



Byron Generating Station

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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
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Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: 2013 Annual Radioactive Effluent Release Report

Enclosed is the Annual Radioactive Effluent Release Report for Byron Station. This report is being submitted in accordance with 10 CFR 50.36 a(2), "Technical specifications on effluents from nuclear power reactors," and includes a summary of radiological liquid and gaseous effluents and solid waste released from the site from January 2013 through December 2013. There were no changes made to the ODCM in 2013.

If you have any questions regarding this information, please contact Steven A. Gackstetter, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "F. Kearney", written over a horizontal line.

Faber A. Kearney
Site Vice President
Byron Nuclear Generating Station

FAK/JG/LZ/sg

Enclosure: Annual Radioactive Effluent Release Report

cc: Cynthia D. Pederson, Regional Administrator – NRC Region III

BYRON NUCLEAR POWER STATION
ANNUAL RADIOLOGICAL EFFLUENT RELEASE REPORT (ARERR)
2013

BYRON NUCLEAR POWER STATION
UNIT 1/2 DOCKET NUMBER STN-50-454/455
RADIOACTIVE EFFLUENT RELEASE REPORT
January 2013 - December 2013
Supplemental Information

1. Regulatory Limits

a. Fission and activation products:

Tech Spec 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:

Tech Spec Organ	=	1500 mrem/year
10CFR50 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 Products: 10CFR20 Appendix B Table 2
- b. Iodine: 10CFR20 Appendix B Table 2
- c. Particulates: 10CFR20 Appendix B Table 2
- d. Liquid Effluents: 10 X 10CFR20 Appendix B Table 2

3. Average Energy: This item is not applicable. The ODCM limits the dose equivalent rates due to the release of noble gases to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin.

4. Measurements and Approximations of Total Radioactivity

- a. Fission and activation products: Prior to release, the isotopic content is determined. Released activity is calculated using volume of release, which is determined by the change in tank level, containment pressure, or containment purge fan flow rates.
- b. Particulate and iodine sampling media for the plant vent stacks are continuously collected and analyzed weekly. Tritium and noble gas analysis for the plant vent stacks are obtained and analyzed weekly.
- c. Liquid effluents: Isotopic analysis is performed on each batch liquid release tank prior to its 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 effluent input composite activities.

- d. All positive results (i.e. higher than the lower limit of detection (LLD)) are reported in units of uCi/cc or uCi/ml unless otherwise noted. All LLD values and the associated LLD requirements are listed in Attachment A.

5. Batch Releases:

a. Liquid:

1. Number of batch releases = 70
2. Total time period for batch releases = 9,132 minutes
3. Maximum time period for a batch release = 401 minutes
4. Average time period for a batch release = 130 minutes
5. Minimum time period for a batch release = 44 minutes
6. Average Rock River stream flow during periods of release of effluent into a flowing stream = 292 m³/sec, based on information from the U.S. Geological Survey Byron Gauging Station.

b. Gaseous:

1. Number of batch releases = 381
2. Total time period for batch releases = 39,929 minutes
3. Maximum time period for a batch release = 2,531 minutes
4. Average time period for batch releases = 105 minutes
5. Minimum time period for a batch release = 7 minutes

6. Abnormal Releases:

a. Liquid - None

b. Gaseous – None

7. There were no revisions to the Off Site Dose Calculation Manual (ODCM) made in 2013.

8. Errata

The Solid Radioactive Waste for Burial, Estimated Solid Waste Composition tables in previous effluent reports contained errors associated with the categorization of shipments made as “combined packages.” Each year the station Radwaste Shipper provides the ODCM Specialist with a report that categorizes all radwaste shipments via a standard shipping software program. The ODCM Specialist uses this report to formulate the Estimated Solid Waste Composition table. It was recently discovered that the report provided to the ODCM Specialist incorrectly placed all shipments classified as “combined packages” into the “Other” category instead of splitting the shipment profiles into the appropriate categories (Resins-Filters-Evap Bottoms, DAW, or Irradiated Components). A combined package shipment is a shipment that combines these solid waste types. As a result, in years where “combined package” shipments were made, the isotopic matrices and volumes reported within the affected categories were inaccurate. It should be noted the errors did not affect the individual shipment manifests, nor did they affect the classification of shipments, and the total activities and volumes for each year were correct. The errors were reflected only in the Estimated Solid Waste Composition tables of the annual effluent reports. The software program has been in use since the mid 1990’s for radioactive shipments, but it is unknown when the ODCM chemists began using the reports. The Estimated Solid Waste Composition table errors will be corrected beginning in 2014.

9. 2013 Radiological Groundwater Protection Program (RGPP) Results Summary:

In 2013, fifteen (15) Radiological Groundwater Protection Program (RGPP) monitoring wells were sampled. The samples were obtained in March, May, August, and November and analyzed for tritium. In addition, a study of gamma, beta, and alpha radioisotopes was performed in accordance with Nuclear Energy Institute (NEI) 07-07, Groundwater Protection Initiative, for the samples obtained in May. None of the May samples showed concentrations of radionuclides above what is considered background levels. Three wells contained levels of tritium above the lower limit of detection (LLD) of 200 pCi/L. They were: AR-4 (818 pCi/L in March, 523 pCi/L in May, 746 pCi/L in August, 686 pCi/L in November), AR-7 (245 pCi/L in March, 351 pCi/L in May, 306 pCi/L in August, 310 pCi/L in November), and AR-11 (850 pCi/L in March, 933 pCi/L in May, 945 pCi/L in August, 912 pCi/L in November). Wells AR-4 and AR-11 are near the Circulating Water Blowdown piping, where historical leakage through vacuum breakers was known to have occurred. Both of these wells are showing a slow but gradual decrease in tritium concentration since being first sampled in 2006. Well AR-7 is located on-site, just west plant structures. Tritium has been measured in this well just above detectable limits on an intermittent basis since the well was first drilled in 2006. The tritium in this well is believed to have originated from precipitation recapture of permitted gaseous releases of tritium from the plant that had entered the well during rainfall events as a result of improperly compacted soil around the well during original installation. The clay-based soil around the well was repacked in 2012. The tritium present in this well is at or below tritium levels that have been measured in rainwater as a result of precipitation recapture from permitted gaseous releases and it is not believed to be the result of new leak(s). Should the water in this aquifer migrate to off-site wells used for drinking, the off-site dose consequence from tritium present in any of these wells is negligible.

SUMMARY

Calculations based on gaseous and liquid effluents and meteorological data indicate that public dose due to radioactive material attributable to Byron Station during the period did not exceed any regulatory or Offsite Dose Calculation Manual (ODCM) limits.

The Total Effective Dose Equivalent (TEDE) due to licensed activities at Byron Station calculated for the maximum exposed individual for the period is 2.60E-01 mrem. The annual limit on TEDE is 100 mrem.

The assessment of radiation doses to the public is performed in accordance with the ODCM. The results of these analyses confirm that the station is operating in compliance with 10CFR50 Appendix I, 10CFR20 and 40CFR190.

There were no additional operational controls implemented in 2013 that affected radiological effluents.

There were no measurements which exceeded the reporting levels, including any that would not have been attributable to station effluents.

The results of the current radiological environmental monitoring program are approximately the same as those found during the pre-operational studies conducted at Byron Station.

RELEASES

Gaseous Effluents to the Atmosphere

A total of 6.62E-01 curies of fission and activation gases were released with a maximum average quarterly release rate of 3.69E-02 $\mu\text{Ci}/\text{sec}$.

A total of 5.05E-06 curies of 1-131 were released during the year with a maximum average quarterly release rate of 4.10E-07 $\mu\text{Ci}/\text{sec}$.

A total of 3.02E-06 curies were released as airborne particulate matter with a maximum average quarterly release rate of 3.84E-07 $\mu\text{Ci}/\text{sec}$.

A total of 8.70E+00 curies of other (C-14, Br-82) radioisotopes were released with a maximum average quarterly release rate of 2.87E-01 $\mu\text{Ci}/\text{sec}$.

A total of 7.15E+01 curies of tritium were released with a maximum average quarterly release rate of 2.60E+00 $\mu\text{Ci}/\text{sec}$.

Gross alpha-emitting radionuclides were below detectable limits.

Liquids Released to Rock River

A total of 2.88E+10 liters of radioactive liquid wastes containing 1.78E-02 curies of fission and activation products were discharged with a maximum quarterly average concentration of 2.50E-09 $\mu\text{Ci}/\text{ml}$.

A total of $1.60\text{E}+03$ curies of tritium were discharged with a maximum quarterly average concentration of $1.72\text{E}-04$ uCi/ml.

A total of $3.36\text{E}-04$ curies of dissolved and entrained gases were discharged with a maximum quarterly average concentration of $5.18\text{E}-11$ uCi/ml.

Gross alpha-emitting radionuclides were below detectable limits.

DOSE TO MAN

GASEOUS EFFLUENT PATHWAYS

Noble Gas - Gamma Dose Rates

Offsite Gamma air and whole body dose rates for the period were calculated based on measured release rates, isotopic composition of the noble gases, and average meteorological data. The maximum gamma air dose was $4.43\text{E}-05$ mrad based on measured effluents and average meteorological data, and $9.20\text{E}-06$ mrad based on measured effluents and concurrent meteorological data.

Noble Gas - Beta Air and Skin Dose Rates

The range of beta particles in air is relatively small (on the order of a few meters or less). Consequently, plumes of gaseous effluents may be considered "semi-infinite" for the purpose of calculating the dose from beta radiation incident on the skin. However, the actual dose to sensitive skin tissues is difficult to calculate due to the effect of the beta particle energies, thickness of inert skin, and clothing covering sensitive tissues. For purposes of this report the skin is taken to have a thickness of 7.0 mg/cm^2 and an occupancy factor of 1.0 is used. The maximum skin dose was $2.62\text{E}-05$ mrem based on measured effluents and average meteorological data, and $1.13\text{E}-05$ mrem based on measured effluents and concurrent meteorological data.

The maximum offsite beta air dose for the year based on measured effluents and average meteorological data was $1.18\text{E}-05$ mrad, and $1.01\text{E}-05$ mrad based on measured effluents and concurrent meteorological data.

Radioactive Iodine & Particulate

The human thyroid exhibits a significant capacity to concentrate ingested or inhaled iodine. I-131 released during routine operation of the station may be made available to man resulting in dose to the thyroid. C-14 is also included in this category. C-14 exhibits a capacity to concentrate in bone. C-14 is released in gaseous form and is absorbed into vegetation through photosynthesis. The principal pathways of interest for C-14 are the consumption of vegetation by humans and milk from which animals have ingested C-14 through the consumption of vegetation. With the requirement to begin reporting C-14 dose in 2011 and the addition of C-14 to plant effluents, human dose in this category is primarily driven by the release of C-14 from the plant.

The hypothetical dose to the maximum exposed individual living near the station via ingestion of milk and vegetation was calculated. The source of milk and vegetation was assumed to be

at the nearest site boundary with the cows pastured and vegetation grown from May through October. The maximum organ dose from radioactive iodine and particulate (including C-14) to any organ was $7.09\text{E-}01$ mrem (child/bone) based on measured effluents and average meteorological data, and $7.81\text{E-}01$ mrem (child/bone) based on measured effluents and concurrent meteorological data. The maximum dose from radioactive iodine and particulate (including C-14) to the whole body was $1.46\text{E-}01$ mrem (child) based on measured effluents and average meteorological data, and $1.61\text{E-}01$ mrem (child) based on measured effluents and concurrent meteorological data.

Gaseous Total Dose

The maximum total dose from gaseous releases to any organ was $7.09\text{E-}01$ mrem (child/bone) based on measured effluents and average meteorological data, and $7.81\text{E-}01$ mrem (child/bone) based on measured effluents and concurrent meteorological data. The maximum total dose from gaseous releases to the whole body was $1.46\text{E-}01$ mrem (child) based on measured effluents and average meteorological data, and $1.61\text{E-}01$ mrem (child) based on measured effluents and concurrent meteorological data .

LIQUID EFFLUENT PATHWAYS

The principal pathways through the aquatic environment for potential doses to man from liquid waste are ingestion of potable water and eating aquatic foods. Liquid dose was calculated based on the ingestion of potable water and sport fish. It should be noted, however, there are currently no communities within 10 km downstream of the plant using the Rock River for drinking water. NRC-developed equations are used to calculate the doses to the whole body, bone, liver, thyroid, kidney, lung, lower GI tract, and skin. Specific parameters for use in the equations are given in the Exelon Offsite Dose Calculation Manual (ODCM).

The maximum dose from liquid releases to any organ was $1.53\text{E-}01$ mrem (adult/gilli). The maximum dose from liquid releases to the whole body was $1.34\text{E-}01$ mrem (adult).

GASEOUS + LIQUID TOTAL DOSE

The maximum total dose to any organ via both gaseous and liquid effluents is $8.40\text{E-}01$ mrem (child/bone). The maximum dose to the whole body via both gaseous and liquid effluents is $2.60\text{E-}01$ mrem (child).

Dose Limits to Members of the Public

Byron Station did not exceed any of the dose limits as shown below based on concurrent or historical meteorological data.

- The RETS limits on dose or dose commitment to a member of the public due to radioactive materials in liquid effluents from each reactor is 1.5 mrem to the whole body or 5 mrem to any organ during any calendar quarter and 3 mrem to the whole body or 10 mrem to any organ during a calendar year.
- The RETS limits on air dose due to noble gases released in gaseous effluents to a member of the public from each reactor is 5 mrad for gamma radiation or 10 mrad for beta radiation

during any calendar quarter and 10 mrad for gamma radiation or 20 mrad for beta radiation during a calendar year.

- The RETS limits on dose to a member of the public due to radioactive iodine & particulate with half-lives greater than eight days in gaseous effluents released from each reactor is 7.5 mrem to any organ during any calendar quarter and 15 mrem to any organ during a calendar year.
- The 10CFR20 limit on Total Effective Dose Equivalent to individual members of the public is 100 mrem.

SITE METEOROLOGY

Detailed records of the site meteorological measurements taken during each calendar quarter of the year are maintained by the meteorological vendor, retained on site, and are available upon request. The data are presented as cumulative joint frequency distributions of the wind direction for the 250' level and wind speed class by atmospheric stability class determined from the temperature difference between the 250' and 30' levels. Data recovery for all measurements on the meteorological tower was 99.6% during 2013.

SOLID RADIOACTIVE WASTE FOR BURIAL 1ST QUARTER 2013

DATE	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT	DESTINATION	VOLUME (m ³) PER SHIPMENT	CURIES* PER SHIPMENT
1/25/13 RWS 13-001 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(1), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	4.66E+01	2.86E-03
1/25/13 RWS 13-002 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(1), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	4.66E+01	2.62E-03
2/19/13 RWS 13-003 Bead Resin	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), CASK(1), NONE	Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.67E+00	5.03E+00
3/19/13 RWS 13-004 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(2), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	7.16E+01	4.61E-03
3/20/13 RWS 13-005 DAW (Trash)	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE LIMITED QUANTITY OF MATERIAL, 7, UN2910, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(1), NONE	Hittman Transport	Bear Creek Oak Ridge, TN	4.66E+01	1.84E-03
3/19/13 RWS 13-006 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), CASK (1), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	6.09E+01	2.94E-02
Quarterly Totals		Number of Shipments:	6	2.77E+02	5.07E+00
* Calculated using measured ratios				CUBIC M	CURIES

SOLID RADIOACTIVE WASTE FOR BURIAL 2ND QUARTER 2013

DATE	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT	DESTINATION	VOLUME (m ³) PER SHIPMENT	CURIES* PER SHIPMENT
4/02/13 RWS 13-007 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (2), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	6.44E+01	1.53E-02
4/12/13 RWS 13-008 DAW (Trash)	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE LIMITED QUANTITY OF MATERIAL, 7, UN2910, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(2), NONE	Hittman Transport	Gallaher Road Kingston, TN	1.40E+01	8.02E-03
4/17/13 RWS 13-009 Other(Oil)	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE LIMITED QUANTITY OF MATERIAL, 7, UN2910, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(1), NONE	Visionary Solutions	Bear Creek Oak Ridge, TN	1.26E+01	2.80E-03
4/17/13 RWS 13-010 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (2), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	2.28E+01	2.69E+00
4/17/13 RWS 13-011 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (2), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	6.98E+01	1.64E-02
4/22/13 RWS 13-012 Other(Oil)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (1), NONE	Visionary Solutions EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.26E+01	5.69E-03
4/24/13 RWS 13-013 DAW (Trash)	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE LIMITED QUANTITY OF MATERIAL, 7, UN2910, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(2), NONE	Hittman Transport	Bear Creek Oak Ridge, TN	6.62E+01	3.01E-03
4/27/13 RWS 13-014 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (1), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	3.47E+01	9.94E-02
5/14/13 RWS 13-015 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (2), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	6.62E+01	3.90E-03
Quarterly Totals		Number of Shipments:	9	3.63E+02	2.84E+00
* Calculated using measured ratios				CUBIC M	CURIES

SOLID RADIOACTIVE WASTE FOR BURIAL 3RD QUARTER 2013

DATE Shipment # Description	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT	DESTINATION	VOLUME (m ³) PER SHIPMENT	CURIES* PER SHIPMENT
7/11/13 RWS 13-016 DAW (Trash)	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX (2), NONE	Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	7.16E+01	5.35E-03
8/28/13 RWS 13-017 Bead Resin	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, UN3321, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), CASK (1), NONE	Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.59E+00	7.67E+00
8/29/13 RWS 13-018 DAW (Sludge)	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE LIMITED QUANTITY OF MATERIAL, 7, UN2910, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(6), NONE	Hittman Transport	Gallaher Road Kingston, TN	1.52E+01	6.36E-03
8/29/13 RWS 13-019 DAW(Sludge)	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE LIMITED QUANTITY OF MATERIAL, 7, UN2910, FISSILE EXCEPTED, CLASS A, GENERAL DESIGN PACKAGE (GDP), 20' METAL BOX(6), NONE	Hittman Transport	Gallaher Road Kingston, TN	1.50E+01	6.07E-03
Quarterly Totals		Number of Shipments:	4	1.06E+02	7.69E+00
* Calculated using measured ratios				CUBIC M	CURIES

SOLID RADIOACTIVE WASTE FOR BURIAL 4TH QUARTER 2013
No Shipments

DATE Shipment #	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT	DESTINATION	VOLUME(m ³) PER SHIPMENT	CURIES* PER SHIPMENT
None	N/A	N/A	N/A	N/A	N/A
Quarterly Totals		Number of Shipments:	0	0	0
* Calculated using measured ratios				CUBIC M	CURIES

SOLID RADIOACTIVE WASTE FOR BURIAL
Estimated Solid Waste Composition
2013

Sum of All Categories			
2013			
Volume (m3)	7.47E+02		
Class	A		
Nuclide	% Abund	Curies	uCi/ml
H-3	25.656	4.01E+00	5.37E-03
C-14	0.598	9.34E-02	1.25E-04
Cr-51	0.319	4.97E-02	6.65E-05
Mn-54	1.268	1.98E-01	2.65E-04
Fe-55	9.278	1.45E+00	1.94E-03
Fe-59	0.021	3.35E-03	4.48E-06
Co-57	0.157	2.45E-02	3.28E-05
Co-58	7.176	1.12E+00	1.50E-03
Co-60	12.764	1.99E+00	2.66E-03
Ni-59	0.319	4.98E+00	6.67E-03
Ni-63	38.999	6.09E+00	8.15E-03
Zn-65	0.124	1.93E-02	2.58E-05
Sr-90	0.005	7.26E-04	9.72E-07
Zr-95	0.116	1.80E-02	2.41E-05
Nb-94	0.001	2.29E-04	3.07E-07
Nb-95	0.958	1.50E-01	2.01E-04
Tc-99	0.016	2.53E-03	3.39E-06
Ru-103	0.002	3.40E-04	4.55E-07
Ru-106	0.025	3.90E-03	5.22E-06
Ag-110m	0.270	4.21E-02	5.64E-05
Sn-113	0.009	1.44E-03	1.93E-06
Sb-124	0.000	6.43E-05	8.61E-08
Sb-125	1.297	2.03E-01	2.72E-04
Te-123m	0.000	6.12E-05	8.19E-08
Te-125m	0.068	1.07E-02	1.43E-05
Te-132	0.000	2.56E-07	3.43E-10
I-129	0.000	1.32E-06	1.77E-09
Cs-134	0.048	7.49E-03	1.00E-05
Cs-137	0.413	6.45E-02	8.63E-05
Ce-141	0.000	6.98E-05	9.34E-08
Ce-144	0.071	1.10E-02	1.47E-05
Hf-181	0.001	1.51E-04	2.02E-07
Pu-238	0.000	1.38E-05	1.85E-08
Pu-239	0.000	8.69E-07	1.16E-09
Pu-241	0.019	3.03E-03	4.06E-06
Am-241	0.000	2.32E-05	3.11E-08
Cm-242	0.000	1.37E-06	1.83E-09
Cm-243	0.000	1.89E-05	2.53E-08

Process Control Program (PCP) for Radioactive Wastes

There were no changes to RW-AA-100, Process Control Program (PCP) for Radioactive Waste, in 2013.

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.

1. Gaseous Effluents

Qme=3.33%
RM=N/A
ECe=5%
Stdcse/Smpcse=5%
qme=N/A

Total error = 7.8%

2. Liquid Effluents

Qme=3.33%
RM=N/A
ECe=N/A
Stdcse/Smpcse=5%
qme=2.22%

Total error = 6.4%

3. Waste Resin

Qme=10.0%
RM=N/A
ECe=5%
Stdcse/Smpcse=5%
qme=1.0%

Total error = 12.3%

4. DAW, Mechanical Filters, and Contaminated Metal

Qme=10.0%
RM=N/A
ECe=N/A
Stdcse/Smpcse=5%
qme=N/A

Instrument calibration error = 10%

Total error = 11.2%

Qme = the process quantity measurement error associated with the release point (e.g. flow, level measurements)

RM = error associated with the radiation monitor used in quantifying releases through the release point

ECe = error associated with the collection efficiency of the sample media

Stdcse = one-sigma counting error associated with the counting instrument of interest

Smpcse = one-sigma counting error associated with a sample of a given geometry that is used for the release point of interest

qme = sample quantity measurement error associated with the sample of interest

Miscellaneous Information

- A. As required by Technical Specification 5.6.2, meteorological and environmental impact information is reported in the 2013 Annual Radiological Environmental Operating Report (AREOR) or is retained on file to be provided upon request.
- B. No limits were exceeded during the 2013 reporting period in liquid hold up tanks or waste gas decay tanks as stated in Technical Specification 5.5.12.
- C. There were no irradiated fuel shipments during the 2013 reporting period. Independent Spent Fuel Storage Installation (ISFSI) campaign began in 2010 when used fuel was removed from the Spent Fuel Pool (SFP), placed into six (6) casks, each containing 32 fuel bundles, and transferred to an outdoor storage pad. No additional casks were placed on the pad in 2011. In 2012, eight (8) additional casks were placed on the pad for a total of fourteen (14) casks. No additional casks were placed on the pad in 2013. Prior to the ISFSI campaign, additional dosimeters were placed at the site boundary nearest to the storage pad (in between the pad and the nearest resident) in order to measure any potential off site dose from the storage pad. Since the dosimeters were placed, data from the dosimeters, when compared to the existing environmental dosimeters, have shown no statistical difference. As a result, there is currently no offsite dose contribution from the ISFSI facility or any other on-site storage facility, including the Old Steam Generator (OSG) Storage Building, as evidenced by dosimetry data that is indistinguishable from the existing environmental dosimeters.
- D. There were no REMP sample results that exceeded any technical specification limits or analytical results investigation levels during the 2013 reporting period. REMP composite surface water samples from point BY-12, Rock River downstream of the plant liquid effluent discharge, detected tritium results of 223 pCi/L in the second quarter, against a lower detection limit of 200 pCi/L. The positive sample result can be attributed to one or more weekly samples being obtained shortly after a permitted liquid discharge, and are not unexpected. The results are well below the TRM reportable limit of 30,000 pCi/L. There are no communities using the Rock River for drinking water within 10 km downstream of the station.
- E. There were no elevated releases during the 2013 reporting period. All planned gaseous releases were via vent stacks and are considered to be mixed mode releases.
- F. There were no plant effluent radiation release monitors that exceeded inoperability time limits as stated in Technical Requirements Manual (TRM) TLCO 3.11.a or Technical Specification 5.5.12 during the 2013 reporting period. There was one plant effluent radiation release monitor that exceeded its inoperability time limit as stated in Technical Requirements Manual (TRM) TLCO 3.11.b. 2RE-PR001, U2 Containment Purge Effluent Rad Monitor, entered the LCO on 3/30/13 09:30 and exited on 4/9/13 14:55. This exceeds the 7-day reporting requirement for this monitor. The monitor entered the LCO due to spiking. During troubleshooting, gas detector HVPS #1 connector was found to be defective. The connector center conductor had broken off and was making intermittent contact, causing the channels to spike. All three (gas, particulate, iodine) high voltage power supplies are fed from the same 26 volt power supply. After the Gas hvps #1 connector was replaced, no more spikes were evident. The amount of time it took to troubleshoot the problem resulted in the monitor exceeding the 7-day reporting requirement.
- G. There were no unplanned or unmonitored releases of radioactivity from the site to unrestricted areas during the 2013 reporting period.
- H. Due to icing conditions near the U.S. Geological Survey Byron Gauging Station for the Rock River, Rock River flow measurements during periods of liquid effluent releases performed on or after December 14, 2013 were obtained from the Rockton flow gauge, located approximately 30 miles upstream of the Byron flow gauge.

I. Attached are offsite dose calculation reports for January through December of 2013.

The following are the maximum annual calculated cumulative offsite doses resulting from Byron airborne releases in 2013 based on concurrent meteorological data:

Unit 1:

<u>Dose</u>	<u>Maximum Value</u>	<u>Sector Affected</u>
gamma air ⁽¹⁾	7.05 x 10 ⁻⁶ mrad	North-Northwest
beta air ⁽²⁾	5.87 x 10 ⁻⁶ mrad	North-Northwest
whole body ⁽³⁾	8.24 x 10 ⁻² mrem	North-Northwest
skin ⁽⁴⁾	8.27 x 10 ⁻⁶ mrem	North-Northwest
organ ⁽⁵⁾ (child-bone)	4.02 x 10 ⁻¹ mrem	North-Northwest

Unit 1 Compliance Status

10 CFR 50 Appendix I	Yearly Objective	% of Appendix I
gamma air	10.0 mrad	0.00
beta air	20.0 mrad	0.02
whole body	5.0 mrem	1.65
skin	15.0 mrem	0.00
organ	15.0 mrem	2.68

Unit 2:

<u>Dose</u>	<u>Maximum Value</u>	<u>Sector Affected</u>
gamma air ⁽¹⁾	2.15 x 10 ⁻⁶ mrad	North-Northwest
beta air ⁽²⁾	4.24 x 10 ⁻⁶ mrad	North-Northwest
whole body ⁽³⁾	7.87 x 10 ⁻² mrem	North-Northwest
skin ⁽⁴⁾	3.06 x 10 ⁻⁶ mrem	North-Northwest
organ ⁽⁵⁾ (child-bone)	3.79 x 10 ⁻¹ mrem	North-Northwest

Unit 2 Compliance Status

10 CFR 50 Appendix I	Yearly Objective	% of Appendix I
gamma air	10.0 mrad	0.00
beta air	20.0 mrad	0.00
whole body	5.0 mrem	1.57
skin	15.0 mrem	0.00
organ	15.0 mrem	2.52

(1) Gamma Air Dose - GASPAR II, NUREG-0597
 (2) Beta Air Dose - GASPAR II, NUREG-0597
 (3) Whole Body Dose - GASPAR II, NUREG-0597
 (4) Skin Dose - GASPAR II, NUREG-0597
 (5) Inhalation and Food Pathways Dose - GASPAR II, NUREG-0597

Attachment A, 2013 Radioactive Effluent Release Report
2013 Lower Limits of Detection (LLD's)

Nuclide	Gaseous LLD (uCi/cc)	Required Gaseous LLD (uCi/cc)	Nuclide	Liquid LLD (uCi/ml)	Required Liquid LLD (uCi/cc)
H3	4.77E-08	1.00E-07	H3	1.91E-06	1.00E-05
Ar41	4.86E-07		Na24	3.27E-08	
Cr51	3.98E-12		Cr51	2.58E-07	
Mn54	7.24E-13	1.00E-11	Mn54	4.53E-08	5.00E-07
Co58	5.26E-13	1.00E-11	Fe55	5.48E-07	1.00E-06
Fe59	1.61E-12	1.00E-11	Co57	2.13E-08	
Co60	1.23E-12	1.00E-11	Co58	4.65E-08	5.00E-07
Ni63	4.66E-15		Fe59	9.84E-08	5.00E-07
Zn65	1.38E-12	1.00E-11	Co60	6.21E-08	5.00E-07
Br82	6.77E-13		Ni63	5.63E-07	
Kr85m	1.89E-07		Zn65	8.92E-08	5.00E-07
Kr87	4.56E-07	1.00E-04	Sr85	3.17E-08	
Kr88	6.26E-07	1.00E-04	Kr85m	2.53E-08	1.00E-05
Sr89	3.07E-14	1.00E-11	Kr87	7.11E-08	1.00E-05
Sr-90	2.33E-15	1.00E-11	Kr88	8.23E-08	1.00E-05
Mo99	2.64E-13	1.00E-11	Sr89	2.77E-08	5.00E-08
I131	5.48E-13	1.00E-12	Sr-90	7.68E-09	5.00E-08
Xe131m	6.43E-06		Sr92	6.88E-08	
I133	7.83E-13	1.00E-10	Nb95	3.96E-08	
Xe133	3.62E-07	1.00E-04	Zr95	6.55E-08	
Xe133m	1.65E-06	1.00E-04	Mo99	2.06E-08	5.00E-07
Cs134	7.38E-13	1.00E-11	Ag110m	2.83E-08	
I135	4.49E-12		Sb122	4.58E-08	
Xe135	4.20E-07	1.00E-04	Te123m	2.35E-08	
Cs137	7.78E-13	1.00E-11	Sb124	1.07E-07	
Xe138	7.95E-07	1.00E-04	Sb125	9.35E-08	
Ba140	1.77E-12		Te125m	7.10E-06	
La140	9.26E-13		Sb126	3.55E-08	
Ce141	4.73E-13	1.00E-11	Xe131m	1.00E-06	1.00E-05
Ce144	2.28E-12	1.00E-11	I131	2.92E-08	1.00E-06
Gross Alpha	4.23E-15	1.00E-11	I132	3.82E-08	
			Te132	2.36E-08	
			I133	4.04E-08	
			Xe133	5.55E-08	1.00E-05
			Xe133m	2.06E-07	1.00E-05
			Cs134	4.44E-08	5.00E-07
			Xe135	2.66E-08	1.00E-05
			Cs137	3.78E-08	5.00E-07
			Xe138	2.34E-07	1.00E-05
			Ba140	1.44E-07	
			La140	4.01E-08	
			Ce141	4.26E-08	5.00E-07
			Ce144	1.77E-07	5.00E-06
			Gross Alpha	7.22E-08	1.00E-07
			Gross Beta	2.63E-07	

EFFLUENT AND WASTE DISPOSAL REPORT
 SUPPLEMENTAL INFORMATION
 GASEOUS EFFLUENTS - BATCH MODE
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		48	61	59	68	236
Total release time	minutes	3.09E+03	4.29E+03	3.68E+03	6.26E+03	1.73E+04
Maximum release time	minutes	1.49E+02	3.56E+02	9.00E+01	1.20E+03	1.20E+03
Average release time	minutes	6.43E+01	7.03E+01	6.24E+01	9.21E+01	7.34E+01
Minimum release time	minutes	3.50E+01	7.00E+00	1.90E+01	2.60E+01	7.00E+00

Note: Waste Gas Decay Tank releases are included with Unit 1 data

EFFLUENT AND WASTE DISPOSAL REPORT
 SUPPLEMENTAL INFORMATION
 GASEOUS EFFLUENTS - BATCH MODE
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		36	47	29	33	145
Total release time	minutes	1.62E+03	1.82E+04	1.34E+03	1.49E+03	2.26E+04
Maximum release time	minutes	6.40E+01	2.53E+03	7.00E+01	6.50E+01	2.53E+03
Average release time	minutes	4.50E+01	3.86E+02	4.62E+01	4.52E+01	1.56E+02
Minimum release time	minutes	1.90E+01	1.80E+01	1.70E+01	8.00E+00	8.00E+00

EFFLUENT AND WASTE DISPOSAL REPORT
 SUPPLEMENTAL INFORMATION
 LIQUID EFFLUENTS - BATCH MODE
 Unit 1 & Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		15	24	18	13	70
Total release time	minutes	3.07E+03	2.58E+03	1.13E+03	2.35E+03	9.13E+03
Maximum release time	minutes	4.00E+02	2.75E+02	1.83E+02	4.01E+02	4.01E+02
Average release time	minutes	2.05E+02	1.08E+02	6.29E+01	1.81E+02	1.30E+02
Minimum release time	minutes	8.40E+01	4.40E+01	5.20E+01	4.60E+01	4.40E+01
Average dilution flow	gpm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: Liquid releases are divided evenly between units

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 1A
 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	6.05E-02	6.45E-02	6.28E-02	1.61E-01	3.49E-01
2. Avg. Release Rate	uCi/sec	7.78E-03	8.20E-03	7.90E-03	2.03E-02	1.11E-02
Iodine-131						
1. Total Release	Ci	(1)	6.63E-07	1.12E-06	(1)	1.78E-06
2. Avg. Release Rate	uCi/sec	(1)	8.43E-08	1.41E-07	(1)	5.65E-08
Particulates Half Life >= 8 days						
1. Total Release	Ci	(1)	3.02E-06	(1)	(1)	3.02E-06
2. Avg. Release Rate	uCi/sec	(1)	3.84E-07	(1)	(1)	9.58E-08
Others						
1. Total Release	Ci	1.13E+00	1.11E+00	1.12E+00	1.12E+00	4.48E+00
2. Avg. Release Rate	uCi/sec	1.45E-01	1.41E-01	1.41E-01	1.41E-01	1.42E-01
Tritium						
1. Total Release	Ci	8.67E+00	6.39E+00	6.87E+00	7.67E+00	2.96E+01
2. Avg. Release Rate	uCi/sec	1.11E+00	8.12E-01	8.64E-01	9.65E-01	9.38E-01
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 1C
 GASEOUS EFFLUENTS - MIXED MODE RELEASES - CONTINUOUS MODE
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR

Fission and Activation Gases						
XE-133	Ci	5.69E-02	5.98E-02	4.51E-02	1.29E-01	2.91E-01

Totals for Period...	Ci	5.69E-02	5.98E-02	4.51E-02	1.29E-01	2.91E-01
Iodines						
I-131	Ci	(1)	6.63E-07	1.12E-06	(1)	1.78E-06
I-133	Ci	(1)	2.81E-05	1.78E-05	(1)	4.59E-05

Totals for Period...	Ci	(1)	2.88E-05	1.89E-05	(1)	4.77E-05
Particulates Half Life >= 8 days						
CO-58	Ci	(1)	1.90E-06	(1)	(1)	1.90E-06
CO-60	Ci	(1)	8.44E-07	(1)	(1)	8.44E-07
SB-125	Ci	(1)	2.73E-07	(1)	(1)	2.73E-07

Totals for Period...	Ci	(1)	3.02E-06	(1)	(1)	3.02E-06
Others						
BR-82	Ci	(1)	(1)	(1)	1.96E-06	1.96E-06
C-14	Ci	1.13E+00	1.11E+00	1.12E+00	1.12E+00	4.48E+00

Totals for Period...	Ci	1.13E+00	1.11E+00	1.12E+00	1.12E+00	4.48E+00
Tritium						
H-3	Ci	8.57E+00	6.21E+00	6.73E+00	7.57E+00	2.91E+01

Totals for Period...	Ci	8.57E+00	6.21E+00	6.73E+00	7.57E+00	2.91E+01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)

Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 1C
 GASEOUS EFFLUENTS - MIXED MODE RELEASES - BATCH MODE
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
AR-41	Ci	1.01E-03	2.12E-03	1.74E-02	3.13E-02	5.18E-02
KR-85M	Ci	(1)	3.33E-06	(1)	(1)	3.33E-06
XE-133	Ci	2.56E-03	2.37E-03	9.49E-05	5.40E-04	5.56E-03
XE-133M	Ci	1.62E-05	3.48E-05	(1)	1.06E-05	6.16E-05
XE-135	Ci	1.89E-05	1.45E-04	2.38E-04	(1)	4.02E-04
Totals for Period...	Ci	3.60E-03	4.67E-03	1.77E-02	3.19E-02	5.78E-02
Iodines						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Others						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	9.49E-02	1.77E-01	1.34E-01	1.05E-01	5.11E-01
Totals for Period...	Ci	9.49E-02	1.77E-01	1.34E-01	1.05E-01	5.11E-01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 1A
 GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	6.60E-02	6.95E-02	4.52E-02	1.32E-01	3.13E-01
2. Avg. Release Rate	uCi/sec	8.49E-03	8.84E-03	5.69E-03	1.66E-02	9.93E-03
Iodine-131						
1. Total Release	Ci	(1)	2.56E-06	(1)	7.09E-07	3.27E-06
2. Avg. Release Rate	uCi/sec	(1)	3.26E-07	(1)	8.93E-08	1.04E-07
Particulates Half Life >= 8 days						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)
Others						
1. Total Release	Ci	1.09E+00	8.48E-01	1.16E+00	1.12E+00	4.22E+00
2. Avg. Release Rate	uCi/sec	1.40E-01	1.08E-01	1.46E-01	1.41E-01	1.34E-01
Tritium						
1. Total Release	Ci	9.60E+00	8.66E+00	1.07E+01	1.30E+01	4.19E+01
2. Avg. Release Rate	uCi/sec	1.24E+00	1.10E+00	1.35E+00	1.63E+00	1.33E+00
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 1C
 GASEOUS EFFLUENTS - MIXED MODE RELEASES - CONTINUOUS MODE
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
XE-133	Ci	5.69E-02	5.98E-02	4.51E-02	1.29E-01	2.91E-01
Totals for Period...	Ci	5.69E-02	5.98E-02	4.51E-02	1.29E-01	2.91E-01
Iodines						
I-131	Ci	(1)	2.56E-06	(1)	7.09E-07	3.27E-06
Totals for Period...	Ci	(1)	2.56E-06	(1)	7.09E-07	3.27E-06
Particulates Half Life >= 8 days						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Others						
C-14	Ci	1.09E+00	8.48E-01	1.16E+00	1.12E+00	4.22E+00
Totals for Period...	Ci	1.09E+00	8.48E-01	1.16E+00	1.12E+00	4.22E+00
Tritium						
H-3	Ci	9.49E+00	8.14E+00	1.07E+01	1.29E+01	4.12E+01
Totals for Period...	Ci	9.49E+00	8.14E+00	1.07E+01	1.29E+01	4.12E+01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 1C
 GASEOUS EFFLUENTS - MIXED MODE RELEASES - BATCH MODE
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
AR-41	Ci	4.82E-03	1.09E-03	(1)	1.48E-03	7.39E-03
KR-85M	Ci	(1)	3.33E-06	(1)	(1)	3.33E-06
XE-133	Ci	4.22E-03	8.43E-03	9.51E-05	1.46E-03	1.42E-02
XE-133M	Ci	1.62E-05	3.49E-05	(1)	1.06E-05	6.17E-05
XE-135	Ci	1.88E-05	1.45E-04	(1)	(1)	1.64E-04
Totals for Period...	Ci	9.08E-03	9.70E-03	9.51E-05	2.95E-03	2.18E-02
Iodines						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Others						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	1.14E-01	5.17E-01	3.33E-02	4.76E-02	7.12E-01
Totals for Period...	Ci	1.14E-01	5.17E-01	3.33E-02	4.76E-02	7.12E-01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2A
 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.73E-03	4.12E-03	1.69E-03	1.38E-03	8.92E-03
2. Avg. Diluted Conc.	uCi/ml	5.01E-10	1.25E-09	4.24E-10	3.71E-10	6.17E-10
Tritium						
1. Total Release	Ci	2.96E+02	2.23E+02	6.36E+01	2.16E+02	7.99E+02
2. Avg. Diluted Conc.	uCi/ml	8.58E-05	6.77E-05	1.60E-05	5.80E-05	5.53E-05
Dissolved and Entrained Gases						
1. Total Release	Ci	8.26E-05	8.53E-05	(1)	(1)	1.68E-04
2. Avg. Diluted Conc.	uCi/ml	2.39E-11	2.59E-11	(1)	(1)	1.16E-11
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste liters		3.45E+09	3.29E+09	3.98E+09	3.73E+09	1.44E+10

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2A - Release Tank
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.73E-03	4.12E-03	1.69E-03	1.38E-03	8.92E-03
2. Avg. Diluted Conc.	uCi/ml	2.73E-06	4.09E-06	2.22E-06	2.48E-06	3.02E-06
Tritium						
1. Total Release	Ci	2.60E+02	1.72E+02	5.64E+01	1.79E+02	6.68E+02
2. Avg. Diluted Conc.	uCi/ml	4.10E-01	1.70E-01	7.43E-02	3.22E-01	2.26E-01
Dissolved and Entrained Gases						
1. Total Release	Ci	8.26E-05	8.53E-05	(1)	(1)	1.68E-04
2. Avg. Diluted Conc.	uCi/ml	1.30E-07	8.45E-08	(1)	(1)	5.68E-08
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	6.34E+05	1.01E+06	7.59E+05	5.56E+05	2.96E+06

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2A - Circulating Water Blowdown
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Diluted Conc.	uCi/ml	(1)	(1)	(1)	(1)	(1)
Tritium						
1. Total Release	Ci	3.62E+01	5.12E+01	7.20E+00	3.68E+01	1.31E+02
2. Avg. Diluted Conc.	uCi/ml	1.05E-05	1.56E-05	1.81E-06	9.87E-06	9.10E-06
Dissolved and Entrained Gases						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Diluted Conc.	uCi/ml	(1)	(1)	(1)	(1)	(1)
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste liters		3.45E+09	3.29E+09	3.97E+09	3.73E+09	1.44E+10

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2B
 LIQUID EFFLUENTS - CONTINUOUS MODE
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	3.62E+01	5.12E+01	7.20E+00	3.68E+01	1.31E+02
Totals for Period...	Ci	3.62E+01	5.12E+01	7.20E+00	3.68E+01	1.31E+02
Dissolved and Entrained Gases						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Gross Alpha Radioactivity						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2B
 LIQUID EFFLUENTS - BATCH MODE
 Unit 1

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
AG-110M	Ci	(1)	3.58E-06	(1)	(1)	3.58E-06
CO-57	Ci	4.32E-06	(1)	2.30E-06	5.76E-06	1.24E-05
CO-58	Ci	6.91E-04	1.73E-03	1.06E-03	5.65E-04	4.05E-03
CO-60	Ci	2.31E-04	2.84E-04	2.40E-04	1.75E-04	9.30E-04
CR-51	Ci	(1)	1.10E-04	(1)	(1)	1.10E-04
FE-59	Ci	(1)	2.74E-04	7.09E-06	(1)	2.81E-04
MN-54	Ci	9.69E-06	1.26E-05	(1)	7.81E-06	3.01E-05
NI-63	Ci	7.92E-04	1.02E-03	3.28E-04	6.29E-04	2.77E-03
SB-125	Ci	(1)	1.53E-05	4.87E-05	(1)	6.40E-05
SB-126	Ci	(1)	9.75E-07	(1)	(1)	9.75E-07
TE-123M	Ci	(1)	9.27E-06	(1)	(1)	9.27E-06
TE-125M	Ci	(1)	6.65E-04	(1)	(1)	6.65E-04
Totals for Period...	Ci	1.73E-03	4.12E-03	1.69E-03	1.38E-03	8.92E-03
Tritium						
H-3	Ci	2.60E+02	1.72E+02	5.64E+01	1.79E+02	6.68E+02
Totals for Period...	Ci	2.60E+02	1.72E+02	5.64E+01	1.79E+02	6.68E+02
Dissolved and Entrained Gases						
XE-133	Ci	8.26E-05	8.30E-05	(1)	(1)	1.66E-04
XE-135	Ci	(1)	2.27E-06	(1)	(1)	2.27E-06
Totals for Period...	Ci	8.26E-05	8.53E-05	(1)	(1)	1.68E-04
Gross Alpha Radioactivity						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2A
 LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.73E-03	4.12E-03	1.69E-03	1.38E-03	8.92E-03
2. Avg. Diluted Conc.	uCi/ml	5.01E-10	1.25E-09	4.24E-10	3.71E-10	6.17E-10
Tritium						
1. Total Release	Ci	2.96E+02	2.23E+02	6.36E+01	2.16E+02	7.99E+02
2. Avg. Diluted Conc.	uCi/ml	8.58E-05	6.77E-05	1.60E-05	5.80E-05	5.53E-05
Dissolved and Entrained Gases						
1. Total Release	Ci	8.26E-05	8.53E-05	(1)	(1)	1.68E-04
2. Avg. Diluted Conc.	uCi/ml	2.39E-11	2.59E-11	(1)	(1)	1.16E-11
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	3.45E+09	3.29E+09	3.98E+09	3.73E+09	1.44E+10

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2A - Release Tank
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.73E-03	4.12E-03	1.69E-03	1.38E-03	8.92E-03
2. Avg. Diluted Conc.	uCi/ml	2.73E-06	4.09E-06	2.22E-06	2.48E-06	3.02E-06
Tritium						
1. Total Release	Ci	2.60E+02	1.72E+02	5.64E+01	1.79E+02	6.68E+02
2. Avg. Diluted Conc.	uCi/ml	4.10E-01	1.70E-01	7.43E-02	3.22E-01	2.26E-01
Dissolved and Entrained Gases						
1. Total Release	Ci	8.26E-05	8.53E-05	(1)	(1)	1.68E-04
2. Avg. Diluted Conc.	uCi/ml	1.30E-07	8.45E-08	(1)	(1)	5.68E-08
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	6.34E+05	1.01E+06	7.59E+05	5.56E+05	2.96E+06

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2A - Circulating Water Blowdown
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Diluted Conc.	uCi/ml	(1)	(1)	(1)	(1)	(1)
Tritium						
1. Total Release	Ci	3.62E+01	5.12E+01	7.20E+00	3.68E+01	1.31E+02
2. Avg. Diluted Conc.	uCi/ml	1.05E-05	1.56E-05	1.81E-06	9.87E-06	9.10E-06
Dissolved and Entrained Gases						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Diluted Conc.	uCi/ml	(1)	(1)	(1)	(1)	(1)
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	3.45E+09	3.29E+09	3.97E+09	3.73E+09	1.44E+10

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2B
 LIQUID EFFLUENTS - CONTINUOUS MODE
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	3.62E+01	5.12E+01	7.20E+00	3.68E+01	1.31E+02
Totals for Period...	Ci	3.62E+01	5.12E+01	7.20E+00	3.68E+01	1.31E+02
Dissolved and Entrained Gases						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)
Gross Alpha Radioactivity						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

EFFLUENT AND WASTE DISPOSAL REPORT
 TABLE 2B
 LIQUID EFFLUENTS - BATCH MODE
 Unit 2

REPORT FOR 2013	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
AG-110M	Ci	(1)	3.58E-06	(1)	(1)	3.58E-06
CO-57	Ci	4.32E-06	(1)	2.30E-06	5.76E-06	1.24E-05
CO-58	Ci	6.91E-04	1.73E-03	1.06E-03	5.65E-04	4.05E-03
CO-60	Ci	2.31E-04	2.84E-04	2.40E-04	1.75E-04	9.30E-04
CR-51	Ci	(1)	1.10E-04	(1)	(1)	1.10E-04
FE-59	Ci	(1)	2.74E-04	7.09E-06	(1)	2.81E-04
MN-54	Ci	9.69E-06	1.26E-05	(1)	7.81E-06	3.01E-05
NI-63	Ci	7.92E-04	1.02E-03	3.28E-04	6.29E-04	2.77E-03
SB-125	Ci	(1)	1.53E-05	4.87E-05	(1)	6.40E-05
SB-126	Ci	(1)	9.75E-07	(1)	(1)	9.75E-07
TE-123M	Ci	(1)	9.27E-06	(1)	(1)	9.27E-06
TE-125M	Ci	(1)	6.65E-04	(1)	(1)	6.65E-04
Totals for Period...	Ci	1.73E-03	4.12E-03	1.69E-03	1.38E-03	8.92E-03
Tritium						
H-3	Ci	2.60E+02	1.72E+02	5.64E+01	1.79E+02	6.68E+02
Totals for Period...	Ci	2.60E+02	1.72E+02	5.64E+01	1.79E+02	6.68E+02
Dissolved and Entrained Gases						
XE-133	Ci	8.26E-05	8.30E-05	(1)	(1)	1.66E-04
XE-135	Ci	(1)	2.27E-06	(1)	(1)	2.27E-06
Totals for Period...	Ci	8.26E-05	8.53E-05	(1)	(1)	1.68E-04
Gross Alpha Radioactivity						
No Nuclide Activities	Ci	(1)	(1)	(1)	(1)	(1)
Totals for Period...	Ci	(1)	(1)	(1)	(1)	(1)

(1) Less than minimum detectable activity which meets the lower limit of detection (LLD) requirements of TRM Section 3.11

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) === QUARTER 1 ===

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	2.03E-02	3.97E-02	3.82E-02	3.82E-02	3.82E-02	4.06E-02	0.00E+00	3.91E-02
TEEN	2.10E-02	3.03E-02	2.87E-02	2.87E-02	2.87E-02	3.03E-02	0.00E+00	2.96E-02
CHILD	2.77E-02	3.35E-02	3.19E-02	3.20E-02	3.19E-02	3.25E-02	0.00E+00	3.31E-02
INFANT	1.55E-04	1.42E-02	1.42E-02	1.42E-02	1.42E-02	1.42E-02	0.00E+00	1.42E-02

=== SITE DOSE LIMIT ANALYSIS === QUARTER 1 ===

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 1 - Admin. Any Organ	ADULT	GILLI	4.06E-02	3.75E+00	1.08E+00
Qtr 1 - Admin. Total Body	ADULT	TBODY	3.91E-02	1.13E+00	3.48E+00

Qtr 1 - T.Spc. Any Organ ADULT GILLI 4.06E-02 5.00E+00 8.11E-01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.42E+01
MN-54	2.63E-01
CO-58	2.54E+00
CO-60	2.26E+00
NI-63	7.23E-01

Qtr 1 - T.Spc. Total Body ADULT TBODY 3.91E-02 1.50E+00 2.61E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.77E+01
MN-54	1.70E-02
CO-58	2.92E-01
CO-60	2.75E-01
NI-63	1.74E+00

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) === QUARTER 2 ===

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	3.50E-02	3.58E-02	3.24E-02	3.91E-02	3.21E-02	4.66E-02	0.00E+00	3.40E-02
TEEN	3.64E-02	2.80E-02	2.45E-02	2.39E-02	2.42E-02	3.50E-02	0.00E+00	2.62E-02
CHILD	4.78E-02	3.06E-02	2.74E-02	2.67E-02	2.69E-02	3.10E-02	0.00E+00	2.94E-02
INFANT	2.61E-04	1.19E-02	1.18E-02	1.18E-02	1.18E-02	1.19E-02	0.00E+00	1.19E-02

=== SITE DOSE LIMIT ANALYSIS === QUARTER 2 ===

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 2 - Admin. Any Organ	CHILD	BONE	4.78E-02	3.75E+00	1.28E+00
Qtr 2 - Admin. Total Body	ADULT	TBODY	3.40E-02	1.13E+00	3.03E+00

Qtr 2 - T.Spc. Any Organ CHILD BONE 4.78E-02 5.00E+00 9.57E-01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
FE-59	7.74E-01
NI-63	9.41E+01
AG-110M	1.00E-05
TE-125M	5.17E+00

Qtr 2 - T.Spc. Total Body ADULT TBODY 3.40E-02 1.50E+00 2.27E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.37E+01
CR-51	4.26E-04
MN-54	3.21E-02
FE-59	7.81E-01
CO-58	1.06E+00
CO-60	4.91E-01
NI-63	3.25E+00
AG-110M	6.07E-06
TE-125M	6.96E-01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) === QUARTER 3 ===

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	2.04E-02	2.18E-02	2.01E-02	2.01E-02	2.01E-02	2.66E-02	0.00E+00	2.14E-02
TEEN	2.11E-02	1.69E-02	1.50E-02	1.50E-02	1.51E-02	1.96E-02	0.00E+00	1.65E-02
CHILD	2.78E-02	1.85E-02	1.68E-02	1.68E-02	1.68E-02	1.83E-02	0.00E+00	1.85E-02
INFANT	1.56E-04	7.44E-03	7.43E-03	7.43E-03	7.43E-03	7.44E-03	0.00E+00	7.44E-03

=== SITE DOSE LIMIT ANALYSIS === QUARTER 3 ===

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 3 - Admin. Any Organ	CHILD	BONE	2.78E-02	3.75E+00	7.41E-01
Qtr 3 - Admin. Total Body	ADULT	TBODY	2.14E-02	1.13E+00	1.91E+00

Qtr 3 - T.Spc. Any Organ CHILD BONE 2.78E-02 5.00E+00 5.56E-01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
FE-59	6.63E-02
NI-63	9.99E+01

Qtr 3 - T.Spc. Total Body ADULT TBODY 2.14E-02 1.50E+00 1.43E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.35E+01
FE-59	6.17E-02
CO-58	1.98E+00
CO-60	1.26E+00
NI-63	3.18E+00

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) === QUARTER 4 ===

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	2.03E-02	3.48E-02	3.33E-02	3.33E-02	3.33E-02	3.56E-02	0.00E+00	3.42E-02
TEEN	2.11E-02	2.66E-02	2.50E-02	2.50E-02	2.50E-02	2.66E-02	0.00E+00	2.59E-02
CHILD	2.78E-02	2.94E-02	2.78E-02	2.78E-02	2.78E-02	2.84E-02	0.00E+00	2.90E-02
INFANT	1.55E-04	1.24E-02	1.23E-02	1.23E-02	1.23E-02	1.23E-02	0.00E+00	1.24E-02

=== SITE DOSE LIMIT ANALYSIS === QUARTER 4 ===

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 4 - Admin. Any Organ	ADULT	GILLI	3.56E-02	3.75E+00	9.50E-01
Qtr 4 - Admin. Total Body	ADULT	TBODY	3.42E-02	1.13E+00	3.04E+00

Qtr 4 - T.Spc. Any Organ ADULT GILLI 3.56E-02 5.00E+00 7.13E-01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.34E+01
MN-54	3.05E-01
CO-58	2.99E+00
CO-60	2.47E+00
NI-63	8.25E-01

Qtr 4 - T.Spc. Total Body ADULT TBODY 3.42E-02 1.50E+00 2.28E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.73E+01
MN-54	1.98E-02
CO-58	3.44E-01
CO-60	3.02E-01
NI-63	1.99E+00

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

Liquid Receptor

=== PERIOD DOSE BY ORGAN AND AGE GROUP (mrem) === ANNUAL 2013 ===

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	9.53E-02	1.38E-01	1.29E-01	1.36E-01	1.29E-01	1.53E-01	0.00E+00	1.34E-01
TEEN	9.89E-02	1.06E-01	9.73E-02	9.68E-02	9.70E-02	1.15E-01	0.00E+00	1.02E-01
CHILD	1.30E-01	1.17E-01	1.09E-01	1.08E-01	1.08E-01	1.15E-01	0.00E+00	1.14E-01
INFANT	7.21E-04	4.79E-02	4.78E-02	4.78E-02	4.78E-02	4.78E-02	0.00E+00	4.79E-02

=== SITE DOSE LIMIT ANALYSIS === ANNUAL 2013 ===

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2013 - Admin. Any Organ	ADULT	GILLI	1.53E-01	7.50E+00	2.05E+00
2013 - Admin. Total Body	ADULT	TBODY	1.34E-01	2.25E+00	5.96E+00
2013 - T.Spc. Any Organ	ADULT	GILLI	1.53E-01	1.00E+01	1.53E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	8.41E+01
CR-51	2.47E-02
MN-54	2.84E-01
FE-59	1.61E+00
CO-58	5.18E+00
CO-60	3.17E+00
NI-63	8.79E-01
AG-110M	9.64E-04
TE-125M	4.79E+00

2013 - T.Spc. Total Body ADULT TBODY 1.34E-01 3.00E+00 4.47E+00

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.62E+01
CR-51	1.13E-04
MN-54	2.03E-02
FE-59	2.12E-01
CO-58	6.55E-01
CO-60	4.25E-01
NI-63	2.33E+00
AG-110M	1.61E-06
TE-125M	1.84E-01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== QUARTER 1 =====

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 1 - Admin. Any Organ	CHILD	BONE	1.81E-01	5.63E+00	3.22E+00
Qtr 1 - Admin. Total Body	CHILD	TBODY	3.72E-02	5.25E+00	7.09E-01

Qtr 1 - T.Spc. Any Organ CHILD BONE 1.81E-01 7.50E+00 2.41E+00

Receptor: 5 Composite Crit. Receptor - IP

Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide Percentage

H-3 0.00E+00

C-14 1.00E+02

Qtr 1 - T.Spc. Total Body CHILD TBODY 3.72E-02 7.50E+00 4.96E-01

Receptor: 5 Composite Crit. Receptor - IP

Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide Percentage

H-3 2.77E+00

C-14 9.72E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

 GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013
 Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ===== QUARTER 1 =====

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
Qtr 1 - Admin. Gamma	5.62E-06	3.75E+00	1.50E-04
Qtr 1 - Admin. Beta	2.08E-06	7.50E+00	2.77E-05

Qtr 1 - T.Spc. Gamma 5.62E-06 5.00E+00 1.12E-04

Receptor: 4 Composite Crit. Receptor - NG
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	5.60E+01
XE-135	7.47E-02
XE-133M	1.09E-02
XE-133	4.40E+01

Qtr 1 - T.Spc. Beta 2.08E-06 1.00E+01 2.08E-05

Receptor: 4 Composite Crit. Receptor - NG
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	1.31E+01
XE-135	6.36E-02
XE-133M	3.28E-02
XE-133	8.68E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== QUARTER 2 =====

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 2 - Admin. Any Organ	CHILD	BONE	1.60E-01	5.63E+00	2.84E+00
Qtr 2 - Admin. Total Body	CHILD	TBODY	3.28E-02	5.25E+00	6.24E-01

Qtr 2 - T.Spc. Any Organ CHILD BONE 1.60E-01 7.50E+00 2.13E+00
 Receptor: 5 Composite Crit. Receptor - IP
 Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation
 Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
CO-58	5.40E-05
CO-60	1.55E-03
I-131	3.58E-04
I-133	5.28E-05

Qtr 2 - T.Spc. Total Body CHILD TBODY 3.28E-02 7.50E+00 4.37E-01
 Receptor: 5 Composite Crit. Receptor - IP
 Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation
 Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	2.59E+00
C-14	9.74E+01
CO-58	4.61E-04
CO-60	7.97E-03
I-131	1.00E-03
I-133	1.34E-04

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

 GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ===== QUARTER 2 =====

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
Qtr 2 - Admin. Gamma	4.44E-06	3.75E+00	1.18E-04
Qtr 2 - Admin. Beta	2.12E-06	7.50E+00	2.82E-05

Qtr 2 - T.Spc. Gamma 4.44E-06 5.00E+00 8.88E-05

Receptor: 4 Composite Crit. Receptor - NG
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	3.90E+01
KR-85M	1.07E-02
XE-135	7.27E-01
XE-133M	2.98E-02
XE-133	6.02E+01

Qtr 2 - T.Spc. Beta 2.12E-06 1.00E+01 2.12E-05

Receptor: 4 Composite Crit. Receptor - NG
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	7.10E+00
KR-85M	8.84E-03
XE-135	4.80E-01
XE-133M	6.95E-02
XE-133	9.23E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

 GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== QUARTER 3 =====

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 3 - Admin. Any Organ	CHILD	BONE	1.86E-01	5.63E+00	3.31E+00
Qtr 3 - Admin. Total Body	CHILD	TBODY	3.82E-02	5.25E+00	7.28E-01

Qtr 3 - T.Spc. Any Organ CHILD BONE 1.86E-01 7.50E+00 2.48E+00

Receptor: 5 Composite Crit. Receptor - IP
 Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation
 Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
I-131	1.06E-04
I-133	2.86E-05

Qtr 3 - T.Spc. Total Body CHILD TBODY 3.82E-02 7.50E+00 5.10E-01

Receptor: 5 Composite Crit. Receptor - IP
 Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation
 Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	2.60E+00
C-14	9.74E+01
I-131	2.99E-04
I-133	7.23E-05

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013
 Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ===== QUARTER 3 =====

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
Qtr 3 - Admin. Gamma	1.13E-05	3.75E+00	3.01E-04
Qtr 3 - Admin. Beta	2.18E-06	7.50E+00	2.90E-05

Qtr 3 - T.Spc. Gamma	1.13E-05	5.00E+00	2.26E-04
Receptor: 4 Composite Crit. Receptor - NG			
Distance: 800 (meters)		Compass Point: SSE	
Nuclide	Percentage		
AR-41	8.34E+01		
XE-135	2.35E-01		
XE-133	1.64E+01		

Qtr 3 - T.Spc. Beta	2.18E-06	1.00E+01	2.18E-05
Receptor: 4 Composite Crit. Receptor - NG			
Distance: 800 (meters)		Compass Point: SSE	
Nuclide	Percentage		
AR-41	3.74E+01		
XE-135	3.84E-01		
XE-133	6.22E+01		

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

 GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== QUARTER 4 =====

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 4 - Admin. Any Organ	CHILD	BONE	1.83E-01	5.63E+00	3.25E+00
Qtr 4 - Admin. Total Body	CHILD	TBODY	3.77E-02	5.25E+00	7.17E-01

Qtr 4 - T.Spc. Any Organ CHILD BONE 1.83E-01 7.50E+00 2.43E+00

Receptor: 5 Composite Crit. Receptor - IP

Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
I-131	6.88E-05

Qtr 4 - T.Spc. Total Body CHILD TBODY 3.77E-02 7.50E+00 5.02E-01

Receptor: 5 Composite Crit. Receptor - IP

Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	3.09E+00
C-14	9.69E+01
I-131	1.92E-04

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013
 Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ===== QUARTER 4 =====

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
Qtr 4 - Admin. Gamma	2.30E-05	3.75E+00	6.13E-04
Qtr 4 - Admin. Beta	5.43E-06	7.50E+00	7.23E-05
Qtr 4 - T.Spc. Gamma	2.30E-05	5.00E+00	4.60E-04
Receptor: 4 Composite Crit. Receptor - NG			
Distance: 800 (meters) Compass Point: SSE			
Nuclide Percentage			
AR-41	7.68E+01		
XE-133M	1.75E-03		
XE-133	2.32E+01		

Qtr 4 - T.Spc. Beta	5.43E-06	1.00E+01	5.43E-05
Receptor: 4 Composite Crit. Receptor - NG			
Distance: 800 (meters) Compass Point: SSE			
Nuclide Percentage			
AR-41	2.82E+01		
XE-133M	8.26E-03		
XE-133	7.18E+01		

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013

Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== ANNUAL 2013 =====

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2013 - Admin. Any Organ	CHILD	BONE	7.09E-01	1.13E+01	6.31E+00
2013 - Admin. Total Body	CHILD	TBODY	1.46E-01	1.05E+01	1.39E+00

2013 - T.Spc. Any Organ CHILD BONE 7.09E-01 1.50E+01 4.73E+00

Receptor: 5 Composite Crit. Receptor - IP

Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide Percentage

H-3	0.00E+00
C-14	1.00E+02
CO-58	1.22E-05
CO-60	3.48E-04
I-131	1.26E-04
I-133	1.94E-05

2013 - T.Spc. Total Body CHILD TBODY 1.46E-01 1.50E+01 9.73E-01

Receptor: 5 Composite Crit. Receptor - IP

Distance: 800 (meters) Compass Point: SSE

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide Percentage

H-3	2.77E+00
C-14	9.72E+01
CO-58	1.03E-04
CO-60	1.79E-03
I-131	3.54E-04
I-133	4.90E-05

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

GASEOUS DOSE SUMMARY

Unit 1 & 2

Report for: 2013
 Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ===== ANNUAL 2013 =====

Annual - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
2013 - Admin. Gamma	4.43E-05	7.50E+00	5.91E-04
2013 - Admin. Beta	1.18E-05	1.50E+01	7.86E-05

2013 - T.Spc. Gamma 4.43E-05 1.00E+01 4.43E-04

Receptor: 4 Composite Crit. Receptor - NG
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	7.21E+01
KR-85M	1.07E-03
XE-135	1.42E-01
XE-133M	5.28E-03
XE-133	2.78E+01

2013 - T.Spc. Beta 1.18E-05 2.00E+01 5.90E-05

Receptor: 4 Composite Crit. Receptor - NG
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	2.35E+01
KR-85M	1.58E-03
XE-135	1.68E-01
XE-133M	2.21E-02
XE-133	7.63E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

 Unit 1 & 2

Report for: 2013
 Unit Range - From: 1 To: 2

=== MAXIMUM DOSE ANALYSIS ===== ANNUAL 2013 =====

Dose Type	Age Group	Organ	Dose (mrem)
Any Organ	CHILD	BONE	8.40E-01

Liquid Receptor: 0 Liquid Receptor
 Gaseous Receptor: 5 Composite Crit. Receptor - IP
 Distance: 800 (meters) Compass Point: SSE

Liquid Dose: 1.30E-01 % of Total: 1.55E+01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
---------	------------

H-3	0.00E+00
CR-51	0.00E+00
MN-54	0.00E+00
FE-59	3.04E-01
CO-58	0.00E+00
CO-60	0.00E+00
NI-63	9.77E+01
AG-110M	3.82E-06
TE-125M	1.98E+00

Gaseous Dose: 7.09E-01 % of Total: 8.45E+01

Critical Pathway: Vegetation (VEG)

Major Contributors (0% or greater to total)

Nuclide	Percentage
---------	------------

H-3	0.00E+00
C-14	1.00E+02
CO-58	1.22E-05
CO-60	3.48E-04
I-131	1.26E-04
I-133	1.94E-05

=== MAXIMUM DOSE ANALYSIS ===== ANNUAL 2013 =====

Dose Type	Age Group	Organ	Dose (mrem)
Total Body	CHILD	TBODY	2.60E-01

Liquid Receptor: 0 Liquid Receptor
 Gaseous Receptor: 5 Composite Crit. Receptor - IP
 Distance: 800 (meters) Compass Point: SSE

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

Liquid Dose: 1.14E-01 % of Total: 4.40E+01

Critical Pathway: Fresh Water Fish - Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
---------	------------

-----	-----
H-3	9.42E+01
CR-51	1.45E-04
MN-54	2.55E-02
FE-59	2.79E-01
CO-58	8.39E-01
CO-60	5.45E-01
NI-63	3.78E+00
AG-110M	2.35E-06
TE-125M	3.00E-01

Gaseous Dose: 1.46E-01 % of Total: 5.61E+01

Critical Pathway: Vegetation (VEG)

Major Contributors (0% or greater to total)

Nuclide	Percentage
---------	------------

-----	-----
H-3	2.77E+00
C-14	9.72E+01
CO-58	1.03E-04
CO-60	1.79E-03
I-131	3.54E-04
I-133	4.90E-05

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 1

=== RELEASE DATA =====
 Total Release Duration (minutes)..... 5.470E+05
 Total Release Volume (cf)..... 6.784E+10
 Average Release Flowrate (cfm)..... 1.240E+05
 Average Period Flowrate (cfm)..... 1.291E+05

=== NUCLIDE DATA =====

Nuclide	uCi	Average uCi/cc	EC Ratio	EC
AR-41	5.18E+04	2.70E-11	2.70E-03	1.00E-08
KR-85M	3.33E+00	1.73E-15	1.73E-08	1.00E-07
XE-133M	6.17E+01	3.21E-14	5.35E-08	6.00E-07
XE-133	2.96E+05	1.54E-10	3.09E-04	5.00E-07
XE-135	4.02E+02	2.09E-13	2.99E-06	7.00E-08
F&AG	3.49E+05	1.82E-10	3.01E-03	
I-131	1.78E+00	9.28E-16	4.64E-06	2.00E-10
I-133	4.59E+01	2.39E-14	2.39E-05	1.00E-09
Iodine	4.77E+01	2.48E-14	2.85E-05	
BR-82	1.96E+00	1.02E-15	2.04E-07	5.00E-09
C-14	4.48E+06	2.33E-09	7.78E-01	3.00E-09
Other	4.48E+06	2.33E-09	7.78E-01	
H-3	2.96E+07	1.54E-08	1.54E-01	1.00E-07
H-3	2.96E+07	1.54E-08	1.54E-01	
SB-125	2.73E-01	1.42E-16	2.03E-07	7.00E-10
CO-58	1.90E+00	9.91E-16	9.91E-07	1.00E-09
CO-60	8.44E-01	4.39E-16	8.79E-06	5.00E-11
P>=8	3.02E+00	1.57E-15	9.98E-06	
Total	3.44E+07	1.79E-08	9.35E-01	

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 1

=== MAXIMUM I&P DOSE FOR PERIOD =====

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
Admin	Any Organ	CHILD	BONE	3.65E-01	31-day	2.25E-01	1.62E+02
					Quarter	5.63E+00	6.50E+00
					Annual	1.13E+01	3.25E+00
T.Spec	Any Organ	CHILD	BONE	3.65E-01	31-day	3.00E-01	1.22E+02
					Quarter	7.50E+00	4.87E+00
					Annual	1.50E+01	2.44E+00

Receptor.....: 5 Composite Crit. Receptor - IP
 Distance (meters).....: 800
 Compass Point.....: SSE
 Critical Pathway.....: 2 Vegetation (VEG)
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
CO-58	2.36E-05
CO-60	6.75E-04
I-131	8.64E-05
I-133	3.77E-05

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 1

=== PERIOD ORGAN DOSE BY AGE GROUP AND PATHWAY (mrem) ===								
Age/Path	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
AGPD	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	0.00E+00	2.57E-06
AINHL	1.16E-03	5.21E-04	5.23E-04	5.21E-04	5.21E-04	5.21E-04	0.00E+00	5.21E-04
AVEG	5.73E-02	1.20E-02	1.20E-02	1.20E-02	1.20E-02	1.20E-02	0.00E+00	1.20E-02
ACMEAT	2.13E-02	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	0.00E+00	4.34E-03
ACMILK	2.32E-02	4.83E-03	4.86E-03	4.83E-03	4.83E-03	4.83E-03	0.00E+00	4.83E-03
TGPD	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	0.00E+00	2.57E-06
TINHL	1.66E-03	6.17E-04	6.19E-04	6.17E-04	6.17E-04	6.17E-04	0.00E+00	6.17E-04
TVEG	9.27E-02	1.92E-02	1.92E-02	1.92E-02	1.92E-02	1.92E-02	0.00E+00	1.92E-02
TCMEAT	1.80E-02	3.64E-03	3.64E-03	3.64E-03	3.64E-03	3.64E-03	0.00E+00	3.64E-03
TCMILK	4.28E-02	8.81E-03	8.86E-03	8.81E-03	8.81E-03	8.81E-03	0.00E+00	8.81E-03
CGPD	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	0.00E+00	2.57E-06
CINHL	2.30E-03	7.00E-04	7.03E-04	7.00E-04	7.00E-04	7.00E-04	0.00E+00	7.00E-04
CVEG	2.24E-01	4.58E-02	4.58E-02	4.58E-02	4.58E-02	4.58E-02	0.00E+00	4.58E-02
CCMEAT	3.38E-02	6.83E-03	6.83E-03	6.83E-03	6.83E-03	6.83E-03	0.00E+00	6.83E-03
CCMILK	1.05E-01	2.14E-02	2.15E-02	2.14E-02	2.14E-02	2.14E-02	0.00E+00	2.14E-02
IGPD	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	2.57E-06	0.00E+00	2.57E-06
IINHL	1.69E-03	4.95E-04	4.98E-04	4.95E-04	4.95E-04	4.95E-04	0.00E+00	4.95E-04
ICMILK	2.07E-01	4.46E-02	4.49E-02	4.46E-02	4.46E-02	4.46E-02	0.00E+00	4.46E-02
----- TOTALS -----								
ADULT	1.03E-01	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	0.00E+00	2.17E-02
TEEN	1.55E-01	3.23E-02	3.24E-02	3.23E-02	3.23E-02	3.23E-02	0.00E+00	3.23E-02
CHILD	3.65E-01	7.47E-02	7.49E-02	7.47E-02	7.47E-02	7.47E-02	0.00E+00	7.47E-02
INFANT	2.08E-01	4.51E-02	4.54E-02	4.51E-02	4.51E-02	4.51E-02	0.00E+00	4.51E-02

=== AGE GROUP / PATHWAY DESCRIPTIONS ===		
Abbreviation	Age Group	Pathway
AGPD	ADULT	Ground Plane Deposition (GPD)
AINHL	ADULT	Inhalation (INHL)
AVEG	ADULT	Vegetation (VEG)
ACMEAT	ADULT	Grs/Cow/Meat (CMEAT)
ACMILK	ADULT	Grs/Cow/Milk (CMILK)
TGPD	TEEN	Ground Plane Deposition (GPD)
TINHL	TEEN	Inhalation (INHL)
TVEG	TEEN	Vegetation (VEG)
TCMEAT	TEEN	Grs/Cow/Meat (CMEAT)
TCMILK	TEEN	Grs/Cow/Milk (CMILK)
CGPD	CHILD	Ground Plane Deposition (GPD)
CINHL	CHILD	Inhalation (INHL)

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
Period Start Date....: 01/01/2013 00:00
Period End Date.....: 01/01/2014 00:00
Period Duration (min): 5.256E+05
Coefficient Type.....: Historical
Unit.....: 1

=== AGE GROUP / PATHWAY DESCRIPTIONS =====

Abbreviation	Age Group	Pathway
CVEG	CHILD	Vegetation (VEG)
CCMEAT	CHILD	Grs/Cow/Meat (CMEAT)
CCMILK	CHILD	Grs/Cow/Milk (CMILK)
IGPD	INFANT	Ground Plane Deposition (GPD)
IINHL	INFANT	Inhalation (INHL)
ICMILK	INFANT	Grs/Cow/Milk (CMILK)

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 1

=== MAXIMUM NG DOSE FOR PERIOD =====

Limit Type	Dose Type	Dose (mrad)	Limit Period	Limit (mrad)	Percent of Limit
Admin	Gamma	3.41E-05	31-day	1.50E-01	2.27E-02
			Quarter	3.75E+00	9.09E-04
			Annual	7.50E+00	4.54E-04
Admin	Beta	6.88E-06	31-day	3.00E-01	2.29E-03
			Quarter	7.50E+00	9.17E-05
			Annual	1.50E+01	4.58E-05
T.Spec	Gamma	3.41E-05	31-day	2.00E-01	1.70E-02
			Quarter	5.00E+00	6.82E-04
			Annual	1.00E+01	3.41E-04

Receptor.....: 4 Composite Crit. Receptor - NG
 Distance (meters).....: 800
 Compass Point.....: SSE
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
AR-41	8.20E+01
KR-85M	6.97E-04
XE-133M	3.43E-03
XE-133	1.78E+01
XE-135	1.31E-01

Limit Type	Dose Type	Dose (mrad)	Limit Period	Limit (mrad)	Percent of Limit
T.Spec	Beta	6.88E-06	31-day	4.00E-01	1.72E-03
			Quarter	1.00E+01	6.88E-05
			Annual	2.00E+01	3.44E-05

Receptor.....: 4 Composite Crit. Receptor - NG
 Distance (meters).....: 0.0
 Compass Point.....: 0.0
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
AR-41	3.52E+01
KR-85M	1.36E-03
XE-133M	1.89E-02
XE-133	6.45E+01

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
Period Start Date....: 01/01/2013 00:00
Period End Date.....: 01/01/2014 00:00
Period Duration (min): 5.256E+05
Coefficient Type.....: Historical
Unit.....: 1

Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
-----	-----
XE-135	2.05E-01

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 2

=== RELEASE DATA =====
 Total Release Duration (minutes)..... 5.588E+05
 Total Release Volume (cf)..... 7.211E+10
 Average Release Flowrate (cfm)..... 1.291E+05

 Average Period Flowrate (cfm)..... 1.372E+05

=== NUCLIDE DATA =====

Nuclide	uCi	Average uCi/cc	EC Ratio	EC
AR-41	7.39E+03	3.62E-12	3.62E-04	1.00E-08
KR-85M	3.33E+00	1.63E-15	1.63E-08	1.00E-07
XE-133M	6.17E+01	3.02E-14	5.03E-08	6.00E-07
XE-133	3.05E+05	1.49E-10	2.99E-04	5.00E-07
XE-135	1.64E+02	8.02E-14	1.15E-06	7.00E-08
F&AG	3.13E+05	1.53E-10	6.62E-04	
I-131	3.27E+00	1.60E-15	8.01E-06	2.00E-10
Iodine	3.27E+00	1.60E-15	8.01E-06	
C-14	4.22E+06	2.07E-09	6.89E-01	3.00E-09
Other	4.22E+06	2.07E-09	6.89E-01	
H-3	4.19E+07	2.05E-08	2.05E-01	1.00E-07
H-3	4.19E+07	2.05E-08	2.05E-01	
Total	4.65E+07	2.28E-08	8.95E-01	

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 2

=== MAXIMUM I&P DOSE FOR PERIOD =====

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
Admin	Any Organ	CHILD	BONE	3.44E-01	31-day	2.25E-01	1.53E+02
					Quarter	5.63E+00	6.12E+00
					Annual	1.13E+01	3.06E+00
T.Spec	Any Organ	CHILD	BONE	3.44E-01	31-day	3.00E-01	1.15E+02
					Quarter	7.50E+00	4.59E+00
					Annual	1.50E+01	2.29E+00

Receptor.....: 5 Composite Crit. Receptor - IP
 Distance (meters).....: 800
 Compass Point.....: SSE
 Critical Pathway.....: 2 Vegetation (VEG)
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
H-3	0.00E+00
C-14	1.00E+02
I-131	1.68E-04

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 2

=== PERIOD ORGAN DOSE BY AGE GROUP AND PATHWAY (mrem) ===								
Age/Path	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
AGPD	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	0.00E+00	6.71E-09
AINHL	1.10E-03	6.35E-04	6.35E-04	6.35E-04	6.35E-04	6.35E-04	0.00E+00	6.35E-04
AVEG	5.40E-02	1.15E-02	1.16E-02	1.15E-02	1.15E-02	1.15E-02	0.00E+00	1.15E-02
ACMEAT	2.00E-02	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	0.00E+00	4.12E-03
ACMILK	2.19E-02	4.63E-03	4.68E-03	4.63E-03	4.63E-03	4.63E-03	0.00E+00	4.63E-03
TGPD	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	0.00E+00	6.71E-09
TINHL	1.57E-03	7.27E-04	7.27E-04	7.27E-04	7.27E-04	7.27E-04	0.00E+00	7.27E-04
TVEG	8.73E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	0.00E+00	1.84E-02
TCMEAT	1.69E-02	3.45E-03	3.45E-03	3.45E-03	3.45E-03	3.45E-03	0.00E+00	3.45E-03
TCMILK	4.03E-02	8.41E-03	8.49E-03	8.41E-03	8.41E-03	8.41E-03	0.00E+00	8.41E-03
CGPD	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	0.00E+00	6.71E-09
CINHL	2.16E-03	7.88E-04	7.89E-04	7.88E-04	7.88E-04	7.88E-04	0.00E+00	7.88E-04
CVEG	2.11E-01	4.36E-02	4.36E-02	4.36E-02	4.36E-02	4.36E-02	0.00E+00	4.36E-02
CCMEAT	3.18E-02	6.46E-03	6.46E-03	6.46E-03	6.46E-03	6.46E-03	0.00E+00	6.46E-03
CCMILK	9.93E-02	2.03E-02	2.05E-02	2.03E-02	2.03E-02	2.03E-02	0.00E+00	2.03E-02
IGPD	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	6.71E-09	0.00E+00	6.71E-09
IINHL	1.60E-03	5.40E-04	5.41E-04	5.40E-04	5.40E-04	5.40E-04	0.00E+00	5.40E-04
ICMILK	1.94E-01	4.23E-02	4.27E-02	4.23E-02	4.23E-02	4.23E-02	0.00E+00	4.23E-02

----- TOTALS -----								
ADULT	9.70E-02	2.09E-02	2.10E-02	2.09E-02	2.09E-02	2.09E-02	0.00E+00	2.09E-02
TEEN	1.46E-01	3.10E-02	3.11E-02	3.10E-02	3.10E-02	3.10E-02	0.00E+00	3.10E-02
CHILD	3.44E-01	7.12E-02	7.14E-02	7.12E-02	7.12E-02	7.12E-02	0.00E+00	7.12E-02
INFANT	1.96E-01	4.28E-02	4.32E-02	4.28E-02	4.28E-02	4.28E-02	0.00E+00	4.28E-02

=== AGE GROUP / PATHWAY DESCRIPTIONS ===		
Abbreviation	Age Group	Pathway
AGPD	ADULT	Ground Plane Deposition (GPD)
AINHL	ADULT	Inhalation (INHL)
AVEG	ADULT	Vegetation (VEG)
ACMEAT	ADULT	Grs/Cow/Meat (CMEAT)
ACMILK	ADULT	Grs/Cow/Milk (CMILK)
TGPD	TEEN	Ground Plane Deposition (GPD)
TINHL	TEEN	Inhalation (INHL)
TVEG	TEEN	Vegetation (VEG)
TCMEAT	TEEN	Grs/Cow/Meat (CMEAT)
TCMILK	TEEN	Grs/Cow/Milk (CMILK)
CGPD	CHILD	Ground Plane Deposition (GPD)
CINHL	CHILD	Inhalation (INHL)

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
 (Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 2

=== AGE GROUP / PATHWAY DESCRIPTIONS =====

Abbreviation	Age Group	Pathway
CVEG	CHILD	Vegetation (VEG)
CCMEAT	CHILD	Grs/Cow/Meat (CMEAT)
CCMILK	CHILD	Grs/Cow/Milk (CMILK)
IGPD	INFANT	Ground Plane Deposition (GPD)
IINHL	INFANT	Inhalation (INHL)
ICMILK	INFANT	Grs/Cow/Milk (CMILK)

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
 Period Start Date....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (min): 5.256E+05
 Coefficient Type.....: Historical
 Unit.....: 2

=== MAXIMUM NG DOSE FOR PERIOD =====

Limit Type	Dose Type	Dose (mrad)	Limit Period	Limit (mrad)	Percent of Limit
Admin	Gamma	1.03E-05	31-day	1.50E-01	6.84E-03
			Quarter	3.75E+00	2.74E-04
			Annual	7.50E+00	1.37E-04
Admin	Beta	4.92E-06	31-day	3.00E-01	1.64E-03
			Quarter	7.50E+00	6.56E-05
			Annual	1.50E+01	3.28E-05
T.Spec	Gamma	1.03E-05	31-day	2.00E-01	5.13E-03
			Quarter	5.00E+00	2.05E-04
			Annual	1.00E+01	1.03E-04

Receptor.....: 4 Composite Crit. Receptor - NG
 Distance (meters).....: 800
 Compass Point.....: SSE
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
AR-41	3.89E+01
KR-85M	2.32E-03
XE-133M	1.14E-02
XE-133	6.09E+01
XE-135	1.78E-01

Limit Type	Dose Type	Dose (mrad)	Limit Period	Limit (mrad)	Percent of Limit
T.Spec	Beta	4.92E-06	31-day	4.00E-01	1.23E-03
			Quarter	1.00E+01	4.92E-05
			Annual	2.00E+01	2.46E-05

Receptor.....: 4 Composite Crit. Receptor - NG
 Distance (meters).....: 0.0
 Compass Point.....: 0.0
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
AR-41	7.03E+00
KR-85M	1.90E-03
XE-133M	2.64E-02
XE-133	9.28E+01

GASEOUS RELEASE AND DOSE SUMMARY REPORT - BY UNIT
(Composite Critical Receptor - Limited Analysis)

Release ID.....: 1 All Gas Release Types
Period Start Date....: 01/01/2013 00:00
Period End Date.....: 01/01/2014 00:00
Period Duration (min): 5.256E+05
Coefficient Type.....: Historical
Unit.....: 2

Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
-----	-----
XE-135	1.17E-01

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 1

=== RELEASE DATA =====
 Total Release Duration (minutes)..... 5.347E+05
 Total Undiluted Volume Released (gallons)..... NA
 Average Undiluted Flowrate (gpm)..... NA

 Total Dilution Volume (gallons)..... NA
 Average Dilution Flowrate (gpm)..... NA

=== NUCLIDE DATA =====

Nuclide	uCi
CO-57	1.24E+01
SB-125	6.40E+01
TE-123M	9.27E+00
SB-126	9.75E-01
CR-51	1.10E+02
MN-54	3.01E+01
FE-59	2.81E+02
CO-58	4.05E+03
CO-60	9.30E+02
AG-110M	3.58E+00
TE-125M	6.65E+02
-----	-----
Gamma	6.15E+03
XE-133	1.66E+02
XE-135	2.27E+00
-----	-----
D&EG	1.68E+02
H-3	7.99E+08
NI-63	2.77E+03
-----	-----
Beta	7.99E+08
-----	-----
Total	7.99E+08

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 1
 Receptor.....: 0 Liquid Receptor

=== PERMIT ORGAN DOSE BY AGE GROUP AND PATHWAY (mrem) =====

Age/Path	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
APWtr	1.63E-04	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.81E-02	0.00E+00	1.80E-02
AFWFSp	4.75E-02	5.08E-02	4.67E-02	5.02E-02	4.66E-02	5.86E-02	0.00E+00	4.90E-02
TPWtr	1.55E-04	1.27E-02	1.27E-02	1.27E-02	1.27E-02	1.27E-02	0.00E+00	1.27E-02
TFWFSp	4.93E-02	4.02E-02	3.60E-02	3.57E-02	3.58E-02	4.46E-02	0.00E+00	3.84E-02
CPWtr	4.70E-04	2.44E-02	2.44E-02	2.44E-02	2.44E-02	2.44E-02	0.00E+00	2.44E-02
CFWFSp	6.46E-02	3.39E-02	2.99E-02	2.96E-02	2.97E-02	3.29E-02	0.00E+00	3.28E-02
IPWtr	3.61E-04	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02

----- TOTALS -----

ADULT	4.77E-02	6.88E-02	6.47E-02	6.82E-02	6.46E-02	7.67E-02	0.00E+00	6.70E-02
TEEN	4.95E-02	5.29E-02	4.87E-02	4.84E-02	4.85E-02	5.73E-02	0.00E+00	5.10E-02
CHILD	6.51E-02	5.83E-02	5.43E-02	5.39E-02	5.40E-02	5.73E-02	0.00E+00	5.72E-02
INFANT	3.61E-04	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02

=== AGE GROUP / PATHWAY DESCRIPTIONS =====

Abbreviation	Age Group	Pathway
APWtr	ADULT	Potable Water (PWtr)
AFWFSp	ADULT	Fresh Water Fish - Sport (FFSP)
TPWtr	TEEN	Potable Water (PWtr)
TFWFSp	TEEN	Fresh Water Fish - Sport (FFSP)
CPWtr	CHILD	Potable Water (PWtr)
CFWFSp	CHILD	Fresh Water Fish - Sport (FFSP)
IPWtr	INFANT	Potable Water (PWtr)

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 1
 Receptor.....: 0 Liquid Receptor

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) =====								
Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB

ADULT								
H-3	0.00E+00	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	0.00E+00	6.45E-02
CR-51	0.00E+00	0.00E+00	4.51E-08	1.66E-08	1.00E-07	1.90E-05	0.00E+00	7.55E-08
MN-54	0.00E+00	7.12E-05	0.00E+00	2.12E-05	0.00E+00	2.18E-04	0.00E+00	1.36E-05
FE-59	1.58E-04	3.71E-04	0.00E+00	0.00E+00	1.04E-04	1.24E-03	0.00E+00	1.42E-04
CO-58	0.00E+00	1.96E-04	0.00E+00	0.00E+00	0.00E+00	3.97E-03	0.00E+00	4.39E-04
CO-60	0.00E+00	1.29E-04	0.00E+00	0.00E+00	0.00E+00	2.43E-03	0.00E+00	2.85E-04
NI-63	4.66E-02	3.23E-03	0.00E+00	0.00E+00	0.00E+00	6.74E-04	0.00E+00	1.56E-03
AG-110M	1.96E-09	1.81E-09	0.00E+00	3.56E-09	0.00E+00	7.40E-07	0.00E+00	1.08E-09
TE-125M	9.21E-04	3.34E-04	2.77E-04	3.75E-03	0.00E+00	3.68E-03	0.00E+00	1.23E-04
TEEN								
H-3	0.00E+00	4.84E-02	4.84E-02	4.84E-02	4.84E-02	4.84E-02	0.00E+00	4.84E-02
CR-51	0.00E+00	0.00E+00	4.32E-08	1.70E-08	1.11E-07	1.31E-05	0.00E+00	7.78E-08
MN-54	0.00E+00	7.00E-05	0.00E+00	2.09E-05	0.00E+00	1.44E-04	0.00E+00	1.39E-05
FE-59	1.63E-04	3.79E-04	0.00E+00	0.00E+00	1.20E-04	8.97E-04	0.00E+00	1.46E-04
CO-58	0.00E+00	1.95E-04	0.00E+00	0.00E+00	0.00E+00	2.68E-03	0.00E+00	4.49E-04
CO-60	0.00E+00	1.29E-04	0.00E+00	0.00E+00	0.00E+00	1.68E-03	0.00E+00	2.91E-04
NI-63	4.83E-02	3.41E-03	0.00E+00	0.00E+00	0.00E+00	5.43E-04	0.00E+00	1.64E-03
AG-110M	1.89E-09	1.79E-09	0.00E+00	3.41E-09	0.00E+00	5.03E-07	0.00E+00	1.09E-09
TE-125M	1.00E-03	3.61E-04	2.80E-04	0.00E+00	0.00E+00	2.96E-03	0.00E+00	1.34E-04
CHILD								
H-3	0.00E+00	5.39E-02	5.39E-02	5.39E-02	5.39E-02	5.39E-02	0.00E+00	5.39E-02
CR-51	0.00E+00	0.00E+00	4.61E-08	1.26E-08	8.42E-08	4.41E-06	0.00E+00	8.31E-08
MN-54	0.00E+00	5.48E-05	0.00E+00	1.54E-05	0.00E+00	4.60E-05	0.00E+00	1.46E-05
FE-59	1.98E-04	3.20E-04	0.00E+00	0.00E+00	9.28E-05	3.33E-04	0.00E+00	1.59E-04
CO-58	0.00E+00	1.57E-04	0.00E+00	0.00E+00	0.00E+00	9.14E-04	0.00E+00	4.80E-04
CO-60	0.00E+00	1.06E-04	0.00E+00	0.00E+00	0.00E+00	5.86E-04	0.00E+00	3.12E-04
NI-63	6.36E-02	3.40E-03	0.00E+00	0.00E+00	0.00E+00	2.29E-04	0.00E+00	2.16E-03
AG-110M	2.49E-09	1.68E-09	0.00E+00	3.13E-09	0.00E+00	2.00E-07	0.00E+00	1.34E-09
TE-125M	1.29E-03	3.49E-04	3.62E-04	0.00E+00	0.00E+00	1.24E-03	0.00E+00	1.72E-04
INFANT								
H-3	0.00E+00	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02
CR-51	0.00E+00	0.00E+00	2.05E-10	4.47E-11	3.98E-10	9.14E-09	0.00E+00	3.14E-10
MN-54	0.00E+00	1.22E-07	0.00E+00	2.70E-08	0.00E+00	4.47E-08	0.00E+00	2.76E-08
FE-59	1.75E-06	3.06E-06	0.00E+00	0.00E+00	9.05E-07	1.46E-06	0.00E+00	1.21E-06
CO-58	0.00E+00	2.95E-06	0.00E+00	0.00E+00	0.00E+00	7.36E-06	0.00E+00	7.37E-06
CO-60	0.00E+00	2.04E-06	0.00E+00	0.00E+00	0.00E+00	4.85E-06	0.00E+00	4.81E-06

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) ===

Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
NI-63	3.56E-04	2.20E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-06	0.00E+00	1.23E-05
AG-110M	7.24E-10	5.28E-10	0.00E+00	7.56E-10	0.00E+00	2.74E-08	0.00E+00	3.50E-10
TE-125M	3.14E-06	1.05E-06	1.06E-06	0.00E+00	0.00E+00	1.50E-06	0.00E+00	4.25E-07

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 1
 Receptor.....: 0 Liquid Receptor

=== MAXIMUM DOSE FOR PERIOD =====

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
Admin	Any Organ	ADULT	GILLI	7.67E-02	31-day	1.50E-01	5.11E+01
					Quarter	3.75E+00	2.05E+00
					Annual	7.50E+00	1.02E+00
Admin	Tot Body	ADULT	TBODY	6.70E-02	31-day	4.50E-02	1.49E+02
					Quarter	1.13E+00	5.96E+00
					Annual	2.25E+00	2.98E+00
T.Spec	Any Organ	ADULT	GILLI	7.67E-02	31-day	2.00E-01	3.83E+01
					Quarter	5.00E+00	1.53E+00
					Annual	1.00E+01	7.67E-01

Critical Pathway.....: 1 Fresh Water Fish - Sport (FFSP)
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
H-3	8.41E+01
CR-51	2.47E-02
MN-54	2.84E-01
FE-59	1.61E+00
CO-58	5.18E+00
CO-60	3.17E+00
NI-63	8.79E-01
AG-110M	9.64E-04
TE-125M	4.79E+00

T.Spec	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
T.Spec	Tot Body	ADULT	TBODY	6.70E-02	31-day	6.00E-02	1.12E+02
					Quarter	1.50E+00	4.47E+00
					Annual	3.00E+00	2.23E+00

Critical Pathway.....: 1 Fresh Water Fish - Sport (FFSP)
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
H-3	9.62E+01
CR-51	1.13E-04
MN-54	2.03E-02
FE-59	2.12E-01

LIQUID RELEASE AND DOSE SUMMARY REPORT
----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
Period Start Date.....: 01/01/2013 00:00
Period End Date.....: 01/01/2014 00:00
Period Duration (mins): 5.256E+05

Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
-----	-----
CO-58	6.55E-01
CO-60	4.25E-01
NI-63	2.33E+00
AG-110M	1.61E-06
TE-125M	1.84E-01

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 2

=== RELEASE DATA =====
 Total Release Duration (minutes)..... 5.347E+05
 Total Undiluted Volume Released (gallons)..... NA
 Average Undiluted Flowrate (gpm)..... NA

 Total Dilution Volume (gallons)..... NA
 Average Dilution Flowrate (gpm)..... NA

=== NUCLIDE DATA =====

Nuclide	uCi
-----	-----
CO-57	1.24E+01
SB-125	6.40E+01
TE-123M	9.27E+00
SB-126	9.75E-01
CR-51	1.10E+02
MN-54	3.01E+01
FE-59	2.81E+02
CO-58	4.05E+03
CO-60	9.30E+02
AG-110M	3.58E+00
TE-125M	6.65E+02
-----	-----
Gamma	6.15E+03
XE-133	1.66E+02
XE-135	2.27E+00
-----	-----
D&EG	1.68E+02
H-3	7.99E+08
NI-63	2.77E+03
-----	-----
Beta	7.99E+08
-----	-----
Total	7.99E+08

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 2
 Receptor.....: 0 Liquid Receptor

=== PERMIT ORGAN DOSE BY AGE GROUP AND PATHWAY (mrem) =====								
Age/Path	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
APWtr	1.63E-04	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.81E-02	0.00E+00	1.80E-02
AFWFSp	4.75E-02	5.08E-02	4.67E-02	5.02E-02	4.66E-02	5.86E-02	0.00E+00	4.90E-02
TPWtr	1.55E-04	1.27E-02	1.27E-02	1.27E-02	1.27E-02	1.27E-02	0.00E+00	1.27E-02
TFWFSp	4.93E-02	4.02E-02	3.60E-02	3.57E-02	3.58E-02	4.46E-02	0.00E+00	3.84E-02
CPWtr	4.70E-04	2.44E-02	2.44E-02	2.44E-02	2.44E-02	2.44E-02	0.00E+00	2.44E-02
CFWFSp	6.46E-02	3.39E-02	2.99E-02	2.96E-02	2.97E-02	3.29E-02	0.00E+00	3.28E-02
IPWtr	3.61E-04	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02

----- TOTALS -----								
ADULT	4.77E-02	6.88E-02	6.47E-02	6.82E-02	6.46E-02	7.67E-02	0.00E+00	6.70E-02
TEEN	4.95E-02	5.29E-02	4.87E-02	4.84E-02	4.85E-02	5.73E-02	0.00E+00	5.10E-02
CHILD	6.51E-02	5.83E-02	5.43E-02	5.39E-02	5.40E-02	5.73E-02	0.00E+00	5.72E-02
INFANT	3.61E-04	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02

=== AGE GROUP / PATHWAY DESCRIPTIONS =====		
Abbreviation	Age Group	Pathway
APWtr	ADULT	Potable Water (PWtr)
AFWFSp	ADULT	Fresh Water Fish - Sport (FFSP)
TPWtr	TEEN	Potable Water (PWtr)
TFWFSp	TEEN	Fresh Water Fish - Sport (FFSP)
CPWtr	CHILD	Potable Water (PWtr)
CFWFSp	CHILD	Fresh Water Fish - Sport (FFSP)
IPWtr	INFANT	Potable Water (PWtr)

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

Release ID.....: 1 All Liquid Releases
 Period Start Date.....: 01/01/2013 00:00
 Period End Date.....: 01/01/2014 00:00
 Period Duration (mins): 5.256E+05
 Unit.....: 2
 Receptor.....: 0 Liquid Receptor

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) =====								
Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB

ADULT								
H-3	0.00E+00	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	0.00E+00	6.45E-02
CR-51	0.00E+00	0.00E+00	4.51E-08	1.66E-08	1.00E-07	1.90E-05	0.00E+00	7.55E-08
MN-54	0.00E+00	7.12E-05	0.00E+00	2.12E-05	0.00E+00	2.18E-04	0.00E+00	1.36E-05
FE-59	1.58E-04	3.71E-04	0.00E+00	0.00E+00	1.04E-04	1.24E-03	0.00E+00	1.42E-04
CO-58	0.00E+00	1.96E-04	0.00E+00	0.00E+00	0.00E+00	3.97E-03	0.00E+00	4.39E-04
CO-60	0.00E+00	1.29E-04	0.00E+00	0.00E+00	0.00E+00	2.43E-03	0.00E+00	2.85E-04
NI-63	4.66E-02	3.23E-03	0.00E+00	0.00E+00	0.00E+00	6.74E-04	0.00E+00	1.56E-03
AG-110M	1.96E-09	1.81E-09	0.00E+00	3.56E-09	0.00E+00	7.40E-07	0.00E+00	1.08E-09
TE-125M	9.21E-04	3.34E-04	2.77E-04	3.75E-03	0.00E+00	3.68E-03	0.00E+00	1.23E-04
TEEN								
H-3	0.00E+00	4.84E-02	4.84E-02	4.84E-02	4.84E-02	4.84E-02	0.00E+00	4.84E-02
CR-51	0.00E+00	0.00E+00	4.32E-08	1.70E-08	1.11E-07	1.31E-05	0.00E+00	7.78E-08
MN-54	0.00E+00	7.00E-05	0.00E+00	2.09E-05	0.00E+00	1.44E-04	0.00E+00	1.39E-05
FE-59	1.63E-04	3.79E-04	0.00E+00	0.00E+00	1.20E-04	8.97E-04	0.00E+00	1.46E-04
CO-58	0.00E+00	1.95E-04	0.00E+00	0.00E+00	0.00E+00	2.68E-03	0.00E+00	4.49E-04
CO-60	0.00E+00	1.29E-04	0.00E+00	0.00E+00	0.00E+00	1.68E-03	0.00E+00	2.91E-04
NI-63	4.83E-02	3.41E-03	0.00E+00	0.00E+00	0.00E+00	5.43E-04	0.00E+00	1.64E-03
AG-110M	1.89E-09	1.79E-09	0.00E+00	3.41E-09	0.00E+00	5.03E-07	0.00E+00	1.09E-09
TE-125M	1.00E-03	3.61E-04	2.80E-04	0.00E+00	0.00E+00	2.96E-03	0.00E+00	1.34E-04
CHILD								
H-3	0.00E+00	5.39E-02	5.39E-02	5.39E-02	5.39E-02	5.39E-02	0.00E+00	5.39E-02
CR-51	0.00E+00	0.00E+00	4.61E-08	1.26E-08	8.42E-08	4.41E-06	0.00E+00	8.31E-08
MN-54	0.00E+00	5.48E-05	0.00E+00	1.54E-05	0.00E+00	4.60E-05	0.00E+00	1.46E-05
FE-59	1.98E-04	3.20E-04	0.00E+00	0.00E+00	9.28E-05	3.33E-04	0.00E+00	1.59E-04
CO-58	0.00E+00	1.57E-04	0.00E+00	0.00E+00	0.00E+00	9.14E-04	0.00E+00	4.80E-04
CO-60	0.00E+00	1.06E-04	0.00E+00	0.00E+00	0.00E+00	5.86E-04	0.00E+00	3.12E-04
NI-63	6.36E-02	3.40E-03	0.00E+00	0.00E+00	0.00E+00	2.29E-04	0.00E+00	2.16E-03
AG-110M	2.49E-09	1.68E-09	0.00E+00	3.13E-09	0.00E+00	2.00E-07	0.00E+00	1.34E-09
TE-125M	1.29E-03	3.49E-04	3.62E-04	0.00E+00	0.00E+00	1.24E-03	0.00E+00	1.72E-04
INFANT								
H-3	0.00E+00	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02
CR-51	0.00E+00	0.00E+00	2.05E-10	4.47E-11	3.98E-10	9.14E-09	0.00E+00	3.14E-10
MN-54	0.00E+00	1.22E-07	0.00E+00	2.70E-08	0.00E+00	4.47E-08	0.00E+00	2.76E-08
FE-59	1.75E-06	3.06E-06	0.00E+00	0.00E+00	9.05E-07	1.46E-06	0.00E+00	1.21E-06
CO-58	0.00E+00	2.95E-06	0.00E+00	0.00E+00	0.00E+00	7.36E-06	0.00E+00	7.37E-06
CO-60	0.00E+00	2.04E-06	0.00E+00	0.00E+00	0.00E+00	4.85E-06	0.00E+00	4.81E-06

LIQUID RELEASE AND DOSE SUMMARY REPORT
 ----- (PERIOD BASIS - BY UNIT) -----

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=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) ===

Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
NI-63	3.56E-04	2.20E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-06	0.00E+00	1.23E-05
AG-110M	7.24E-10	5.28E-10	0.00E+00	7.56E-10	0.00E+00	2.74E-08	0.00E+00	3.50E-10
TE-125M	3.14E-06	1.05E-06	1.06E-06	0.00E+00	0.00E+00	1.50E-06	0.00E+00	4.25E-07

LIQUID RELEASE AND DOSE SUMMARY REPORT
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 Unit.....: 2
 Receptor.....: 0 Liquid Receptor

=== MAXIMUM DOSE FOR PERIOD =====

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
Admin	Any Organ	ADULT	GILLI	7.67E-02	31-day	1.50E-01	5.11E+01
					Quarter	3.75E+00	2.05E+00
					Annual	7.50E+00	1.02E+00
Admin	Tot Body	ADULT	TBODY	6.70E-02	31-day	4.50E-02	1.49E+02
					Quarter	1.13E+00	5.96E+00
					Annual	2.25E+00	2.98E+00
T.Spec	Any Organ	ADULT	GILLI	7.67E-02	31-day	2.00E-01	3.83E+01
					Quarter	5.00E+00	1.53E+00
					Annual	1.00E+01	7.67E-01

Critical Pathway.....: 1 Fresh Water Fish - Sport (FFSP)
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
H-3	8.41E+01
CR-51	2.47E-02
MN-54	2.84E-01
FE-59	1.61E+00
CO-58	5.18E+00
CO-60	3.17E+00
NI-63	8.79E-01
AG-110M	9.64E-04
TE-125M	4.79E+00

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
T.Spec	Tot Body	ADULT	TBODY	6.70E-02	31-day	6.00E-02	1.12E+02
					Quarter	1.50E+00	4.47E+00
					Annual	3.00E+00	2.23E+00

Critical Pathway.....: 1 Fresh Water Fish - Sport (FFSP)
 Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
H-3	9.62E+01
CR-51	1.13E-04
MN-54	2.03E-02
FE-59	2.12E-01

LIQUID RELEASE AND DOSE SUMMARY REPORT
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Period Duration (mins): 5.256E+05

Major Contributors.....: 0.0 % or greater to total

Nuclide	Percentage
-----	-----
CO-58	6.55E-01
CO-60	4.25E-01
NI-63	2.33E+00
AG-110M	1.61E-06
TE-125M	1.84E-01