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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Carolinas, LLC
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Annual Radioactive Effluent Release Report

Pursuant to the requirements of Technical Specification Reporting Requirement 5.6.3 and Section 16.11.17 of the McGuire Selected Licensee Commitments (SLC) Manual, attached is the Annual Radioactive Effluent Release Report. Also included in this report is a CD-Rom of the Offsite Dose Calculation Manual (Revision 53) and the 2011 Process Control Program (PCP) manual.

The following Attachments form the contents of the report:

Attachment 1 - Summary of Gaseous and Liquid Effluents Report
Attachment 2 - Supplemental Information
Attachment 3 - Solid Waste Disposal Report
Attachment 4 - Meteorological Data
Attachment 5 - Unplanned Offsite Releases
Attachment 6 - Assessment of Radiation Dose from Radioactive Effluents to Members of the Public (Includes Fuel Cycle Dose Calculation Results)
Attachment 7 - Radioactive Waste Systems
Attachment 8 - Inoperable Monitoring Equipment
Attachment 9 - Groundwater Protection Program

Questions concerning this report should be directed to Ken Ashe, McGuire Regulatory Compliance at (980) 875-4535.

Regis T. Repko

Attachments

AOD 9
IE48
NRR

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Attachment 1

Summary of Gaseous and Liquid Effluents Report

McGUIRE NUCLEAR STATION

EFFLUENT RELEASE DATA

(January 1, 2011 through December 31, 2011)

This attachment includes a summary of the quantities of radioactive liquid and gaseous effluents as outlined in Regulatory Guide 1.21, Rev. 1, Appendix B. Radioactive liquid and gaseous wastes are sampled and analyzed per the requirements in Selected Licensee Commitment (SLC) Table 16.11.1-1, "Radioactive Liquid Waste Sampling and Analysis Program", and SLC Table 16.11.6-1, "Radioactive Gaseous Waste Sampling and Analysis Program". Included in the gaseous effluent releases is an estimate of Carbon-14 radioactivity released in 2011 (Ref. *"Carbon-14 Supplemental Information"*, contained in the ARERR for further information).

TABLE 1A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
A. Fission and Activation Gases						
1. Total Release	Ci	6.10E-01	1.01E+00	5.84E-01	4.90E-01	2.69E+00
2. Avg. Release Rate	µCi/sec	7.85E-02	1.28E-01	7.35E-02	6.17E-02	8.53E-02
B. Iodine-131						
1. Total Release	Ci	5.97E-06	1.81E-06	2.78E-06	0.00E+00	1.06E-05
2. Avg. Release Rate	µCi/sec	7.68E-07	2.30E-07	3.50E-07	0.00E+00	3.35E-07
C. Particulates Half Life >= 8 days						
1. Total Release	Ci	0.00E+00	0.00E+00	2.78E-06	4.28E-06	7.06E-06
2. Avg. Release Rate	µCi/sec	0.00E+00	0.00E+00	3.50E-07	5.39E-07	2.24E-07
D. Tritium						
1. Total Release	Ci	2.61E+01	3.14E+01	3.45E+01	3.81E+01	1.30E+02
2. Avg. Release Rate	µCi/sec	3.35E+00	3.99E+00	4.34E+00	4.79E+00	4.12E+00
E. Carbon-14						
1. Total Release	Ci	3.98E+00	5.21E+00	4.96E+00	5.01E+00	1.92E+01
2. Avg. Release Rate	µCi/sec	5.12E-01	6.62E-01	6.24E-01	6.31E-01	6.08E-01
F. Gross Alpha Radioactivity						
1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. Avg. Release Rate	µCi/sec	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE 1B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS EFFLUENTS - ELEVATED RELEASES - CONTINUOUS MODE

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
1. Fission and Activation Gases						
** No Nuclide Activities **		.....	.....	.....	.....	.....
2. Iodines						
** No Nuclide Activities **		.....	.....	.....	.....	.....
3. Particulates Half Life >= 8 days						
** No Nuclide Activities **		.....	.....	.....	.....	.....
4. Tritium						
** No Nuclide Activities **		.....	.....	.....	.....	.....
5. Carbon-14						
** No Nuclide Activities **		.....	.....	.....	.....	.....
6. Gross Alpha Radioactivity						
** No Nuclide Activities **		.....	.....	.....	.....	.....

TABLE 1B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS EFFLUENTS - ELEVATED RELEASES - BATCH MODE

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
1. Fission and Activation Gases						
** No Nuclide Activities **		.....	.....	.....	.....	.....
2. Iodines						
** No Nuclide Activities **		.....	.....	.....	.....	.....
3. Particulates Half Life >= 8 days						
** No Nuclide Activities **		.....	.....	.....	.....	.....
4. Tritium						
** No Nuclide Activities **		.....	.....	.....	.....	.....
5. Carbon-14						
** No Nuclide Activities **		.....	.....	.....	.....	.....
6. Gross Alpha Radioactivity						
** No Nuclide Activities **		.....	.....	.....	.....	.....

TABLE 1C

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS EFFLUENTS - GROUND RELEASES - CONTINUOUS MODE

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
1. Fission and Activation Gases						
** No Nuclide Activities **		.....	.....	.....	.....	.....
2. Iodines						
I-131	Ci	5.97E-06	1.81E-06	2.78E-06	0.00E+00	1.06E-05
Totals for Period...	Ci	5.97E-06	1.81E-06	2.78E-06	0.00E+00	1.06E-05
3. Particulates Half Life >= 8 days						
BE-7	Ci	0.00E+00	0.00E+00	0.00E+00	2.90E-06	2.90E-06
CO-58	Ci	0.00E+00	0.00E+00	2.78E-06	1.38E-06	4.16E-06
Totals for Period...	Ci	0.00E+00	0.00E+00	2.78E-06	4.28E-06	7.06E-06
4. Tritium						
H-3	Ci	2.54E+01	3.11E+01	3.38E+01	3.65E+01	1.27E+02
5. Carbon-14						
C-14	Ci	1.19E+00	1.56E+00	1.49E+00	1.50E+00	5.75E+00
6. Gross Alpha Radioactivity						
** No Nuclide Activities **		.....	.....	.....	.....	.....

TABLE 1C

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS EFFLUENTS - GROUND RELEASES - BATCH MODE

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
1. Fission and Activation Gases						
AR-41	Ci	5.81E-01	5.70E-01	5.66E-01	4.75E-01	2.19E+00
KR-85	Ci	9.37E-06	0.00E+00	0.00E+00	2.52E-07	9.62E-06
KR-85M	Ci	0.00E+00	2.53E-03	0.00E+00	0.00E+00	2.53E-03
KR-87	Ci	0.00E+00	6.23E-05	0.00E+00	0.00E+00	6.23E-05
KR-88	Ci	0.00E+00	3.23E-03	0.00E+00	0.00E+00	3.23E-03
XE-131M	Ci	3.69E-06	0.00E+00	0.00E+00	1.41E-14	3.69E-06
XE-133	Ci	2.61E-02	3.33E-01	1.66E-02	1.42E-02	3.90E-01
XE-133M	Ci	7.45E-04	8.90E-03	0.00E+00	0.00E+00	9.65E-03
XE-135	Ci	2.64E-03	8.81E-02	2.12E-03	4.84E-04	9.33E-02
Totals for Period...	Ci	6.10E-01	1.01E+00	5.84E-01	4.90E-01	2.69E+00
2. Iodines						
** No Nuclide Activities **		.....	.....	.....	.....	.....
3. Particulates Half Life >= 8 days						
** No Nuclide Activities **		.....	.....	.....	.....	.....
4. Tritium						
H-3	Ci	6.23E-01	2.27E-01	6.85E-01	1.59E+00	3.13E+00
5. Carbon-14						
C-14	Ci	2.79E+00	3.65E+00	3.47E+00	3.51E+00	1.34E+01
6. Gross Alpha Radioactivity						
** No Nuclide Activities **		.....	.....	.....	.....	.....

TABLE 2A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
A. Fission and Activation Products						
1. Total Release	Ci	2.25E-02	2.33E-02	2.32E-02	2.10E-02	9.00E-02
2. Average Diluted Concentration						
a. Continuous Releases	µCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
b. Batch Releases	µCi/ml	3.06E-11	2.44E-11	2.45E-11	2.21E-11	2.51E-11
B. Tritium						
1. Total Release	Ci	8.71E+02	1.85E+02	2.57E+02	1.99E+02	1.51E+03
2. Average Diluted Concentration						
a. Continuous Releases	µCi/ml	4.03E-08	8.25E-09	4.08E-08	7.94E-09	2.56E-08
b. Batch Releases	µCi/ml	1.18E-06	1.93E-07	2.70E-07	2.10E-07	4.20E-07
C. Dissolved and Entrained Gases						
1. Total Release	Ci	3.43E-05	1.73E-05	6.14E-06	2.04E-06	5.98E-05
2. Average Diluted Concentration						
a. Continuous Releases	µCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
b. Batch Releases	µCi/ml	4.66E-14	1.81E-14	6.48E-15	2.15E-15	1.67E-14
D. Gross Alpha Radioactivity						
1. Total Release	Ci	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2. Average Diluted Concentration						
a. Continuous Releases	µCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
b. Batch Releases	µCi/ml	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E. Volume of Liquid Waste						
1. Continuous Releases	liters	2.84E+08	9.17E+07	9.63E+07	9.25E+07	5.64E+08
2. Batch Releases	liters	2.33E+06	8.78E+05	1.40E+06	1.18E+06	5.80E+06
F. Volume of Dilution Water						
1. Continuous Releases	liters	4.76E+10	3.23E+10	2.61E+10	3.00E+10	1.36E+11
2. Batch Releases	liters	7.36E+11	9.57E+11	9.47E+11	9.49E+11	3.59E+12

TABLE 2B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID EFFLUENTS - CONTINUOUS MODE

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
1. Fission and Activation Products						
** No Nuclide Activities **		.....	.....	.....	.....	.....
2. Tritium						
H-3	Ci	1.93E+00	2.67E-01	1.07E+00	2.39E-01	3.50E+00
3. Dissolved and Entrained Gases						
** No Nuclide Activities **		.....	.....	.....	.....	.....
4. Gross Alpha Radioactivity						
** No Nuclide Activities **		.....	.....	.....	.....	.....

TABLE 2B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID EFFLUENTS - BATCH MODE

McGuire Nuclear Station Units 1 & 2

REPORT FOR 2011	Unit	QTR 1	QTR 2	QTR 3	QTR 4	YEAR
1. Fission and Activation Products						
AG-108M	Ci	7.82E-06	3.61E-05	4.63E-05	9.26E-06	9.95E-05
AG-110M	Ci	2.85E-04	4.45E-05	1.08E-04	3.60E-05	4.73E-04
BE-7	Ci	1.50E-04	2.98E-04	5.45E-04	6.46E-05	1.06E-03
CD-115	Ci	0.00E+00	0.00E+00	0.00E+00	5.10E-06	5.10E-06
CO-57	Ci	1.06E-04	6.96E-05	8.10E-05	8.65E-06	2.66E-04
CO-58	Ci	3.85E-03	4.19E-03	2.10E-03	4.34E-03	1.45E-02
CO-60	Ci	1.10E-02	7.51E-03	1.40E-02	5.30E-03	3.78E-02
CR-51	Ci	2.57E-03	6.40E-03	1.59E-03	7.74E-03	1.83E-02
CS-134	Ci	5.30E-05	0.00E+00	1.57E-05	0.00E+00	6.87E-05
CS-137	Ci	1.17E-03	3.35E-04	4.91E-05	1.05E-05	1.56E-03
FE-59	Ci	7.33E-05	3.22E-04	8.39E-05	1.59E-04	6.38E-04
I-131	Ci	0.00E+00	0.00E+00	2.56E-06	0.00E+00	2.56E-06
K-40	Ci	1.01E-05	0.00E+00	0.00E+00	0.00E+00	1.01E-05
LA-140	Ci	0.00E+00	0.00E+00	1.91E-06	0.00E+00	1.91E-06
MN-54	Ci	1.20E-03	8.34E-04	1.26E-03	4.15E-04	3.72E-03
NB-95	Ci	3.72E-04	5.03E-04	3.34E-04	9.82E-04	2.19E-03
NB-97	Ci	3.78E-05	6.02E-05	8.44E-05	1.33E-05	1.96E-04
SB-122	Ci	0.00E+00	0.00E+00	7.72E-06	0.00E+00	7.72E-06
SB-124	Ci	4.18E-05	5.04E-04	1.29E-04	2.75E-04	9.50E-04
SB-125	Ci	1.31E-03	1.86E-03	2.47E-03	1.05E-03	6.68E-03
SN-113	Ci	7.01E-05	0.00E+00	0.00E+00	5.66E-06	7.57E-05
SR-90	Ci	0.00E+00	0.00E+00	7.94E-05	0.00E+00	7.94E-05
SR-92	Ci	3.78E-06	1.57E-05	2.28E-06	0.00E+00	2.18E-05
TE-123	Ci	0.00E+00	0.00E+00	9.16E-06	1.66E-05	2.58E-05
ZN-65	Ci	8.07E-05	1.12E-04	1.57E-04	2.25E-05	3.72E-04
ZR-95	Ci	8.80E-05	2.34E-04	3.45E-05	5.41E-04	8.98E-04
ZR-97	Ci	1.78E-05	3.03E-06	0.00E+00	0.00E+00	2.08E-05
		--------	--------	--------	--------	--------
Totals for Period...	Ci	2.25E-02	2.33E-02	2.32E-02	2.10E-02	9.00E-02
2. Tritium						
H-3	Ci	8.69E+02	1.84E+02	2.56E+02	1.99E+02	1.51E+03
3. Dissolved and Entrained Gases						
AR-41	Ci	0.00E+00	5.06E-06	0.00E+00	0.00E+00	5.06E-06
XE-133	Ci	1.70E-05	3.66E-06	6.14E-06	0.00E+00	2.68E-05
XE-135	Ci	1.73E-05	8.63E-06	0.00E+00	0.00E+00	2.60E-05
XE-135M	Ci	0.00E+00	0.00E+00	0.00E+00	2.04E-06	2.04E-06
		--------	--------	--------	--------	--------
Totals for Period...	Ci	3.43E-05	1.73E-05	6.14E-06	2.04E-06	5.98E-05
4. Gross Alpha Radioactivity						
** No Nuclide Activities **		.....	.....	.....	.....	.....

Attachment 2

Supplemental Information

McGUIRE NUCLEAR STATION

SUPPLEMENTAL INFORMATION

(January 1, 2011 through December 31, 2011)

This attachment includes:

(1) Carbon-14 Supplemental Information
(2) Regulatory Guide 1.21, Revision 1, Supplemental Information
(3) Overall Error Estimate for Liquid and Gaseous Effluent Release Data

McGuire 2011 ARERR - Carbon-14 Supplemental Information

Carbon-14 (C-14), with a half-life of 5730 years, is a naturally occurring isotope of carbon produced by cosmic ray interactions in the atmosphere. Nuclear weapons testing in the 1950s and 1960s significantly increased the amount of C-14 in the atmosphere. C-14 is also produced in commercial nuclear reactors, but the amounts produced are much less than those produced naturally or from weapons testing.

In Regulatory Guide 1.21, Revision 2, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste", the NRC recommends U.S. nuclear power plants evaluate whether C-14 is a "principal radionuclide", and if so, report the amount of C-14 released. At McGuire, improvements over the years in effluent management practices and fuel performance have resulted in a decrease in gaseous radionuclide (non-C-14) concentrations, and a change in the distribution of gaseous radionuclides released to the environment. As a result, C-14 has become a "principal radionuclide" for the gaseous effluent pathway at McGuire, as defined in Regulatory Guide 1.21, Rev. 2. McGuire's 2011 Annual Radioactive Effluent Release Report (ARERR) contains estimates of C-14 radioactivity released in 2011, and estimates of public dose resulting from the C-14 effluent.

Because the dose contribution of C-14 from liquid radioactive waste is much less than that contributed by gaseous radioactive waste, evaluation of C-14 in liquid radioactive waste at McGuire is not required (Ref. Reg. Guide 1.21, Rev. 2). The quantity of gaseous C-14 released to the environment can be estimated by use of a C-14 source term scaling factor based on power generation (Ref. Reg. Guide 1.21, Rev. 2). Many documents provide information related to the magnitude of C-14 in typical effluents from commercial nuclear power plants. Those documents suggest that nominal annual releases of C-14 in gaseous effluents are approximately 5 to 7.3 curies from PWRs (Ref. Reg. Guide 1.21, Rev. 2). A more recent study recommends a higher C-14 gaseous source term scaling factor of approximately 9.0 to 9.8 Ci/GWe-yr for a PWR (Westinghouse) (Ref. EPRI 1021106). For the 2011 McGuire ARERR a source term scaling factor of 9.4 Ci/GWe-yr is assumed. Using a source term scaling factor of 9.4 Ci/GWe-yr and actual electric generation (MWe-hrs) from McGuire in 2011 results in a site total C-14 gaseous release estimate to the environment of ~20 Curies. 70% of the C-14 gaseous effluent is assumed to be from batch releases (e.g. WGDTs), and 30% of C-14 gaseous effluent is assumed to be from continuous releases through the unit vents (ref. IAEA Technical Reports Series no. 421, "Management of Waste Containing Tritium and Carbon-14", 2004).

C-14 releases in PWRs occur primarily as a mix of organic carbon and carbon dioxide released from the waste gas system. Since the PWR operates with a reducing chemistry, most, if not all, of the C-14 species initially produced are organic (e.g., methane). As a general rule, C-14 in the primary coolant is essentially all organic with a large fraction as a gaseous species. Any time the RCS liquid or gas is exposed to an oxidizing environment (e.g. during shutdown or refueling), a slow transformation from an organic to an inorganic chemical form can occur. Various studies documenting measured C-14 releases from PWRs suggest a range of 70% to 95% organic with an average of 80% organic with the remainder being CO_2 (Ref. EPRI TR-105715). For the McGuire 2011 ARERR a value of 80% organic C-14 is assumed.

Public dose estimates from airborne C-14 are performed using dose models in NUREG-0133 and Regulatory Guide 1.109. The dose models and assumptions used are documented in the 2011 McGuire ODCM. The estimated C-14 dose impact on the maximum organ dose from airborne effluents released from McGuire in 2011 is well below the 10CFR50, Appendix I, ALARA design objective (i.e., 15 mrem/yr per unit).

McGUIRE NUCLEAR STATION

2011 EFFLUENT AND WASTE DISPOSAL SUPPLEMENTAL INFORMATION

I. REGULATORY LIMITS - PER UNIT

A. NOBLE GASES - AIR DOSE
1. CALENDAR QUARTER - GAMMA DOSE = 5 MRAD
2. CALENDAR QUARTER - BETA DOSE = 10 MRAD
3. CALENDAR YEAR - GAMMA DOSE = 10 MRAD
4. CALENDAR YEAR - BETA DOSE = 20 MRAD

B. LIQUID EFFLUENTS - DOSE
1. CALENDAR QUARTER - TOTAL BODY DOSE = 1.5 MREM
2. CALENDAR QUARTER - ORGAN DOSE = 5 MREM
3. CALENDAR YEAR - TOTAL BODY DOSE = 3 MREM
4. CALENDAR YEAR - ORGAN DOSE = 10 MREM

C. GASEOUS EFFLUENTS - IODINE - 131 AND 133, TRITIUM, PARTICULATES W/T 1/2 > 8 DAYS - ORGAN DOSE
1. CALENDAR QUARTER = 7.5 MREM
2. CALENDAR YEAR = 15 MREM

II. MAXIMUM PERMISSIBLE EFFLUENT CONCENTRATIONS

A. GASEOUS EFFLUENTS - INFORMATION FOUND IN OFFSITE DOSE CALCULATION MANUAL
B. LIQUID EFFLUENTS - INFORMATION FOUND IN 10CFR20, APPENDIX B, TABLE 2, COLUMN 2

III. AVERAGE ENERGY - NOT APPLICABLE

IV. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

ANALYSES OF SPECIFIC RADIONUCLIDES IN SELECTED OR COMPOSITED SAMPLES AS DESCRIBED IN THE SELECTED LICENSEE COMMITMENTS ARE USED TO DETERMINE THE RADIONUCLIDE COMPOSITION OF THE EFFLUENT. A SUMMARY DESCRIPTION OF THE METHOD USED FOR ESTIMATING OVERALL ERRORS ASSOCIATED WITH RADIOACTIVITY MEASUREMENTS IS PROVIDED AS PART OF THE "SUPPLEMENTAL INFORMATION" ATTACHMENT.

V. BATCH RELEASES

A. LIQUID EFFLUENT
1. 2.96E+02 = TOTAL NUMBER OF BATCH RELEASES
2. 2.15E+04 = TOTAL TIME (MIN.) FOR BATCH RELEASES.
3. 1.50E+02 = MAXIMUM TIME (MIN.) FOR A BATCH RELEASE.
4. 7.25E+01 = AVERAGE TIME (MIN.) FOR A BATCH RELEASE.
5. 5.00E+00 = MINIMUM TIME (MIN.) FOR A BATCH RELEASE.
6. 1.80E+06 = AVERAGE DILUTION WATER FLOW DURING RELEASES (GPM).

B. GASEOUS EFFLUENT
1. 4.20E+01 = TOTAL NUMBER OF BATCH RELEASES.
2. 1.11E+06 = TOTAL TIME (MIN.) FOR BATCH RELEASES.
3. 5.32E+04 = MAXIMUM TIME (MIN.) FOR A BATCH RELEASE.
4. 2.65E+04 = AVERAGE TIME (MIN.) FOR A BATCH RELEASE.
5. 1.00E+00 = MINIMUM TIME (MIN.) FOR A BATCH RELEASE.

VI. ABNORMAL RELEASES

(SEE "UNPLANNED OFFSITE RELEASES" ATTACHMENT)

McGUIRE NUCLEAR STATION

Overall Estimate of Error for Effluent Radioactivity Release Reported

The estimated percentage of overall error for both Liquid and Gaseous effluent release data at McGuire Nuclear Station has been determined to be ± 30.3%. This value was derived by taking the square root of the sum of the squares of the following discrete individual estimates of error:

(1) Flow Rate Determining Devices = ± 20%

(2) Counting Statistical Error = ± 20%

(3) Calibration Error = ± 10%

(4) Calibration Source Error = ± 2.5%

(5) Sample Preparation Error = ± 3%

Attachment 3

Solid Waste Disposal Report

REPORT PERIOD
JANUARY - DECEMBER 2011

McGUIRE NUCLEAR STATION
SOLID RADIOACTIVE WASTE SHIPPED TO DISPOSAL FACILITIES

TYPES OF WASTES SHIPPED Waste from Liquid Systems	Number of Shipments	Number of Containers	Container Type	Disposal Volume ft^3	m^3	Waste Class	Total Curies
(A) dewatered powdex resin (brokered)	none						
(B) dewatered powdex resin	none						
(C) dewatered bead resin (brokered)	none						
(D) dewatered bead resin	none						
(E) dewatered radwaste system resin	none						
(F) dewatered primary bead resin	none						
(G) dewatered mechanical filter media	none						
(H) dewatered mechanical filter media (brokered)	4	4	DBP	291.2	8.25	A/U	1.43E+00
(I) solidified waste	none						
Dry Solid Waste							
(A) dry active waste (compacted)	none						
dry active waste (non-compacted)	none						
dry active waste (brokered/compacted)	none						
dry active waste (brokered/non-compacted)	25	77	DBP	4529.7286	128.27	A/U	4.080E-01
(B) sealed sources/smoke detectors	none						
(C) sealed sources	none						
(D) irradiated components	none						
Totals	**29**	**81**		**4820.9286**	**136.52**		**1.840E+00**

3/1/2012

MCGUIRE NUCLEAR SITE
SUMMARY OF MAJOR RADIONUCLIDE COMPOSITION
2011

Type of waste	Nuclide	% Abundance
1. Waste from liquid systems:		
A. Dewatered Powdex Resin (brokered)	No shipments in 2011	
B. Dewatered Powdex Resin	No shipments in 2011	
C. Dewatered Bead Resin (brokered)	No shipments in 2011	
D. Dewatered Bead Resin	No shipments in 2011	
E. Dewatered Radwaste System Resin (brokered)	No shipments in 2011	
F. Dewatered Primary Bead Resin (brokered)	No Shipments in 2011	
G. Dewatered Mechanical Filter Media	No shipments in 2011	
H. Dewatered Mechanical Filter Media (brokered)		

2011 - 0023	Nuclide	%Abundance
	Mn-54	**3.88**
	Co-57	**.38**
	Co-58	**1.54**
	Co-60	**29.64**
	Cs-137	**.35**
	Fe-55	**46.52**
	Ni-63	**16.41**
	Zr-95	**.03**
	Ce-144	**.67**
	Sr-90	**.09**
	Sn-113	**.03**
	Zn-65	**.44**

2011 - 0024	Nuclide	%Abundance
	Mn-54	3.11
	Co-57	.18
	Co-58	.10
	Co-60	29.03
	Cs-137	1.43
	Cs-134	.27
	Fe-55	46.92
	Ni-63	17.17
	C-14	.52
	Ce-144	.18
	Sb-125	.46
	Sr-90	.03
	Sn-113	.01
	Zn-65	.18
	Tc-99	.41

2011 - 0028	Nuclide	%Abundance
	Mn-54	2.03
	Co-57	.09
	Co-60	29.44
	Cs-137	2.04
	Cs-134	.33
	Fe-55	44.81
	Ni-63	19.06
	C-14	.83
	Ce-144	.04
	Sb-125	.61
	Zn-65	.08
	Tc-99	.64

2011 - 0030	Nuclide	%Abundance
	Be-7	.18
	Cr-51	3.51
	Mn-54	3.12
	Co-57	.27
	Co-58	25.97
	Co-60	19.86
	Cs-137	.11
	Fe-55	20.18
	Fe-59	.22
	Ni-63	9.10
	H-3	6.50
	C-14	.49
	Zr-95	4.14
	Ce-144	.29
	Sb-124	.32
	Sb-125	1.94
	Sr-89	.52
	Sr-90	.02
	Sn-113	.29
	Ag-108M	.21
	Zn-65	.57
	Hf-181	.01
	Nb-95	2.18

I. Solidified Waste — No shipments in 2011

2. Dry Solid Waste:

A. Dry Active Waste (compacted) — Compaction no longer performed on-site.

Dry Active Waste (non-compacted) — No shipments in 2011

Dry Active Waste (brokered/compacted) — No shipments in 2011

Dry Active Waste (brokered/non-compacted)

2011 - 0001

Nuclide	%Abundance
Cr-51	25.64
Mn-54	2.38
Co-57	.10
Co-58	21.17
Co-60	7.92
Cs-137	.02
Fe-55	26.91
Fe-59	1.82
Ni-63	1.63
H-3	.71
Zr-95	4.41
Ce-144	.06
Sb-124	.10
Sb-125	.30
Ru-103	.03
Sn-113	.22
Zn-65	.57
Hf-181	.04
Nb-95	5.98

2011 - 0002	Nuclide	%Abundance
	Cr-51	24.42
	Mn-54	2.48
	Co-57	.10
	Co-58	20.13
	Co-60	8.59
	Cs-137	.02
	Fe-55	28.92
	Fe-59	1.70
	Ni-63	1.77
	H-3	.77
	Zr-95	4.18
	Ce-144	.06
	Sb-124	.10
	Sb-125	.32
	Ru-103	.03
	Sn-113	.21
	Zn-65	.59
	Hf-181	.04
	Nb-95	5.58

2011 - 0003	Nuclide	%Abundance
	Co-60	7.54
	Cs-137	1.56
	Cs-134	.43
	Fe-55	25.20
	Ni-63	1.57
	H-3	57.54
	Ce-144	4.21
	Sb-125	1.97

2011 - 0004	Nuclide	%Abundance
	Cr-51	22.37
	Mn-54	2.59
	Co-57	.10
	Co-58	17.07
	Co-60	10.18
	Cs-137	.03
	Fe-55	33.30
	Fe-59	1.46
	Ni-63	2.15
	H-3	.93
	Zr-95	3.54
	Ce-144	.06
	Sb-124	.08
	Sb-125	.38
	Ru-103	.02
	Sn-113	.19
	Zn-65	.59
	Hf-181	.03
	Nb-95	4.93

2011 - 0005	Nuclide	%Abundance
	Cr-51	24.62
	Mn-54	2.44
	Co-57	.10
	Co-58	21.25
	Co-60	8.18
	Cs-137	.02
	Fe-55	27.60
	Fe-59	1.80
	Ni-63	1.67
	H-3	.73
	Zr-95	4.42
	Ce-144	.06
	Sb-124	.10
	Sb-125	.31
	Ru-103	.03
	Sn-113	.22
	Zn-65	.58
	Hf-181	.04
	Nb-95	5.83

2011 - 0006	Nuclide	%Abundance
	Cr-51	30.72
	Mn-54	1.93
	Co-57	.07
	Co-58	22.97
	Co-60	10.44
	Cs-137	.12
	Fe-55	5.50
	Fe-59	.67
	Ni-63	.77
	Zr-95	10.00
	Ce-144	.46
	Sb-124	.58
	Sb-125	.85
	Sn-113	.40
	Zn-65	.38
	Nb-95	14.13

2011 - 0007	Nuclide	%Abundance
	Cr-51	32.40
	Mn-54	1.82
	Co-57	.07
	Co-58	22.47
	Co-60	9.75
	Cs-137	.11
	Fe-55	5.13
	Fe-59	.67
	Ni-63	.72
	Zr-95	9.84
	Ce-144	.44
	Sb-124	.57
	Sb-125	.80
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.48

2011 - 0008	Nuclide	%Abundance
	Cr-51	32.24
	Mn-54	1.84
	Co-57	.07
	Co-58	22.49
	Co-60	9.78
	Cs-137	.11
	Fe-55	5.16
	Fe-59	.67
	Ni-63	.72
	Zr-95	9.85
	Ce-144	.44
	Sb-124	.57
	Sb-125	.80
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.52

2011 - 0009	Nuclide	%Abundance
	Cr-51	32.11
	Mn-54	1.84
	Co-57	.07
	Co-58	22.48
	Co-60	9.87
	Cs-137	.11
	Fe-55	5.20
	Fe-59	.67
	Ni-63	.73
	Zr-95	9.89
	Ce-144	.44
	Sb-124	.57
	Sb-125	.81
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.47

2011 - 0010	Nuclide	%Abundance
	Cr-51	31.91
	Mn-54	1.85
	Co-57	.07
	Co-58	22.60
	Co-60	9.92
	Cs-137	.11
	Fe-55	5.22
	Fe-59	.67
	Ni-63	.73
	Zr-95	9.90
	Ce-144	.44
	Sb-124	.57
	Sb-125	.81
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.44

2011 - 0011	Nuclide	%Abundance
	Cr-51	32.61
	Mn-54	1.80
	Co-57	.07
	Co-58	22.40
	Co-60	9.63
	Cs-137	.11
	Fe-55	5.09
	Fe-59	.67
	Ni-63	.71
	Zr-95	9.81
	Ce-144	.43
	Sb-124	.57
	Sb-125	.79
	Sn-113	.38
	Zn-65	.36
	Nb-95	14.57

2011 - 0012	Nuclide	%Abundance
	Cr-51	32.14
	Mn-54	1.84
	Co-57	.07
	Co-58	22.53
	Co-60	9.82
	Cs-137	.11
	Fe-55	5.19
	Fe-59	.67
	Ni-63	.72
	Zr-95	9.89
	Ce-144	.44
	Sb-124	.57
	Sb-125	.81
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.44

2011 - 0013	Nuclide	%Abundance
	Cr-51	32.25
	Mn-54	1.83
	Co-57	.07
	Co-58	22.51
	Co-60	9.79
	Cs-137	.11
	Fe-55	5.16
	Fe-59	.67
	Ni-63	.72
	Zr-95	9.85
	Ce-144	.44
	Sb-124	.57
	Sb-125	.80
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.48

2011 - 0017	Nuclide	%Abundance
	Cr-51	27.31
	Mn-54	2.09
	Co-57	.08
	Co-58	25.24
	Co-60	11.31
	Cs-137	.16
	Fe-55	6.53
	Fe-59	.68
	Ni-63	1.13
	H-3	.20
	C-14	.02
	Zr-95	9.74
	Ce-144	.48
	Sb-124	.54
	Sb-125	.87
	Sn-113	.41
	Zn-65	.40
	Nb-95	12.80

2011 - 0019	Nuclide	%Abundance
	Cr-51	27.80
	Mn-54	2.16
	Co-57	.08
	Co-58	23.67
	Co-60	11.88
	Cs-137	.14
	Fe-55	6.22
	Fe-59	.65
	Ni-63	.88
	Zr-95	10.25
	Ce-144	.51
	Sb-124	.59
	Sb-125	.97
	Sn-113	.43
	Zn-65	.42
	Nb-95	13.35

2011 - 0020	Nuclide	%Abundance
	Cr-51	27.75
	Mn-54	2.15
	Co-57	.08
	Co-58	23.82
	Co-60	11.79
	Cs-137	.13
	Fe-55	6.18
	Fe-59	.65
	Ni-63	.87
	Zr-95	10.29
	Ce-144	.51
	Sb-124	.59
	Sb-125	.96
	Sn-113	.43
	Zn-65	.42
	Nb-95	13.38

2011 - 0022	Nuclide	%Abundance
	Cr-51	27.44
	Mn-54	2.18
	Co-57	.08
	Co-58	23.81
	Co-60	12.04
	Cs-137	.14
	Fe-55	6.29
	Fe-59	.65
	Ni-63	.89
	Zr-95	10.29
	Ce-144	.52
	Sb-124	.59
	Sb-125	.98
	Sn-113	.44
	Zn-65	.42
	Nb-95	13.25

2011 - 0025	Nuclide	%Abundance
	Cr-51	23.68
	Mn-54	2.47
	Co-57	.09
	Co-58	24.73
	Co-60	13.91
	Cs-137	.16
	Fe-55	7.28
	Fe-59	.63
	Ni-63	1.03
	Zr-95	10.53
	Ce-144	.59
	Sb-124	.60
	Sb-125	1.13
	Sn-113	.47
	Zn-65	.48
	Nb-95	12.22

2011 - 0026	Nuclide	%Abundance
	Cr-51	32.99
	Mn-54	1.78
	Co-57	.07
	Co-58	22.26
	Co-60	9.50
	Cs-137	.11
	Fe-55	5.01
	Fe-59	.67
	Ni-63	.70
	Zr-95	9.77
	Ce-144	.43
	Sb-124	.57
	Sb-125	.78
	Sn-113	.38
	Zn-65	.35
	Nb-95	14.63

2011 - 0027	Nuclide	%Abundance
	Cr-51	32.48
	Mn-54	1.82
	Co-57	.07
	Co-58	22.38
	Co-60	9.71
	Cs-137	.11
	Fe-55	5.11
	Fe-59	.67
	Ni-63	.71
	Zr-95	9.85
	Ce-144	.43
	Sb-124	.57
	Sb-125	.79
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.55

2011 - 0032	Nuclide	%Abundance
	Cr-51	31.80
	Mn-54	1.86
	Co-57	.07
	Co-58	22.65
	Co-60	9.98
	Cs-137	.11
	Fe-55	5.25
	Fe-59	.67
	Ni-63	.73
	Zr-95	9.91
	Ce-144	.45
	Sb-124	.57
	Sb-125	.81
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.38

2011 - 0033	Nuclide	%Abundance
	Cr-51	32.48
	Mn-54	1.81
	Co-57	.07
	Co-58	22.39
	Co-60	9.72
	Cs-137	.11
	Fe-55	5.11
	Fe-59	.67
	Ni-63	.72
	Zr-95	9.85
	Ce-144	.44
	Sb-124	.57
	Sb-125	.79
	Sn-113	.39
	Zn-65	.36
	Nb-95	14.54

2011- 0035	Nuclide	%Abundance
	Cr-51	33.68
	Mn-54	1.73
	Co-57	.06
	Co-58	22.04
	Co-60	9.20
	Cs-137	.10
	Fe-55	4.85
	Fe-59	.67
	Ni-63	.68
	Zr-95	9.71
	Ce-144	.42
	Sb-124	.56
	Sb-125	.75
	Sn-113	.37
	Zn-65	.34
	Nb-95	14.82

2011- 0037	Nuclide	%Abundance
	Cr-51	21.34
	Mn-54	2.65
	Co-57	.10
	Co-58	25.24
	Co-60	15.22
	Cs-137	.17
	Fe-55	7.90
	Fe-59	.62
	Ni-63	1.13
	Zr-95	10.66
	Ce-144	.63
	Sb-124	.60
	Sb-125	1.23
	Sn-113	.49
	Zn-65	.51
	Nb-95	11.50

2011- 0038	Nuclide	%Abundance
	Cr-51	16.64
	Mn-54	3.11
	Co-57	.11
	Co-58	25.67
	Co-60	18.39
	Cs-137	.21
	Fe-55	9.52
	Fe-59	.57
	Ni-63	1.38
	Zr-95	10.66
	Ce-144	.74
	Sb-124	.59
	Sb-125	1.48
	Sn-113	.54
	Zn-65	.59
	Nb-95	9.80

B. Sealed Sources	No shipments in 2011
C. Sealed Sources/Smoke Detectors	No shipments in 2011
D. Irradiated Components	No shipments in 2011

Attachment 4

Meteorological Data

MCGUIRE NUCLEAR STATION

2011 METEOROLOGICAL JOINT FREQUENCY DISTRIBUTION TABLE OF WIND SPEED, WIND DIRECTION, AND ATMOSPHERIC STABILITY USING WINDS AT THE 10m LEVEL

(HOURS OF OCCURRENCE)

		SECTOR															
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
STAB	WSCLS (m/s)																
A	0.46-0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.76-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.01-1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.26-1.50	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
	1.51-2.00	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
	2.01-3.00	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1
	3.01-4.00	1	1	0	0	0	0	0	0	3	0	0	0	0	2	0	0
	4.01-5.00	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0
	5.01-6.00	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0
	6.01-8.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8.01-10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10.01-Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0.46-0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.76-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.01-1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.26-1.50	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.51-2.00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	2.01-3.00	0	2	2	3	1	0	2	1	0	1	0	0	2	0	0	0
	3.01-4.00	0	1	0	2	7	0	0	0	4	6	1	2	0	0	0	0
	4.01-																

	5.00	0	0	0	0	0	1	0	1	0	5	5	2	0	0	1	0
	5.01-6.00	0	0	0	0	0	0	0	1	0	1	4	1	0	1	0	0
	6.01-8.00	2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
	8.01-10.00	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10.01-Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	**0.46-0.75**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.76-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.01-1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.26-1.50	1	2	0	0	0	0	0	0	2	0	0	0	0	0	2	1
	1.51-2.00	5	3	2	1	1	2	0	0	1	0	1	5	0	0	0	0
	2.01-3.00	2	4	6	11	9	6	2	1	4	9	14	9	5	6	0	0
	3.01-4.00	0	6	8	11	5	2	3	1	5	12	33	15	2	1	0	0
	4.01-5.00	1	2	5	4	0	1	0	0	2	10	32	9	2	0	1	2
	5.01-6.00	3	4	4	0	0	0	0	2	0	4	18	5	2	4	8	6
	6.01-8.00	12	3	0	0	0	0	0	0	0	0	3	1	0	3	6	13
	8.01-10.00	6	5	0	0	0	0	0	0	0	0	1	0	0	0	3	4
	10.01-Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	**0.46-0.75**	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1
	0.76-1.00	2	3	1	1	0	1	0	1	3	2	1	1	1	7	1	4
	1.01-1.25	11	13	8	2	1	6	2	5	4	2	2	1	5	5	4	9
	1.26-1.50	29	18	13	4	13	6	7	9	10	10	15	11	11	14	10	25
	1.51-2.00	69	75	49	46	32	26	19	28	42	32	44	54	39	21	26	39
	2.01-3.00	123	150	208	135	99	70	64	46	88	109	184	122	60	45	38	45
	3.01-4.00	65	103	257	106	72	40	37	6	36	82	256	78	42	41	39	39

	4.01-5.00	39	87	192	32	14	15	12	5	18	51	134	43	32	24	49	39
	5.01-6.00	27	48	56	2	1	1	6	1	6	11	80	16	12	17	28	37
	6.01-8.00	33	26	16	2	1	0	1	5	5	7	37	19	12	15	25	33
	8.01-10.00	7	4	2	0	0	0	0	0	0	1	9	9	1	8	21	17
	10.01-Max	1	1	0	0	0	0	0	0	0	0	0	4	0	0	1	2
E	0.46-0.75	1	0	1	1	0	2	1	1	4	5	4	0	1	0	2	0
	0.76-1.00	2	1	3	2	1	4	4	4	10	10	11	11	4	2	2	1
	1.01-1.25	0	2	1	2	1	6	4	10	12	13	10	14	10	7	2	2
	1.26-1.50	3	3	5	2	2	3	10	23	14	14	18	17	18	11	6	2
	1.51-2.00	6	9	13	9	9	15	22	47	44	59	40	65	29	24	10	6
	2.01-3.00	8	14	8	14	19	19	60	26	77	148	151	70	37	17	25	11
	3.01-4.00	5	2	9	10	10	9	6	4	12	34	77	22	10	9	19	12
	4.01-5.00	1	4	9	0	2	1	1	4	3	6	12	4	2	8	9	8
	5.01-6.00	2	4	2	0	0	0	0	1	4	2	4	3	1	3	4	1
	6.01-8.00	1	0	1	0	0	0	0	0	0	1	1	10	1	2	2	1
	8.01-10.00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	1
	10.01-Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
F	0.46-0.75	1	0	1	1	1	1	0	5	5	10	5	4	2	0	1	1
	0.76-1.00	1	2	0	1	1	1	1	2	10	16	19	19	11	3	1	4
	1.01-1.25	0	0	0	1	0	0	0	0	9	22	22	17	8	2	1	1
	1.26-1.50	0	2	1	0	0	0	2	9	15	29	16	18	7	5	1	0
	1.51-2.00	1	1	1	0	0	1	1	18	26	49	20	26	10	2	4	1
	2.01-3.00	0	2	0	0	0	1	2	7	27	26	39	28	17	9	0	0
	3.01-																

	4.00	0	0	0	0	0	0	0	0	1	1	1	2	4	2	2	1
	4.01-5.00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
	5.01-6.00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	6.01-8.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8.01-10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10.01-Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	**0.46-0.75**	0	1	0	0	0	0	0	3	3	25	11	10	4	0	2	1
	0.76-1.00	0	0	0	0	0	0	0	2	5	36	31	9	4	2	1	1
	1.01-1.25	0	0	0	0	0	0	0	0	4	38	22	5	4	1	0	0
	1.26-1.50	0	0	0	0	0	0	0	0	1	16	14	5	2	0	0	0
	1.51-2.00	0	3	1	0	0	0	0	0	6	17	7	6	1	0	0	0
	2.01-3.00	0	0	0	0	0	0	0	0	4	5	8	3	2	1	0	0
	3.01-4.00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	4.01-5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5.01-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6.01-8.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8.01-10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10.01-Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Attachment 5

Unplanned Offsite Releases

January 25, 2011

Memorandum To: Annual Radioactive Effluent Release Report

CC: Steve Mooneyhan, H. J. Sloan, Chris Whitener, C.D. Ingram, Kay Crane

From: William C. Spencer
RP Staff
Radiation Protection
McGuire Nuclear Station

Re: Unplanned release to the Unit 1 Vent Reference PIP M-11-0141

Event Summary:
See referenced PIP for details.
On 1/08/11 Radiation Protection (RP) Shift Group was performing routine weekly sampling of the Unit 1 Vent which includes noble gas and tritium grab samples. The airborne tritium concentration from the vent sample was within normal limits. The Xe-133 identified @ ~9.0E-8 uci/ml was not expected. RP Supervision was contacted and investigation indicated a loss of volume from the Waste Gas Decay Tank (WGDT)-E. There was no indication seen during the event on Vent gas monitor EMF 36 (L) due to Xe-133 activity being below EMF delectability limit. Chemistry personnel verified WGDT-E isolation valves closed. Follow up sampling at the Unit 1 Vent indicated no activity identified on 1/9/11 @ 05:32. WGDT-E was later sampled to identify nuclides present during the loss of volume event. This sample was used to account for radioactivity released out the Unit 1 Vent via Gaseous Waste Release #2011003. Conservative estimate 1.66E-4 curies of fission and activation gas (noble gas) were released. The quantity of gas released was insignificant. Trending the Unit Vent Monitor 1EMF-36 (L) indicated no counts above normal background. No offsite release limits were challenged. No reporting criteria thresholds reached.

The total Noble gas activity released was reported on (GWR) Gaseous Waste Release # 2011003.
The unplanned activity was evaluated against off site dose limits using current ODCM methodology on the attached spreadsheet.

Safety Significance:
The health and safety of the public were not compromised by this event. The total activity released was insignificant. Calculated dose and doserate to the Total Body, Skin, Gamma Air, and Beta Air were all many orders of magnitude below the limit specified by Selected Licensee Commitments and Code of Federal Regulations.

W.C. Spencer
RP Staff Support
Radiation Protection
McGuire Nuclear Station

Harry J Sloan
General Supervisor
Radiation Protection
McGuire Nuclear Station

March 28, 2011

Memorandum To: Annual Radioactive Effluent Release Report

CC: Steve Mooneyhan, H. J. Sloan, Chris Whitener, C.D. Ingram, Kay Crane

From: William C. Spencer
RP Staff
Radiation Protection
McGuire Nuclear Station

Re: Unplanned release to the Unit 1 Vent Reference PIP M-11-1946

Event Summary:
See referenced PIP for details.
On 3/9/11 Chemistry staff noted a pressure drop in the in-service WGDT-B of ~ 8.0psi. The WGDT-B pressure loss started on 3/3/11 15:00 hrs and continued until the in-service tank was re-aligned to WGDT-E on 3/9/11 21:32hrs. Two psi was accounted for in WGDT-A and WGDT-C determined by a pressure increase seen in each tank during the period. Radiation Protection was contacted to perform trending to evaluate unit vent and auxiliary building radioactive gas monitors over the period for any indication of noble gas released to the environment. No indication was identified of a radioactive gas release off site during the period.
WGDT-B was sampled on 3/10/11 to identify the specific radioisotopes and their concentration of the gas potentially leaked off site.
Follow up investigation identified bank isolation valve 1WG-263 as having a very small external leak into room 617 which exhausts to the auxiliary building ventilation and to the Unit 1 vent.

The total Noble gas activity released (1.02E-2 Curies) was reported on (GWR) Gaseous Waste Release # 2011018.
The unplanned activity was evaluated against off site dose limits using current ODCM methodology on the attached spreadsheet.

Safety Significance:
The health and safety of the public were not compromised by this event. The total activity released was insignificant. Calculated dose and doserate to the Total Body, Skin, Gamma Air, and Beta Air were all orders of magnitude below the limit specified by Selected Licensee Commitments and Code of Federal Regulations.

WC Spencer

W.C. Spencer
RP Staff Support
Radiation Protection
McGuire Nuclear Station

HJ Sloan

Harry J Sloan
General Supervisor
Radiation Protection
McGuire Nuclear Station

May 17, 2011

Memorandum To: Annual Radioactive Effluent Release Report

CC: Steve Mooneyhan, H. J. Sloan, Chris Whitener, C.D. Ingram, Kay Crane

From: William C. Spencer
RP Staff
Radiation Protection
McGuire Nuclear Station

Re: Unplanned release to the Unit 1 Vent Reference PIP M-11-3864

Event Summary:
See referenced PIP for details.
On 5/17/11 at 09:26 Operations received a trip 1 alarm (trip 1 setpoint 75 cpm) on 1 EMF 36 Unit Vent gas monitor. At 09:43 Operations received a trip 2 alarm on EMF 41(Aux Bld ventilation gas monitor) point #1.
The following time line is established to describe the event:

- 09:24 WG compressor "A" placed in service by Rad-Waste Chemistry to perform functional verification on 1 WG-238 post repair.
- 09:26 Operations received trip 1 alarm on Unit Vent monitor 1 EMF 36 at ~77cpm up from ~27cpm.
- 09:43 Operations received trip 2 alarm on EMF 41 point #1 Auxiliary bld ventilation gas monitor at 590 cpm.
- 09:45 Operations received annunciator alarm on point #2 at 159 cpm followed by point #4 at 234 cpm.
- At ~ 09:45 Rad-Waste Chemistry performed snoop check of 1WG-238 and found it to be leaking externally. Rad-Waste Chemistry immediately secured the alignment to the WGDT-B in-service tank.
- Follow up trending showed EMF 41 point #4 returning to 50 cpm at 10:06. (normal is ~60 cpm)
- Follow up trending of 1EMF 36 showed increase from 22 cpm, going to 77 cpm then returning to 35 cpm at 10:01. 1 EMF 36 reached a high of 105 cpm during the event. (normal is 25-30 cpm)
- Follow up investigation indicated a loss of 17 psig (694 cubic feet) from WGDT-B.

The most recent sample from WGDT-B in-service tank was used to evaluate radioactive gas released to the Unit 1 Vent. The total Noble gas activity released (2.04E-1 Curies) was reported on (GWR) Gaseous Waste Release (GWR) # 2011039.
The unplanned release of radioactivity was evaluated against off site dose limits using current ODCM methodology on the attached spreadsheet.

Safety Significance:
The health and safety of the public were not compromised by this event. The total Noble gas activity released was 0.204 curies. Calculated dose and doserate to the Total Body, Skin, Gamma Air, and Beta Air were all well below the limits specified by Selected Licensee Commitments and Code of Federal Regulations.

W C Spencer

W.C. Spencer
RP Staff Support
Radiation Protection
McGuire Nuclear Station

H J Sloan

Harry J Sloan
General Supervisor
Radiation Protection
McGuire Nuclear Station

May 31, 2011

Memorandum To: Annual Radioactive Effluent Release Report

CC: Steve Mooneyhan, H. J. Sloan, Chris Whitener, C.D. Ingram, Kay Crane

From: William C. Spencer
RP Staff
Radiation Protection
McGuire Nuclear Station

Re: Unplanned release to the Unit 1 Vent Reference PIP M-11-4129

Event Summary:
See referenced PIP for details.
On the afternoon 5/25/11 the waste gas (WG) system was returned to service after maintenance activities completed. The B WG compressor was used with WGDT-A as the in-service tank.
On 5-27-11 while performing morning rounds the chemistry technician noted WGDT-A was indicating a loss of pressure since the WG system start-up on 5-25-11. Chemistry management was contacted and increased monitoring of WGDT-A was put into place to verify pressure changes.
On the morning of 5-29-11 long term trending of WGDT-A pressure indicated a loss of three psig or 123 cubic feet of noble gas over the period of 5-25-11 through 5-29-11. Radiation Protection was notified and trending of Unit Vent gas monitor (1EMF 36) as well as the Auxiliary bld noble gas monitor (0EMF 41 point 4) showed no increase above background for the period.
On 5-29-11 Chemistry initiated steps to secure WG-B compressor and start WG-A compressor. Follow up pressure trending of WGDT-A showed no pressure loss.

On 5-31-11 WGDT-A in-service tank was sampled to evaluate radioactive gas released to the Unit 1 Vent during this event. The total Noble gas activity released (7.59E-3 Curies) was reported on (GWR) Gaseous Waste Release (GWR) # 2011040.
The unplanned release of radioactivity was evaluated against off site dose limits using current ODCM methodology on the attached spreadsheet.

Safety Significance:
The health and safety of the public were not compromised by this event. The total Noble gas activity released was 0.0076 curies. Calculated dose and doserate to the Total Body, Skin, Gamma Air, and Beta Air were all orders of magnitude below the limits specified by Selected Licensee Commitments and Code of Federal Regulations.

WC Spencer

W.C. Spencer
RP Staff Support
Radiation Protection
McGuire Nuclear Station

HJ Sloan

Harry J Sloan
General Supervisor
Radiation Protection
McGuire Nuclear Station

June 1, 2011

Memorandum To: Annual Radioactive Effluent Release Report

CC: Steve Mooneyhan, H. J. Sloan, Chris Whitener, C.D. Ingram, Kay Crane

From: William C. Spencer
RP Staff
Radiation Protection
McGuire Nuclear Station

Re: Unplanned release to the Unit 1 Vent Reference PIP M-11-3695

Event Summary:
See referenced PIP for details.
On or about 4/9/11 Chemistry technicians identified a pressure decrease in WGDT-B during the period of 4/28/11 through 5/9/11. Noble gas monitors EMF 41 (Aux Bld ventilation) and 1EMF 36 (Unit 1 Vent) showed no increase above normal background during the period. A leak investigation was initiated by Chemistry and 1WG-238 diaphragm valve was identified with an external leak. The WG system was shutdown to repair the valve.
Follow up investigation of the decrease in tank pressure indicated a loss of 17 psig (694 cubic feet) from the in-service WGDT-B during the period of 4/3/11 to 5/10/11. WGDT-B was sampled on 5/10/11 to account for the noble gas activity released to the Unit 1 Vent.
The sample from WGDT-B in-service tank was used to evaluate radioactive gas released to the Unit 1 Vent. The total Noble gas activity released (2.04E-1 Curies) was reported on (GWR) Gaseous Waste Release (GWR) # 2011043.
The unplanned release of radioactivity was evaluated against off site dose limits using current ODCM methodology on the attached spreadsheet.

Safety Significance:
The health and safety of the public were not compromised by this event. The total Noble gas activity released was 0.204 curies. Calculated dose and doserate to the Total Body, Skin, Gamma Air, and Beta Air were all well below the limits specified by Selected Licensee Commitments and Code of Federal Regulations.

W C Spencer

W.C. Spencer
RP Staff Support
Radiation Protection
McGuire Nuclear Station

H J Sloan

Harry J Sloan
General Supervisor
Radiation Protection
McGuire Nuclear Station

Attachment 6

Assessment of Radiation Dose from Radioactive Effluents to Members of the Public

(Includes fuel cycle dose calculation results)

McGUIRE NUCLEAR STATION

ASSESSMENT OF RADIATION DOSE FROM RADIOACTIVE EFFLUENTS AND ALL URANIUM FUEL CYCLE SOURCES TO MEMBERS OF THE PUBLIC

(January 1, 2011 through December 31, 2011)

This attachment includes an assessment of radiation doses to the maximum exposed member of the public due to radioactive liquid and gaseous effluents released from the site for each calendar quarter and for the calendar year of this report. The effluent dose calculations consider radionuclides identified as part of the liquid and gaseous wastes sample and analysis program. Radioactive liquid and gaseous wastes are sampled and analyzed per the requirements in Selected Licensee Commitment (SLC) Table 16.11.1-1, "Radioactive Liquid Waste Sampling and Analysis Program", and SLC Table 16.11.6-1, "Radioactive Gaseous Waste Sampling and Analysis Program". Included in the gaseous effluent dose calculations is an estimate of the dose contributed by Carbon-14 (Ref. *"Carbon-14 Supplemental Information"*, contained in the ARERR for further information). The "Fuel Cycle Calculation" attachment also includes an assessment of radiation doses to the maximum exposed member of the public from all uranium fuel cycle sources within 8 km of McGuire for the calendar year of this report to show conformance with 40CFR190. Methods for calculating the dose contribution from liquid and gaseous effluents are given in the ODCM.

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

1st Quarter 2011

=== IODINE, H3, AND PARTICULATE DOSE LIMIT ANALYSIS======= Quarter 1 2011 ====

Period-Limit	Critical Group	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q1 - Maximum Organ Dose	CHILD	BONE	1.81E-01	1.50E+01	1.20E+00

Maximum Organ Dose Receptor Location: 1.5 Mile NE
Critical Pathway: Vegetation

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
C-14	1.00E+02

=== NOBLE GAS DOSE LIMIT ANALYSIS========================= Quarter 1 2011 ====

Period-Limit	Dose (mrad)	Limit (mrad)	% of Limit
Q1 - Maximum Gamma Air Dose	1.31E-02	1.00E+01	1.31E-01

Maximum Gamma Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.97E+01

Q1 - Maximum Beta Air Dose	4.68E-03	2.00E+01	2.34E-02

Maximum Beta Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.82E+01

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

2nd Quarter 2011

=== IODINE, H3, AND PARTICULATE DOSE LIMIT ANALYSIS======= Quarter 2 2011 ====

Period-Limit	Critical Group	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q2 - Maximum Organ Dose	CHILD	BONE	2.36E-01	1.50E+01	1.58E+00

Maximum Organ Dose Receptor Location: 1.5 Mile NE
Critical Pathway: Vegetation

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
C-14	1.00E+02

=== NOBLE GAS DOSE LIMIT ANALYSIS========== Quarter 2 2011 ====

Period-Limit	Dose (mrad)	Limit (mrad)	% of Limit
Q2 - Maximum Gamma Air Dose	1.36E-02	1.00E+01	1.36E-01

Maximum Gamma Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.39E+01

Q2 - Maximum Beta Air Dose	5.95E-03	2.00E+01	2.97E-02

Maximum Beta Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	7.59E+01
XE-133	1.42E+01
XE-135	8.79E+00

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

3rd Quarter 2011

=== IODINE, H3, AND PARTICULATE DOSE LIMIT ANALYSIS======= Quarter 3 2011 ====

Period-Limit	Critical Group	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q3 - Maximum Organ Dose	CHILD	BONE	2.25E-01	1.50E+01	1.50E+00

Maximum Organ Dose Receptor Location: 1.5 Mile NE
Critical Pathway: Vegetation

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
C-14	1.00E+02

=== NOBLE GAS DOSE LIMIT ANALYSIS========================== Quarter 3 2011 ====

Period-Limit	Dose (mrad)	Limit (mrad)	% of Limit
Q3 - Maximum Gamma Air Dose	1.27E-02	1.00E+01	1.27E-01

Maximum Gamma Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.98E+01

Q3 - Maximum Beta Air Dose	4.53E-03	2.00E+01	2.27E-02

Maximum Beta Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.88E+01

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

4th Quarter 2011

=== IODINE, H3, AND PARTICULATE DOSE LIMIT ANALYSIS======= Quarter 4 2011 ====

Period-Limit	Critical Group	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q4 - Maximum Organ Dose	CHILD	BONE	2.28E-01	1.50E+01	1.52E+00

Maximum Organ Dose Receptor Location: 1.5 Mile NE
Critical Pathway: Vegetation

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
C-14	1.00E+02

=== NOBLE GAS DOSE LIMIT ANALYSIS========== Quarter 4 2011 ====

Period-Limit	Dose (mrad)	Limit (mrad)	% of Limit
Q4 - Maximum Gamma Air Dose	1.07E-02	1.00E+01	1.07E-01

Maximum Gamma Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.99E+01

Q4 - Maximum Beta Air Dose			3.80E-03	2.00E+01	1.90E-02

Maximum Beta Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.90E+01

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
GASEOUS ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

ANNUAL 2011

=== IODINE, H3, AND PARTICULATE DOSE LIMIT ANALYSIS======= Annual 2011 ========

Period-Limit	Critical Group	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Yr - Maximum Organ Dose	CHILD	BONE	8.70E-01	3.00E+01	2.90E+00

Maximum Organ Dose Receptor Location: 1.5 Mile NE
Critical Pathway: Vegetation

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
C-14	1.00E+02

=== NOBLE GAS DOSE LIMIT ANALYSIS========================= Annual 2011 ========

Period-Limit	Dose (mrad)	Limit (mrad)	% of Limit
Yr - Maximum Gamma Air Dose	5.01E-02	2.00E+01	2.50E-01

Maximum Gamma Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.82E+01

Yr - Maximum Beta Air Dose	1.90E-02	4.00E+01	4.74E-02

Maximum Beta Air Dose Receptor Location: 0.5 Mile NNE

Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
AR-41	9.15E+01
XE-133	5.22E+00

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

1st Quarter 2011

=== BATCH LIQUID RELEASES ========== Quarter 1 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q1 - Maximum Organ Dose	CHILD	LIVER	1.30E-01	1.00E+01	1.30E+00
Q1 - Total Body Dose	CHILD		1.23E-01	3.00E+00	4.12E+00

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.40E+01
CS-137	5.41E+00

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.87E+01

=== CONTINUOUS LIQUID RELEASES (WC) ========== Quarter 1 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q1 - Maximum Organ Dose	CHILD	LIVER	4.16E-03	1.00E+01	4.16E-02
Q1 - Total Body Dose	CHILD		4.16E-03	3.00E+00	1.39E-01

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

2nd Quarter 2011

=== BATCH LIQUID RELEASES ========== Quarter 2 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q2 - Maximum Organ Dose	ADULT	GI-LLI	2.29E-02	1.00E+01	2.29E-01
Q2 - Total Body Dose	CHILD		2.06E-02	3.00E+00	6.87E-01

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	6.59E+01
NB-95	2.97E+01

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.76E+01

=== CONTINUOUS LIQUID RELEASES (WC) ========== Quarter 2 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q2 - Maximum Organ Dose	CHILD	LIVER	8.61E-04	1.00E+01	8.61E-03
Q2 - Total Body Dose	CHILD		8.61E-04	3.00E+00	2.87E-02

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

3rd Quarter 2011

=== BATCH LIQUID RELEASES ========== Quarter 3 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q3 - Maximum Organ Dose	CHILD	GI-LLI	3.03E-02	1.00E+01	3.03E-01
Q3 - Total Body Dose	CHILD		2.92E-02	3.00E+00	9.74E-01

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.40E+01

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.74E+01

=== CONTINUOUS LIQUID RELEASES (WC) ========== Quarter 3 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q3 - Maximum Organ Dose	CHILD	LIVER	4.30E-03	1.00E+01	4.30E-02
Q3 - Total Body Dose	CHILD		4.30E-03	3.00E+00	1.43E-01

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

4th Quarter 2011

=== BATCH LIQUID RELEASES ========== Quarter 4 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q4 - Maximum Organ Dose	ADULT	GI-LLI	3.08E-02	1.00E+01	3.08E-01
Q4 - Total Body Dose	CHILD		2.23E-02	3.00E+00	7.44E-01

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	5.38E+01
NB-95	4.39E+01

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.92E+01

=== CONTINUOUS LIQUID RELEASES (WC) ========== Quarter 4 2011 ======

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Q4 - Maximum Organ Dose	CHILD	LIVER	8.38E-04	1.00E+01	8.38E-03
Q4 - Total Body Dose	CHILD		8.38E-04	3.00E+00	2.79E-02

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
PERIOD 1/1/11 TO 1/1/12
LIQUID ANNUAL DOSE SUMMARY REPORT

McGuire Nuclear Station Units 1 & 2

ANNUAL 2011

=== BATCH LIQUID RELEASES ========== Annual 2011 =========

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Yr - Maximum Organ Dose	CHILD	GI-LLI	1.86E-01	2.00E+01	9.30E-01
Yr - Total Body Dose	CHILD		1.79E-01	6.00E+00	2.98E+00

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.46E+01

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	9.84E+01

=== CONTINUOUS LIQUID RELEASES (WC) ========== Annual 2011 =========

Period-Limit	Critical Age	Critical Organ	Dose (mrem)	Limit (mrem)	Max % of Limit
Yr - Maximum Organ Dose	CHILD	LIVER	1.07E-02	2.00E+01	5.37E-02
Yr - Total Body Dose	CHILD		1.07E-02	6.00E+00	1.79E-01

Maximum Organ
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

Total Body
Critical Pathway: Potable Water
Major Isotopic Contributors (5% or greater to total)

Nuclide	Percentage
H-3	1.00E+02

McGuire Nuclear Station
2011 Radioactive Effluent and ISFSI
40CFR190 Uranium Fuel Cycle Dose Calculation Results

In accordance with the requirements of 40CFR190, the annual dose commitment to any member of the general public shall be calculated to assure that doses are limited to 25 millirems to the total body or any organ with the exception of the thyroid which is limited to 75 millirems. The fuel cycle dose assessment for McGuire Nuclear Station only includes liquid and gaseous effluent dose contributions from McGuire and direct and air-scatter dose from McGuire's onsite Independent Spent Fuel Storage Installation (ISFSI) since no other uranium fuel cycle facility contributes significantly to McGuire's maximum exposed individual. Included in the gaseous effluent dose calculations is an estimate of the dose contributed by Carbon-14 (Ref. *"Carbon-14 Supplemental Information"*, contained in the ARERR for further information). The combined dose to a maximum exposed individual from McGuire's effluent releases and direct and air-scatter dose from McGuire's ISFSI is below 40CFR190 limits as shown by the following summary:

I. 2011 McGuire 40CFR190 Effluent Dose Summary

The 40CFR190 effluent dose analysis to the maximum exposed individual from liquid and gas releases includes the dose from noble gases (i.e., total body and skin).

Maximum Total Body Dose = 4.74E-01 mrem

Maximum Location: 1.5 Mile, Northeast Sector
Critical Age: Child
Gas non-NG Contribution: 62%
Gas NG Contribution: <1%
Liquid Contribution: 38%

Maximum Organ (other than TB) Dose = 8.80E-01 mrem

Maximum Location: 1.5 Mile, Northeast Sector
Critical Age: Child
Critical Organ: Bone
Gas Contribution: 99%
Liquid Contribution: 1%

II. 2011 McGuire 40CFR190 ISFSI Dose Summary

Direct and air-scatter radiation dose contributions from the onsite Independent Spent Fuel Storage Installation (ISFSI) at McGuire have been calculated and documented in the "McGuire Nuclear Site 10CFR72.212 Evaluation Report". **The maximum dose rate to the nearest real individual from the McGuire ISFSI is conservatively calculated to be less than 4 mrem/yr.**

The attached excerpt from the "McGuire Nuclear Site 10CFR72.212 Evaluation Report" is provided to document the method used to calculate the McGuire ISFSI less than 4 mrem/year dose estimate to the nearest real individual.

The following two pages are excerpted from the McGuire Nuclear Site, Independent Spent Fuel Storage Installation, "10CFR72.212 Evaluation Report".

6.0 10 CFR 72.212(b)(5)(iii) - Radioactive Materials in Effluents and Direct Radiation

6.1 Purpose

10 CFR 72.212(b)(5)(iii) requires the general licensee to perform written evaluations, before use and before applying the changes authorized by an amended CoC to a cask loaded under the initial CoC or an earlier amended CoC, that establish that the requirements of 10 CFR 72.104 have been met. A copy of this record shall be retained until spent fuel is no longer stored under the general license issued under 10 CFR 72.210.

10 CFR 72.104 provides the regulatory criteria for radioactive materials in effluents and direct radiation from an independent spent fuel storage installation (ISFSI) during normal operation and anticipated occurrences. Specifically, 10 CFR 72.104(a) limits the annual dose equivalent to any real individual who is located beyond the controlled area to 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other critical organ. This dose equivalent must include contributions from (1) planned discharges of radioactive materials (radon and its decay products excepted) to the general environment, (2) direct radiation from ISFSI operations, and (3) any other radiation from uranium fuel cycle operations within the region. In addition, 10 CFR 72.104(b) requires that operational restrictions be established to meet as low as is reasonably achievable (ALARA) objectives for radioactive materials in effluents and direct radiation levels associated with ISFSI operations. Also, 10 CFR 72.104(c) requires that operational limits be established for radioactive materials in effluents and direct radiation levels associated with ISFSI operations to meet the above-mentioned dose limits.

This section provides the written evaluation required by 10 CFR 72.212(b)(5)(iii), demonstrating Duke Energy's compliance with the requirements of 10 CFR 72.104 for the MNS ISFSI.

6.2 Evaluation

This evaluation addresses the radiological dose rate from a composite population of all MNS ISFSI cask types.

6.2.1 §72.104(a) – Dose Limits

Duke Energy Engineering Instruction MCEI-0400-241 determined that the distance from the nearest residence to the ISFSI is 0.65 miles (1046 meters). Hence, it is conservative to assume that the closest real individual is at least 700 meters from the ISFSI.

Enercon determined the annual total dose (gamma plus neutron) at a distance of 700 meters from all currently loaded casks (10 TN-32A casks and 28 NAC-UMS® casks) to be approximately 1.62 mrem. The evaluation was based on actual cask average burn-up (as loaded) and considering cooling time on the storage

pads as of September 1, 2010. The distance at which this dose is calculated (700 meters) is conservative compared to the distance to the closest real individual.

NAC International determined the annual total dose (gamma plus neutron) at a distance of 700 meters from a (future) 2x6 array of MAGNASTOR® casks to be approximately 1.01 mrem (2.02 mrem for two arrays). The evaluation was conservatively based on full cask loads of 37 fuel assemblies at the maximum allowable heat load of 35.5 kW. The distance at which this dose is calculated (700 meters) is conservative compared to the distance to the closest real individual.

The total calculated annual public dose from liquid and gaseous effluent pathways averaged over a ten-year period is less than 1 mrem. No other uranium fuel cycle facility contributes significantly to the dose received by the closest real individual.

Based on the above, the calculated annual dose to the closest real individual due to the ISFSI, which is comprised of the currently existing ten TN-32A casks and 28 NAC-UMS® casks, and up to two 2x6 arrays of MAGNASTOR® casks (*see Note below*), is determined to be less than 4 mrem, and the estimated annual dose due to McGuire power generation is less than 1 mrem. Hence, the total annual dose to the closest real individual (less than 5 mrem) is within the 10 CFR 72.104(a) limit.

Note: As stated above, up to two 2x6 arrays of MAGNASTOR® casks *are assumed in this evaluation. The first eight MAGNASTOR® casks are planned to be placed on a concrete pad currently containing four NAC-UMS® casks. This will conservatively count as one 2x6 array. Additional MAGNASTOR® casks will be placed on their own concrete pad (the second 2x6 array). Hence, this §72.104(a) evaluation bounds up to 20 MAGNASTOR® casks, arranged as described.*

Attachment 7

Radioactive Waste Systems

MEMO TO:

Annual Radioactive Effluent Release Report

Reference SLC 16.11.17 element to identify any licensee initiated major changes to Radioactive Waste Systems (liquid, gaseous, and solid).

There were no major changes to design or function and no UFSAR updates resulting from major changes to the Radioactive Waste Systems (liquid, gaseous and solid) during the 2011 period.

Attachment 8

Inoperable Monitoring Equipment

ATTACHMENT 8

Inoperable Equipment

1EMF39L - Containment Purge System Noble Gas Monitor

Equipment Out of Service	1EMF39L - Containment Purge System Noble Gas Monitor Low Range
Duration of Out of Service:	9/19/2011 to 10/4/2011 Out of Service date was based on the day system configuration was potentially affected and found as documented in M-11-7542, Sequence of Event section.
Function of Equipment:	Upon detection of high radiation level, provide alarm and automatic termination of release via containment ventilation isolation.
Regulatory Requirement Not Met:	SLC 16.11.7 - Radioactive Gaseous Effluent Monitoring Instrumentation TABLE 16.11-7-1 INSTRUMENTS - 4. Containment Purge System - Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release (Low Range - EMF - 39) MODE 1-6, except when isolation valve is closed & locked REMEDIAL ACTION - A, F, I APPLICABILTY - Modes 1 through 6, except when isolation valve is closed & locked. REMEDIAL ACTIONS - F CONDITION: Noble gas activity monitor providing automatic termination of release inoperable REQUIRED ACTION - F.1: Suspend PURGING or VENTING of radioactive effluents via this path way. COMPLETION TIME: Immediately
Summary of Issue	Reference letter attached.

OTHERS:

There were no other radiation monitor related failures that were not corrected within the specified required completion time in accordance with McGuire SLC.

Memo to: 2011 Annual Radiological Effluent Release Report

Subject: SLC 16.11.7 F. Suspension of Containment Purge (VP) when 1EMF39L is inoperable.
PIP M-11-07542

SSPS containment ventilation isolation slave relays are the method 1EMF39L utilizes to shutdown containment purge upon detection of high radiation (TRIP 2). Without either train of SSPS available, this automatic termination was non-functional. SLC 16.11.7 F. requires immediate suspending of containment purge (VP) when 1EMF39L is inoperable, this was not performed.

Topic: The above auto termination unavailability was due to Jumpers being incorrectly installed in the Unit 1 SSPS cabinets, such that the VP valves would not have closed after receiving a trip signal from EMF-39. Unit 1 was in Mode 6 at the time of discovery.

Risk Assessment: SSPS containment ventilation isolation slave relays are the method 1EMF39L utilizes to shutdown containment purge upon detection of high radiation. Without either train of SSPS available, this automatic termination was non-functional. It was also unknown that this automatic system was inoperable until the time installed jumpers in SSPS cabinets A & B were to be removed from service post-outage.

Normal Unit 1 containment and Unit Vent sampling was performed during the period. No radioactivity above expected outage conditions was identified. Evaluations revealed normal Gaseous Release accounting was being performed during the outage period and no unusual activity was seen during this period.

Summary of Cause: There were two jumpers found to be out of correct configuration in SSPS cabinets A and B. In cabinet A, a jumper had been placed into the incorrect terminal rendering its intended functions described above inoperable and a jumper in Cabinet B had been knocked loose altogether from its correct terminal also rendering its function inoperable. This configuration error was attributed to attention to detail and configuration control of plant equipment. The inoperability was not corrected in the specified completion time because the jumpers in question were inside closed cabinets and was not discovered until it was time to remove them.

Steve Mooneyhan
Radiation Protection Manager
McGuire Nuclear Station

Attachment 9

Groundwater Protection Program

2011 ARERR Groundwater Well Data Section

Duke Energy implemented a Groundwater Protection Program in 2007. This program was developed to ensure timely and effective management of situations involving inadvertent releases of licensed material to ground water. As part of this program, McGuire Nuclear Station monitored sixty ground water wells during 2011.

Wells are sampled quarterly, semi-annually or annually. Ground water samples are regularly analyzed for tritium and gamma emitters, with selected wells being analyzed for difficult to detect radionuclides. No gamma or difficult to detect radionuclides (other than naturally occurring radionuclides) were identified in well samples during 2011. Results from sampling during 2011 confirmed existing knowledge of tritium concentrations in site ground water (shown in the table below).

Results from sampling during 2011 are shown in the table below.

Well Name	Well Location	Avg. Tritium Conc.(pCi/l)	Conc. Range	# of Samples
M-20	South of Hwg. 73	642	626 - 658	2
M-20R	South of Hwg. 73	554	539 - 568	2
M-21	South of Hwg. 73	<	<	2
M-22	South of Hwg. 73	<	<	2
M-22R	South of Hwg. 73	<	<	2
M-23	South of Acs. Rd.	<	<	2
M-30	WWCB	<	<	2
M-30R	WWCB	281	261 - 300	2
M-31	Access road	<	<	2
M-32	Main entrance	<	<	2
M-34R	Access road	<	<	3
M-34DR	Access road	<	<	4
M-35	Access road	<	<	4
M-42	U-2 Rx. Bldg.	2,425	2,100 - 2,720	4
M-48	U-2 SFP	*	*	0
M-48R	U-2 SFP	782	660 - 946	4
M-48DR	U-2 SFP	326	274 - 387	3
M-53	North of plant	1,003	919 - 1,210	4
M-55	North Admin. Bldg.	268	243 - 293	4
M-59	U-2 Doghouse	2,090	1,710 - 2,510	4
M-60	MOC Parking	<	<	2
M-62	S of RWF	<	<	4
M-64	Rdwst. Bldg.	533	477 - 562	4
M-66	S of SSF	529	473 - 602	4
M-66R	S of SSF	<	<	4
M-68	U-1 RMWST	802	728 - 888	4
M-70	U-1 SFP	526	417 - 700	4
M-70R	U-1 SFP	244	212 - 277	4

M-70DR	U-1 SFP	<	< - 336-	4
M-72	Rdwst. Trench	810	794 - 828	4
M-76	West of U-1 SFP	357	313 - 399	4
M-82	River	2,220	2,108 - 2,330	4
M-84	River	6,280	5,220 - 6,990	4
M-84R	River	7,555	7,300 - 7,830	4
M-85	River	1,575	1,440 - 1,690	4
M-87	Landfarm	656	585 - 697	4
M-89	Landfarm	901	742 - 1,020	4
M-90	Landfarm	476	467 - 485	2
M-91	East of WC	324	259 - 395	4
M-91R	East of WC	272	< - 325	4
M-92	N of WC Ponds	321	295 - 347	2
M-92R	N of WC Ponds	<	<	2
M-93	North of IHUP	560	546 - 574	2
M-93R	North of IHUP	223	209 - 236	2
M-94	SE of IHUP	<	<	2
M-95	Lower Parking	<	<	2
M-95R	Lower Parking	<	<	2
M-96	West Parking	<	<	2
M-96R	West Parking	<	<	2
M-97	East Parking	227	206 - 248	2
M-98	S of Admin. Bldg.	<	<	2
M-98R	S of Admin. Bldg.	<	<	2
M-100R	SE of WC	284	222 - 401	4
M-101	SE of WC	323	247 - 395	4
M-102	SW of WC	7,965	7,450 - 8,410	4
M-103	South of WC	2,120	1,930 - 2,240	4
M-103R	South of WC	2,150	1,980 - 2,380	4
M-104R	West of WC	6,060	3,910 - 7,960	4
M-104DR	West of WC	4,328	3,970 - 4,520	4
M-105	Landfarm	292	243 - 340	2
MW-1	Landfill #1	<	<	2
MW-1D	Landfill #1	<	<	2
MW-2A	Landfill #1	<	<	2
MW-2D	Landfill #1	<	<	2
MW-3	Landfill #1	<	<	2
MW-3D	Landfill #1	<	<	2
MW-4	Landfill #1	<	<	2
MW-4D	Landfill #1	<	<	2
MW-11	Landfill #1	<	<	2
MW-11D	Landfill #1	<	<	2
MW-12	Landfill #1	<	<	2
MW-12D	Landfill #1	<	<	2
MW-5	Landfill #2	<	<	1

MW-5A	Landfill #2	<	<	2
MW-6	Landfill #2	<	<	2
MW-6A	Landfill #2	<	<	2
MW-7	Landfill #2	<	<	2
MW-7A	Landfill #2	<	<	2
MW-8	Landfill #2	<	<	2
MW-8A	Landfill #2	<	<	2
MW-9	Landfill #2	<	<	2
MW-9A	Landfill #2	<	<	2
MW-10A	Landfill #2	<	<	2

*Insufficient volume in well to sample.

pCi/l - pico curies per liter

< - less than minimum detectable activity, typically 250 pCi/liter

20,000 pCi/l - the Environmental Protection Agency drinking water standard for tritium. This standard applies only to water that is used for drinking.

1,000,000 pCi/l - the 10CFR20, Appendix B, Table 2, Column 2, Effluent Concentration limit for tritium.