Commonwealth Edison
Byron Nuclear Station
4450 North German Church Road
Byron, Illinois 61010

February 2, 1994

LTR: BYRON 94-0041

FILE: 2.12.1522 (1.10.0101)

Mr. J. B. Martin, Administrator
Nuclear Regulatory Commission Region III
801 Warrenville Road
Lisle, Illinois 60532-4351

SUBJECT: Semi-Annual Radiological Effluent Release Report
Byron Station Units 1 and 2
Facility Operating License Nos. NPF 37 and 66
NRC Docket Nos. 50-454 and 50-455

Dear Mr. Martin:

Enclosed is the Semi-Annual Radiological Effluent Release Report for July through December, 1993, for Byron Nuclear Power Station. This report is required by Technical Specification 6.9.1.7.

Two copies of the report are provided for your use. Two copies will be forwarded to the Document Control Desk and one copy to the Senior Resident Inspector.

Sincerely,

G K Schwartz

G.K. Schwartz
Station Manager
Byron Nuclear Power Station

GKS/DD/rp

Enclosure

cc: Distribution List Attached

(3635z/013194)

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SEMI-ANNUAL RADIOLOGICAL EFFLUENT RELEASE REPORT

DISTRIBUTION LIST

Director of Nuclear Reactor Regulation - U.S. Nuclear Regulatory Commission

Nuclear Regulatory Commission, Region III

Illinois Department of Nuclear Safety, Office of Environmental Safety

A N.I.

U.S. Environmental Protection Agency Air and Radiation Branch - Region V Health Physicist

Murray and Trettel, Inc.

Teledyne Isotopes Midwest Laboratory and General Manager

Chemistry Services - Chemistry Services Director

Byron Station Central Files, File Number 2.12.1522

Health Physics Services Supervisor - Byron Nuclear Power Station

Radiological Effluent Monitoring Program Coordinator

NRC Senior Resident Inspector - Byron Nuclear Power Station

B.P.I. Associates General Counsel

Health Physics Services Supervisor - Braidwood Nuclear Power Station

(3635z/012894)

BYRON NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL REPORT
JULY through DECEMBER 1993
Supplemental Information

1. Regulatory Limits

   a. Fission and activation gases:

      10CFR20 Whole Body = 500 mrem/year
              Skin = 3000 mrem/year

      10CFR50 Gamma = 5 mrad/quarter; 10 mrad/year
              Beta = 10 mrad/quarter; 20 mrad/year

   b. Iodine: (summed with particulate, see below)

   c. Particulates with half-lives > 8 days:

      10CFR 20 Organ = 1500 mrem/year

      10CFR 50 Organ = 7.5 mrem/quarter; 15 mrem/year

   d. Liquid effluents:

      10CFR50 Whole Body = 1.5 mrem/quarter; 3 mrem/year

              Organ = 5 mrem/quarter; 10 mrem/year

2. Maximum Permissible Concentration

   a. Fission and Activation Gases: 10CFR20 Appendix B Table II
   b. Iodine: 10CFR20 Appendix B Table II
   c. Particulates: 10CFR20 Appendix B Table II
   d. Liquid Effluents: 10CFR20 Appendix B Table II

3. Average Energy: This item is not applicable. Release rates are calculated using an isotopic mix rather than average energy.

4. Measurements and Approximations of Total Radioactivity

   a. Fission and Activation Gases: Prior to release, the isotopic content is determined. Released activity is calculated using volume of release, which is determined by the change in tank or containment pressure. Additional methods of calculation utilize historical data and assign an isotopic mix which is representative of normal vent stack isotopics.

   b. Particulate, Tritium and Iodine sampling media for the plant vent stacks are collected and isotopically analyzed daily for the plant vent stacks.

c. Liquids effluents: Batch releases are isotopically analyzed prior to release. Total release activity is calculated using volume of release. Total tritium activity released is calculated from the highest of a monthly circulating water blowdown composite activity or a sum of the input composite activities.

d. Analysis results which are less than the lower limit of detection (<LLD) are reported in units of Ci/ml unless otherwise noted. All LLD values are listed in Attachment A.

5. Batch Releases:

a. Liquid:

1. Number of batch releases = 155
2. Total time period for batch releases = 15,281 minutes
3. Maximum time period for a batch release = 382 minutes
4. Average time period for a batch release = 98.6 minutes
5. Minimum time period for a batch release = 6 minutes
6. Average stream flow during periods of release of effluent into a flowing stream = 8,322 cfs, based on information from the National Weather Service or Army Corps of Engineers for the Rock River.

b. Gaseous:

1. Number of batch releases = 154
2. Total time period for batch releases = 49,558 minutes
3. Maximum time period for a batch release = 14,185 minutes
4. Average time period for batch releases = 321.8 minutes
5. Minimum time period for a batch release = 13 minutes

6. Abnormal Releases:

a. Liquid - none

b. Gaseous - none

7. Public dose calculations due to liquid and gaseous effluents are attached at the end of this report.

BYRON NUCLEAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
A. FISSION AND ACTIVATION GAS RELEASES					
1. Total Release Activity	Ci			3.74E+0	4.52E+1
2. Maximum Release Rate for Quarter	uCi/sec			4.85E+0	2.31E+0
3. % of 10CFR20 Limits*					
a. Whole Body (500 mrem/yr)	%			0.00	0.00
b. Skin (3000 mrem/yr)	%			0.00	0.00
4. % of 10CFR50 Limits					
a. Gamma Quarterly (5 mrad)	%			0.00	0.00
b. Beta Quarterly (10 mrad)	%			0.00	0.00
c. Gamma Annual (10 mrad)	%			0.00	0.00
d. Beta Annual (20 mrad)	%			0.00	0.00
B. IODINE RELEASES**					
1. Total I-131/I-133 Activity	Ci			<LLD	<LLD
C. PARTICULATE (>8 day half-life) RELEASES**					
1. Gross Activity	Ci			3.75E-6	<LLD
2. Gross Alpha Activity for Quarter	Ci			<LLD	<LLD
D. TRITIUM RELEASES**					
1. Total Release Activity	Ci			4.20E-1	8.56E-2

* % of 10CFR20 limits is based on the maximum release rate for the period considered.

** Iodine, particulate, and tritium % of 10CFR20/10CFR50 limits are expressed as a total limit. See step E.

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BYRON NUCLEAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES (CONT)

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
E. SUM OF IODINE, PARTICULATE (>8 day half-life), AND TRITIUM RELEASES					
1. Total Activity	Ci			4.20E-1	8.56E-2
2. % of 10CFR20 Limit					
a. Any Organ (1500 mrem/yr)	%			0.00	0.00
3. % of 10CFR50 Limit					
a. Quarterly Any Organ (7.5 mrem)	%			0.01	0.00
b. Annual Any Organ (15.0 mrem)	%			0.01	0.00

GASEOUS EFFLUENTS - VENT STACK RELEASES - BATCH MODE

F. FISSION AND ACTIVATION GAS RELEASES

Ar-41	Ci			7.57E-3	1.81E-2
Kr-85	Ci			2.42E-2	1.31E-2
Xe-133	Ci			2.01E-1	1.72E-1
Xe-133m	Ci			7.24E-4	< LLD
Xe-135	Ci			2.26E-3	1.95E-3
Kr-85m	Ci			< LLD	8.31E-4
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

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BYRON NUCLEAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - VENT STACK RELEASES - BATCH MODE (CONT)

UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR

G. IODINE RELEASES

I-131	Ci			*	*
I-133	Ci			*	*
I-135	Ci			*	*

* Value reported as Continuous Release Mode.

H. PARTICULATE (>8 day half-life) RELEASES

Sr-89	Ci			*	*
Sr-90	Ci			*	*
	Ci				
	Ci				
	Ci				

* Value reported as Continuous Release Mode.

GASEOUS EFFLUENTS - VENT STACK RELEASES - CONTINUOUS MODE

I. FISSION AND ACTIVATION GAS RELEASES

Kr-88	Ci			3.50E+0	3.26E+0
Xe-131m	Ci			<LLD	3.27E+1
Xe-133	Ci			<LLD	9.08E+0
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

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BYRON NUCLEAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - VENT STACK RELEASES - CONTINUOUS MODE (CONT)

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
J. IODINE RELEASES					
I-131	Ci			<LLD	<LLD
I-133	Ci			<LLD	<LLD
I-135	Ci			<LLD	<LLD
K. PARTICULATE (>8 day half-life) RELEASES					
Co-58	Ci			5.75E-6	<LLD
Sr-89	Ci			<LLD	*
Sr-90	Ci			<LLD	*
	Ci				
	Ci				

* Analysis done by off-site vendor. Results not available.

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

L. FISSION AND ACTIVATION GAS RELEASES					
1. Total Activity Released	Ci			3.18E-1	3.16E-2
2. Average Concentration Released for Quarter	uCi/ml			1.18E-7	1.37E-8
3. % of 10CFR50 Limits					
a. Quarterly Whole Body (1.5 mrem)	%			0.07	0.06
b. Quarterly Any Organ (5.0 mrem)	%			0.10	0.04
c. Annual Whole Body (3.0 mrem)	%			0.04	0.02
d. Annual Any Organ (10.0 mrem)	%			0.05	0.02

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BYRON NUCLEAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES (CONT)

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
M. TRITIUM					
1. Total Activity Released	Ci			1.59E+2	1.05E+2
2. Average Concentration Released for Quarter	uCi/ml			5.90E-5	4.55E-5
3. % of Limit (3.00E-3 uCi/ml)	%			1.97	1.52
N. DISSOLVED NOBLE GASES					
1. Total Activity Released	Ci			7.59E-3	3.60E-3
2. Average Concentration Released for Quarter	uCi/ml			2.82E-9	1.56E-9
3. % of Limit (2.00E-4 uCi/ml)	%			1.41E-3	7.82E-4
O. GROSS ALPHA					
1. Total Activity Released	Ci			<LLD	<LLD
2. Average Concentration Released for Quarter	uCi/ml			0.00	0.00
P. VOLUME OF WASTE RELEASED PER UNIT	liters			4.91E+6	2.64E+6
Q. VOLUME OF DILUTION WATER PER UNIT	liters			2.69E+9	2.30E+9

LIQUID EFFLUENTS - CONTINUOUS MODE

R. LIQUID EFFLUENTS					
Fe-55	Ci			*	*
Sr-89	Ci			*	*
Sr-90	Ci			*	*
Sb-125	Ci			3.67E-2	<LLD
	Ci				
	Ci				

* Value reported as liquid effluents - Batch Mode.

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BYRON NUCLRAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELRASE REPORT
July, 1993 THROUGH December, 1993

LIQUID EFFLUENTS - BATCH MODE

UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
S. LIQUID EFFLUENTS				
H-3	Ci			1.59E+2	1.05E+2
Cr-51	Ci			6.23E-3	3.94E-3
Mn-54	Ci			1.52E-3	5.02E-4
Fe-55	Ci			4.84E-2	*
Co-57	Ci			3.67E-5	2.74E-5
Co-58	Ci			1.65E-2	1.20E-2
Fe-59	Ci			2.65E-3	1.07E-3
Co-60	Ci			1.66E-2	4.22E-3
Zn-65	Ci			6.94E-5	3.84E-5
Sr-89	Ci			<LLD	*
Sr-90	Ci			<LLD	*
Sr-92	Ci			2.78E-4	<LLD
Nb-95	Ci			8.29E-4	5.71E-4
Zr-95	Ci			3.55E-4	3.30E-4
Ru-105	Ci			9.85E-6	<LLD
Ag-110m	Ci			8.51E-4	7.04E-5
Sn-113	Ci			3.76E-5	< LLD
Sn-117m	Ci			1.38E-4	1.98E-5
Sb-122	Ci			6.71E-5	<LLD
Sb-124	Ci			2.68E-3	3.56E-4
Sb-125	Ci			9.86E-2	6.37E-3
Sb-126	Ci			1.40E-3	< LLD

* Analysis done by offsite vendor. Results not available.

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BYRON NUCLEAR POWER STATION
UNIT 1 DOCKET NUMBER STN-50-454
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

LIQUID EFFLUENTS - BATCH MODE

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
S.	LIQUID EFFLUENTS				
Te-125m	Ci			8.27E-2	1.38E-3
Xe-133	Ci			7.49E-3	9.62E-4
Xe-133m	Ci			2.70E-5	< LLD
Xe-135	Ci			6.27E-5	5.52E-6
Cs-134	Ci			2.00E-4	2.33E-4
Cs-137	Ci			5.44E-4	4.79E-4
W-187	Ci			8.72E-5	< LLD
Kr-88	Ci			<LLD	2.63E-3
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
A. FISSION AND ACTIVATION GAS RELEASES					
1. Total Release Activity	Ci			6.93E+0	9.12E+0
2. Maximum Release Rate for Quarter	uCi/sec			4.85E+0	1.48E+0
3. % of 10CFR20 Limits*					
a. Whole Body (500 mrem/yr)	%			0.00	0.00
b. Skin (3000 mrem/yr)	%			0.00	0.00
4. % of 10CFR50 Limits					
a. Gamma Quarterly (5 mrad)	%			0.00	0.00
b. Beta Quarterly (10 mrad)	%			0.00	0.00
c. Gamma Annual (10 mrad)	%			0.00	0.00
d. Beta Annual (20 mrad)	%			0.00	0.00
B. IODINE RELEASES**					
1. Total I-131/I-133 Activity	Ci			<LLD	<LLD
C. PARTICULATE (>8 day half-life) RELEASES**					
1. Gross Activity	Ci			<LLD	<LLD
2. Gross Alpha Activity for Quarter	Ci			<LLD	<LLD
D. TRITIUM RELEASES**					
1. Total Release Activity	Ci			7.94E-2	1.18E-1

* % of 10CFR20 limits is based on the maximum release rate for the period considered.

** Iodine, particulate, and tritium % of 10CFR20/10CFR50 limits are expressed as a total limit. See step E.

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RRLEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES (CONT)

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
E.	SUM OF IODINE, PARTICULATE (>8 day half-life), AND TRITIUM RELEASES				
1.	Total Activity	Ci			7.94E-2	1.18E-1
2.	% of 10CFR20 Limit					
a.	Any Organ (1500 mrem/yr)	%			0.00	0.00
3.	% of 10CFR50 Limit					
a.	Quarterly Any Organ (7.5 mrem)	%			0.00	0.00
b.	Annual Any Organ (15.0 mrem)	%			0.00	0.00

GASEOUS EFFLUENTS - VENT STACK RELEASES - BATCH MODE

F. FISSION AND ACTIVATION GAS RELEASES

Ar-41	Ci			1.38E-2	1.24E-2
Kr-85	Ci			2.42E-2	1.31E-2
Xe-133	Ci			1.33E-1	1.05E-2
Xe-133m	Ci			7.24E-4	< LLD
Xe-135	Ci			2.73E-5	2.34E-6
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993, THROUGH December, 1993

GASEOUS EFFLUENTS - VENT STACK RELEASES - BATCH MODE (CONT)

UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR

G. IODINE RELEASES

I-131	Ci			*	*
I-133	Ci			*	*
I-135	Ci			*	*

* Value reported as Continuous Release Mode.

H. PARTICULATE (>8 day half-life) RELEASES

Sr-89	Ci			*	*
Sr-90	Ci			*	*
	Ci				
	Ci				
	Ci				

* Value reported as Continuous Release Mode.

GASEOUS EFFLUENTS - VENT STACK RELEASES - CONTINUOUS MODE

I. FISSION AND ACTIVATION GAS RELEASES

Kr-88	Ci			3.66E+0	<LLD
Xe-133	Ci			3.10E+0	9.08E+0
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

GASEOUS EFFLUENTS - VENT STACK RELEASES - CONTINUOUS MODE (CONT)

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
J. IODINE RELEASES					
I-131	Ci			<LLD	<LLD
I-133	Ci			<LLD	<LLD
I-135	Ci			<LLD	<LLD
K. PARTICULATE (>8 day half-life) RELEASES					
Sr-89	Ci			<LLD	*
Sr-90	Ci			<LLD	*
	Ci				
	Ci				
	Ci				

* Analysis done by offsite vendor. Results not available.

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

L. FISSION AND ACTIVATION GAS RELEASES					
1. Total Activity Released	Ci			3.18E-1	3.16E-2
2. Average Concentration Released for Quarter	uCi/ml			1.18E-7	1.37E-8
3. % of 10CFR50 Limits					
a. Quarterly Whole Body (1.5 mrem)	%			0.07	0.06
b. Quarterly Any Organ (5.0 mrem)	%			0.10	0.04
c. Annual Whole Body (3.0 mrem)	%			0.04	0.02
d. Annual Any Organ (10.0 mrem)	%			0.05	0.02

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES (CONT)

	UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
M. TRITIUM					
1. Total Activity Released	Ci			1.59E+2	1.05E+2
2. Average Concentration Released for Quarter	uCi/ml			5.90E-5	4.55E-5
3. % of Limit (3.00E-3 uCi/ml)	%			1.97	1.52
N. DISSOLVED NOBLE GASES					
1. Total Activity Released	Ci			7.59E-3	3.60E-3
2. Average Concentration Released for Quarter	uCi/ml			2.82E-9	1.56E-9
3. % of Limit (2.00E-4 uCi/ml)	%			1.41E-3	7.82E-4
O. GROSS ALPHA					
1. Total Activity Released	Ci			<LLD	<LLD
2. Average Concentration Released for Quarter	uCi/ml			0.00	0.00
P. VOLUME OF WASTE RELEASED PER UNIT	liters			4.91E+6	2.64E+6
Q. VOLUME OF DILUTION WATER PER UNIT	liters			2.69E+9	2.30E+9

LIQUID EFFLUENTS - CONTINUOUS MODE

R. LIQUID EFFLUENTS					
Fe-55	Ci			*	*
Sr-89	Ci			*	*
Sr-90	Ci			*	*
Sb-125	Ci			3.67E-2	<LLD
	Ci				
	Ci				

* Value reported as Liquid Effluents - Batch Mode.

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

LIQUID EFFLUENTS - BATCH MODE

UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
S. LIQUID EFFLUENTS				
H-3	Ci			1.59E+2	1.05E+2
Cr-51	Ci			6.23E-3	3.94E-3
Mn-54	Ci			1.52E-3	5.02E-3
Fe-55	Ci			4.84E-2	*
Co-57	Ci			3.67E-5	2.74E-5
Co-58	Ci			1.65E-2	1.20E-2
Fe-59	Ci			2.65E-3	1.07E-3
Co-60	Ci			1.66E-2	4.22E-3
Zn-65	Ci			6.94E-5	3.84E-5
Sr-89	Ci			< LLD	*
Sr-90	Ci			< LLD	*
Sr-92	Ci			2.78E-4	< LLD
Nb-95	Ci			8.29E-4	5.71E-4
Zr-95	Ci			3.55E-4	3.30E-4
Ru-105	Ci			9.85E-6	< LLD
Ag-110m	Ci			8.51E-4	7.04E-5
Sn-113	Ci			3.76E-5	< LLD
Sn-117m	Ci			1.38E-4	1.98E-5
Sb-122	Ci			6.71E-5	< LLD
Sb-124	Ci			2.68E-3	3.56E-4
Sb-125	Ci			9.86E-2	6.37E-3
Sb-126	Ci			1.40E-3	< LLD

* Analysis done by offsite vendor. Results not available.

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BYRON NUCLEAR POWER STATION
UNIT 2 DOCKET NUMBER STN-50-455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

LIQUID EFFLUENTS - BATCH MODE

UNITS	1ST QTR	2ND QTR	3RD QTR	4TH QTR
S. LIQUID EFFLUENTS				
Te-125m	Ci			8.27E-2	1.38E-3
Xe-133	Ci			7.49E-3	9.62E-4
Xe-133m	Ci			2.70E-5	<LLD
Xe-135	Ci			6.27E-5	5.52E-6
Cs-134	Ci			2.00E-4	2.33E-4
Cs-137	Ci			5.44E-4	4.79E-4
W-187	Ci			8.72E-5	<LLD
Kr-88	Ci			< LLD	2.63E-3
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
	Ci				
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	Ci				

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BYRON NUCLEAR POWER STATION
UNIT 1&2 DOCKET NUMBER STN-50- 454/455
RADIOACTIVE EFFLUENT RELEASE REPORT
July , 1993 THROUGH December , 1993

SOLID RADIOACTIVE WASTE 3rd QUARTER 1993 YEAR

DATE	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE, AND SOLIDIFYING AGENT)	MODE OF TRANSPORT	DESTINATION	VOLUME PER SHIPMENT CUBIC FT	CURIES PER SHIPMENT
07-19-93	Dewatered bead resin, Class C, HIC, None	Exclusive Use	Barnwell,SC	132.4	3.32E+2
07-27-93	DAW, Class A, Drums, None	Exclusive Use	Barnwell,SC	622.5	1.02
08-09-93	Dewatered bead resin, Class B, HIC, None	Exclusive Use	Barnwell, SC	132.4	2.67E+1
09-10-93	Dewatered bead resin, and DAW, Class A Unstable, Cask, None	Exclusive Use	Barnwell, SC	199.4	9.90
09-17-93	Dewatered bead resin, Class B, Cask, None	Exclusive Use	Barnwell,SC	202.1	1.79E+1
				1288.8	387.52
QUARTERLY TOTALS - NUMBER OF SHIPMENTS: 5				CUBIC FT	CURIES

APPROVED

JAN 01 1994

(Final)

(9916SS/WPF/110893)

BYRON NUCLEAR POWER STATION
UNIT 1&2 DOCKET NUMBER STN-50-454/455
RADIOACTIVE EFFLUENT RELEASE REPORT
July, 1993 THROUGH December, 1993

SOLID RADIOACTIVE WASTE 4th QUARTER 1993 YEAR

DATE	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE, AND SOLIDIFYING AGENT)	MODE OF TRANSPORT	DESTINATION	VOLUME PER SHIPMENT CUBIC FT	CURIES PER SHIPMENT
10-13-93	Dewatered bead resin and DAW, Class A, Unstable	Exclusive Use	Barnwell, SC	199.4	4.09
	Cask, None				
10-22-93	DAW Class A, Drums, None	Exclusive Use	Barnwell, SC	622.5	1.07
11-10-93	Dewatered bead resin, Class A Unstable, Cask	Exclusive Use	Barnwell, SC	199.4	1.00
	None				
12-10-93	DAW, Class A, Drums and LSA Boxes, None	Exclusive Use	Barnwell, SC	828	0.144
12-17-93	DAW Class A, Seavan, None	Exclusive Use	Barnwell, SC	1280	0.285
12-20-93	Dewatered bead resin and DAW, Class A Unstable,	Exclusive Use	Barnwell, SC	199.4	1.38
	Cask, None				
				3328.7	7.97
QUARTERLY TOTALS - NUMBER OF SHIPMENTS: 6				CUBIC FT	CURIES

APPROVED
JAN 01 1994

(Final)

(9916SS/WPF/110893)

BYRON NUCLEAR POWER STATION
EFFLUENT AND WASTE DISPOSAL REPORT
JULY TO DECEMBER, 1993

ADDENDUM

A. The following data is the estimated composition of Byron's solid waste.

1. Dry Active Waste (DAW)		2. Primary Resin		3. Radwaste Resin	
Cr-51	12.82%	Cr-51	<0.01%	Cr-51	0.10%
Mn-54	1.63%	Mn-54	5.82%	Mn-54	3.31%
Co-57	<0.01%	Co-57	0.62%	Co-57	0.53%
Co-58	20.29%	Co-58	11.43%	Co-58	29.39%
Fe-59	0.21%	Fe-59	<0.01%	Fe-59	0.03%
Co-60	14.10%	Co-60	15.38%	Co-60	13.80%
Zn-65	<0.01%	Zn-65	<0.01%	Zn-65	0.08%
Sr-92	<0.01%	Sr-92	<0.01%	Sr-92	<0.01%
Nb-95	11.05%	Nb-95	<0.01%	Nb-95	0.08%
Zr-95	3.26%	Zr-95	<0.01%	Zr-95	0.03%
Sb-124	<0.01%	Ag-110m	<0.01%	Ag-110m	<0.01%
Sb-125	<0.01%	Sb-124	0.01%	Sn-113	<0.01%
Sn-113	0.09%	Sb-125	1.17%	Sb-124	0.05%
Cs-134	0.46%	Cs-134	14.82%	Sb-125	1.83%
Cs-137	1.76%	Cs-137	16.47%	Cs-134	8.41%
H-3	2.96%	H-3	<0.01%	Cs-137	11.34%
C-14	0.37%	C-14	0.47%	H-3	0.01%
Fe-55	23.94%	Fe-55	26.05%	C-14	0.42%
Ni-63	7.04%	Ni-63	7.69%	Fe-55	23.66%
Sr-90	<0.01%	Sr-90	0.03%	Ni-63	6.92%
Tc-99	<0.01%	Tc-99	<0.01%	Sr-90	0.02%
I-129	<0.01%	I-129	<0.01%	Tc-99	<0.01%
Pu-239	<0.01%	Pu-239	<0.01%	I-129	<0.01%
Pu-238	<0.01%	Pu-238	<0.01%	Pu-239	<0.01%
Pu-241	<0.01%	Pu-241	0.03%	Pu-238	<0.01%
Am-241	<0.01%	Am-241	<0.01%	Pu-241	0.02%
Cm-242	<0.01%	Cm-242	<0.01%	Am-241	<0.01%
Cm-244	<0.01%	Cm-244	<0.01%	Cm-242	<0.01%
				Cm-244	<0.01%

B. There were no major changes or modifications to the PCP or to any liquid gaseous or solid radwaste treatment systems for this period. Byron Station continues to utilize the services of Pacific Nuclear for dewatering and solidification services.

C. Error Analysis

The following is an estimate of the errors associated with effluent monitoring and analysis. The estimate is calculated using the square root of the sum of the squares methodology.

(3635z/013194)

1. Gaseous Effluents

Sampling error	= 1 to 3.5%
Calibration error	= 10%
Counting Statistics error	= 5%
Vent Stack Flowrates error	= 1.5%
Total error	= 11 - 12%

2. Liquid Effluents

Sampling error	= 1%
Calibration error	= 10%
Sample volume error	= 1%
Discharged volume error	= 2%
Total error	= 10%

3. Waste Resin

Sampling error	= 5%
Counting Statistics error	= 7%
Weight error	= 1%
Volume error	= 5%
Total error	= 10%

4. DAW

Counting Statistics error	= 7%
Calibration error	= 10%
Weight error	= 2%
Total error	= 12.4%

D. Meteorological and environmental impact information is reported in the Station Annual Radiological Environmental Operating Report as required by Technical Specifications 6.9 1.6.

E. No limits were exceeded in liquid hold up tanks as stated in Technical Specifications 3.11.1.4 or in waste gas decay tanks as stated in Technical Specifications 3.11.2.6.

F. There were no irradiated fuel shipments during this period.

G. There were no elevated releases. All releases are considered ground level releases.

H. The Offsite Dose Calculation Manual (ODCM) was revised effective January 1, 1994. This revision addressed changes to support the new 10CFR20 implementation. These major changes include:

- Whole body dose factors are now calculated using 1 cm depth as opposed to 5 cm.
- Restricted Area Boundaries have been revised and are included in Appendix F of the ODCM.
- The Land Use Census (e.g. nearest resident, dairy and livestock was used to update Appendix F tables in the ODCM.
- Joint Frequency Distribution Tables were added for reference to Appendix F in the ODCM.
- Revised Curie limits for radioactivity in unprotected tanks.

ATTACHMENT A

BYRON NUCLEAR POWER STATION

EFFLUENT AND WASTE DISPOSAL REPORT FOR JULY THROUGH DECEMBER, 1993

UNIT 1 AND 2 (DOCKET NUMBERS 50-454 AND 50-455)

LLD VALUES FOR GASEOUS RELEASES

Isotopes	LLD(Ci/ml)
H-3	3.71E-17
Ar-41	2.12E-13
Mn-54	4.57E-19
Fe-59	9.68E-19
Co-58	4.66E-19
Co-60	7.03E-19
Kr-85	4.98E-11
Kr-85m	1.58E-12
Kr-87	3.23E-13
Kr-88	5.12E-13
Sr-89	3.45E-21
Sr-90	1.20E-21
I-131	3.28E-18
I-132	5.35E-19
I-133	5.20E-19
I-134	6.18E-18
I-135	2.09E-18
Xe-131m	6.53E-12
Xe-133	3.69E-13
Xe-133m	1.35E-12
Xe-135	1.57E-13
Xe-135m	2.19E-13
Cs-134	4.58E-19
Cs-136	4.38E-19
Cs-137	4.95E-19
Ba/La-140	2.98E-18

ATTACHMENT A (cont.)

BYRON NUCLEAR POWER STATION

EFFLUENT AND WASTE DISPOSAL REPORT FOR JULY THROUGH DECEMBER, 1993

UNIT 1 AND 2 (DOCKET NUMBERS 50-454 AND 50-455)

LLD VALUES FOR LIQUID RELEASES

Isotopes	LLD(Ci/ml)
H-3	2.57E-12
Cr-51	2.21E-13
Mn-54	3.09E-14
Fe-55	7.27E-14
Fe-59	6.47E-14
Co-57	1.96E-14
Co-58	3.11E-14
Co-60	4.60E-14
Zn-65	6.56E-14
Kr-88	7.46E-14
Sr-89	6.70E-15
Sr-90	8.57E-15
Sr-92	3.49E-14
Nb-95	2.84E-14
Zr-95	5.62E-14
Mo-99	2.64E-13
Ru-105	8.28E-14
Ag-110m	4.86E-14
Sn-113	3.48E-14
Sn-117m	2.08E-14
Sb-122	4.99E-14
Sb-124	7.91E-14
Sb-125	7.36E-14
Sb-126	4.89E-14
Te-125m	5.91E-12
Xe-133	5.35E-14
Xe-133m	1.96E-13
Xe-135	2.27E-14
Cs-134	3.20E-14
Cs-137	3.43E-14
Ba/La-140	2.95E-14
W-187	1.47E-13

BYRON STATION UNIT ONE

ACTUAL 1993
MAXIMUM DOSES RESULTING FROM AIRBORNE RELEASES
PERIOD OF RELEASE - 01/01/93 TO 12/31/93 CALCULATED 01/07/94
CHILD RECEPTOR

TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
GAMMA AIR	1.17E-04	1.14E-06	1.35E-06	3.58E-05	1.55E-04
(MRAD)	(SSE)	(SSE)	(SSE)	(SSE)	(SSE)
BETA AIR	4.89E-04	1.03E-05	4.12E-06	1.40E-04	6.43E-04
(MRAD)	(SSE)	(SSE)	(SSE)	(SSE)	(SSE)
TOT. BODY	6.16E-05	6.22E-07	7.89E-07	1.90E-05	8.20E-05
(MREM)	(SSE)	(SSE)	(SSE)	(SSE)	(SSE)
SKIN	2.44E-04	6.51E-06	2.74E-06	6.92E-05	3.23E-04
(MREM)	(SSE)	(SSE)	(SSE)	(SSE)	(SSE)
ORGAN	7.39E-05	4.47E-05	7.43E-04	5.64E-05	9.08E-04
(MREM)	(SSE)	(SE)	(SE)	(S)	(SSE)
	THYROID	LIVER THYROID KIDNEY LUNG GI_LLI	GI_LLI	LIVER THYROID KIDNEY LUNG GI_LLI	THYROID

THIS IS A REPORT FOR THE CALENDAR YEAR 1993

COMPLIANCE STATUS - 10CFR 50 APP. I
CHILD RECEPTOR

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
		---------- % OF APP I. ----------					
GAMMA AIR (MRAD)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
BETA AIR (MRAD)	10.0	0.00	0.00	0.00	0.00	20.0	0.00
TOT. BODY (MREM)	2.5	0.00	0.00	0.00	0.00	5.0	0.00
SKIN (MREM)	7.5	0.00	0.00	0.00	0.00	15.0	0.00
ORGAN (MREM)	7.5	0.00	0.00	0.01	0.00	15.0	0.01
		THYROID	LIVER THYROID KIDNEY LUNG GI_LLI	GI_LLI	LIVER THYROID KIDNEY LUNG GI_LLI		THYROID

RESULTS BASED UPON: ODCM ANNEX REVISION 0.K JANUARY 1993
ODCM SOFTWARE VERSION 0.1 APRIL 1993
ODCM DATABASE VERSION 0.1 APRIL 1993

BYRON STATION UNIT TWO

ACTUAL 1993
MAXIMUM DOSES RESULTING FROM AIRBORNE RELEASES
PERIOD OF RELEASE - 01/01/93 TO 12/31/93 CALCULATED 01/07/94
CHILD RECEPTOR

TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
GAMMA AIR (MRAD)	6.16E-05 (SSE)	1.38E-06 (SSE)	1.50E-06 (SSE)	3.47E-05 (SSE)	9.92E-05 (SSE)
BETA AIR (MRAD)	2.64E-04 (SSE)	1.04E-05 (SSE)	3.31E-06 (SSE)	1.37E-04 (SSE)	4.15E-04 (SSE)
TOT. BODY (MREM)	3.25E-05 (SSE)	7.86E-07 (SSE)	9.26E-07 (SSE)	1.84E-05 (SSE)	5.26E-05 (SSE)
SKIN (MREM)	1.34E-04 (SSE)	6.81E-06 (SSE)	2.74E-06 (SSE)	6.73E-05 (SSE)	2.11E-04 (SSE)
ORGAN (MREM)	5.08E-05 (S)	5.52E-05 (SE)	1.41E-04 (SE)	6.15E-05 (S)	2.91E-04 (SE)
	THYROID	LIVER THYROID KIDNEY LUNG GI_LLI	LIVER THYROID KIDNEY LUNG GI_LLI	LIVER THYROID KIDNEY LUNG GI_LLI	THYROID

THIS IS A REPORT FOR THE CALENDAR YEAR 1993

COMPLIANCE STATUS - 10CFR 50 APP. I
CHILD RECEPTOR

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
		---------- % OF APP I. ----------					
GAMMA AIR (MRAD)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
BETA AIR (MRAD)	10.0	0.00	0.00	0.00	0.00	20.0	0.00
TOT. BODY (MREM)	2.5	0.00	0.00	0.00	0.00	5.0	0.00
SKIN (MREM)	7.5	0.00	0.00	0.00	0.00	15.0	0.00
ORGAN (MREM)	7.5	0.00	0.00	0.00	0.00	15.0	0.00
		THYROID	LIVER THYROID KIDNEY LUNG GI_LLI	LIVER THYROID KIDNEY LUNG GI_LLI	LIVER THYROID KIDNEY LUNG GI_LLI		THYROID

RESULTS BASED UPON: ODCM ANNEX REVISION 0.M JANUARY 1993
ODCM SOFTWARE VERSION 0.1 APRIL 1993
ODCM DATABASE VERSION 0.1 APRIL 1993

BYRON STATION UNIT ONE

ACTUAL 1993
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 01/01/93 TO 12/31/93 CALCULATED 01/07/94
ADULT RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	7.31E-04	1.39E-03	1.05E-03	8.49E-04	4.02E-03
INTERNAL ORGAN	4.32E-03	5.71E-03	4.95E-03	2.13E-03	1.71E-02
	GI_LLI	GI_LLI	GI_LLI	GI_LLI	GI_LLI

THIS IS A REPORT FOR THE CALENDAR YEAR 1993

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
		---------- % OF APP I. ----------					
TOTAL BODY (MREM)	1.5	0.05	0.09	0.07	0.06	3.0	0.13
CRIT. ORGAN(MREM)	5.0	0.09	0.11	0.10	0.04	10.0	0.17
		GI_LLI	GI_LLI	GI_LLI	GI_LLI		GI_LLI

RESULTS BASED UPON: ODCM ANNEX REVISION 0.K JANUARY 1993
ODCM SOFTWARE VERSION 0.1 APRIL 1993
ODCM DATABASE VERSION 0.1 APRIL 1993

BYRON STATION UNIT TWO

ACTUAL 1993
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 01/01/93 TO 12/31/93 CALCULATED 01/07/94
ADULT RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	7.31E-04	1.39E-03	1.05E-03	8.49E-04	4.02E-03
INTERNAL ORGAN	4.32E-03	5.71E-03	4.95E-03	2.13E-03	1.71E-02
	GI_LLI	GI_LLI	GI_LLI	GI_LLI	GI_LLI

THIS IS A REPORT FOR THE CALENDAR YEAR 1993

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
		---------- % OF APP I. ----------					
TOTAL BODY (MREM)	1.5	0.05	0.09	0.07	0.06	3.0	0.13
CRIT. ORGAN(MREM)	5.0	0.09	0.11	0.10	0.04	10.0	0.17
		GI_LLI	GI_LLI	GI_LLI	GI_LLI		GI_LLI

RESULTS BASED UPON: ODCM ANNEX REVISION 0.K JANUARY 1993
ODCM SOFTWARE VERSION 0.1 APRIL 1993
ODCM DATABASE VERSION 0.1 APRIL 1993