7	15.4	70.9
B2802-3	Long.	600	47,450	72,850	22.1	12.7	67.1
B2802-3	Long.	600	47,200	75,600	25.4	14.9	64.8
B2803-3	Long.	75	64,600	86,100	26.8	16.8	65.9
B2803-3	Long.	75	64,700	86,450	27.5	15.4	66.5
B2803-3	Long.	300	59,200	78,600	23.4	13.7	70.0
B2803-3	Long.	300	58,250	78,200	24.4	14.0	69.7
B2803-3	Long.	600	54,400	82,700	25.2	15.5	65.2
B2803-3	Long.	600	54,100	81,850	24.4	15.5	59.8
B2803-3	Trans.	75	67,050	88,000	24.4	15.0	59.4
B2803-3	Trans.	75	66,050	88,400	23.6	14.9	58.3
B2803-3	Trans.	300	59,950	80,800	20.9	13.3	57.6
B2803-3	Trans.	300	60,050	80,650	19.5	12.4	55.6
B2803-3	Trans.	600	53,450	82,200	23.7	15.5	56.4
B2803-3	Trans.	600	53,850	81,500	23.5	14.9	55.2

Question (5d)

Provide a copy of the report which describes the surveillance program for your reactor vessel(s), if available.

Answer (5d)

This report will be supplied in a supplementary letter to the Nuclear Regulatory Commission.