



Byron Generating Station

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United States Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Byron Station, Units 1 and 2  
Renewed Facility Operating License Nos. NPF-37 and NPF-66  
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: 2020 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 2020 through December 2020. We are enclosing Revision 17 of the Byron Station Offsite Dose Calculation Manual (ODCM), the ODCM Change Determination and the ODCM Change Log in accordance with ODCM Section 5.4.1.

If you have any questions regarding this information, please contact Ms. Lisa Zurawski, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "Harris Welt".

Harris Welt  
Site Vice President  
Byron Station

HW/AH/LZ/mf

Enclosures

cc: Darrell J. Roberts, Regional Administrator – NRC Region III

**BYRON NUCLEAR POWER STATION  
ANNUAL RADIOLOGICAL EFFLUENT RELEASE REPORT (ARERR)  
2020**



## INTRODUCTION

Liquid effluents from Byron Station are released to the Rock River in controlled batches after radioassay of each batch. Gaseous effluents are released to the atmosphere and are calculated on the basis of analyses of weekly grab samples and grab samples of batch releases prior to the release of noble gases as well as continuously collected composite samples of iodine and particulate radioactivity sampled during the course of the year. The results of effluent analyses are summarized on a monthly basis. Airborne concentrations of noble gases, I-131, and particulate radioactivity in offsite areas are calculated using isotopic composition of effluents and meteorological data. C-14 concentration in offsite areas is calculated based on industry-approved methodology for estimation of the amount released and meteorological data.

Environmental monitoring is conducted by sampling at indicator and control (background) locations in the vicinity of Byron Station to measure changes in radiation or radioactivity levels that may be attributable to station operation. If significant changes attributable to Byron Station are measured, these changes are correlated with effluent releases. An environmental monitoring program is conducted which also includes all potential pathways at the site. Gaseous pathways include ground plane (direct), inhalation, vegetation, meat, and milk. Liquid pathways include potable water and freshwater fish. The critical pathway for 2020 gaseous dose was vegetation. The critical pathway for 2020 liquid dose was freshwater fish.

BYRON NUCLEAR POWER STATION  
UNIT 1/2 DOCKET NUMBER STN-50-454/455  
RADIOACTIVE EFFLUENT RELEASE REPORT  
January 2020 - December 2020  
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 = 113
2. Total time period for batch releases = 15,766 minutes
3. Maximum time period for a batch release = 586 minutes
4. Average time period for a batch release = 140 minutes
5. Minimum time period for a batch release = 39 minutes
6. Average Rock River stream flow during periods of release of effluent into a flowing stream = 268 m<sup>3</sup>/sec, based on information from the U.S. Geological Survey Byron Gauging Station.

b. Gaseous:

1. Number of batch releases = 368
2. Total time period for batch releases = 58,100 minutes
3. Maximum time period for a batch release = 4890 minutes
4. Average time period for batch releases = 158 minutes
5. Minimum time period for a batch release = 18 minutes

6. Abnormal Releases:

a. Liquid - None

b. Gaseous – None

7. There was two revisions to the Offsite Dose Calculation Manual (ODCM), which was implemented in 2020. Revision 16 and 17, which involved updating a figure schematic of the Partial Abandonment of the Containment Charcoal Filter, and clarification verbiage on gaseous batch releases setpoints.

Revision 16 based off revision 15 added detailed schematic and a note for Unit 2 “Containment releases to be consistent with Unit 1 release schematic.

Revision 17 consisted of clarification of setpoint calculations. It was updated to state that for gaseous batch releases default radiation monitor alert and alarm setpoints are used, which are calculated based on the instantaneous offsite dose limits set forth by 10CFR20 and the standard isotopic mix (stated in ODCM) and are set at a lower fraction of the limit. The default setpoints are compared to calculated set points, which are determined by multiplying the noble gas activity for each release by 1.25. If the calculated set points are less than the defaults, the defaults are used in order to avoid changing setpoints for each release.

8. Errata Data

During the review and approval process of transitioning the Offsite Dose Calculation from RETDAS to OpenEMS program, a discrepancy was identified with calculating the gaseous release volume using pressure differential methodology. The old methodology had the volume calculated using the ratio of the delta pressure change over the starting absolute pressure, measured in percent tank volume released. This calculation does not take into account that the sample of the tank is obtained and analyzed under close to

atmospheric pressure conditions and therefore the volume of the gas released must be calculated under same conditions. Using the Boyles law for an ideal gas, the newly developed formula calculates the volume of the gas under standard atmospheric pressure. It should be noted that the RETDAS program calculations have been set in accordance with the Offsite Dose Calculation Manual and the calculation methodology most likely was set during initial implementation of RETDAS effluent software. It should also be noted that at no point the dose rate to the public had exceeded a TRM or station ODCM requirements. The discrepancy equated to approximately 10% of Waste Gas Decay Tank dose increase.

9. 2020 Radiological Groundwater Protection Program (RGPP) Results Summary:

In 2020, Radiological Groundwater Protection Program (RGPP) monitoring well designations and sampling frequencies were modified to align with an update to the Nuclear Energy Institute (NEI) 07-07, Groundwater Protection Initiative. In 2020, fourteen (14) monitoring wells were sampled in total. Groundwater samples were obtained in March, September, and November for tritium. With the exception of wells AR-7 and AR-12, groundwater samples were not obtained in the second quarter of 2020 due to risk mitigation efforts put in place in response to the Coronavirus pandemic. In addition, Sr-89 and Sr-90 analyses were performed on the samples obtained in September for select wells in accordance with Nuclear Energy Institute (NEI) 07-07, Groundwater Protection Initiative. None of these samples showed detectable concentrations of Sr-89 and Sr-90. Two wells contained levels of tritium above the lower limit of detection (LLD) of 200 pCi/L. They were: AR-11 (448 pCi/L in September, 459 pCi/L in November) and AR-7 (227 pCi/L in March, 289 pCi/L in June, 251 pCi/L in September, 313 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. Well AR-4 began a downward trend in 2006 and levels have reached <200 pCi/L in a full year for the first time since being measured. Tritium in Well AR-7, located on-site just west of plant structures, has been measured in this well slightly above detection limits on an intermittent basis since the well was first drilled in 2006. The tritium present in this well is likely due to legacy tritium prior to 2006 or precipitation recapture and is not believed to be the result of new leaks. The tritium measured in this well has been at or below tritium levels that have been historically measured in rainwater as a result of precipitation recapture from permitted gaseous releases. In August 2014, a break in the well piping was discovered about six feet below the surface that could have served as the entry point for tritium in the recapture water. Tritium present in well AR-7 has shown a gradual decrease since 2014. Should any of the water in these aquifers migrate to off-site wells used for drinking, the off-site dose consequence from tritium present in these wells would be negligible. There are currently no existing leaks evident at the site and all groundwater well sample results are well below the drinking water standard of 20,000 pCi/L tritium.

### **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 3.14E-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 2020 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 3.86E+00 curies of fission and activation gases were released with a maximum average quarterly release rate of 1.01E+00  $\mu\text{Ci}/\text{sec}$ .

A total of 1.48E-06 curies of I-131 were released during the year with a maximum average quarterly release rate of 1.88E-07  $\mu\text{Ci}/\text{sec}$ .

A total of 1.50E-04 curies were released as airborne particulate matter with a maximum average quarterly release rate of 9.93E-06  $\mu\text{Ci}/\text{sec}$ .

A total of 8.91E+00 curies of other (C-14) radioisotopes were released with a maximum average quarterly release rate of 3.35E-01  $\mu\text{Ci}/\text{sec}$ .

A total of 4.78E+01 curies of tritium were released with a maximum average quarterly release rate of 1.86E+00  $\mu\text{Ci}/\text{sec}$ .

Gross alpha-emitting radionuclides were below detectable limits.

### Liquids Released to Rock River

A total of 2.84E+10 liters of radioactive liquid wastes containing 1.02E-01 curies of fission and activation products were discharged with a maximum quarterly average concentration of 4.69E-09  $\mu\text{Ci}/\text{ml}$ .

A total of 2.80E+03 curies of tritium were discharged with a maximum quarterly average concentration of 1.96E-04  $\text{uCi}/\text{ml}$ .

A total of 9.98E-04 curies of dissolved and entrained gases were discharged with a maximum quarterly average concentration of 8.50E-11  $\text{uCi}/\text{ml}$ .

Gross alpha-emitting radionuclides were below detectable limits.

## **DOSE TO HUMAN**

### **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 2.84E-04 mrad based on measured effluents and average meteorological data, and 6.25E-05 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  $7.0 \text{ mg/cm}^2$  and an occupancy factor of 1.0 is used. The maximum skin dose was  $7.90\text{E-}05$  mrem based on measured effluents and average meteorological data, and  $8.38\text{E-}05$  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  $6.86\text{e-}05$  mrad, and  $5.46\text{e-}05$  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  $7.26\text{E-}01$  mrem (child/bone) based on measured effluents and average meteorological data, and  $6.84\text{E-}01$  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  $1.48\text{E-}01$  mrem (child) based on measured effluents and average meteorological data, and  $1.40\text{E-}01$  mrem (child) based on measured effluents and concurrent meteorological data.

## Gaseous Total Dose

The maximum total dose from gaseous releases to any organ was  $7.26\text{E-}01$  mrem (child/bone) based on measured effluents and average meteorological data, and  $6.84\text{E-}01$  mrem (child/bone) based on measured effluents and concurrent meteorological data. The maximum total dose from gaseous releases to the whole body was  $1.48\text{E-}01$  mrem (child) based on measured effluents and average meteorological data, and  $1.40\text{E-}01$  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 6.45E-01 mrem (adult/gilli). The maximum dose from liquid releases to the whole body was 2.71E-01 mrem (adult).

#### GASEOUS + LIQUID TOTAL DOSE

The maximum total dose to any organ via both gaseous and liquid effluents is 1.40E+00 mrem (child/bone). The maximum dose to the whole body via both gaseous and liquid effluents is 3.26E-01 mrem (adult).

#### 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 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 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 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 annual 10CFR20 limit on Total Effective Dose Equivalent to individual members of the public is 100 mrem.
- The 40CFR190 limits on individual members of the public is 25 mrem to the whole body, 25 mrem to any organ (except thyroid), and 75 mrem to the thyroid.

#### 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 99.7% during 2020.

SOLID RADIOACTIVE WASTE FOR BURIAL 1<sup>ST</sup> QUARTER 2020

DATE Shipment # Description	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT/ CARRIER	DESTINATION	VOLUME (m <sup>3</sup> ) PER SHIPMENT	CURIES* PER SHIPMENT
1/23/20 RW S20-01 DAW	UN2912, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Bear Creek Facility Oak Ridge, TN	6.44E+01	5.14E-02
2/3/20 RW S20-02 Trash	UN3321, RADIOACTIVE MATERIAL LOW SPECIFIC ACTIVITY(LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Bear Creek Facility Oak Ridge, TN	3.14E+01	5.20E+00
3/20/20 RW S20-06 DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACITIVITY(LSA-II), 7, METAL BOX(1) CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Bear Creek Facility Oak Ridge, TN	5.94E+01	4.18E+01
3/20/20 RW S20-04 DRY ACTIVE WASTE	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACITIVITY(LSA-II), 7, METAL BOX(1) CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Bear Creek Facility Oak Ridge, TN	5.94E+01	4.18E+01
3/20/20 RW S20-07 RADWASTE RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACITIVITY(LSA-II), METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Bear Creek Facility Oak Ridge, TN	2.54E+01	4.18E+01
3/21/20 RW S20-03	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACITIVITY(LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Bear Creek Facility Oak Ridge, TN	5.94E+01	4.18E+01
Quarterly Totals		Number of Shipments:	6	3.00E+02	1.72E+02
*Calculated using measured ratios				CUBIC M	CURIES

**SOLID RADIOACTIVE WASTE FOR BURIAL 2<sup>ND</sup> QUARTER 2020**

DATE Shipment # Description	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT/ CARRIER	DESTINATION	VOLUME (m <sup>3</sup> ) PER SHIPMENT	CURIES* PER SHIPMENT
4/14/20 RW S20-08 DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.79E+01	2.93E+01
4/15/20 RW S20-09 DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	3.22E+01	1.65E-02
5/13/20 RW S20-10 DEWATERED RESIN & CHARCOAL	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.59E+00	3.97E+00
5/21/20 RW S20-05 DAW AND FILTERS	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	3.13E+01	6.12E-01
6/3/20 RW S20-11 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.14E+01	3.01E-03
6/10/20 RW S20-12 DEWATERED RESIN AND CHARCOAL	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.53E+00	4.31E+00
6/16/20 RW S20-13 BEAD RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.81E+00	3.78E+00
6/17/20 RW S20-15 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.14E+01	4.62E-03
6/23/20 RW S20-14 BEAD RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.81E+00	3.83E+00
6/24/20 RW S20-16 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.14E+01	1.56E-01
<b>Quarterly Totals</b>		<b>Number of Shipments:</b>	<b>10</b>	<b>1.34E+02</b>	<b>4.60E+01</b>
* Calculated using measured ratios				CUBIC M	CURIES

**SOLID RADIOACTIVE WASTE FOR BURIAL 3<sup>RD</sup> QUARTER 2020**

DATE Shipment # Description	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT/ CARRIER	DESTINATION	VOLUME (m <sup>3</sup> ) PER SHIPMENT	CURIES* PER SHIPMENT
7/8/2020 RW S20-17 DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	6.45E+01	3.50E-02
9/15/2020 RW S20-18 RESIN AND CHARCOAL	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.53E+00	2.86E+00
9/22/20 RW S20-19 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.53E+00	2.99E+00
Quarterly Totals		Number of Shipments:	3	7.36E+01	5.89E+00
* Calculated using measured ratios				CUBIC M	CURIES

SOLID RADIOACTIVE WASTE FOR BURIAL 4<sup>TH</sup> QUARTER 2020

DATE Shipment # Description	DISPOSITION OF MATERIAL (DESCRIPTION, CLASS, TYPE AND SOLIDIFYING AGENT)	MODE OF TRANSPORT/ CARRIER	DESTINATION	VOLUME(m <sup>3</sup> ) PER SHIPMENT	CURIES* PER SHIPMENT
10/8/2020 RW S20-23 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	4.71E+01	2.02E-02
10/10/2020 RW S20-20 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.18E+01	3.43E-03
10/11/2020 RW S20-21 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.18E+01	5.97E-03
10/12/2020 RW S20-24 EMPTY 20' SEALAND	UN2913,RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS(SCO-II), 7, METAL BOX(1)	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.18E+01	4.03E-3
10/13/2020 RW S20-25 WASTE OIL	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	1.79E+01	4.40E-03
10/14/2020 RW S20-26 EMPTY SEALAND	UN2913,RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS(SCO-II), 7, METAL BOX(1)	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	8.20E-01	3.66E-03
10/15/2020 RW S20-22 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.98E+01	5.57E-03
10/15/2020 RW S20-28 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.98E+01	9.41E-03
10/16/2020 RW S20-27 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.98E+01	9.51E-03
10/16/2020 RW S20-29 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.98E+01	9.27E-03
10/17/2020 RW S20-30 CONDENSATE POLISHER RESIN/DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	4.71E+01	7.07E-02
10/17/2020 RW S20-31 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.98E+01	8.66E-03
10/18/2020 RW S20-32 DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	3.51E+01	1.74E-01
10/18/2020 RW S20-33 CONDENSATE POLISHER RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Gallaher Road Processing Facility Kinston, TN	1.69E+01	8.86E-03
10/26/2020 RW S20-37 DAW	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7, METAL BOX(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Bear Creek Oak Ridge, TN	7.16E+01	1.91E-01
10/27/2020 RW S20-34 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.67E+00	2.75E+00

11/3/2020 RW S20-35 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.67E+00	2.52E+00
11/11/2020 RW S20-36 RESIN	UN3321, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), 7,METAL CASK(1), CLASS A, NONE	Highway Hittman Transport EXCLUSIVE-USE	Energy Solutions Clive, UT	4.67E+00	4.75E+00
Quarterly Totals		Number of Shipments:	18	3.85E+02	1.05E+01
* Calculated using measured ratios				CUBIC M	CURIES

**SOLID RADIOACTIVE WASTE FOR BURIAL**  
**Estimated Solid Waste Composition**  
**2020**

Resins, Filters, Evap Bottoms			
2020			
Volume (m3) 2.89E+02			
Class A			
Nuclide	% Abund	Curies	uCi/ml
H-3	69.02	2.25E+01	7.79E-02
Be-7	0.00	8.19E-08	2.83E-10
C-14	0.00	4.01E-05	1.39E-07
Cr-51	0.00	2.40E-10	8.30E-13
Mn-54	0.37	1.22E-01	4.22E-04
Fe-55	2.24	7.30E-01	2.53E-03
Fe-59	0.00	6.36E-09	2.20E-11
Co-57	0.17	5.62E-02	1.94E-04
Co-58	16.55	5.40E+00	1.87E-02
Co-60	3.88	1.27E+00	4.39E-03
Ni-59	0.15	4.96E-02	1.72E-04
Ni-63	7.47	2.44E+00	8.44E-03
Zn-65	0.04	1.17E-02	4.05E-05
Sr-89	0.00	3.29E-04	1.14E-06
Zr-95	0.00	7.93E-08	2.74E-10
Nb-95	0.00	1.81E-07	6.26E-10
Tc-99	0.00	1.25E-03	4.33E-06
Sn-113	0.00	1.71E-05	5.92E-08
Sb-125	0.02	6.26E-03	2.17E-05
Cs-137	0.01	2.15E-03	7.44E-06
Ce-144	0.08	2.45E-02	8.48E-05

Dry Active Waste			
2020			
Volume (m3) 1.24E+02			
Class A			
Nuclide	% Abund	Curies	uCi/ml
H-3	14.18	3.59E-02	2.90E-04
Cr-51	0.35	3.57E-02	2.88E-04
Mn-54	0.60	2.65E-03	2.14E-05
Fe-55	29.86	3.75E-02	3.02E-04
Fe-59	0.11	8.74E-04	7.05E-06
Co-57	1.89	1.87E-04	1.51E-06
Co-58	26.69	4.50E-02	3.63E-04
Co-60	23.94	3.91E-02	3.15E-04
Ni-63	0.12	7.37E-03	5.94E-05
Zr-95	0.24	5.90E-03	4.76E-05
Nb-95	1.55	9.72E-03	7.84E-05
Sn-113	0.26	3.38E-04	2.73E-06
Sb-124	0.04	1.61E-04	1.30E-06
Sb-125	0.00	1.73E-03	1.40E-05
Cs-137	0.00	2.11E-04	1.70E-06
Ce-144	0.17	6.80E-04	5.48E-06

Other Waste	
2020	
Volume (m3) 0.00E+00	
Class A	
No Shipments	

Irradiated Components	
2020	
Volume (m3) 0.00E+00	
Class N/A	
No Shipments	

**SOLID RADIOACTIVE WASTE FOR BURIAL**  
**Estimated Solid Waste Composition**  
**2020**

Sum of All Categories			
2020			
Volume (m3)		8.31E+02	
Class		A	
Nuclide	% Abund	Curies	uCi/ml
H-3	83.96	5.68E+01	6.84E-02
Be-7	0.00	8.19E-08	9.86E-11
C-14	0.00	4.01E-05	4.83E-08
Cr-51	0.00	2.37E-05	2.85E-08
Mn-54	0.20	1.34E-01	1.61E-04
Fe-55	1.56	1.06E+00	1.28E-03
Fe-59	0.00	6.76E-06	8.13E-09
Co-57	0.08	5.72E-02	6.88E-05
Co-58	8.08	5.47E+00	6.58E-03
Co-60	2.18	1.47E+00	1.77E-03
Ni-59	0.07	4.96E-02	5.97E-05
Ni-63	3.74	2.53E+00	3.04E-03
Zn-65	0.02	1.17E-02	1.41E-05
Sr-89	0.00	3.29E-04	3.96E-07
Zr-95	0.01	6.06E-03	7.29E-06
Nb-95	0.02	1.25E-02	1.50E-05
Tc-99	0.00	1.25E-03	1.50E-06
Sn-113	0.00	4.72E-05	5.68E-08
Sb-124	0.00	3.49E-06	4.20E-09
Sb-125	0.03	2.28E-02	2.74E-05
Cs-137	0.01	5.51E-03	6.63E-06
Ce-144	0.04	2.66E-02	3.20E-05
Pu-238	0.00	9.45E-06	1.14E-08
Am-241	0.00	2.17E-05	2.61E-08



Process Control Program (PCP) for Radioactive Wastes

There were no changes to RW-AA-100, Process Control Program (PCP) for Radioactive Waste, in 2020.

## 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/Smplcse=5%  
qme=N/A

---

Total error = 7.8%

2. Liquid Effluents

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

---

Total error = 6.4%

3. Waste Resin

Qme=10.0%  
RM=N/A  
ECe=5%  
Stdcse/Smplcse=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/Smplcse=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

Smplcse = 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 2020 Annual Radiological Environmental Operating Report (AREOR) or is retained on file to be provided upon request.
- B. No limits were exceeded during the 2020 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 2020 reporting period. An 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 or 2014. In 2015, six (6) additional casks were placed on the pad for a total of twenty (20) casks. In 2016, six (6) additional casks were placed on the pad. No additional casks were placed on the pad in 2017. In 2018, five (5) additional casks were placed on the pad. In 2019, six (6) additional cask were placed on the pad. In 2020, six (6) additional cask were placed on the pad for a total of forty-three (43) Prior to the first ISFSI campaign, additional dosimeters were placed at the site boundary nearest to the storage pad (in between the pad and the nearest resident) for the purpose of measuring any potential offsite dose to the public from the storage pad. Since the dosimeters were placed, data from the dosimeters, when compared to the existing environmental dosimeters in the surrounding area, 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 Dry Active Waste (DAW) Building and the Old Steam Generator (OSG) Storage Building, as evidenced by dosimetry data that is indistinguishable from the existing environmental dosimeters.
- D. There were no effluent releases or offsite dose calculations that exceeded technical specification or TRM limits during the 2020 reporting period. There were no REMP sample results that exceeded TRM or analytical result investigation levels.
- E. There were no elevated releases during the 2020 reporting period. All planned gaseous releases are considered mixed mode releases and were discharged by way of the plant vent stacks.
- F. There were no gaseous or liquid effluent monitors that exceeded their respective inoperability time limits in 2020 as stated in TRM TLCO 3.11.b.
- G. There were no unplanned gaseous or liquid releases to unrestricted areas during the 2020 reporting period.
- H. All Rock River flow measurements during liquid effluent discharges were obtained from the U.S. Geological Survey Byron Gauging Station for the Rock River.
- I. On 4/5/2020, a chemistry technician went down to the River Screen House to collect the daily ODCM CWBD sample, to see that there was no sample in the compositor or the steel pot. The Circwater Blowdown was secured for the majority of the weekend which caused a build up in the pipe to the compositor so there was no flow to the steel pot. Due to the extensive build-up on the CircWater Blowdown piping restoration could not be performed until B2R22. Per procedure if there is insufficient sample then obtain a 1L dip sample from an alternate sample point and start sampling 1 x 8 hour frequency. The alternate sampling did not start for 16 hrs after notification of in-operational compositor due to safety concerns for one of the alternate sample points. The 1 x 8 hrs sampling began at 1240 on 4/6/2020 from the alternate sample point of OPR10J and exited November 16, 2020. A new compositor was installed at the River Valve House on November 16 and continuous flow was restored.

- J. The weekly vent stack rad monitor was in-operable on the week of 9/27/20-10/2/20, the backup rad monitor was analyzed for the weekly isotopic analysis but due to a damaged iodine cartridge it could not be analyzed for Iodine's. The cartridge was damaged due to it not fitting properly in the monitor thus when the radiation technician retrieved the cartridge, they destroyed the cartridge to get it out.
- K. During a peer check of the DMR it was found that the March 2020 composite spreadsheet had a typo in the amount of gallons discharged for liquid release 20101. The amount was 54,190, when it should of been 24,190 gallons. Chemistry technicians make a monthly composite for analyses based off the gallons released, thus this release sample had more liquid composited than the rest of the releases for that month by 66 mls in a 1000ml monthly composite. The composite created was still a representative sample of all liquid releases in March and by doing this results in a more conservative analysis.
- L. Attached are offsite dose calculation reports for January through December of 2020.

The following are the maximum annual calculated cumulative offsite doses resulting from Bryon airborne releases in 2020 based on concurrent meteorological data:

**Unit 1:**

<u>Dose</u>	<u>Maximum Value</u>	<u>Sector Affected</u>
gamma air <sup>(1)</sup>	3.320 x 10 <sup>-5</sup> mrad	East-Southeast
beta air <sup>(2)</sup>	4.200 x 10 <sup>-5</sup> mrad	East-Southeast
whole body <sup>(3)</sup>	7.060 x 10 <sup>-2</sup> mrem	East-Southeast
skin <sup>(4)</sup>	5.210 x 10 <sup>-5</sup> mrem	East-Southeast
organ <sup>(5)</sup> (child-bone)	3.490 x 10 <sup>-1</sup> mrem	East-Southeast

**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	0.00
whole body	5.0	mrem	1.41
skin	15.0	mrem	0.00
organ	15.0	mrem	2.33

**Unit 2:**

<u>Dose</u>	<u>Maximum Value</u>	<u>Sector Affected</u>
gamma air <sup>(1)</sup>	2.930 x 10 <sup>-5</sup> mrad	East-Southeast
beta air <sup>(2)</sup>	1.260 x 10 <sup>-5</sup> mrad	East-Southeast
whole body <sup>(3)</sup>	6.940 x 10 <sup>-2</sup> mrem	East-Southeast
skin <sup>(4)</sup>	3.170 x 10 <sup>-5</sup> mrem	East-Southeast
organ <sup>(5)</sup> (child-bone)	3.350 x 10 <sup>-1</sup> mrem	East-Southeast

**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	1.39
skin	15.0	mrem	0.00
organ	15.0	mrem	2.23

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, 2020 Radioactive Effluent Release Report  
2020 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	5.01E-08	1.00E-07	H3	2.00E-06	1.00E-05
Mn54	5.70E-14	1.00E-11	Mn54	1.90E-08	5.00E-07
Co58	6.71E-14	1.00E-11	Fe55	5.59E-07	1.00E-06
Fe59	1.18E-13	1.00E-11	Co58	1.75E-08	5.00E-07
Co60	9.63E-14	1.00E-11	Fe59	3.84E-08	5.00E-07
Zn65	1.35E-13	1.00E-11	Co60	2.74E-08	5.00E-07
Kr87	7.11E-08	1.00E-04	Zn65	3.60E-08	5.00E-07
Kr88	7.22E-08	1.00E-04	Kr85m	2.29E-08	1.00E-05
Sr89	1.70E-14	1.00E-11	Kr87	3.74E-08	1.00E-05
Sr-90	1.86E-15	1.00E-11	Kr88	8.30E-08	1.00E-05
Mo99	9.91E-14	1.00E-11	Sr89	3.74E-08	5.00E-08
I131	1.19E-13	1.00E-12	Sr90	9.44E-09	5.00E-08
I133	4.70E-13	1.00E-10	Mo99	1.78E-08	5.00E-07
Xe133	5.37E-08	1.00E-04	Xe131m	8.46E-07	1.00E-05
Xe133m	1.43E-07	1.00E-04	I131	2.11E-08	1.00E-06
Cs134	6.11E-14	1.00E-11	Xe133	5.48E-08	1.00E-05
Xe135	1.89E-08	1.00E-04	Xe133m	1.68E-07	1.00E-05
Cs137	6.13E-14	1.00E-11	Cs134	2.14E-08	5.00E-07
Xe138	1.38E-06	1.00E-04	Xe135	1.89E-08	1.00E-05
Ce141	9.95E-14	1.00E-11	Cs137	2.02E-08	5.00E-07
Ce144	4.38E-13	1.00E-11	Xe138	5.04E-07	1.00E-05
Gross Alpha	2.71E-15	1.00E-11	Ce141	3.09E-08	5.00E-07
			Ce144	1.48E-07	5.00E-06
			Gross Alpha	7.28E-08	1.00E-07
			Gross Beta	2.86E-07	

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

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		71	42	51	48	212
Total release time	minutes	2.28E+04	3.44E+03	5.73E+03	4.30E+03	3.63E+04
Maximum release time	minutes	4.89E+03	2.85E+02	1.01E+03	3.32E+02	4.89E+03
Average release time	minutes	3.22E+02	8.19E+01	1.12E+02	8.95E+01	1.71E+02
Minimum release time	minutes	2.50E+01	4.80E+01	5.30E+01	4.10E+01	2.50E+01

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

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		40	34	44	38	156
Total release time	minutes	2.11E+03	1.64E+03	2.20E+03	1.59E+04	2.18E+04
Maximum release time	minutes	7.20E+01	6.20E+01	6.20E+01	2.94E+03	2.94E+03
Average release time	minutes	5.28E+01	4.82E+01	4.99E+01	4.18E+02	1.40E+02
Minimum release time	minutes	2.90E+01	3.50E+01	1.80E+01	3.10E+01	1.80E+01

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

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Number of releases		34	23	28	28	113
Total release time	minutes	6.73E+03	2.58E+03	4.32E+03	2.14E+03	1.58E+04
Maximum release time	minutes	5.86E+02	3.25E+02	3.21E+02	2.13E+02	5.86E+02
Average release time	minutes	1.98E+02	1.12E+02	1.54E+02	7.64E+01	1.40E+02

Minimum release time    minutes    4.70E+01    5.30E+01    5.10E+01    3.90E+01    3.90E+01

Average Dil Water 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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	2.95E+00	2.15E-01	9.06E-02	7.86E-02	3.33E+00
2. Avg. Release Rate	uCi/sec	3.75E-01	2.73E-02	1.14E-02	9.89E-01	1.05E-01
Iodine-131						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
2. Avg. Release Rate	uCi/sec	(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
1. Total Release	Ci	2.74E-05	2.45E-05	(1)	3.22E-05	8.41E-05
2. Avg. Release Rate	uCi/sec	3.49E-06	3.11E-06	(1)	4.06E-06	2.66E-06
Others						
1. Total Release	Ci	8.02E-01	1.18E+00	1.12E+00	1.44E+00	4.55E+00
2. Avg. Release Rate	uCi/sec	1.02E-01	1.50E-01	1.41E-01	1.81E-01	1.44E-01
Tritium						
1. Total Release	Ci	2.61E+00	1.91E+00	1.98E+00	3.06E+00	9.57E+00
2. Avg. Release Rate	uCi/sec	3.32E-01	2.43E-01	2.50E-01	3.85E-01	3.03E-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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
-----						
Fission and Activation Gases						
XE-133	Ci	4.02E-02	1.24E-01	3.15E-02	1.67E-02	2.12E-01
-----						
Totals for Period...	Ci	4.02E-02	1.24E-01	3.15E-02	1.67E-02	2.12E-01
Iodines						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
CO-58	Ci	5.18E-06	(1)	(1)	(1)	5.18E-06
CO-60	Ci	2.22E-05	2.45E-05	(1)	3.22E-05	7.89E-05
-----						
Totals for Period...	Ci	2.74E-05	2.45E-05	(1)	3.22E-05	8.41E-05
Others						
C-14	Ci	8.02E-01	1.18E+00	1.12E+00	1.44E+00	4.55E+00
-----						
Totals for Period...	Ci	8.02E-01	1.18E+00	1.12E+00	1.44E+00	4.55E+00
Tritium						
H-3	Ci	2.40E+00	1.88E+00	1.91E+00	2.95E+00	9.13E+00
-----						
Totals for Period...	Ci	2.40E+00	1.88E+00	1.91E+00	2.95E+00	9.13E+00
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
AR-41	Ci	7.12E-02	4.57E-02	5.44E-02	5.76E-02	2.29E-01
KR-85M	Ci	7.93E-06	(1)	(1)	1.92E-05	2.71E-05
KR-88	Ci	(1)	(1)	(1)	1.43E-05	1.43E-05
XE-131M	Ci	8.06E-05	(1)	2.51E-05	(1)	1.06E-04
XE-133	Ci	2.84E+00	4.48E-02	4.59E-03	3.59E-03	2.89E+00
XE-133M	Ci	1.93E-04	1.58E-05	1.20E-05	4.16E-05	2.62E-04
XE-135	Ci	1.10E-03	1.67E-04	3.06E-05	6.73E-04	1.97E-03
Totals for Period...	Ci	2.91E+00	9.07E-02	5.91E-02	6.19E-02	3.12E+00
Iodines						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Others						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	2.13E-01	3.74E-02	7.26E-02	1.14E-01	4.36E-01
Totals for Period...	Ci	2.13E-01	3.74E-02	7.26E-02	1.14E-01	4.36E-01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
1. Total Release	Ci	9.48E-02	1.63E-01	8.48E-02	1.90E-01	5.32E-01
2. Avg. Release Rate	uCi/sec	1.21E-02	2.07E-02	1.07E-02	2.39E-02	1.68E-02
Iodine-131						
1. Total Release	Ci	1.48E-06	(1)	(1)	(1)	1.48E-06
2. Avg. Release Rate	uCi/sec	1.88E-07	(1)	(1)	(1)	4.67E-08
Particulates Half Life >= 8 days						
1. Total Release	Ci	1.05E-05	8.72E-06	(1)	4.66E-05	6.58E-05
2. Avg. Release Rate	uCi/sec	1.33E-06	1.11E-06	(1)	5.87E-06	2.08E-06
Others						
1. Total Release	Ci	1.21E+00	1.10E+00	1.18E+00	8.77E-01	4.36E+00
2. Avg. Release Rate	uCi/sec	1.54E-01	1.40E-01	1.48E-01	1.10E-01	1.38E-01
Tritium						
1. Total Release	Ci	1.15E+01	7.13E+00	9.28E+00	1.03E+01	3.82E+01
2. Avg. Release Rate	uCi/sec	1.47E+00	9.07E-01	1.17E+00	1.29E+00	1.21E+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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
-----						
Fission and Activation Gases						
XE-133	Ci	4.02E-02	1.24E-01	3.15E-02	1.67E-02	2.12E-01
-----						
Totals for Period...	Ci	4.02E-02	1.24E-01	3.15E-02	1.67E-02	2.12E-01
Iodines						
I-131	Ci	1.48E-06	(1)	(1)	(1)	1.48E-06
-----						
Totals for Period...	Ci	1.48E-06	(1)	(1)	(1)	1.48E-06
Particulates Half Life >= 8 days						
CO-58	Ci	(1)	(1)	(1)	1.56E-05	1.56E-05
CO-60	Ci	1.05E-05	8.72E-06	(1)	3.10E-05	5.02E-05
-----						
Totals for Period...	Ci	1.05E-05	8.72E-06	(1)	4.66E-05	6.58E-05
Others						
C-14	Ci	1.21E+00	1.10E+00	1.18E+00	8.77E-01	4.36E+00
-----						
Totals for Period...	Ci	1.21E+00	1.10E+00	1.18E+00	8.77E-01	4.36E+00
Tritium						
H-3	Ci	1.14E+01	7.07E+00	9.22E+00	1.01E+01	3.78E+01
-----						
Totals for Period...	Ci	1.14E+01	7.07E+00	9.22E+00	1.01E+01	3.78E+01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Gases						
AR-41	Ci	4.05E-02	3.78E-02	5.16E-02	1.70E-01	3.00E-01
KR-85M	Ci	7.97E-06	(1)	(1)	1.92E-05	2.72E-05
KR-88	Ci	(1)	(1)	(1)	1.42E-05	1.42E-05
XE-131M	Ci	8.04E-05	(1)	2.51E-05	(1)	1.06E-04
XE-133	Ci	1.27E-02	5.81E-04	1.68E-03	2.29E-03	1.73E-02
XE-133M	Ci	1.92E-04	1.57E-05	1.19E-05	4.17E-05	2.61E-04
XE-135	Ci	1.10E-03	7.53E-05	3.06E-05	6.77E-04	1.88E-03
-----						
Totals for Period...	Ci	5.46E-02	3.85E-02	5.33E-02	1.73E-01	3.20E-01
Iodines						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Particulates Half Life >= 8 days						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Others						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	8.04E-02	6.24E-02	5.37E-02	1.97E-01	3.94E-01
-----						
Totals for Period...	Ci	8.04E-02	6.24E-02	5.37E-02	1.97E-01	3.94E-01
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.10E-02	9.42E-03	1.21E-02	1.86E-02	5.11E-02
2. Avg. Diluted Conc.	uCi/ml	3.60E-09	2.63E-09	3.11E-09	5.12E-09	3.61E-09
Tritium						
1. Total Release	Ci	5.98E+02	2.11E+02	4.52E+02	1.44E+02	1.40E+03
2. Avg. Diluted Conc.	uCi/ml	1.96E-04	5.88E-05	1.16E-04	3.97E-05	9.92E-05
Dissolved and Entrained Gases						
1. Total Release	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
2. Avg. Diluted Conc.	uCi/ml	8.50E-11	2.39E-12	5.60E-11	3.65E-12	3.53E-11
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	3.05E+09	3.59E+09	3.90E+09	3.63E+09	1.42E+10
Volume of dil. water	liters	(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 - Release Tank  
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT  
 Unit 1

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.10E-02	9.42E-03	1.21E-02	1.86E-02	5.11E-02
2. Avg. Diluted Conc.	uCi/ml	7.71E-06	1.02E-05	1.01E-05	1.63E-05	1.09E-05
Tritium						
1. Total Release	Ci	5.17E+02	1.83E+02	3.38E+02	1.30E+02	1.17E+03
2. Avg. Diluted Conc.	uCi/ml	3.62E-01	1.97E-01	2.81E-01	1.14E-01	2.48E-01
Dissolved and Entrained Gases						
1. Total Release	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
2. Avg. Diluted Conc.	uCi/ml	1.82E-07	9.26E-09	1.82E-07	1.16E-08	1.06E-07
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	1.43E+06	9.28E+05	1.20E+06	1.14E+06	4.70E+06
Volume of dil. water	liters	(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 - Circulating Water Blowdown  
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT  
 Unit 1

REPORT FOR 2020	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	8.06E+01	2.82E+01	1.15E+02	1.37E+01	2.37E+02
2. Avg. Diluted Conc.	uCi/ml	2.64E-05	7.85E-06	2.94E-05	3.77E-06	1.67E-05
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	3.05E+09	3.59E+09	3.90E+09	3.63E+09	1.42E+10
Volume of dil. water	liters	(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 - CONTINUOUS MODE  
 Unit 1

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	8.06E+01	2.82E+01	1.15E+02	1.37E+01	2.37E+02
Totals for Period...	Ci	8.06E+01	2.82E+01	1.15E+02	1.37E+01	2.37E+02
Dissolved and Entrained Gases						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
AG-110M	Ci	(1)	(1)	(1)	1.75E-05	1.75E-05
CO-57	Ci	3.60E-05	1.05E-05	1.50E-05	3.97E-05	1.01E-04
CO-58	Ci	1.74E-03	3.48E-03	2.18E-03	7.04E-03	1.44E-02
CO-60	Ci	1.13E-03	1.13E-03	1.43E-03	3.38E-03	7.06E-03
CR-51	Ci	1.02E-03	6.44E-04	(1)	1.05E-03	2.71E-03
CS-134	Ci	(1)	(1)	6.40E-06	(1)	6.40E-06
CS-137	Ci	(1)	4.26E-05	5.40E-04	(1)	5.83E-04
FE-55	Ci	(1)	(1)	(1)	3.19E-03	3.19E-03
FE-59	Ci	(1)	(1)	(1)	5.89E-05	5.89E-05
I-132	Ci	5.23E-05	(1)	(1)	(1)	5.23E-05
MN-54	Ci	8.79E-05	8.16E-05	6.57E-05	4.51E-04	6.86E-04
MN-56	Ci	3.78E-06	(1)	(1)	(1)	3.78E-06
NB-95	Ci	9.57E-06	9.20E-06	(1)	1.99E-04	2.18E-04
NB-97	Ci	(1)	(1)	(1)	4.60E-06	4.60E-06
NI-63	Ci	6.89E-03	3.28E-03	6.98E-03	(1)	1.72E-02
SB-124	Ci	(1)	1.02E-05	(1)	(1)	1.02E-05
SB-125	Ci	(1)	4.41E-05	9.03E-04	3.15E-04	1.26E-03
SN-113	Ci	(1)	(1)	(1)	1.01E-04	1.01E-04
SR-89	Ci	(1)	(1)	(1)	8.18E-05	8.18E-05
TE-123M	Ci	2.17E-05	1.50E-05	(1)	1.83E-05	5.51E-05
TE-125M	Ci	(1)	6.64E-04	(1)	2.49E-03	3.15E-03
TE-132	Ci	2.35E-05	(1)	(1)	3.57E-06	2.71E-05
ZN-65	Ci	(1)	9.52E-06	5.70E-06	4.26E-05	5.78E-05
ZR-95	Ci	4.92E-06	(1)	(1)	8.51E-05	9.00E-05
Totals for Period...	Ci	1.10E-02	9.42E-03	1.21E-02	1.86E-02	5.11E-02
Tritium						
H-3	Ci	5.17E+02	1.83E+02	3.38E+02	1.30E+02	1.17E+03
Totals for Period...	Ci	5.17E+02	1.83E+02	3.38E+02	1.30E+02	1.17E+03
Dissolved and Entrained Gases						
XE-133	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
Totals for Period...	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.10E-02	9.42E-03	1.21E-02	1.86E-02	5.11E-02
2. Avg. Diluted Conc.	uCi/ml	3.60E-09	2.63E-09	3.11E-09	5.12E-09	3.61E-09
Tritium						
1. Total Release	Ci	5.98E+02	2.11E+02	4.52E+02	1.44E+02	1.40E+03
2. Avg. Diluted Conc.	uCi/ml	1.96E-04	5.88E-05	1.16E-04	3.97E-05	9.92E-05
Dissolved and Entrained Gases						
1. Total Release	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
2. Avg. Diluted Conc.	uCi/ml	8.50E-11	2.39E-12	5.60E-11	3.65E-12	3.53E-11
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	3.05E+09	3.59E+09	3.90E+09	3.63E+09	1.42E+10
Volume of dil. water	liters	(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 - Release Tank  
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT  
 Unit 2

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
1. Total Release	Ci	1.10E-02	9.42E-03	1.21E-02	1.86E-02	5.11E-02
2. Avg. Diluted Conc.	uCi/ml	7.71E-06	1.02E-05	1.01E-05	1.63E-05	1.09E-05
Tritium						
1. Total Release	Ci	5.17E+02	1.83E+02	3.38E+02	1.30E+02	1.17E+03
2. Avg. Diluted Conc.	uCi/ml	3.62E-01	1.97E-01	2.81E-01	1.14E-01	2.48E-01
Dissolved and Entrained Gases						
1. Total Release	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
2. Avg. Diluted Conc.	uCi/ml	1.82E-07	9.26E-09	1.82E-07	1.16E-08	1.06E-07
Gross Alpha Radioactivity						
1. Total Release	Ci	(1)	(1)	(1)	(1)	(1)
Volume of liquid waste	liters	1.43E+06	9.28E+05	1.20E+06	1.14E+06	4.70E+06
Volume of dil. water	liters	(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 - Circulating Water Blowdown  
 LIQUID EFFLUENTS - SUMMATION BY RELEASE POINT  
 Unit 2

REPORT FOR 2020	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	8.06E+01	2.82E+01	1.15E+02	1.37E+01	2.37E+02
2. Avg. Diluted Conc.	uCi/ml	2.64E-05	7.85E-06	2.94E-05	3.77E-06	1.67E-05
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	3.05E+09	3.59E+09	3.90E+09	3.63E+09	1.42E+10
Volume of dil. water	liters	(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 - CONTINUOUS MODE  
 Unit 2

REPORT FOR 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Tritium						
H-3	Ci	8.06E+01	2.82E+01	1.15E+02	1.37E+01	2.37E+02
Totals for Period...	Ci	8.06E+01	2.82E+01	1.15E+02	1.37E+01	2.37E+02
Dissolved and Entrained Gases						
** No Nuclide Activities **		(1)	(1)	(1)	(1)	(1)
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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 2020	Units	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
Fission and Activation Products						
AG-110M	Ci	(1)	(1)	(1)	1.75E-05	1.75E-05
CO-57	Ci	3.60E-05	1.05E-05	1.50E-05	3.97E-05	1.01E-04
CO-58	Ci	1.74E-03	3.48E-03	2.18E-03	7.04E-03	1.44E-02
CO-60	Ci	1.13E-03	1.13E-03	1.43E-03	3.38E-03	7.06E-03
CR-51	Ci	1.02E-03	6.44E-04	(1)	1.05E-03	2.71E-03
CS-134	Ci	(1)	(1)	6.40E-06	(1)	6.40E-06
CS-137	Ci	(1)	4.26E-05	5.40E-04	(1)	5.83E-04
FE-55	Ci	(1)	(1)	(1)	3.19E-03	3.19E-03
FE-59	Ci	(1)	(1)	(1)	5.89E-05	5.89E-05
I-132	Ci	5.23E-05	(1)	(1)	(1)	5.23E-05
MN-54	Ci	8.79E-05	8.16E-05	6.57E-05	4.51E-04	6.86E-04
MN-56	Ci	3.78E-06	(1)	(1)	(1)	3.78E-06
NB-95	Ci	9.57E-06	9.20E-06	(1)	1.99E-04	2.18E-04
NB-97	Ci	(1)	(1)	(1)	4.60E-06	4.60E-06
NI-63	Ci	6.89E-03	3.28E-03	6.98E-03	(1)	1.72E-02
SB-124	Ci	(1)	1.02E-05	(1)	(1)	1.02E-05
SB-125	Ci	(1)	4.41E-05	9.03E-04	3.15E-04	1.26E-03
SN-113	Ci	(1)	(1)	(1)	1.01E-04	1.01E-04
SR-89	Ci	(1)	(1)	(1)	8.18E-05	8.18E-05
TE-123M	Ci	2.17E-05	1.50E-05	(1)	1.83E-05	5.51E-05
TE-125M	Ci	(1)	6.64E-04	(1)	2.49E-03	3.15E-03
TE-132	Ci	2.35E-05	(1)	(1)	3.57E-06	2.71E-05
ZN-65	Ci	(1)	9.52E-06	5.70E-06	4.26E-05	5.78E-05
ZR-95	Ci	4.92E-06	(1)	(1)	8.51E-05	9.00E-05
Totals for Period...	Ci	1.10E-02	9.42E-03	1.21E-02	1.86E-02	5.11E-02
Tritium						
H-3	Ci	5.17E+02	1.83E+02	3.38E+02	1.30E+02	1.17E+03
Totals for Period...	Ci	5.17E+02	1.83E+02	3.38E+02	1.30E+02	1.17E+03
Dissolved and Entrained Gases						
XE-133	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
Totals for Period...	Ci	2.60E-04	8.59E-06	2.18E-04	1.32E-05	4.99E-04
Gross Alpha Radioactivity						
** No Nuclide Activities **		(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

Units 1 and 2

Report for: 2020

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	9.27E-02	4.68E-02	4.00E-02	4.02E-02	4.00E-02	5.27E-02	0.00E+00 4.36E-02
TEEN	9.62E-02	3.72E-02	3.01E-02	3.02E-02	3.00E-02	3.90E-02	0.00E+00 3.38E-02
CHILD	1.27E-01	4.06E-02	3.35E-02	3.37E-02	3.35E-02	3.67E-02	0.00E+00 3.83E-02
INFANT	7.08E-04	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	0.00E+00 1.49E-02

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

Quartr - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Qtr 1 - Admin. Any Organ	CHILD	BONE	1.27E-01	3.75E+00	3.38E+00
Qtr 1 - Admin. Total Body	ADULT	TBODY	4.36E-02	1.13E+00	3.88E+00

Qtr 1 - T.Spc. Any Organ CHILD BONE 1.27E-01 5.00E+00 2.53E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
NI-63	1.00E+02
ZR-95	6.18E-07
NB-95	1.73E-03
TE-132	2.55E-02
I-132	1.77E-04

Qtr 1 - T.Spc. Total Body ADULT TBODY 4.36E-02 1.50E+00 2.91E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	9.18E+01
CR-51	1.28E-03
MN-54	7.27E-02
MN-56	7.30E-05
CO-58	3.47E-01
CO-60	6.33E-01
NI-63	7.13E+00
ZR-95	2.80E-07
NB-95	1.26E-03
TE-132	3.41E-02
I-132	3.61E-04

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

Liquid Receptor

Agegrp	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	1.15E-01	6.14E-02	3.17E-02	4.56E-02	3.36E-02	6.57E-02	0.00E+00	5.03E-02
TEEN	1.20E-01	5.49E-02	2.39E-02	3.15E-02	2.63E-02	4.83E-02	0.00E+00	3.65E-02
CHILD	1.57E-01	5.51E-02	2.67E-02	3.30E-02	2.85E-02	3.53E-02	0.00E+00	3.57E-02
INFANT	7.61E-04	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	0.00E+00	1.16E-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	1.57E-01	3.75E+00	4.19E+00
Qtr 2 - Admin. Total Body	ADULT	TBODY	5.03E-02	1.13E+00	4.47E+00

Qtr 2 - T.Spc. Any Organ CHILD BONE 1.57E-01 5.00E+00 3.14E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
NI-63	8.51E+01
ZN-65	1.25E-01
NB-95	2.97E-03
SB-124	9.46E-05
SB-125	2.63E-04
TE-125M	1.45E+00
CS-137	1.33E+01

Qtr 2 - T.Spc. Total Body ADULT TBODY 5.03E-02 1.50E+00 3.35E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	6.21E+01
CR-51	1.56E-03
MN-54	1.30E-01
CO-58	1.33E+00
CO-60	1.22E+00
NI-63	6.53E+00
ZN-65	6.02E-01
NB-95	2.33E-03
SB-124	6.97E-05
SB-125	1.15E-04
TE-125M	4.34E-01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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Nuclide

Percentage

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CS-137

2.76E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Units 1 and 2

Report for: 2020

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	2.30E-01	1.96E-01	3.27E-02	8.52E-02	5.01E-02	4.39E-02	0.00E+00	1.39E-01
TEEN	2.42E-01	1.94E-01	2.45E-02	7.93E-02	4.57E-02	3.26E-02	0.00E+00	8.57E-02
CHILD	3.11E-01	1.82E-01	2.74E-02	7.49E-02	4.44E-02	3.04E-02	0.00E+00	5.53E-02
INFANT	9.57E-04	1.23E-02	1.22E-02	1.22E-02	1.22E-02	1.22E-02	0.00E+00	1.22E-02

=== 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	3.11E-01	3.75E+00	8.30E+00
Qtr 3 - Admin. Total Body	ADULT	TBODY	1.39E-01	1.13E+00	1.23E+01
Qtr 3 - T.Spc. Any Organ	CHILD	BONE	3.11E-01	5.00E+00	6.23E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)  
Major Contributors (0% or greater to total)

Nuclide	Percentage
NI-63	5.15E+01
ZN-65	2.13E-02
SB-125	1.53E-03
CS-134	4.08E-01
CS-137	4.81E+01

Qtr 3 - T.Spc. Total Body	ADULT	TBODY	1.39E-01	1.50E+00	9.26E+00
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Critical Pathway: Fresh Water Fish-Sport (FFSP)  
Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	2.35E+01
MN-54	2.13E-02
CO-58	1.70E-01
CO-60	3.16E-01
NI-63	2.84E+00
ZN-65	7.36E-02
SB-125	4.81E-04
CS-134	1.44E+00
CS-137	7.16E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

LIQUID DOSE SUMMARY

Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

Agegrp	Liquid Receptor							
	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	1.33E-02	3.92E-02	2.92E-02	6.02E-02	2.80E-02	4.49E-01	0.00E+00	3.45E-02
TEEN	1.41E-02	3.28E-02	2.25E-02	2.33E-02	2.15E-02	3.21E-01	0.00E+00	2.80E-02
CHILD	1.80E-02	3.33E-02	2.55E-02	2.49E-02	2.36E-02	1.33E-01	0.00E+00	3.11E-02
INFANT	1.37E-04	1.00E-02	1.00E-02	1.00E-02	1.00E-02	1.01E-02	0.00E+00	1.01E-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	4.49E-01	3.75E+00	1.20E+01
Qtr 4 - Admin. Total Body	ADULT	TBODY	3.45E-02	1.13E+00	3.06E+00

Qtr 4 - T.Spc. Any Organ ADULT GILLI 4.49E-01 5.00E+00 8.98E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	6.01E+00
CR-51	8.70E-02
MN-54	1.56E+00
FE-55	2.15E-01
FE-59	1.24E-01
CO-58	3.30E+00
CO-60	4.21E+00
ZN-65	5.09E-01
SR-89	7.56E-02
ZR-95	5.91E-03
NB-95	7.73E+01
NB-97	4.14E-03
AG-110M	1.72E-03
SB-125	5.15E-03
TE-125M	6.57E+00
TE-132	6.78E-02

Qtr 4 - T.Spc. Total Body ADULT TBODY 3.45E-02 1.50E+00 2.30E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	7.83E+01
CR-51	4.51E-03

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Nuclide	Percentage
MN-54	1.26E+00
FE-55	1.14E+00
FE-59	1.86E-01
CO-58	4.75E+00
CO-60	6.44E+00
ZN-65	4.76E+00
SR-89	1.76E-01
ZR-95	1.64E-05
NB-95	8.92E-02
NB-97	1.46E-05
AG-110M	3.26E-05
SB-125	1.45E-03
TE-125M	2.87E+00
TE-132	1.75E-02

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LIQUID DOSE SUMMARY

Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

Agegrp	Liquid Receptor							
	Bone	Liver	Thyroid	Kidney	Lung	GI-LLI	Skin	TB
ADULT	4.96E-01	3.65E-01	1.36E-01	2.25E-01	1.57E-01	4.24E-01	0.00E+00	2.83E-01
TEEN	5.19E-01	3.42E-01	1.02E-01	1.73E-01	1.29E-01	3.07E-01	0.00E+00	1.92E-01
CHILD	6.74E-01	3.32E-01	1.14E-01	1.75E-01	1.35E-01	1.88E-01	0.00E+00	1.64E-01
INFANT	2.78E-03	5.02E-02	4.99E-02	4.99E-02	4.99E-02	5.00E-02	0.00E+00	5.00E-02

=== SITE DOSE LIMIT ANALYSIS === ANNUAL 2020 ===

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2020 - Admin. Any Organ	CHILD	BONE	6.74E-01	7.50E+00	8.99E+00
2020 - Admin. Total Body	ADULT	TBODY	2.83E-01	2.25E+00	1.26E+01

2020 - T.Spc. Any Organ CHILD BONE 6.74E-01 1.00E+01 6.74E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
FE-55	2.76E-01
FE-59	7.32E-03
NI-63	6.95E+01
ZN-65	1.18E-01
SR-89	2.48E-01
ZR-95	3.15E-06
NB-95	1.10E-02
NB-97	2.24E-06
AG-110M	2.14E-06
SB-124	1.48E-05
SB-125	1.18E-03
TE-125M	1.08E+00
TE-132	8.20E-03
I-132	4.93E-05
CS-134	2.24E-01
CS-137	2.85E+01

2020 - T.Spc. Total Body ADULT TBODY 2.83E-01 3.00E+00 9.43E+00

Critical Pathway: Fresh Water Fish-Sport (FFSP)

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	4.75E+01
CR-51	7.85E-04

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Nuclide	Percentage
-----	-----
MN-54	1.30E-01
MN-56	1.67E-05
FE-55	7.69E-02
FE-59	1.25E-02
CO-58	6.59E-01
CO-60	9.10E-01
NI-63	4.07E+00
ZN-65	4.36E-01
SR-89	1.19E-02
ZR-95	1.18E-06
NB-95	6.59E-03
NB-97	9.89E-07
AG-110M	2.20E-06
SB-124	8.32E-06
SB-125	3.93E-04
TE-125M	2.46E-01
TE-132	9.00E-03
I-132	8.28E-05
CS-134	8.40E-01
CS-137	4.51E+01



40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

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	1.64E-01	5.63E+00	2.92E+00
Qtr 1 - Admin. Total Body	CHILD	TBODY	3.37E-02	5.25E+00	6.42E-01

Qtr 1 - T.Spc. Any Organ CHILD BONE 1.64E-01 7.50E+00 2.19E+00

Receptor: 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	9.99E+01
CO-58	1.43E-04
CO-60	5.11E-02
I-131	1.59E-04

Qtr 1 - T.Spc. Total Body CHILD TBODY 3.37E-02 7.50E+00 4.50E-01

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

Critical Pathway: Vegetation

Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	2.37E+00
C-14	9.74E+01
CO-58	1.22E-03
CO-60	2.66E-01
I-131	4.47E-04

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

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

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
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Qtr 1 - Admin. Gamma	1.20E-04	3.75E+00	3.21E-03
Qtr 1 - Admin. Beta	4.92E-05	7.50E+00	6.55E-04

Qtr 1 - T.Spc. Gamma	1.20E-04	5.00E+00	2.41E-03
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Receptor: Composite Crit. Receptor - NG  
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
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AR-41	5.00E+01
KR-85M	9.44E-04
XE-135	2.04E-01
XE-133M	6.06E-03
XE-131M	1.21E-03
XE-133	4.98E+01

Qtr 1 - T.Spc. Beta	4.92E-05	1.00E+01	4.92E-04
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Receptor: Composite Crit. Receptor - NG  
 Distance: 800 (meters) Compass Point: SSE

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

AR-41	1.06E+01
KR-85M	9.11E-04
XE-135	1.57E-01
XE-133M	1.65E-02
XE-131M	5.18E-03
XE-133	8.92E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

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	1.86E-01	5.63E+00	3.30E+00
Qtr 2 - Admin. Total Body	CHILD	TBODY	3.77E-02	5.25E+00	7.19E-01

Qtr 2 - T.Spc. Any Organ CHILD BONE 1.86E-01 7.50E+00 2.48E+00

Receptor: 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-60	4.58E-02

Qtr 2 - T.Spc. Total Body CHILD TBODY 3.77E-02 7.50E+00 5.03E-01

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

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

Nuclide	Percentage
H-3	1.35E+00
C-14	9.84E+01
CO-60	2.41E-01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

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

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
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Qtr 2 - Admin. Gamma	5.11E-05	3.75E+00	1.36E-03
Qtr 2 - Admin. Beta	8.29E-06	7.50E+00	1.11E-04

Qtr 2 - T.Spc. Gamma	5.11E-05	5.00E+00	1.02E-03
----------------------	----------	----------	----------

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

Nuclide	Percentage
AR-41	8.82E+01
XE-135	5.29E-02
XE-133M	1.17E-03
XE-133	1.17E+01

Qtr 2 - T.Spc. Beta	8.29E-06	1.00E+01	8.29E-05
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Receptor: Composite Crit. Receptor - NG  
 Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
AR-41	4.71E+01
XE-135	1.03E-01
XE-133M	8.02E-03
XE-133	5.28E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

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	1.87E-01	5.63E+00	3.33E+00
Qtr 3 - Admin. Total Body	CHILD	TBODY	3.80E-02	5.25E+00	7.25E-01

Qtr 3 - T.Spc. Any Organ CHILD BONE 1.87E-01 7.50E+00 2.49E+00

Receptor: 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 3 - T.Spc. Total Body CHILD TBODY 3.80E-02 7.50E+00 5.07E-01

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

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

Nuclide	Percentage
H-3	1.67E+00
C-14	9.83E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

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	5.86E-05	3.75E+00	1.56E-03
Qtr 3 - Admin. Beta	5.99E-06	7.50E+00	7.99E-05
Qtr 3 - T.Spc. Gamma	5.86E-05	5.00E+00	1.17E-03
Receptor: Composite Crit. Receptor - NG			
Distance: 800 (meters)		Compass Point: SSE	
Nuclide	Percentage		
-----	-----		
AR-41	9.76E+01		
XE-135	1.16E-02		
XE-133M	7.73E-04		
XE-131M	7.75E-04		
XE-133	2.42E+00		
Qtr 3 - T.Spc. Beta	5.99E-06	1.00E+01	5.99E-05
Receptor: Composite Crit. Receptor - NG			
Distance: 800 (meters)		Compass Point: SSE	
Nuclide	Percentage		
-----	-----		
AR-41	8.26E+01		
XE-135	3.58E-02		
XE-133M	8.40E-03		
XE-131M	1.32E-02		
XE-133	1.73E+01		

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

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	1.89E-01	5.63E+00	3.36E+00
Qtr 4 - Admin. Total Body	CHILD	TBODY	3.87E-02	5.25E+00	7.37E-01

Qtr 4 - T.Spc. Any Organ CHILD BONE 1.89E-01 7.50E+00 2.52E+00

Receptor: 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	9.99E+01
CO-58	3.74E-04
CO-60	8.59E-02

Qtr 4 - T.Spc. Total Body CHILD TBODY 3.87E-02 7.50E+00 5.16E-01

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

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

Nuclide	Percentage
H-3	1.94E+00
C-14	9.76E+01
CO-58	3.20E-03
CO-60	4.48E-01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

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

Quartr - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
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Qtr 4 - Admin. Gamma	5.36E-05	3.75E+00	1.43E-03
Qtr 4 - Admin. Beta	5.20E-06	7.50E+00	6.94E-05

Qtr 4 - T.Spc. Gamma	5.36E-05	5.00E+00	1.07E-03
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Receptor: Composite Crit. Receptor - NG

Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
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AR-41	9.82E+01
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KR-85M	5.10E-03
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XE-135	2.81E-01
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XE-133M	2.95E-03
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KR-88	4.68E-02
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XE-133	1.50E+00
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Qtr 4 - T.Spc. Beta	5.20E-06	1.00E+01	5.20E-05
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Receptor: Composite Crit. Receptor - NG

Distance: 800 (meters) Compass Point: SSE

Nuclide	Percentage
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AR-41	8.77E+01
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KR-85M	2.07E-02
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XE-135	9.13E-01
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XE-133M	3.38E-02
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KR-88	2.29E-02
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XE-133	1.13E+01
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40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

=== I&P DOSE LIMIT ANALYSIS ===== ANNUAL 2020 =====

Annual - Limit	Age Group	Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
2020 - Admin. Any Organ	CHILD	BONE	7.26E-01	1.13E+01	6.45E+00
2020 - Admin. Total Body	CHILD	TBODY	1.48E-01	1.05E+01	1.41E+00

2020 - T.Spc. Any Organ CHILD BONE 7.26E-01 1.50E+01 4.84E+00

Receptor: 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	1.30E-04
CO-60	4.56E-02
I-131	3.60E-05

2020 - T.Spc. Total Body CHILD TBODY 1.48E-01 1.50E+01 9.88E-01

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

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

Nuclide	Percentage
H-3	1.82E+00
C-14	9.79E+01
CO-58	1.11E-03
CO-60	2.39E-01
I-131	1.02E-04

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 GASEOUS DOSE SUMMARY  
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Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

=== NG DOSE LIMIT ANALYSIS ===== ANNUAL 2020 =====

Annual - Limit	Dose (mrad)	Limit (mrad)	Max % of Limit
2020 - Admin. Gamma	2.84E-04	7.50E+00	3.78E-03
2020 - Admin. Beta	6.86E-05	1.50E+01	4.58E-04

2020 - T.Spc. Gamma 2.84E-04 1.00E+01 2.84E-03

Receptor: Composite Crit. Receptor - NG

Distance: 800 (meters) Compass Point: SSE

Nuclide Percentage

AR-41	7.58E+01
KR-85M	1.37E-03
XE-135	1.52E-01
XE-133M	3.50E-03
KR-88	8.85E-03
XE-131M	6.73E-04
XE-133	2.40E+01

2020 - T.Spc. Beta 6.86E-05 2.00E+01 3.43E-04

Receptor: Composite Crit. Receptor - NG

Distance: 800 (meters) Compass Point: SSE

Nuclide Percentage

AR-41	2.72E+01
KR-85M	2.22E-03
XE-135	1.97E-01
XE-133M	1.61E-02
KR-88	1.73E-03
XE-131M	4.86E-03
XE-133	7.26E+01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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 Units 1 and 2

Report for: 2020

Unit Range - From: 1 To: 2

=== MAXIMUM DOSE ANALYSIS ===== ANNUAL 2020 =====

Dose Type	Age Group	Organ	Dose (mrem)
Any Organ	CHILD	BONE	1.40E+00
Liquid Receptor: Liquid Receptor			
Gaseous Receptor: Composite Crit. Receptor - IP			
Distance: 800 (meters)		Compass Point: SSE	

Liquid Dose: 6.74E-01 % of Total: 4.81E+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
MN-56	0.00E+00
FE-55	2.76E-01
FE-59	7.32E-03
CO-58	0.00E+00
CO-60	0.00E+00
NI-63	6.95E+01
ZN-65	1.18E-01
SR-89	2.48E-01
ZR-95	3.15E-06
NB-95	1.10E-02
NB-97	2.24E-06
AG-110M	2.14E-06
SB-124	1.48E-05
SB-125	1.18E-03
TE-125M	1.08E+00
TE-132	8.20E-03
I-132	4.93E-05
CS-134	2.24E-01
CS-137	2.85E+01

Gaseous Dose: 7.26E-01 % of Total: 5.19E+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	1.30E-04
CO-60	4.56E-02

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

Nuclide	Percentage
I-131	3.60E-05

=== MAXIMUM DOSE ANALYSIS ===== ANNUAL 2020 =====

Dose Type	Age Group	Organ	Dose (mrem)
Total Body	ADULT	TBODY	3.26E-01

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

Liquid Dose:            2.83E-01       % of Total: 8.68E+01  
 Critical Pathway:    Fresh Water Fish - Sport (FFSP)  
 Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	4.75E+01
CR-51	7.85E-04
MN-54	1.30E-01
MN-56	1.67E-05
FE-55	7.69E-02
FE-59	1.25E-02
CO-58	6.59E-01
CO-60	9.10E-01
NI-63	4.07E+00
ZN-65	4.36E-01
SR-89	1.19E-02
ZR-95	1.18E-06
NB-95	6.59E-03
NB-97	9.89E-07
AG-110M	2.20E-06
SB-124	8.32E-06
SB-125	3.93E-04
TE-125M	2.46E-01
TE-132	9.00E-03
I-132	8.28E-05
CS-134	8.40E-01
CS-137	4.51E+01

Gaseous Dose:            4.30E-02       % of Total: 1.32E+01  
 Critical Pathway:    Vegetation (VEG)  
 Major Contributors (0% or greater to total)

Nuclide	Percentage
H-3	4.16E+00
C-14	9.50E+01
CO-58	2.89E-03
CO-60	7.91E-01

40CFR190 URANIUM FUEL CYCLE DOSE REPORT

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Nuclide

Percentage

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I-131

1.38E-04

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

Release ID.....: 1 All Gas Release Types  
 Period Start Date....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+05  
 Coefficient Type.....: Historical  
 Unit.....: 1

=== RELEASE DATA =====  
 Total Release Duration (minutes)..... 6.009E+05  
 Total Release Volume (cf)..... 6.067E+10  
 Average Release Flowrate (cfm)..... 1.010E+05  
  
 Average Period Flowrate (cfm)..... 1.151E+05

=== NUCLIDE DATA =====

Nuclide	uCi	Average uCi/cc	EC Ratio	EC
AR-41	2.29E+05	1.33E-10	1.33E-02	1.00E-08
KR-85M	2.72E+01	1.58E-14	1.58E-07	1.00E-07
KR-88	1.42E+01	8.29E-15	9.21E-07	9.00E-09
XE-131M	1.05E+02	6.14E-14	3.07E-08	2.00E-06
XE-133M	2.62E+02	1.52E-13	2.54E-07	6.00E-07
XE-133	3.10E+06	1.80E-09	3.61E-03	5.00E-07
XE-135	1.98E+03	1.15E-12	1.64E-05	7.00E-08
F&AG	3.33E+06	1.94E-09	1.69E-02	
C-14	4.55E+06	2.65E-09	8.82E-01	3.00E-09
Other	4.55E+06	2.65E-09	8.82E-01	
H-3	9.57E+06	5.57E-09	5.57E-02	1.00E-07
H-3	9.57E+06	5.57E-09	5.57E-02	
CO-58	5.18E+00	3.02E-15	3.02E-06	1.00E-09
CO-60	7.89E+01	4.60E-14	9.19E-04	5.00E-11
P>=8	8.41E+01	4.90E-14	9.22E-04	
Total	1.74E+07	1.02E-08	9.56E-01	

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

Release ID.....: 1 All Gas Release Types  
 Period Start Date....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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	3.71E-01	31-day	2.25E-01	1.65E+02
					Quarter	5.63E+00	6.59E+00
					Annual	1.13E+01	3.29E+00
T.Spec	Any Organ	CHILD	BONE	3.71E-01	31-day	3.00E-01	1.24E+02
					Quarter	7.50E+00	4.94E+00
					Annual	1.50E+01	2.47E+00

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

Nuclide	Percentage
H-3	0.00E+00
C-14	9.99E+01
CO-58	6.34E-05
CO-60	5.46E-02

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

Release ID.....: 1 All Gas Release Types  
 Period Start Date....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	0.00E+00	2.03E-04
AINHL	1.18E-03	3.19E-04	3.19E-04	3.19E-04	3.26E-04	3.19E-04	0.00E+00	3.19E-04
AVEG	5.81E-02	1.18E-02	1.18E-02	1.18E-02	1.18E-02	1.18E-02	0.00E+00	1.18E-02
ACMEAT	2.16E-02	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.35E-03	0.00E+00	4.34E-03
ACMILK	2.35E-02	4.76E-03	4.76E-03	4.76E-03	4.76E-03	4.77E-03	0.00E+00	4.76E-03
TGPD	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	0.00E+00	2.03E-04
TINHL	1.69E-03	4.14E-04	4.14E-04	4.14E-04	4.24E-04	4.15E-04	0.00E+00	4.14E-04
TVEG	9.40E-02	1.91E-02	1.91E-02	1.91E-02	1.91E-02	1.91E-02	0.00E+00	1.91E-02
TCMEAT	1.82E-02	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	0.00E+00	3.66E-03
TCMILK	4.34E-02	8.76E-03	8.76E-03	8.76E-03	8.76E-03	8.76E-03	0.00E+00	8.76E-03
CGPD	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	0.00E+00	2.03E-04
CINHL	2.33E-03	5.23E-04	5.23E-04	5.23E-04	5.31E-04	5.24E-04	0.00E+00	5.23E-04
CVEG	2.27E-01	4.57E-02	4.57E-02	4.57E-02	4.57E-02	4.58E-02	0.00E+00	4.58E-02
CCMEAT	3.43E-02	6.89E-03	6.89E-03	6.89E-03	6.89E-03	6.89E-03	0.00E+00	6.89E-03
CCMILK	1.07E-01	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.14E-02	0.00E+00	2.14E-02
IGPD	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	2.03E-04	0.00E+00	2.03E-04
IINHL	1.72E-03	3.94E-04	3.94E-04	3.94E-04	3.99E-04	3.94E-04	0.00E+00	3.94E-04
ICMILK	2.09E-01	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	0.00E+00	4.48E-02
----- TOTALS -----								
ADULT	1.05E-01	2.14E-02	2.14E-02	2.14E-02	2.14E-02	2.15E-02	0.00E+00	2.14E-02
TEEN	1.57E-01	3.21E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02	0.00E+00	3.21E-02
CHILD	3.71E-01	7.48E-02	7.48E-02	7.48E-02	7.48E-02	7.48E-02	0.00E+00	7.48E-02
INFANT	2.11E-01	4.54E-02	4.54E-02	4.54E-02	4.54E-02	4.54E-02	0.00E+00	4.54E-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....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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	1.87E-04	31-day	1.50E-01	1.25E-01
			Quarter	3.75E+00	4.99E-03
			Annual	7.50E+00	2.50E-03
Admin	Beta	5.72E-05	31-day	3.00E-01	1.91E-02
			Quarter	7.50E+00	7.63E-04
			Annual	1.50E+01	3.81E-04
T.Spec	Gamma	1.87E-04	31-day	2.00E-01	9.36E-02
			Quarter	5.00E+00	3.74E-03
			Annual	1.00E+01	1.87E-03

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	6.59E+01
KR-85M	1.04E-03
KR-88	6.71E-03
XE-131M	5.10E-04
XE-133M	2.65E-03
XE-133	3.39E+01
XE-135	1.18E-01

Limit Type	Dose Type	Dose (mrad)	Limit Period	Limit (mrad)	Percent of Limit
T.Spec	Beta	5.72E-05	31-day	4.00E-01	1.43E-02
			Quarter	1.00E+01	5.72E-04
			Annual	2.00E+01	2.86E-04

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	1.87E+01
KR-85M	1.33E-03

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

Release ID.....: 1 All Gas Release Types  
Period Start Date....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (min): 5.270E+05  
Coefficient Type.....: Historical  
Unit.....: 1

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

Nuclide	Percentage
-----	-----
KR-88	1.04E-03
XE-131M	2.92E-03
XE-133M	9.66E-03
XE-133	8.12E+01
XE-135	1.21E-01

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

Release ID.....: 1 All Gas Release Types  
 Period Start Date....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+05  
 Coefficient Type.....: Historical  
 Unit.....: 2

=== RELEASE DATA =====  
 Total Release Duration (minutes)..... 5.851E+05  
 Total Release Volume (cf)..... 8.377E+10  
 Average Release Flowrate (cfm)..... 1.432E+05  
 Average Period Flowrate (cfm)..... 1.589E+05

=== NUCLIDE DATA =====

Nuclide	uCi	Average uCi/cc	EC Ratio	EC
AR-41	1.70E+05	7.16E-11	7.16E-03	1.00E-08
KR-85M	2.72E+01	1.14E-14	1.14E-07	1.00E-07
KR-88	1.42E+01	6.00E-15	6.67E-07	9.00E-09
XE-131M	1.05E+02	4.45E-14	2.22E-08	2.00E-06
XE-133M	2.62E+02	1.10E-13	1.84E-07	6.00E-07
XE-133	2.29E+05	9.66E-11	1.93E-04	5.00E-07
XE-135	1.88E+03	7.94E-13	1.13E-05	7.00E-08
F&AG	4.01E+05	1.69E-10	7.37E-03	
I-131	1.48E+00	6.22E-16	3.11E-06	2.00E-10
Iodine	1.48E+00	6.22E-16	3.11E-06	
C-14	4.36E+06	1.84E-09	6.13E-01	3.00E-09
Other	4.36E+06	1.84E-09	6.13E-01	
H-3	3.82E+07	1.61E-08	1.61E-01	1.00E-07
H-3	3.82E+07	1.61E-08	1.61E-01	
CO-58	1.56E+01	6.58E-15	6.58E-06	1.00E-09
CO-60	5.02E+01	2.12E-14	4.24E-04	5.00E-11
P>=8	6.58E+01	2.78E-14	4.30E-04	
Total	4.30E+07	1.81E-08	7.82E-01	



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

Release ID.....: 1 All Gas Release Types  
Period Start Date....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (min): 5.270E+05  
Coefficient Type.....: Historical  
Unit.....: 2

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

Release ID.....: 1 All Gas Release Types  
 Period Start Date....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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	3.56E-01	31-day	2.25E-01	1.58E+02
					Quarter	5.63E+00	6.32E+00
					Annual	1.13E+01	3.16E+00
T.Spec	Any Organ	CHILD	BONE	3.56E-01	31-day	3.00E-01	1.19E+02
					Quarter	7.50E+00	4.74E+00
					Annual	1.50E+01	2.37E+00

Receptor.....: 5 Composite Crit. Receptor - IP  
 Distance (meters).....: 0.0  
 Compass Point.....: 0.0  
 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	1.99E-04
CO-60	3.62E-02
I-131	7.35E-05

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

Release ID.....: 1 All Gas Release Types  
 Period Start Date....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	0.00E+00	1.30E-04
AINHL	1.13E-03	6.03E-04	6.03E-04	6.03E-04	6.08E-04	6.03E-04	0.00E+00	6.03E-04
AVEG	5.58E-02	1.18E-02	1.18E-02	1.18E-02	1.18E-02	1.19E-02	0.00E+00	1.18E-02
ACMEAT	2.07E-02	4.24E-03	4.24E-03	4.24E-03	4.24E-03	4.25E-03	0.00E+00	4.24E-03
ACMILK	2.26E-02	4.75E-03	4.78E-03	4.75E-03	4.75E-03	4.75E-03	0.00E+00	4.75E-03
TGPD	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	0.00E+00	1.30E-04
TINHL	1.62E-03	6.98E-04	6.98E-04	6.98E-04	7.04E-04	6.98E-04	0.00E+00	6.98E-04
TVEG	9.02E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	0.00E+00	1.89E-02
TCMEAT	1.75E-02	3.56E-03	3.56E-03	3.56E-03	3.56E-03	3.56E-03	0.00E+00	3.56E-03
TCMILK	4.17E-02	8.64E-03	8.68E-03	8.64E-03	8.64E-03	8.64E-03	0.00E+00	8.64E-03
CGPD	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	0.00E+00	1.30E-04
CINHL	2.23E-03	7.67E-04	7.67E-04	7.67E-04	7.72E-04	7.67E-04	0.00E+00	7.67E-04
CVEG	2.18E-01	4.48E-02	4.49E-02	4.48E-02	4.48E-02	4.49E-02	0.00E+00	4.49E-02
CCMEAT	3.29E-02	6.67E-03	6.67E-03	6.67E-03	6.67E-03	6.67E-03	0.00E+00	6.67E-03
CCMILK	1.03E-01	2.10E-02	2.10E-02	2.10E-02	2.10E-02	2.10E-02	0.00E+00	2.10E-02
IGPD	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	0.00E+00	1.30E-04
IINHL	1.65E-03	5.31E-04	5.31E-04	5.31E-04	5.34E-04	5.31E-04	0.00E+00	5.31E-04
ICMILK	2.01E-01	4.36E-02	4.38E-02	4.36E-02	4.36E-02	4.36E-02	0.00E+00	4.36E-02
----- TOTALS -----								
ADULT	1.00E-01	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	0.00E+00	2.16E-02
TEEN	1.51E-01	3.19E-02	3.20E-02	3.19E-02	3.19E-02	3.20E-02	0.00E+00	3.19E-02
CHILD	3.56E-01	7.34E-02	7.34E-02	7.34E-02	7.34E-02	7.34E-02	0.00E+00	7.34E-02
INFANT	2.03E-01	4.43E-02	4.44E-02	4.43E-02	4.43E-02	4.43E-02	0.00E+00	4.43E-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....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (min): 5.270E+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	9.66E-05	31-day	1.50E-01	6.44E-02
			Quarter	3.75E+00	2.58E-03
			Annual	7.50E+00	1.29E-03
Admin	Beta	1.15E-05	31-day	3.00E-01	3.82E-03
			Quarter	7.50E+00	1.53E-04
			Annual	1.50E+01	7.63E-05
T.Spec	Gamma	9.66E-05	31-day	2.00E-01	4.83E-02
			Quarter	5.00E+00	1.93E-03
			Annual	1.00E+01	9.66E-04

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	9.49E+01
KR-85M	2.01E-03
KR-88	1.30E-02
XE-131M	9.88E-04
XE-133M	5.14E-03
XE-133	4.86E+00
XE-135	2.17E-01

Limit Type	Dose Type	Dose (mrad)	Limit Period	Limit (mrad)	Percent of Limit
T.Spec	Beta	1.15E-05	31-day	4.00E-01	2.86E-03
			Quarter	1.00E+01	1.15E-04
			Annual	2.00E+01	5.73E-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	6.94E+01
KR-85M	6.66E-03

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

Release ID.....: 1 All Gas Release Types  
Period Start Date....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (min): 5.270E+05  
Coefficient Type.....: Historical  
Unit.....: 2

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

Nuclide	Percentage
-----	-----
KR-88	5.19E-03
XE-131M	1.46E-02
XE-133M	4.82E-02
XE-133	3.00E+01
XE-135	5.77E-01

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

Release ID.....: 1 All Liquid Releases  
Period Start Date.....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (mins): 5.270E+05  
Unit.....: 1

=== MULTIPLE RELEASE POINT MESSAGE =====  
Undiluted and Diluted Flowrate(s) and Concentration(s) cannot be combined.

=== RELEASE DATA =====  
Total Release Duration (minutes)..... 5.435E+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 1.01E+02  
NB-97 4.60E+00  
SN-113 1.01E+02  
SB-124 1.02E+01  
SB-125 1.26E+03  
TE-123M 5.51E+01  
CR-51 2.71E+03  
MN-54 6.86E+02  
MN-56 3.78E+00  
FE-59 5.89E+01  
CO-58 1.44E+04  
CO-60 7.06E+03  
ZN-65 5.78E+01  
ZR-95 9.00E+01  
NB-95 2.18E+02  
AG-110M 1.75E+01  
TE-125M 3.15E+03  
TE-132 2.71E+01  
I-132 5.23E+01  
CS-134 6.40E+00  
CS-137 5.83E+02  
-----  
Gamma 3.07E+04  
  
XE-133 4.99E+02  
-----  
D&EG 4.99E+02  
  
H-3 1.40E+09  
FE-55 3.19E+03

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

Release ID.....: 1 All Liquid Releases  
Period Start Date.....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (mins): 5.270E+05

=== NUCLIDE DATA =====

Nuclide	uCi
NI-63	1.72E+04
SR-89	8.18E+01
Beta	1.40E+09
Total	1.40E+09

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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+05  
 Unit.....: 1  
 Receptor.....: 0 Liquid Receptor

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=== PERMIT ORGAN DOSE BY AGE GROUP AND PATHWAY (mrem) =====
Age/Path Bone      Liver      Thyroid  Kidney   Lung     GI-Lli   Skin     TB
-----
APWtr      5.92E-04  1.80E-02  1.80E-02  1.80E-02  1.80E-02  1.81E-02  0.00E+00  1.80E-02
AFWFSp     2.37E-01  1.57E-01  4.70E-02  8.97E-02  5.72E-02  1.85E-01  0.00E+00  1.17E-01
TPWtr      5.64E-04  1.27E-02  1.27E-02  1.27E-02  1.27E-02  1.28E-02  0.00E+00  1.27E-02
TFWFSp     2.48E-01  1.51E-01  3.63E-02  7.03E-02  4.89E-02  1.34E-01  0.00E+00  7.92E-02
CPWtr      1.71E-03  2.44E-02  2.43E-02  2.43E-02  2.43E-02  2.44E-02  0.00E+00  2.44E-02
CFWFSp     3.21E-01  1.34E-01  3.04E-02  5.94E-02  4.01E-02  6.55E-02  0.00E+00  5.40E-02
IPWtr      1.33E-03  2.40E-02  2.39E-02  2.39E-02  2.39E-02  2.39E-02  0.00E+00  2.39E-02
  
```

```

----- TOTALS -----
ADULT      2.37E-01  1.75E-01  6.50E-02  1.08E-01  7.52E-02  2.03E-01  0.00E+00  1.35E-01
TEEN      2.48E-01  1.63E-01  4.90E-02  8.29E-02  6.15E-02  1.47E-01  0.00E+00  9.19E-02
CHILD     3.22E-01  1.59E-01  5.47E-02  8.37E-02  6.45E-02  8.99E-02  0.00E+00  7.84E-02
INFANT    1.33E-03  2.40E-02  2.39E-02  2.39E-02  2.39E-02  2.39E-02  0.00E+00  2.39E-02
  
```

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=== 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.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+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	6.42E-02	6.42E-02	6.42E-02	6.42E-02	6.42E-02	0.00E+00	6.42E-02
CR-51	0.00E+00	0.00E+00	6.35E-07	2.34E-07	1.41E-06	2.67E-04	0.00E+00	1.06E-06
MN-54	0.00E+00	9.22E-04	0.00E+00	2.74E-04	0.00E+00	2.82E-03	0.00E+00	1.76E-04
MN-56	0.00E+00	1.28E-07	0.00E+00	1.62E-07	0.00E+00	4.07E-06	0.00E+00	2.26E-08
FE-55	6.46E-04	4.46E-04	0.00E+00	0.00E+00	2.49E-04	2.56E-04	0.00E+00	1.04E-04
FE-59	1.88E-05	4.43E-05	0.00E+00	0.00E+00	1.24E-05	1.48E-04	0.00E+00	1.70E-05
CO-58	0.00E+00	3.98E-04	0.00E+00	0.00E+00	0.00E+00	8.06E-03	0.00E+00	8.92E-04
CO-60	0.00E+00	5.59E-04	0.00E+00	0.00E+00	0.00E+00	1.05E-02	0.00E+00	1.23E-03
NI-63	1.64E-01	1.14E-02	0.00E+00	0.00E+00	0.00E+00	2.38E-03	0.00E+00	5.51E-03
ZN-65	4.11E-04	1.31E-03	0.00E+00	8.74E-04	0.00E+00	8.23E-04	0.00E+00	5.91E-04
SR-89	5.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E-05	0.00E+00	1.61E-05
ZR-95	7.33E-09	2.35E-09	0.00E+00	3.69E-09	0.00E+00	7.45E-06	0.00E+00	1.59E-09
NB-95	2.98E-05	1.66E-05	0.00E+00	1.64E-05	0.00E+00	1.01E-01	0.00E+00	8.92E-06
NB-97	5.29E-09	1.34E-09	0.00E+00	1.56E-09	0.00E+00	4.93E-06	0.00E+00	1.34E-09
AG-110M	5.43E-09	5.02E-09	0.00E+00	9.88E-09	0.00E+00	2.05E-06	0.00E+00	2.98E-09
SB-124	2.84E-08	5.37E-10	1.78E-07	0.00E+00	2.21E-08	8.08E-07	0.00E+00	1.13E-08
SB-125	2.24E-06	2.50E-08	2.27E-09	0.00E+00	1.73E-06	2.46E-05	0.00E+00	5.32E-07
TE-125M	2.48E-03	8.99E-04	7.46E-04	1.01E-02	0.00E+00	9.91E-03	0.00E+00	3.32E-04
TE-132	2.01E-05	1.30E-05	1.43E-05	1.25E-04	0.00E+00	6.14E-04	0.00E+00	1.22E-05
I-132	1.20E-07	3.20E-07	1.12E-05	5.10E-07	0.00E+00	6.02E-08	0.00E+00	1.12E-07
CS-134	5.85E-04	1.39E-03	0.00E+00	4.50E-04	1.49E-04	2.43E-05	0.00E+00	1.14E-03
CS-137	6.82E-02	9.32E-02	0.00E+00	3.17E-02	1.05E-02	1.80E-03	0.00E+00	6.11E-02
TEEN								
H-3	0.00E+00	4.82E-02	4.82E-02	4.82E-02	4.82E-02	4.82E-02	0.00E+00	4.82E-02
CR-51	0.00E+00	0.00E+00	6.08E-07	2.40E-07	1.56E-06	1.84E-04	0.00E+00	1.09E-06
MN-54	0.00E+00	9.07E-04	0.00E+00	2.70E-04	0.00E+00	1.86E-03	0.00E+00	1.80E-04
MN-56	0.00E+00	1.34E-07	0.00E+00	1.69E-07	0.00E+00	8.79E-06	0.00E+00	2.38E-08
FE-55	6.76E-04	4.79E-04	0.00E+00	0.00E+00	3.04E-04	2.07E-04	0.00E+00	1.12E-04
FE-59	1.94E-05	4.53E-05	0.00E+00	0.00E+00	1.43E-05	1.07E-04	0.00E+00	1.75E-05
CO-58	0.00E+00	3.95E-04	0.00E+00	0.00E+00	0.00E+00	5.45E-03	0.00E+00	9.11E-04
CO-60	0.00E+00	5.58E-04	0.00E+00	0.00E+00	0.00E+00	7.27E-03	0.00E+00	1.26E-03
NI-63	1.70E-01	1.20E-02	0.00E+00	0.00E+00	0.00E+00	1.91E-03	0.00E+00	5.77E-03
ZN-65	3.72E-04	1.29E-03	0.00E+00	8.28E-04	0.00E+00	5.48E-04	0.00E+00	6.03E-04
SR-89	6.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.27E-05	0.00E+00	1.75E-05
ZR-95	7.50E-09	2.37E-09	0.00E+00	3.48E-09	0.00E+00	5.47E-06	0.00E+00	1.63E-09
NB-95	3.00E-05	1.67E-05	0.00E+00	1.62E-05	0.00E+00	7.13E-02	0.00E+00	9.17E-06
NB-97	5.70E-09	1.41E-09	0.00E+00	1.65E-09	0.00E+00	3.38E-05	0.00E+00	5.16E-10
AG-110M	5.24E-09	4.96E-09	0.00E+00	9.46E-09	0.00E+00	1.39E-06	0.00E+00	3.02E-09

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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+05

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) =====								
Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
SB-124	2.93E-08	5.39E-10	6.63E-11	0.00E+00	2.56E-08	5.92E-07	0.00E+00	1.14E-08
SB-125	2.31E-06	2.53E-08	2.21E-09	0.00E+00	2.03E-06	1.80E-05	0.00E+00	5.41E-07
TE-125M	2.70E-03	9.74E-04	7.55E-04	0.00E+00	0.00E+00	7.97E-03	0.00E+00	3.61E-04
TE-132	2.12E-05	1.34E-05	1.41E-05	1.29E-04	0.00E+00	4.25E-04	0.00E+00	1.26E-05
I-132	1.25E-07	3.27E-07	1.10E-05	5.16E-07	0.00E+00	1.43E-07	0.00E+00	1.17E-07
CS-134	5.99E-04	1.41E-03	0.00E+00	4.48E-04	1.71E-04	1.75E-05	0.00E+00	6.55E-04
CS-137	7.30E-02	9.71E-02	0.00E+00	3.31E-02	1.28E-02	1.38E-03	0.00E+00	3.38E-02

CHILD

H-3	0.00E+00	5.37E-02	5.37E-02	5.37E-02	5.37E-02	5.37E-02	0.00E+00	5.37E-02
CR-51	0.00E+00	0.00E+00	6.49E-07	1.77E-07	1.19E-06	6.20E-05	0.00E+00	1.17E-06
MN-54	0.00E+00	7.10E-04	0.00E+00	1.99E-04	0.00E+00	5.96E-04	0.00E+00	1.89E-04
MN-56	0.00E+00	1.22E-07	0.00E+00	1.47E-07	0.00E+00	1.77E-05	0.00E+00	2.75E-08
FE-55	8.91E-04	4.72E-04	0.00E+00	0.00E+00	2.67E-04	8.75E-05	0.00E+00	1.46E-04
FE-59	2.36E-05	3.82E-05	0.00E+00	0.00E+00	1.11E-05	3.98E-05	0.00E+00	1.90E-05
CO-58	0.00E+00	3.18E-04	0.00E+00	0.00E+00	0.00E+00	1.86E-03	0.00E+00	9.74E-04
CO-60	0.00E+00	4.57E-04	0.00E+00	0.00E+00	0.00E+00	2.53E-03	0.00E+00	1.35E-03
NI-63	2.24E-01	1.20E-02	0.00E+00	0.00E+00	0.00E+00	8.08E-04	0.00E+00	7.62E-03
ZN-65	3.82E-04	1.02E-03	0.00E+00	6.41E-04	0.00E+00	1.79E-04	0.00E+00	6.33E-04
SR-89	8.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-05	0.00E+00	2.29E-05
ZR-95	1.02E-08	2.24E-09	0.00E+00	3.20E-09	0.00E+00	2.33E-06	0.00E+00	1.99E-09
NB-95	3.55E-05	1.38E-05	0.00E+00	1.30E-05	0.00E+00	2.55E-02	0.00E+00	9.86E-06
NB-97	7.23E-09	1.31E-09	0.00E+00	1.45E-09	0.00E+00	4.03E-04	0.00E+00	6.09E-10
AG-110M	6.90E-09	4.66E-09	0.00E+00	8.68E-09	0.00E+00	5.54E-07	0.00E+00	3.73E-09
SB-124	4.77E-08	6.18E-10	1.06E-10	0.00E+00	2.65E-08	2.99E-07	0.00E+00	1.67E-08
SB-125	3.79E-06	2.92E-08	3.51E-09	0.00E+00	2.11E-06	9.07E-06	0.00E+00	7.94E-07
TE-125M	3.47E-03	9.41E-04	9.75E-04	0.00E+00	0.00E+00	3.35E-03	0.00E+00	4.63E-04
TE-132	2.65E-05	1.17E-05	1.70E-05	1.09E-04	0.00E+00	1.18E-04	0.00E+00	1.41E-05
I-132	1.59E-07	2.92E-07	1.36E-05	4.47E-07	0.00E+00	3.44E-07	0.00E+00	1.34E-07
CS-134	7.23E-04	1.19E-03	0.00E+00	3.68E-04	1.32E-04	6.40E-06	0.00E+00	2.50E-04
CS-137	9.19E-02	8.80E-02	0.00E+00	2.87E-02	1.03E-02	5.51E-04	0.00E+00	1.30E-02

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	2.88E-09	6.29E-10	5.60E-09	1.29E-07	0.00E+00	4.41E-09
MN-54	0.00E+00	1.58E-06	0.00E+00	3.49E-07	0.00E+00	5.79E-07	0.00E+00	3.57E-07
MN-56	0.00E+00	3.56E-10	0.00E+00	3.06E-10	0.00E+00	3.24E-08	0.00E+00	6.14E-11
FE-55	5.11E-06	3.30E-06	0.00E+00	0.00E+00	1.61E-06	4.19E-07	0.00E+00	8.82E-07
FE-59	2.09E-07	3.66E-07	0.00E+00	0.00E+00	1.08E-07	1.75E-07	0.00E+00	1.44E-07
CO-58	0.00E+00	6.00E-06	0.00E+00	0.00E+00	0.00E+00	1.50E-05	0.00E+00	1.50E-05
CO-60	0.00E+00	8.80E-06	0.00E+00	0.00E+00	0.00E+00	2.09E-05	0.00E+00	2.08E-05



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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+05

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) =====								
Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
-----	-----	-----	-----	-----	-----	-----	-----	-----
NI-63	1.25E-03	7.76E-05	0.00E+00	0.00E+00	0.00E+00	3.86E-06	0.00E+00	4.35E-05
ZN-65	1.23E-07	4.21E-07	0.00E+00	2.04E-07	0.00E+00	3.55E-07	0.00E+00	1.94E-07
SR-89	2.37E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-07	0.00E+00	6.79E-07
ZR-95	2.14E-09	5.21E-10	0.00E+00	5.62E-10	0.00E+00	2.60E-07	0.00E+00	3.70E-10
NB-95	1.06E-09	4.35E-10	0.00E+00	3.12E-10	0.00E+00	3.67E-07	0.00E+00	2.51E-10
NB-97	2.44E-13	5.20E-14	0.00E+00	4.06E-14	0.00E+00	1.64E-08	0.00E+00	1.87E-14
AG-110M	2.01E-09	1.46E-09	0.00E+00	2.09E-09	0.00E+00	7.59E-08	0.00E+00	9.69E-10
SB-124	2.53E-08	3.74E-10	6.72E-11	0.00E+00	1.59E-08	7.82E-08	0.00E+00	7.85E-09
SB-125	1.79E-06	1.73E-08	2.24E-09	0.00E+00	1.04E-06	2.39E-06	0.00E+00	3.69E-07
TE-125M	8.47E-06	2.83E-06	2.85E-06	0.00E+00	0.00E+00	4.03E-06	0.00E+00	1.14E-06
TE-132	6.50E-08	3.22E-08	4.75E-08	2.01E-07	0.00E+00	1.19E-07	0.00E+00	3.00E-08
I-132	1.00E-08	2.04E-08	9.54E-07	2.27E-08	0.00E+00	1.65E-08	0.00E+00	7.25E-09
CS-134	2.78E-07	5.19E-07	0.00E+00	1.34E-07	5.48E-08	1.41E-09	0.00E+00	5.24E-08
CS-137	3.51E-05	4.11E-05	0.00E+00	1.10E-05	4.46E-06	1.28E-07	0.00E+00	2.91E-06

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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+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	CHILD	BONE	3.22E-01	31-day	1.50E-01	2.15E+02
					Quarter	3.75E+00	8.60E+00
					Annual	7.50E+00	4.30E+00
Admin	Tot Body	ADULT	TBODY	1.35E-01	31-day	4.50E-02	3.01E+02
					Quarter	1.13E+00	1.20E+01
					Annual	2.25E+00	6.01E+00
T.Spec	Any Organ	CHILD	BONE	3.22E-01	31-day	2.00E-01	1.61E+02
					Quarter	5.00E+00	6.45E+00
					Annual	1.00E+01	3.22E+00

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

Nuclide	Percentage
NB-97	2.24E-06
SB-125	1.18E-03
SB-124	1.48E-05
FE-55	2.76E-01
FE-59	7.32E-03
NI-63	6.95E+01
ZN-65	1.18E-01
SR-89	2.48E-01
ZR-95	3.15E-06
NB-95	1.10E-02
AG-110M	2.14E-06
TE-125M	1.08E+00
TE-132	8.20E-03
I-132	4.93E-05
CS-134	2.24E-01
CS-137	2.85E+01

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
T.Spec	Tot Body	ADULT	TBODY	1.35E-01	31-day	6.00E-02	2.26E+02
					Quarter	1.50E+00	9.02E+00
					Annual	3.00E+00	4.51E+00

Critical Pathway.....: 1 Fresh Water Fish - Sport (FFSP)

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

Release ID.....: 1 All Liquid Releases  
Period Start Date.....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (mins): 5.270E+05

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

Nuclide	Percentage
-----	-----
SB-125	3.93E-04
SB-124	8.32E-06
NB-97	9.89E-07
H-3	4.75E+01
CR-51	7.85E-04
MN-54	1.30E-01
MN-56	1.67E-05
FE-55	7.69E-02
FE-59	1.25E-02
CO-58	6.59E-01
CO-60	9.10E-01
NI-63	4.07E+00
ZN-65	4.36E-01
SR-89	1.19E-02
ZR-95	1.18E-06
NB-95	6.59E-03
AG-110M	2.20E-06
TE-125M	2.46E-01
TE-132	9.00E-03
I-132	8.28E-05
CS-134	8.40E-01
CS-137	4.51E+01

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

Release ID.....: 1 All Liquid Releases  
Period Start Date.....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (mins): 5.270E+05  
Unit.....: 2

=== MULTIPLE RELEASE POINT MESSAGE =====  
Undiluted and Diluted Flowrate(s) and Concentration(s) cannot be combined.

=== RELEASE DATA =====  
Total Release Duration (minutes)..... 5.435E+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 1.01E+02  
NB-97 4.60E+00  
SN-113 1.01E+02  
SB-124 1.02E+01  
SB-125 1.26E+03  
TE-123M 5.51E+01  
CR-51 2.71E+03  
MN-54 6.86E+02  
MN-56 3.78E+00  
FE-59 5.89E+01  
CO-58 1.44E+04  
CO-60 7.06E+03  
ZN-65 5.78E+01  
ZR-95 9.00E+01  
NB-95 2.18E+02  
AG-110M 1.75E+01  
TE-125M 3.15E+03  
TE-132 2.71E+01  
I-132 5.23E+01  
CS-134 6.40E+00  
CS-137 5.83E+02  
-----  
Gamma 3.07E+04  
  
XE-133 4.99E+02  
-----  
D&EG 4.99E+02  
  
H-3 1.40E+09  
FE-55 3.19E+03

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

Release ID.....: 1 All Liquid Releases  
Period Start Date.....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (mins): 5.270E+05

=== NUCLIDE DATA =====

Nuclide	uCi
NI-63	1.72E+04
SR-89	8.18E+01
Beta	1.40E+09
Total	1.40E+09

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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+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	5.92E-04	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.81E-02	0.00E+00	1.80E-02
AFWFSp	2.37E-01	1.57E-01	4.70E-02	8.97E-02	5.72E-02	1.85E-01	0.00E+00	1.17E-01
TPWtr	5.64E-04	1.27E-02	1.27E-02	1.27E-02	1.27E-02	1.28E-02	0.00E+00	1.27E-02
TFWFSp	2.48E-01	1.51E-01	3.63E-02	7.03E-02	4.89E-02	1.34E-01	0.00E+00	7.92E-02
CPWtr	1.71E-03	2.44E-02	2.43E-02	2.43E-02	2.43E-02	2.44E-02	0.00E+00	2.44E-02
CFWFSp	3.21E-01	1.34E-01	3.04E-02	5.94E-02	4.01E-02	6.55E-02	0.00E+00	5.40E-02
IPWtr	1.33E-03	2.40E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	0.00E+00	2.39E-02

----- TOTALS -----								
ADULT	2.37E-01	1.75E-01	6.50E-02	1.08E-01	7.52E-02	2.03E-01	0.00E+00	1.35E-01
TEEN	2.48E-01	1.63E-01	4.90E-02	8.29E-02	6.15E-02	1.47E-01	0.00E+00	9.19E-02
CHILD	3.22E-01	1.59E-01	5.47E-02	8.37E-02	6.45E-02	8.99E-02	0.00E+00	7.84E-02
INFANT	1.33E-03	2.40E-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.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+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	6.42E-02	6.42E-02	6.42E-02	6.42E-02	6.42E-02	0.00E+00	6.42E-02
CR-51	0.00E+00	0.00E+00	6.35E-07	2.34E-07	1.41E-06	2.67E-04	0.00E+00	1.06E-06
MN-54	0.00E+00	9.22E-04	0.00E+00	2.74E-04	0.00E+00	2.82E-03	0.00E+00	1.76E-04
MN-56	0.00E+00	1.28E-07	0.00E+00	1.62E-07	0.00E+00	4.07E-06	0.00E+00	2.26E-08
FE-55	6.46E-04	4.46E-04	0.00E+00	0.00E+00	2.49E-04	2.56E-04	0.00E+00	1.04E-04
FE-59	1.88E-05	4.43E-05	0.00E+00	0.00E+00	1.24E-05	1.48E-04	0.00E+00	1.70E-05
CO-58	0.00E+00	3.98E-04	0.00E+00	0.00E+00	0.00E+00	8.06E-03	0.00E+00	8.92E-04
CO-60	0.00E+00	5.59E-04	0.00E+00	0.00E+00	0.00E+00	1.05E-02	0.00E+00	1.23E-03
NI-63	1.64E-01	1.14E-02	0.00E+00	0.00E+00	0.00E+00	2.38E-03	0.00E+00	5.51E-03
ZN-65	4.11E-04	1.31E-03	0.00E+00	8.74E-04	0.00E+00	8.23E-04	0.00E+00	5.91E-04
SR-89	5.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E-05	0.00E+00	1.61E-05
ZR-95	7.33E-09	2.35E-09	0.00E+00	3.69E-09	0.00E+00	7.45E-06	0.00E+00	1.59E-09
NB-95	2.98E-05	1.66E-05	0.00E+00	1.64E-05	0.00E+00	1.01E-01	0.00E+00	8.92E-06
NB-97	5.29E-09	1.34E-09	0.00E+00	1.56E-09	0.00E+00	4.93E-06	0.00E+00	1.34E-09
AG-110M	5.43E-09	5.02E-09	0.00E+00	9.88E-09	0.00E+00	2.05E-06	0.00E+00	2.98E-09
SB-124	2.84E-08	5.37E-10	1.78E-07	0.00E+00	2.21E-08	8.08E-07	0.00E+00	1.13E-08
SB-125	2.24E-06	2.50E-08	2.27E-09	0.00E+00	1.73E-06	2.46E-05	0.00E+00	5.32E-07
TE-125M	2.48E-03	8.99E-04	7.46E-04	1.01E-02	0.00E+00	9.91E-03	0.00E+00	3.32E-04
TE-132	2.01E-05	1.30E-05	1.43E-05	1.25E-04	0.00E+00	6.14E-04	0.00E+00	1.22E-05
I-132	1.20E-07	3.20E-07	1.12E-05	5.10E-07	0.00E+00	6.02E-08	0.00E+00	1.12E-07
CS-134	5.85E-04	1.39E-03	0.00E+00	4.50E-04	1.49E-04	2.43E-05	0.00E+00	1.14E-03
CS-137	6.82E-02	9.32E-02	0.00E+00	3.17E-02	1.05E-02	1.80E-03	0.00E+00	6.11E-02
TEEN								
H-3	0.00E+00	4.82E-02	4.82E-02	4.82E-02	4.82E-02	4.82E-02	0.00E+00	4.82E-02
CR-51	0.00E+00	0.00E+00	6.08E-07	2.40E-07	1.56E-06	1.84E-04	0.00E+00	1.09E-06
MN-54	0.00E+00	9.07E-04	0.00E+00	2.70E-04	0.00E+00	1.86E-03	0.00E+00	1.80E-04
MN-56	0.00E+00	1.34E-07	0.00E+00	1.69E-07	0.00E+00	8.79E-06	0.00E+00	2.38E-08
FE-55	6.76E-04	4.79E-04	0.00E+00	0.00E+00	3.04E-04	2.07E-04	0.00E+00	1.12E-04
FE-59	1.94E-05	4.53E-05	0.00E+00	0.00E+00	1.43E-05	1.07E-04	0.00E+00	1.75E-05
CO-58	0.00E+00	3.95E-04	0.00E+00	0.00E+00	0.00E+00	5.45E-03	0.00E+00	9.11E-04
CO-60	0.00E+00	5.58E-04	0.00E+00	0.00E+00	0.00E+00	7.27E-03	0.00E+00	1.26E-03
NI-63	1.70E-01	1.20E-02	0.00E+00	0.00E+00	0.00E+00	1.91E-03	0.00E+00	5.77E-03
ZN-65	3.72E-04	1.29E-03	0.00E+00	8.28E-04	0.00E+00	5.48E-04	0.00E+00	6.03E-04
SR-89	6.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.27E-05	0.00E+00	1.75E-05
ZR-95	7.50E-09	2.37E-09	0.00E+00	3.48E-09	0.00E+00	5.47E-06	0.00E+00	1.63E-09
NB-95	3.00E-05	1.67E-05	0.00E+00	1.62E-05	0.00E+00	7.13E-02	0.00E+00	9.17E-06
NB-97	5.70E-09	1.41E-09	0.00E+00	1.65E-09	0.00E+00	3.38E-05	0.00E+00	5.16E-10
AG-110M	5.24E-09	4.96E-09	0.00E+00	9.46E-09	0.00E+00	1.39E-06	0.00E+00	3.02E-09

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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+05

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) =====								
Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
SB-124	2.93E-08	5.39E-10	6.63E-11	0.00E+00	2.56E-08	5.92E-07	0.00E+00	1.14E-08
SB-125	2.31E-06	2.53E-08	2.21E-09	0.00E+00	2.03E-06	1.80E-05	0.00E+00	5.41E-07
TE-125M	2.70E-03	9.74E-04	7.55E-04	0.00E+00	0.00E+00	7.97E-03	0.00E+00	3.61E-04
TE-132	2.12E-05	1.34E-05	1.41E-05	1.29E-04	0.00E+00	4.25E-04	0.00E+00	1.26E-05
I-132	1.25E-07	3.27E-07	1.10E-05	5.16E-07	0.00E+00	1.43E-07	0.00E+00	1.17E-07
CS-134	5.99E-04	1.41E-03	0.00E+00	4.48E-04	1.71E-04	1.75E-05	0.00E+00	6.55E-04
CS-137	7.30E-02	9.71E-02	0.00E+00	3.31E-02	1.28E-02	1.38E-03	0.00E+00	3.38E-02

CHILD

H-3	0.00E+00	5.37E-02	5.37E-02	5.37E-02	5.37E-02	5.37E-02	0.00E+00	5.37E-02
CR-51	0.00E+00	0.00E+00	6.49E-07	1.77E-07	1.19E-06	6.20E-05	0.00E+00	1.17E-06
MN-54	0.00E+00	7.10E-04	0.00E+00	1.99E-04	0.00E+00	5.96E-04	0.00E+00	1.89E-04
MN-56	0.00E+00	1.22E-07	0.00E+00	1.47E-07	0.00E+00	1.77E-05	0.00E+00	2.75E-08
FE-55	8.91E-04	4.72E-04	0.00E+00	0.00E+00	2.67E-04	8.75E-05	0.00E+00	1.46E-04
FE-59	2.36E-05	3.82E-05	0.00E+00	0.00E+00	1.11E-05	3.98E-05	0.00E+00	1.90E-05
CO-58	0.00E+00	3.18E-04	0.00E+00	0.00E+00	0.00E+00	1.86E-03	0.00E+00	9.74E-04
CO-60	0.00E+00	4.57E-04	0.00E+00	0.00E+00	0.00E+00	2.53E-03	0.00E+00	1.35E-03
NI-63	2.24E-01	1.20E-02	0.00E+00	0.00E+00	0.00E+00	8.08E-04	0.00E+00	7.62E-03
ZN-65	3.82E-04	1.02E-03	0.00E+00	6.41E-04	0.00E+00	1.79E-04	0.00E+00	6.33E-04
SR-89	8.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-05	0.00E+00	2.29E-05
ZR-95	1.02E-08	2.24E-09	0.00E+00	3.20E-09	0.00E+00	2.33E-06	0.00E+00	1.99E-09
NB-95	3.55E-05	1.38E-05	0.00E+00	1.30E-05	0.00E+00	2.55E-02	0.00E+00	9.86E-06
NB-97	7.23E-09	1.31E-09	0.00E+00	1.45E-09	0.00E+00	4.03E-04	0.00E+00	6.09E-10
AG-110M	6.90E-09	4.66E-09	0.00E+00	8.68E-09	0.00E+00	5.54E-07	0.00E+00	3.73E-09
SB-124	4.77E-08	6.18E-10	1.06E-10	0.00E+00	2.65E-08	2.99E-07	0.00E+00	1.67E-08
SB-125	3.79E-06	2.92E-08	3.51E-09	0.00E+00	2.11E-06	9.07E-06	0.00E+00	7.94E-07
TE-125M	3.47E-03	9.41E-04	9.75E-04	0.00E+00	0.00E+00	3.35E-03	0.00E+00	4.63E-04
TE-132	2.65E-05	1.17E-05	1.70E-05	1.09E-04	0.00E+00	1.18E-04	0.00E+00	1.41E-05
I-132	1.59E-07	2.92E-07	1.36E-05	4.47E-07	0.00E+00	3.44E-07	0.00E+00	1.34E-07
CS-134	7.23E-04	1.19E-03	0.00E+00	3.68E-04	1.32E-04	6.40E-06	0.00E+00	2.50E-04
CS-137	9.19E-02	8.80E-02	0.00E+00	2.87E-02	1.03E-02	5.51E-04	0.00E+00	1.30E-02

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	2.88E-09	6.29E-10	5.60E-09	1.29E-07	0.00E+00	4.41E-09
MN-54	0.00E+00	1.58E-06	0.00E+00	3.49E-07	0.00E+00	5.79E-07	0.00E+00	3.57E-07
MN-56	0.00E+00	3.56E-10	0.00E+00	3.06E-10	0.00E+00	3.24E-08	0.00E+00	6.14E-11
FE-55	5.11E-06	3.30E-06	0.00E+00	0.00E+00	1.61E-06	4.19E-07	0.00E+00	8.82E-07
FE-59	2.09E-07	3.66E-07	0.00E+00	0.00E+00	1.08E-07	1.75E-07	0.00E+00	1.44E-07
CO-58	0.00E+00	6.00E-06	0.00E+00	0.00E+00	0.00E+00	1.50E-05	0.00E+00	1.50E-05
CO-60	0.00E+00	8.80E-06	0.00E+00	0.00E+00	0.00E+00	2.09E-05	0.00E+00	2.08E-05



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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+05

=== PERMIT ORGAN DOSE BY AGE GROUP AND NUCLIDE (mrem) =====								
Agegroup	Bone	Liver	Thyroid	Kidney	Lung	GI-Lli	Skin	TB
-----	-----	-----	-----	-----	-----	-----	-----	-----
NI-63	1.25E-03	7.76E-05	0.00E+00	0.00E+00	0.00E+00	3.86E-06	0.00E+00	4.35E-05
ZN-65	1.23E-07	4.21E-07	0.00E+00	2.04E-07	0.00E+00	3.55E-07	0.00E+00	1.94E-07
SR-89	2.37E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-07	0.00E+00	6.79E-07
ZR-95	2.14E-09	5.21E-10	0.00E+00	5.62E-10	0.00E+00	2.60E-07	0.00E+00	3.70E-10
NB-95	1.06E-09	4.35E-10	0.00E+00	3.12E-10	0.00E+00	3.67E-07	0.00E+00	2.51E-10
NB-97	2.44E-13	5.20E-14	0.00E+00	4.06E-14	0.00E+00	1.64E-08	0.00E+00	1.87E-14
AG-110M	2.01E-09	1.46E-09	0.00E+00	2.09E-09	0.00E+00	7.59E-08	0.00E+00	9.69E-10
SB-124	2.53E-08	3.74E-10	6.72E-11	0.00E+00	1.59E-08	7.82E-08	0.00E+00	7.85E-09
SB-125	1.79E-06	1.73E-08	2.24E-09	0.00E+00	1.04E-06	2.39E-06	0.00E+00	3.69E-07
TE-125M	8.47E-06	2.83E-06	2.85E-06	0.00E+00	0.00E+00	4.03E-06	0.00E+00	1.14E-06
TE-132	6.50E-08	3.22E-08	4.75E-08	2.01E-07	0.00E+00	1.19E-07	0.00E+00	3.00E-08
I-132	1.00E-08	2.04E-08	9.54E-07	2.27E-08	0.00E+00	1.65E-08	0.00E+00	7.25E-09
CS-134	2.78E-07	5.19E-07	0.00E+00	1.34E-07	5.48E-08	1.41E-09	0.00E+00	5.24E-08
CS-137	3.51E-05	4.11E-05	0.00E+00	1.10E-05	4.46E-06	1.28E-07	0.00E+00	2.91E-06

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

Release ID.....: 1 All Liquid Releases  
 Period Start Date.....: 01/01/2020 00:00  
 Period End Date.....: 01/01/2021 00:00  
 Period Duration (mins): 5.270E+05  
 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	CHILD	BONE	3.22E-01	31-day	1.50E-01	2.15E+02
					Quarter	3.75E+00	8.60E+00
					Annual	7.50E+00	4.30E+00
Admin	Tot Body	ADULT	TBODY	1.35E-01	31-day	4.50E-02	3.01E+02
					Quarter	1.13E+00	1.20E+01
					Annual	2.25E+00	6.01E+00
T.Spec	Any Organ	CHILD	BONE	3.22E-01	31-day	2.00E-01	1.61E+02
					Quarter	5.00E+00	6.45E+00
					Annual	1.00E+01	3.22E+00

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

Nuclide	Percentage
NB-97	2.24E-06
SB-125	1.18E-03
SB-124	1.48E-05
FE-55	2.76E-01
FE-59	7.32E-03
NI-63	6.95E+01
ZN-65	1.18E-01
SR-89	2.48E-01
ZR-95	3.15E-06
NB-95	1.10E-02
AG-110M	2.14E-06
TE-125M	1.08E+00
TE-132	8.20E-03
I-132	4.93E-05
CS-134	2.24E-01
CS-137	2.85E+01

Limit Type	Organ Type	Age Group	Organ	Dose (mrem)	Limit Period	Limit (mrem)	Percent of Limit
T.Spec	Tot Body	ADULT	TBODY	1.35E-01	31-day	6.00E-02	2.26E+02
					Quarter	1.50E+00	9.02E+00
					Annual	3.00E+00	4.51E+00

Critical Pathway.....: 1 Fresh Water Fish - Sport (FFSP)

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

Release ID.....: 1 All Liquid Releases  
Period Start Date.....: 01/01/2020 00:00  
Period End Date.....: 01/01/2021 00:00  
Period Duration (mins): 5.270E+05

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

Nuclide	Percentage
-----	-----
SB-125	3.93E-04
SB-124	8.32E-06
NB-97	9.89E-07
H-3	4.75E+01
CR-51	7.85E-04
MN-54	1.30E-01
MN-56	1.67E-05
FE-55	7.69E-02
FE-59	1.25E-02
CO-58	6.59E-01
CO-60	9.10E-01
NI-63	4.07E+00
ZN-65	4.36E-01
SR-89	1.19E-02
ZR-95	1.18E-06
NB-95	6.59E-03
AG-110M	2.20E-06
TE-125M	2.46E-01
TE-132	9.00E-03
I-132	8.28E-05
CS-134	8.40E-01
CS-137	4.51E+01



**Byron Station  
ODCM Revision 17 Change Summary Matrix**

Technical Change – (Clarification to setpoint calculations for gaseous batch releases)- Determination A

Technical Change-(Clarification to setpoint calculation for Waste Gas Decay Tank Releases)-Determination B

Administrative Change- (Renumbering sections to account for Determination A and change to page numbers in the Table of Contents due to additional page in ODCM)- Determination C

<b>Item No.</b>	<b>(old) Rev. page No.</b>	<b>(new) Rev. page No.</b>	<b>Determination Identifier</b>	<b>Description of Change</b>
1.	56 of 188 Section 2.6.4	56 of 189 Section 2.6.4	A	<ul style="list-style-type: none"> <li>Added Section 2- “For gaseous batch releases default rad monitor alert and alarm setpoints are used, which are calculated based on the instantaneous offsite dose limits set forth by 10CFR20 and the standard isotopic mix (ODCM Table 2-3), and are set at a lower fraction of the limit. The default setpoints are compared to calculated setpoints, which are determined by multiplying the noble gas activity for each release by 1.25. If the calculated setpoints are less than the default setpoints, the defaults are used in order to avoid changing setpoints for each release.”</li> </ul>
2.	55 of 188 Section 2.6.3	55 of 189 Section 2.6.3	B	<ul style="list-style-type: none"> <li>Added to section 1 “The setpoints are established at 1.25 times the analyzed noble gas activity during release and compared to the default set points, which are calculated based on the instantaneous off site dose limits set forth from 10CFR20 and the standard isotopic mix (ODCM Table 2-3), and are set at the lower fraction of the limit. The default setpoints are used to avoid having to change the set points for each Waste Gas Decay Tank release.”</li> </ul>
3.	56 of 188 Section 2.6.4	56 of 189 Section 2.6.4	C	<ul style="list-style-type: none"> <li>Change Section numbers from 2 to 3.</li> </ul>
4.	56 of 188 Section 2.6.4	56 of 189 Section 2.6.4	C	<ul style="list-style-type: none"> <li>Change Section numbers from 3 to 4,</li> </ul>
5.	56 of 188 Section 2.6.4	56 of 189 Section 2.6.4	C	<ul style="list-style-type: none"> <li>Change Section numbers from 4 to 5.</li> </ul>
6.	Table of Contents 2-5	Table of Contents 2-5	C	<ul style="list-style-type: none"> <li>Table of Contents was changed due adding a page to the ODCM by addition of Determination A and B.</li> </ul>

**Byron Station**  
**ODCM Revision 17 Change Summary Matrix**

Technical Change – (Clarification to setpoint calculations for gaseous batch releases)- Determination A

Technical Change-(Clarification to setpoint calculation for Waste Gas Decay Tank Releases)-Determination B

Administrative Change- (Renumbering sections to account for Determination A and change to page numbers in the Table of Contents due to additional page in ODCM)- Determination C