Entergy

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PNP 2011-038

May 2, 2011

10 CFR 50.36a

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

Subject: 2010 Annual Radioactive Effluent Release and Waste Disposal Report

Palisades Nuclear Plant	Big Rock Point
Docket 50-255	Dockets 50-155 and 72-043
License No. DPR-20	License No. DPR-6

Dear Sir or Madam:

Attached are the Entergy Nuclear Operations, Inc. 2010 Annual Radioactive Effluent Release and Waste Disposal Reports for Palisades Nuclear Plant (PNP) and Big Rock Point (BRP) Independent Spent Fuel Storage Installation (ISFSI). These reports are submitted in accordance with 10 CFR 50.36a(a)(2).

Attachment 1 contains the report for PNP. Attachment 2 contains the report for the BRP ISFSI.

These reports provide a summary of the quantities of radioactive liquid and gaseous effluent releases and solid radioactive waste processed during the period of January 1, 2010, through December 31, 2010.

This letter contains no new commitments and no revision to existing commitments.

Sincerely,

pka/bed

Attachment 1: Palisades Nuclear Plant 2010 Radioactive Effluent Release Report
Attachment 2: Big Rock Point Independent Spent Fuel Storage Installation 2010 Radioactive Effluent Release Report

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
NRC NMSS Project Manager

NMSS26
FSME20
IE48
NRR

ATTACHMENT 1
PALISADES NUCLEAR PLANT
2010 RADIOACTIVE EFFLUENT RELEASE REPORT

2010 Plant Operating History

Palisades Nuclear Plant (PNP) was on line on January 1, 2010. PNP was taken off line on June 24, 2010, to repair control rod drive mechanism leakage. The plant was returned to service on July 3, 2010. PNP was taken off line on October 3, 2010, for a refueling outage, and was returned to service on October 29, 2010. PNP remained on line for the remainder of 2010.

A. Gaseous Effluents

Tables A-1, "Gaseous Effluents – Summation of All Discharges," A-1A, "Gaseous Effluents – Ground-Level Release – Batch Mode," and A-1B, "Gaseous Effluents – Ground-Level Release – Continuous Mode," list and summarize gaseous effluents released during this reporting period.

B. Liquid Effluents

Tables A-2, "Liquid Effluents – Summation of All Discharges," A-2A, "Liquid Effluents – Batch Mode," and A-2B, "Liquid Effluents – Continuous Mode," list and summarize liquid effluents released during this reporting period.

C. Solid Waste Storage and Shipments

Table A-3, "Low-Level Waste for Waste Classification A, B and C, summarizes solid radioactive waste shipped for processing or burial in 2009 for the following waste streams: resins, filters and evaporator bottoms, dry active waste, irradiated components, other waste, and sum of all waste.

D. Dose Assessments

Tables A-4, "Dose Assessments, 10 CFR Part 50, Appendix I," and A-5, "EPA 40 CFR Part 190, Individual in the Unrestricted Area," lists annual dose to the members of the public.

E. Supplemental Information

1. Abnormal Discharges

In December 2007, tritium was detected in a groundwater monitoring well at a level of 22,000 pCi/L. The source of the activity is leakage associated with T-91, the utility water storage tank, and associated piping. T-91 is used to store processed liquid waste prior to discharge. No radionuclides other than tritium have been detected in the groundwater. Tritium is still being released to the environment (Lake Michigan) via an unmonitored pathway, as demonstrated by the continued detection of monitoring well sample activity.

However, repairs have been made and tritium concentrations have dropped to approximately 90% of values seen in previous years. A definitive release rate or total activity released cannot be determined. Conservatively, 0.5% of the total tritium activity released via batch releases, or half of the percentage that was used in 2007, 2008, and 2009, was used for 2010 effluent calculations.

Date and Duration – Tritium was first detected in a monitoring well in December 2007 and release to the environment is still occurring.

Location – The location is between the northwest corner of the auxiliary building and Lake Michigan; the plume roughly paralleling piping associated with T-91.

Volume – The volume release is conservatively estimated at 0.5% of liquid radioactive waste discharge volume – 3886 gallons.

Estimated Activity of Each Radionuclide – 3.37 curies of tritium

Effluent Monitoring Results – PNP has no offsite monitoring wells as part of the ground water monitoring program.

On-site Monitoring Results – Monitoring well sample results range in concentration from < MDA to 11,029 pCi/L for the most affected well.

Depth to Local Water Table – The depth is approximately eight to nine feet.

Classification of Subsurface Aquifers – Not used for drinking water.

Size and Extent of Any Groundwater Plume – Fifteen yards wide by fifty yards long.

Expected Movement/Mobility of Groundwater Plume – Westerly direction down-gradient toward Lake Michigan at approximately two feet per day.

Land Use Characteristics – PNP site property, water not used for drinking or irrigation.

Remedial Actions Considered or Taken – None

Calculated Member of Public Dose Attributable to the Release – Total body and organ dose are both 2.65E-6 mrem.

Calculated Member of Public Dose Attributable to the Discharge – Total body and organ dose are both 2.65E-6 mrem.

Actions Taken to Prevent Recurrence – T-91 has been repaired and recirculation piping from the auxiliary building to T-91 has been replaced. The T-90/T-91 overflow line is drained routinely.

NRC Notification, Date and contact Organization – The NRC was notified on December 10, 2007, by PNP.

2. Non-Routine Planned Discharges

None.

3. Radioactive Waste Treatment System Changes

None.

4. Annual Land Use Census Changes

The garden critical receptor is now located in the southeast sector at 1.47 miles. The residence critical receptor is unchanged. Also unchanged is that there are no beef cattle, dairy cows or goats located within five miles of the plant.

5. Effluent Monitoring System Inoperability

The effluent monitors that were out of service for greater than 30 days were: RIA-2323, B steam generator main steam line monitor, was out of service from March 28, 2010, to July 26, 2010 (120 days). RIA-2327, high range noble gas monitor, was out of service from July 4, 2010, to December 15, 2010 (142 days).

6. Offsite Dose Calculation Manual (ODCM) Changes

The ODCM was revised on July 7, 2010. Changes included:

- Tables 1.3, "Palisades XOQDOQ," 1.4, "Land Use Census," and Table 1.4a, "Critical Receptors," were removed and placed in a site procedure.
- Removed Section C, "Design Basis Quantities Limits" and all references to Design Basis Quantities (DBQ).
- Removed Section I D, Optional Quarterly Dose Calculations.
- Editorial changes.

ODCM, Appendix A Changes:

- Removed asterisk from the Mo-99 isotope that permitted a higher lower limit of detection (LLD) from Tables B-1 and D-1.

- Removed the phrase "Xe-133 content" and replaced it with "dose consequences" from Section III E 2 a.
- On Table E-3, Lower Limit of Detection, Listed Ba-140 and La-140 in two separate lines and changed the LLD value for Ba-140 from 15 pCi/l to 60 pCi/l. Also listed Zr-95 and Nb-95 on two separate lines and changed the LLD for Zr-95 from 15 pCi/L to 30 pCi/l.
- Removed the majority of Section IV A, that described what was to be included in the Annual Radioactive Effluent Release Report, and instead stated that the contents and format should follow the guidance of Regulatory Guide 1.21, Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste.
- Added a new section, Section VI, Onsite Ground Water Monitoring. This section provides a brief description of the ground water monitoring wells added in 2007 and 2008.
- Editorial changes.

Enclosure 1 contains the ODCM, Revision 24, per the requirements of Technical Specification 5.5.1.c.3.

7. Process Control Program Changes

None.

8. Errata/Corrections to Previous Reports

None

9. Other

Groundwater Monitoring

PNP installed five groundwater monitoring wells in 2007, and added an additional nine wells in 2008. These wells were strategically placed within the owner controlled area, both inside and outside the protected area to allow detection of radioactive contamination of ground water due to leaks or spills from plant systems. Monitoring well (MW) 3 is most indicative of the leak described in the Abnormal Leaks section. Tritium levels ranged from a less than minimum detectable activity (MDA) to 11,029 pCi/L. Monitoring wells MW2 and MW11 tritium levels ranged from <MDA to 2944 and 1217 pCi/L, respectively. The remaining wells showed no activity throughout the year. Well locations are depicted in Figure 1.

Carbon-14

In 2010, PNP and other facilities participated in an EPRI task force to build a model to accurately estimate gaseous C-14 releases, given some key site-specific plant parameters (mass of the primary coolant, average thermal neutron cross section, rated MW, etc). This work was completed in November 2010. The estimates for C-14 were constructed using the aforementioned EPRI methodology contained with EPRI 1021106, Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents. Using the C-14 curie estimates, the annual dose to man was derived from guidance contained within Regulatory Guide 1.109. Because the dose contribution of C-14 from liquid radioactive waste is much less than that contributed by gaseous radioactive waste, evaluation of C-14 in liquid radioactive waste is not required. (Reg Guide 1.21 Rev 2)

Annual C-14 release PNP and subsequent doses	
Total Gaseous C-14 Released Curies =	7.69
Gaseous C-14 as CO2 Curies =	2.31
Effective Child TB Dose, C-14 mrem =	0.0207
Effective Child Bone Dose, C-14 mrem =	0.104

The quarterly curies released are provided in Tables A-1A and A-1B. Airborne doses due to C-14 are grouped under the category of Particulate, Iodine, and Tritium which are contained in Table A-4.

FIGURE 1
GROUNDWATER MONITORING WELL LOCATIONS

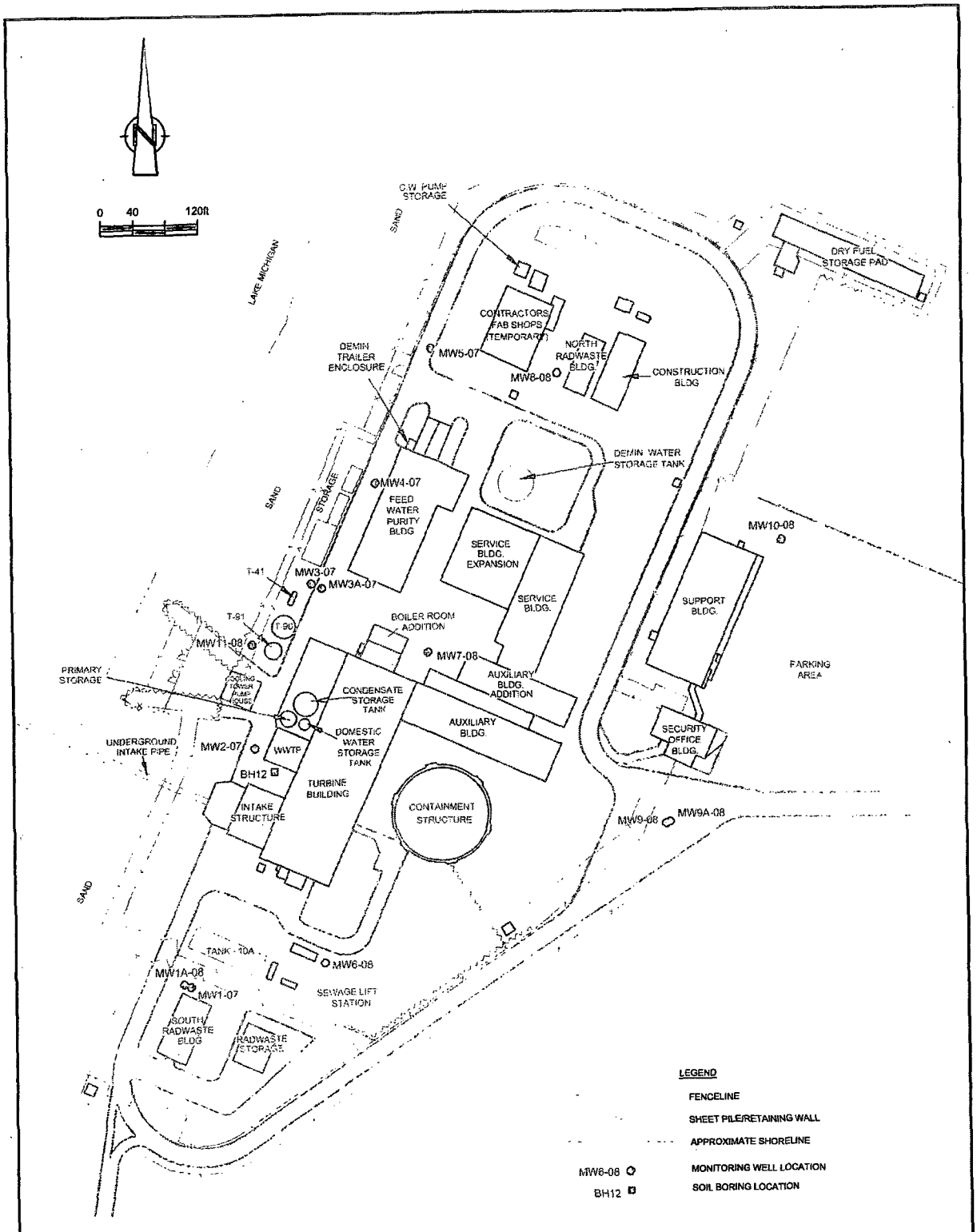

figure 4.1

GROUNDWATER MONITORING WELL LOCATIONS
PALISADES NUCLEAR POWER PLANT
27780 BLUE STAR HWY.
Covert, Michigan

050620-02(002)GN-DE003 NOV 17/2008

ATTACHMENT 1
Palisades - Table A-1
Gaseous Effluents – Sum of All Releases

Summation of All Releases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Uncertainty (%)
Fission and Activation Gases	Ci	3.258E+00	1.025E+01	2.572E+01	2.288E+01	6.211E+01	4.7
Average Release Rate	µCi/s	4.190E-01	1.303E+00	3.235E+00	2.879E+00	1.969E+00	
% of Limit	%	3.069E-03	4.165E-03	3.174E-02	1.020E-02	1.237E-02	
Iodines (Halogens)	Ci	2.751E-04	9.455E-04	8.619E-04	8.084E-03	1.017E-02	10.7
Average Release Rate	µCi/s	3.538E-05	1.203E-04	1.084E-04	1.017E-03	3.224E-04	
% of Limit	%	1.775E-05	1.082E-04	1.017E-04	6.011E-04	2.085E-04	
Particulates	Ci	1.094E-08	0.000E+00	1.043E-07	1.510E-06	1.625E-06	31.0
Average Release Rate	µCi/s	1.407E-09	0.000E+00	1.312E-08	1.900E-07	5.154E-08	
% of Limit	%	1.695E-09	0.000E+00	5.276E-08	4.578E-08	2.526E-08	
Tritium	Ci	5.144E+00	5.156E+00	4.873E+00	7.819E+00	2.299E+01	4.1
Average Release Rate	µCi/s	6.616E-01	6.557E-01	6.130E-01	9.836E-01	7.290E-01	
% of Limit	%	1.594E-03	1.580E-03	1.477E-03	2.371E-03	1.757E-03	
Gross Alpha	Ci	5.125E-07	ND	ND	5.511E-07	1.064E-06	34.3
C-14	Ci	2.117E+00	1.980E+00	2.099E+00	1.495E+00	7.691E+00	
Average Release Rate	µCi/s	2.723E-01	2.518E-01	2.641E-01	1.880E-01	2.439E-01	
% of Limit	%	2.188E-06	2.023E-06	2.121E-06	1.511E-06	1.959E-06	

ATTACHMENT 1
Palisades - Table A-1A
Gaseous Effluents – Ground Level Release, Batch Mode

Fission and Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	Ci	ND	ND	ND	ND
Kr-85	Ci	1.212E-01	4.891E-01	8.468E-01	4.432E-01
Kr-85m	Ci	ND	ND	3.919E-05	ND
Kr-87	Ci	ND	ND	ND	ND
Kr-88	Ci	ND	ND	ND	ND
Xe-131m	Ci	4.860E-04	2.275E-02	1.502E-01	1.945E-01
Xe-133	Ci	1.204E-03	6.706E-01	5.820E+00	5.708E+00
Xe-133m	Ci	ND	2.636E-03	2.952E-02	4.750E-03
Xe-135	Ci	ND	8.435E-04	4.329E-03	ND
Xe-135m	Ci	ND	ND	ND	ND
Xe-138	Ci	ND	ND	ND	ND
(List Others)	Ci	1.229E-01	1.186E+00	6.851E+00	6.351E+00
Total	Ci				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
Iodines/Halogens	Units	ND	1.161E-08	2.014E-05	6.806E-06
I-131	Ci	ND	ND	5.535E-08	ND
I-132	Ci	ND	ND	9.433E-08	ND
I-133	Ci	ND	ND	ND	ND
I-134	Ci	ND	ND	ND	ND
I-135	Ci	0.000E+00	1.161E-08	2.029E-05	6.806E-06
Total	Ci				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
Particulates	Units	ND	ND	1.822E-08	ND
Co-58	Ci	ND	ND	ND	ND
Co-60	Ci	NR	NR	NR	NR
Sr-89	Ci	NR	NR	NR	NR
Sr-90	Ci	ND	ND	ND	ND
Cs-134	Ci	ND	ND	ND	ND
Cs-137	Ci	0.000E+00	0.000E+00	1.822E-08	0.000E+00
Total	Ci				
		ND	4.622E-01	ND	9.314E-02
Tritium	Ci				
		NR	NR	NR	NR
Gross Alpha	Ci				
		NR	NR	NR	NR
C-14	Ci	ND	ND	ND	ND

ND = Measurements performed but no activity detected.
NR = Analysis not required and not performed

ATTACHMENT 1
Palisades - Table A-1B
Gaseous Effluents – Ground Level Release, Continuous Mode

Fission and Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	Ci	ND	ND	ND	ND
Kr-85	Ci	1.212E-01	4.891E-01	8.468E-01	4.432E-01
Kr-85m	Ci	ND	ND	3.919E-05	ND
Kr-87	Ci	ND	ND	ND	ND
Kr-88	Ci	ND	ND	ND	ND
Xe-131m	Ci	4.860E-04	2.275E-02	1.502E-01	1.945E-01
Xe-133	Ci	1.204E-03	6.706E-01	5.820E+00	5.708E+00
Xe-133m	Ci	ND	2.636E-03	2.952E-02	4.750E-03
Xe-135	Ci	ND	8.435E-04	4.329E-03	ND
Xe-135m	Ci	ND	ND	ND	ND
Xe-138	Ci	ND	ND	ND	ND
(List Others)	Ci	1.229E-01	1.186E+00	6.851E+00	6.351E+00
Total	Ci				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
Iodines/Halogens	Units	ND	1.161E-08	2.014E-05	6.806E-06
I-131	Ci	ND	ND	5.535E-08	ND
I-132	Ci	ND	ND	9.433E-08	ND
I-133	Ci	ND	ND	ND	ND
I-134	Ci	ND	ND	ND	ND
I-135	Ci	0.000E+00	1.161E-08	2.029E-05	6.806E-06
Total	Ci				
		Quarter 1	Quarter 2	Quarter 3	Quarter 4
Particulates	Units	ND	ND	1.822E-08	ND
Co-58	Ci	ND	ND	ND	ND
Co-60	Ci	NR	NR	NR	NR
Sr-89	Ci	NR	NR	NR	NR
Sr-90	Ci	ND	ND	ND	ND
Cs-134	Ci	ND	ND	ND	ND
Cs-137	Ci	0.000E+00	0.000E+00	1.822E-08	0.000E+00
Total	Ci				
		ND	4.622E-01	ND	9.314E-02
Tritium	Ci				
		NR	NR	NR	NR
Gross Alpha	Ci				
		NR	NR	NR	NR
C-14	Ci	ND	ND	ND	ND

ND = Measurements performed but no activity detected.

ATTACHMENT 1
Palisades - Table A-2
Liquid Effluents – Sum of All Releases

Summation of All Liquid Releases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Uncertainty (%)
Fission and Activation Products (excluding tritium, gases, and gross alpha)	Ci	1.696E-04	1.156E-02	3.031E-02	1.942E-02	6.146E-02	11.4
Average Concentration	µCi/ml	4.322E-12	3.084E-10	7.555E-10	6.230E-10	4.152E-10	
% of Limit	%	9.577E-05	4.534E-03	8.339E-03	7.659E-03	5.047E-03	
Tritium	Ci	2.008E+01	2.123E+02	3.901E+02	5.193E+01	6.744E+02	4.0
Average Concentration	µCi/ml	5.116E-07	5.662E-06	9.724E-06	1.666E-06	4.556E-06	
% of Limit	%	5.116E-02	5.662E-01	9.724E-01	1.666E-01	4.556E-01	
Dissolved and Entrained Gases	Ci	1.150E-05	0.000E+00	9.894E-03	1.084E-03	1.099E-02	6.6
Average Concentration	µCi/ml	2.930E-13	0.000E+00	2.466E-10	3.476E-11	7.424E-11	
% Of Limit	%	1.465E-07	0.000E+00	1.233E-04	1.738E-05	3.712E-05	
Gross Alpha	Ci	0.000E+00	1.771E-04	0.000E+00	3.815E-06	1.809E-04	4.6
Average Concentration	µCi/ml	0.000E+00	4.723E-12	0.000E+00	1.224E-13	1.222E-12	
Volume of Primary System Liquid Effluent (Before Dilution)	Liters	1.060E+05	4.560E+05	1.565E+06	8.147E+05	2.942E+06	
Dilution Water Used for Above	Liters	3.924E+10	3.750E+10	4.011E+10	3.118E+10	1.480E+11	
Volume of Secondary or Balance-of-Plant Liquid Effluent (e.g., low-activity or unprocessed) (Before Dilution)	Liters	7.838E+09	8.233E+09	9.797E+09	8.144E+09	3.401E+10	
Average Stream Flow	m^3/s	5.047E+00	4.769E+00	5.047E+00	3.922E+00	4.696E+00	

Dilution flow rate (gal/qtr) = # of Dilution pumps running x days running/qtr x 4000 gpm/pump x min/day

ATTACHMENT 1
Palisades - Table A-2A
Liquid Effluents – Batch Mode

Fission and Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Cr-51	Ci	ND	ND	ND	ND
Mn-54	Ci	ND	2.015E-04	8.460E-05	5.182E-05
Fe-55	Ci	ND	1.988E-03	7.091E-03	2.221E-03
Fe-59	Ci	ND	ND	2.955E-04	ND
Co-57	Ci	ND	3.237E-05	ND	ND
Co-58	Ci	1.236E-05	1.147E-03	1.148E-02	9.454E-03
Co-60	Ci	6.270E-05	4.081E-03	5.706E-03	3.907E-03
Sr-89	Ci	ND	1.244E-05	2.152E-05	2.223E-05
Sr-90	Ci	ND	ND	ND	ND
Nb-95	Ci	ND	1.021E-04	9.238E-05	5.411E-04
Ag-110m	Ci	ND	5.254E-04	1.832E-03	1.060E-03
Sn-113	Ci	ND	ND	ND	ND
Sb-124	Ci	ND	ND	ND	ND
Sb-125	Ci	2.010E-05	5.987E-04	1.127E-04	ND
I-131	Ci	ND	ND	4.178E-04	2.814E-04
I-133	Ci	ND	ND	ND	ND
I-135	Ci	ND	ND	ND	ND
Cs-134	Ci	ND	ND	ND	ND
Cs-137	Ci	1.480E-05	1.150E-04	ND	7.830E-05
Ni-63	Ci	5.967E-05	2.760E-03	3.119E-03	1.395E-03
Zn-65	Ci	ND	ND	ND	ND
Zr-95	Ci	ND	ND	ND	2.487E-04
La-140	Ci	ND	ND	4.833E-05	1.621E-04
Totals	Ci	1.696E-04	1.156E-02	3.031E-02	1.942E-02

ATTACHMENT 1
Palisades - Table A-2A
Liquid Effluents – Batch Mode

Dissolved and Entrained Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-85	Ci	ND	ND	ND	ND
Kr-85m	Ci	ND	ND	ND	ND
Kr-88	Ci	ND	ND	ND	ND
Xe-131m	Ci	ND	ND	ND	ND
Xe-133	Ci	1.150E-05	ND	9.894E-03	1.084E-03
Xe-133m	Ci	ND	ND	ND	ND
Xe-135	Ci	ND	ND	ND	ND
Xe-135m	Ci	ND	ND	ND	ND
Totals		1.150E-05	0.000E+00	9.894E-03	1.084E-03

Tritium	Ci	2.001E+01	2.123E+02	3.901E+02	5.193E+01

Gross Alpha	Ci	ND	9.678E-06	ND	3.815E-06

ND = None Detected

ATTACHMENT 1
Palisades - Table A-2B
Liquid Effluents – Continuous Mode

Fission and Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Cr-51	Ci	ND	ND	ND	ND
Mn-54	Ci	ND	ND	ND	ND
Fe-55	Ci	ND	ND	ND	ND
Fe-59	Ci	ND	ND	ND	ND
Co-57	Ci	ND	ND	ND	ND
Co-58	Ci	ND	ND	ND	ND
Co-60	Ci	ND	ND	ND	ND
Sr-89	Ci	ND	ND	ND	ND
Sr-90	Ci	ND	ND	ND	ND
Nb-95	Ci	ND	ND	ND	ND
Ag-110m	Ci	ND	ND	ND	ND
Sn-113	Ci	ND	ND	ND	ND
Sb-124	Ci	ND	ND	ND	ND
Sb-125	Ci	ND	ND	ND	ND
I-131	Ci	ND	ND	ND	ND
I-133	Ci	ND	ND	ND	ND
I-135	Ci	ND	ND	ND	ND
Cs-134	Ci	ND	ND	ND	ND
Cs-137	Ci	ND	ND	ND	ND
Ni-63	Ci	ND	ND	ND	ND
Zn-65	Ci	ND	ND	ND	ND
Zr-95	Ci	ND	ND	ND	ND
La-140	Ci	ND	ND	ND	ND
Totals	Ci	0.000E+00	0.000E+00	0.000E+00	0.000E+00

ATTACHMENT 1
Palisades - Table A-2B
Liquid Effluents – Continuous Mode

Dissolved and Entrained Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-85	Ci	ND	ND	ND	ND
Kr-85m	Ci	ND	ND	ND	ND
Kr-88	Ci	ND	ND	ND	ND
Xe-131m	Ci	ND	ND	ND	ND
Xe-133	Ci	ND	ND	ND	ND
Xe-133m	Ci	ND	ND	ND	ND
Xe-135	Ci	ND	ND	ND	ND
Xe-135m	Ci	ND	ND	ND	ND
Totals		0.000E+00	0.000E+00	0.000E+00	0.000E+00

Tritium	Ci	6.650E-02	3.910E-02	8.197E-04	9.571E-03

Gross Alpha	Ci	ND	1.674E-04	ND	ND

ND = None Detected

ATTACHMENT 1
Palisades - Table A-3
Low Level Waste

Resins, Filters, and Evaporator Bottoms	Volume		Curies Shipped
Waste Class	ft^3	m^3	Curies
A	1.44E+02	4.08E+00	4.33E-05
B	0.00E+00	0.00E+00	0.00E+00
C	1.40E+02	3.96E+00	2.00E+02
ALL	2.84E+02	8.04E+00	2.00E+02

Major Nuclides for the Above Table:
Mn-54, Fe-55, Co-58, Co-60, Ni-63, Zn-65, Sb-125, Cs-134, Cs-137

Dry Active Waste	Volume		Curies Shipped
Waste Class	ft^3	m^3	Curies
A	1.01E+04	2.85E+02	2.55E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	1.01E+04	2.85E+02	2.55E+00

Major Nuclides for the Above Table:
H-3, Co-58, Co-60, Ni-63

Irradiated Components	Volume		Curies Shipped
Waste Class	ft^3	m^3	Curies
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	0.00E+00	0.00E+00	0.00E+00

Major Nuclides for the Above Table:

Other Waste	Volume		Curies Shipped
Waste Class	ft^3	m^3	Curies
A	3.73E+02	1.06E+01	8.91E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
ALL	3.73E+02	1.06E+01	8.91E+00

Major Nuclides for the Above Table:
Fe-55, Co-58, Co-60, Ni-63, Cs-137, Sb-125, Cs-134, Cs-137

ATTACHMENT 1
Palisades - Table A-3
Low Level Waste

Sum of All Low-Level Waste Shipped from Site	Volume		Curies Shipped
Waste Class	ft^3	m^3	Curies
A	1.06E+04	3.00E+02	1.15E+01
B	0.00E+00	0.00E+00	0.00E+00
C	1.40E+02	3.96E+00	2.00E+02
ALL	1.08E+04	3.04E+02	2.11E+02

Major Nuclides for the Above Table:
H-3, Mn-54, Fe-55, Co-58, Co-60, Ni-63, Zn-65, Sb-125, Cs-134, Cs-137

ATTACHMENT 1
Palisades - Table A-4
Dose Assessments, 10 CFR Part 50, Appendix I

	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Yearly
Liquid Effluent Dose Limit, Total Body	1.5 mrem	1.5 mrem	1.5 mrem	1.5 mrem	3 mrem
Total Body Dose	5.00E-05	1.99E-03	2.65E-03	2.26E-03	6.95E-03
% Of Limit	0.00%	0.13%	0.18%	0.15%	0.23%
Liquid Effluent Dose Limit, Any Organ	5 mrem	5 mrem	5 mrem	5 mrem	10 mrem
Organ Dose	6.95E-05	2.38E-03	3.11E-03	4.97E-03	1.05E-02
% of Limit	0.00%	0.05%	0.06%	0.10%	0.11%
Gaseous Effluent Dose Limit, Gamma Air	5 mrad	5 mrad	5 mrad	5 mrad	10 mrad
Gamma Air Dose	1.10E-03	1.43E-03	9.77E-03	3.01E-03	1.53E-02
% of Limit	0.02%	0.03%	0.20%	0.06%	0.15%
Gaseous Effluent Dose Limit, Beta Air	10 mrad	10 mrad	10 mrad	10 mrad	20 mrad
Beta Air Dose	7.05E-04	1.33E-03	5.46E-03	2.68E-03	1.02E-02
% of Limit	0.007%	0.013%	0.055%	0.027%	0.051%
Gaseous Effluent Dose Limit, Any Organ (Iodine, Tritium, Particulates with >8 day half-life)	7.5 mrem	7.5 mrem	7.5 mrem	7.5 mrem	15 mrem
Gaseous Effluent Organ Dose (Iodine, Tritium, Particulates with >8-Day half-life)	2.86E-02	2.68E-02	2.90E-02	2.05E-02	1.05E-01
% of Limit	0.38%	0.36%	0.39%	0.27%	0.70%

Palisades - Table A-5
EPA 40 CFR Part 190, Individual in the Unrestricted Area

	Whole Body	Thyroid	Any Other Organ
Dose Limit	25 mrem	75 mrem	25 mrem
Dose	4.71E-02	3.66E-02	1.05E-02
% of Limit	0.19%	0.05%	0.04%