

ENCLOSURE 1

OFF-SITE RADIATION DOSE ASSESSMENT

January 1, 2013 – December 31, 2013

7 pages to follow

PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
OFF-SITE RADIATION DOSE ASSESSMENT FOR

January 1, 2013 - December 31, 2013

An Assessment of the radiation dose due to releases from Prairie Island Nuclear Generating Plant during 2013 was performed, in accordance with the Offsite Dose Calculation Manual, as required by Technical Specifications. Computed doses were well below the 40 CFR Part 190 Standards and 10 CFR Part 50 Appendix I Guidelines.

Off-site dose calculation formulas and historical meteorological data were used in making this assessment. Source terms were obtained from the Annual Radioactive Effluent and Waste Disposal Report and prepared for NRC review, for the year of 2013.

OFFSITE DOSES FROM GASEOUS RELEASE:

Computed doses due to gaseous releases are reported in Table 1. Critical receptor location and pathways for organ doses are reported in Table 2. Gaseous release doses are a small percentage of Appendix I Guidelines.

OFFSITE DOSES FROM LIQUID RELEASE:

Computed doses due to liquid releases are reported in Table 1. Critical receptor information is reported in Table 2. Liquid release doses, both whole body and organ, are a small percentage of Appendix I Guidelines.

DOSES TO INDIVIDUALS DUE TO ACTIVITIES INSIDE THE SITE BOUNDARY:

Occasionally sportsmen enter the Prairie Island site for recreational activities. These individuals are not expected to spend more than a few hours per year within the site boundary. Commercial and recreational river traffic exists through this area.

For purposes of estimating the dose due to recreational and river water transportation activities within the site boundary, it is assumed that the limiting dose within the site boundary would be received by an individual who spends a total of seven days per year on the river just off-shore from the plant buildings (ESE at 0.2 miles). The gamma dose from noble gas releases and the whole body and organ doses from the inhalation pathway due to Iodine 131, Iodine-133, tritium and long-lived particulates were calculated for this location and occupancy time. These doses are reported in Table 1.

Critical Receptor location and pathways for organ doses are reported in Table 2.

## ABNORMAL RELEASES

There were ten (10) Abnormal Releases Permits generated for 2013, to characterize one (1) single release source.

### 11 Steam Generator Safety Valve Leakage (RS-21-5)

#### EVENT:

Upon startup from Unit 1 Refueling Outage 1R28, it was noted that downstream temperatures for 11 Steam Generator Safety Valve (RS-21-5) were elevated, indicating leakage. Engineering determined the leakage to be 7800 lbm/hour (2.0855 cuft/min).

#### EVALUATION:

Data review indicated that no overpressure condition existed.

The valve cannot be repaired on-line. Repairs will be performed during the next refueling outage 1R29, in the fall of 2014. Downstream temperatures were routinely reviewed to ensure that no change in leak rate occurred.

Activity was assessed daily, with highest values noted used in subsequent dose calculations. No nuclides, other than tritium, were detected on the daily samples.

Abnormal Release Permits were created on a periodic basis to track and account for the release, and to ensure that the dose was attributed to the corresponding release quarters.

0.433 curies of tritium were released. Associated dose from the release tritium was 0.002 mrem, maximum organ dose at the critical receptor location.

The dose from the activity released represented a small percentage of the total dose for 2013 and a very small percentage of limits. The dose did not impose upon the health and safety of the public.

## 40CFR190 COMPLIANCE

The calculated dose from the release of radioactive materials in liquid or gaseous effluents did not exceed twice the limits of 10CFR50, Appendix I, therefore compliance with 40CFR190 was not required to be assessed, in this report.

## SAMPLING, ANALYSIS AND LLD REQUIREMENTS

The lower limit of detection (LLD) requirements, as specified in ODCM Table 2.1 and 3.1 were met for 2013. The minimum sampling frequency requirements, as specified in ODCM Table 2.1 and 3.1 were met for 2013.

## MONITORING INSTRUMENTATION

There were no (0) occurrences, when less than the minimum required radioactive liquid and/or gaseous effluent monitoring instrumentation channels were operable, as required by ODCM Tables 2.2 and 3.2.

During the Unit 2 SGR (Steam Generator Replacement), the containment was opened to the environment, via the Equipment Hatch. Additionally, a temporary diesel was installed in containment drawing air from containment atmosphere and exhausting out a discharge trunk.

When releases via the noted pathways occurred, stringent controls were placed on containment work allowed to be performed during periods. Ventilation was managed to maintain a negative pressure in containment, to ensure that air flow was inward. These additional pathways were equipped with temporary sampling equipment.

Due to work activities in containment, power was lost to temporary monitoring on 3 occasions, due to samplers being disconnected or power source being deenergized. The interruptions were minimal. Alternate sampling was always provided by the installed sampling equipment associated with the Shield Building Ventilation and other temporary monitoring.

To preclude further interruptions in sampling, redundant monitors were placed in service and verified to be powered from alternate sources. The monitors themselves were already labelled as effluent control equipment. An additional tag was placed on the cord at the plug in, to emphasize the monitor importance.

DOSES TO INDIVIDUALS DUE TO EFFLUENT RELEASES FROM THE INDEPENDENT SPENT FUEL STORAGE FACILITY (ISFSI):

Six (6) fuel casks were loaded and placed in the storage facility during the 2013 calendar year. The total number of casks in the ISFSI is thirty-five (35). There was no release of radioactive effluents from the ISFSI.

CURRENT OFFSITE DOSE CALCULATIONS MANUAL (ODCM) REVISION:

The Offsite Dose Calculation Manual was revised in 2013. The 2013 revision is revision 28. The date of revision 28 is November 27, 2013. A copy of revision 28 is submitted with this year's report as Enclosures 4.

CRITICAL RECEPTOR

Based on the Annual Land Use Census, there was no change in critical receptor.

PROCESS CONTROL PROGRAM

The Process Control Program for Solidification/Dewatering of Radioactive Waste from Liquid Systems (D 59) was not revised in 2013. Current manual revision is 10. The revision date is May 24, 2010.

SOLID WASTE SHIPMENTS

A copy of the "LOW LEVEL WASTE DISPOSAL ANNUAL REPORT SOLID WASTE AND IRRADIATED COMPONENT SHIPMENTS" is included as enclosure 3.

## INDUSTRY INITIATIVE ON GROUND WATER PROTECTION:

There was one (1) event for inclusion in the Annual Effluent Report, as part of the NEI Ground Water Initiative.

### Summary

The total liquid dose to the critical receptor for the third quarter of 2013 is 0 mrem. This dose is reported in this attachment to the annual report.

### Background

On December 22, 2013, it was noted that secondary steam condensate was leaking to the ground from a vent line on the east side of the green warehouse. All of the condensate was frozen in a mound of ice on the asphalt and was removed for disposal in the turbine building sump. The release was estimated at 1 gallon. This water had a tritium concentration of 12,600 pCi/L. Due to the asphalt surface and the fact that the leakage had frozen in an easily retrievable form, no plausible pathway to groundwater was postulated. A collection bucket was placed under the vent line to contain any further leakage. Corrective actions have been taken to prevent a similar spill in the future.

### Discussion

This spill did not result in potential contamination of the groundwater. There is no dose to any member of the public from this spill.

This event does not meet the requirements for reporting, but is included in this report for completeness.

Table 1

## OFF-SITE RADIATION DOSE ASSESSMENT - PRAIRIE ISLAND

PERIOD: JANUARY 2013 through DECEMBER 2013

10 CFR Part 50  
Appendix I Guidelines  
(2-unit site per year)

## Gaseous Releases

Maximum Site Boundry Gamma Air Dose (mrad)	9.89E-09	20
Maximum Site Boundry Beta Air Dose (mrad)	2.94E-08	40
Maximum Off-site Dose to any organ (mrem)* Organ:	7.03E-02 Child - bone	30
Offshore Location Gamma Dose (mrad)	6.52E-10	20
Beta Air Dose (mrad)	1.94E-09	40
Organ (mrem)* Organ:	4.58E-03 Teen - Lung	30

## Liquid Releases

Maximum Off-site Dose Total Body (mrem)	1.66E-03	6
Maximum Off-site Dose (mrem) Organ:	3.30E-03 Adult - bone	20

\* Long-Lived Particulate, I-131, I-133 and Tritium

Table 2

**OFF-SITE RADIATION DOSE ASSESSMENT – PRAIRIE ISLAND  
SUPPLEMENTAL INFORMATION**

January 1, 2013 – December 31, 2013

**Gaseous Releases**

**Maximum Site Boundary  
Dose Location  
(From Building Vents)**

<b>Sector</b>	<b>W</b>
<b>Distance (miles)</b>	<b>0.36</b>

**Offshore Location  
Within Site Boundary**

<b>Sector</b>	<b>ESE</b>
<b>Distance (miles)</b>	<b>0.2</b>
<b>Pathway</b>	<b>Inhalation</b>

**Maximum Off-site**

<b>Sector</b>	<b>NNW</b>
<b>Distance (miles)</b>	<b>0.60</b>
<b>Pathways</b>	<b>Ground, Inhalation Vegetable</b>
<b>Age Group</b>	<b>Child</b>

**Liquid Release**

**Maximum Off-site Dose  
Location Downstream**

<b>Pathway</b>	<b>Fish</b>
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