Memorandum

Exelon SM
Nuclear

Date: October 19, 2004

To: J. Strmec, Chemistry Manager

From: J. Kalb, Environmental Chemist

Subject: Estimates of off-site doses from difficult-to-measure nuclides

Reference: Dresden Off-site Dose Calculation Manual (ODCM)

Enclosure: (1) Unit 3 2004 dose projection including H-3, Fe-59, Sr-89, Sr-90
(2) Unit 3 December 2004 dose projection including H-3, Fe-59, Sr-89, Sr-90

On the recommendation of Exelon Corporate Environmental, the impact to dose received by the public from difficult to measure (DTM) nuclides as a result of the underground pipe leak was evaluated. Tritium (H-3), iron-55 (Fe-55), strontium-89 (Sr-89), and strontium-90 (Sr-90) are the DTM nuclides of concern. These nuclides are regarded as difficult to measure because they decay by weak beta emission and cannot be detected using routine gamma spectroscopy techniques. Tritium can be analyzed on site using liquid scintillation techniques; iron and strontium analyses require chemical separations that are beyond the reasonable capabilities of the on-site laboratory. In order to estimate the activity of the iron and strontium, scaling factors were derived as follows:

- Fe-55 – Because liquid radwaste discharges are processed in the same manner as water processed for return to the Condensate Storage Tank (CST), Fe-55 concentration can be estimated using the scaling factor determined per CY-DR-120-600, Liquid Radwaste Scaling Factors. This method uses the average log value of actual river discharge Fe-55 analyses to determine the scaling factor in relation to Co-60. The current value, calculated on 6-17-04, is 2.68; this means for every curie of Co-60 activity present, an estimated 2.68 curies of Fe-55 is present.
- Sr-90 – No Sr-90 activity was detected in liquid radwaste discharges for the past two years, so the 10CFR61 Sr-90 scaling factor (the highest 10CFR61 scaling factor available) per RP-DR-605, Waste Stream Sampling and Analysis, was used. This procedure also uses average log calculation methodology. The current value, calculated on 6-29-04, is 2.33E-03; this means for every curie of Co-60 activity present, an estimated 0.00233 curies of Sr-90 is present.
- Sr-89 – No Sr-89 activity was detected in liquid radwaste discharges for the past two years, and Sr-89 scaling factors are not required by 10CFR61. Sr-89 and Sr-90 are fission products that exist in the reactor coolant in a ratio of 1.0E-04 µCi/g Sr-89 to 7.0E-06 µCi/g Sr-90 per ANSI/ANS-18.1-1999, Radioactive Source Term for Normal Operation of Light Water Reactors. Because both are isotopes of the same element, both isotopes will react chemically in the same manner, having the same removal processes and maintaining the same approximate ratio if decay is neglected. Neglecting the effects of decay is conservative for the determination of Sr-89, which has a significantly shorter half-life (50.52 days) than Sr-90 (28.78 years). For every curie of Sr-90 present, an estimated 14.29 curies of Sr-89 is present.
- H-3 – The tritium concentration used for these calculations is from the 9-3-04 analysis of the CST. Tritium analysis of the CST is not performed on a routine basis. The result was 8.624E+06 pCi/L. It should be noted that this tritium concentration is for the CST, not what is released from the site. CST water is diluted by groundwater and rainwater, resulting in a lower concentration.
- Co-60 – The Co-60 concentration was calculated using the average concentration of routine analyses performed since 11-12-03. Less than detectable values were not used in the calculation. The average value was 312.8 pCi/L

with the max being ≈ 400 pCi/L on 9/04

1 of 2

C-23

The following estimates and projections assumed a 2.0 gallon per minute (gpm) leak of CST water during the entirety of 2004 and that the filtering effects of the soil to remove these isotopes is negligible (which is conservative).

Actual measured leak was 1.3 gpm

Total volume released:
(2.0 gpm) x (1440 min/day) x (366 days in 2004) x (3.785 liters / gallon) = 3.99E+06 L

Fe-55 concentration (prior to dilution by other groundwater sources):
(312.8 pCi/L Co-60) x (2.68 Ci Fe-55 / Ci Co-60) = 838.3 pCi/L Fe-55
Fe-55 activity:
(838.3 pCi/L Fe-55) x (3.99E+06 L) x (1 Ci / 1E12 pCi) = 3.34E-03 Ci Fe-55 ✓

Sr-90 concentration (prior to dilution by other groundwater sources):
(312.8 pCi/L Co-60) x (2.33E-03 Ci Sr-90 / Ci Co-60) = 0.7288 pCi/L Sr-90
Sr-90 activity:
(0.7288 pCi/L Sr-90) x (3.99E+06 L) x (1 Ci / 1E12 pCi) = 2.91E-06 Ci Sr-90 ✓

Sr-89 concentration (prior to dilution by other groundwater sources):
(312.8 pCi/L Co-60) x (2.33E-03 Ci Sr-90 / Ci Co-60) x (14.29 Ci Sr-89 / Ci Sr-90) = 10.41 pCi/L Sr-89
Sr-89 activity:
(10.41 pCi/L Sr-89) x (3.99E+06 L) x (1 Ci / 1E12 pCi) = 4.15E-05 Ci Sr-89 ✓

Tritium concentration (prior to dilution by other groundwater sources):
Analytical result from 9-3-04 of the CST: 8.624E+06 pCi/L H-3
Tritium activity:
(8.624E+06 pCi/L H-3) x (3.99E+06 L) x (1 Ci / 1E12 pCi) = 34.4 Ci H-3

Table 2, Col 2
10 CFR 20 limit:
Fe 55 = 1E-4 μCi/ml = 10^5 pCi/l
Sr 89 = 8E-6 μCi/ml = 8E4 pCi/l
Sr 90 = 5E-7 μCi/ml = 5E2 pCi/l
H-3 = 1E-3 μCi/ml = 10^6 pCi/l

All of the above concentrations for Fe-55, Sr-89, and Sr-90 before dilution of natural sources, which are calculated in a very conservative manner (i.e., higher than anticipated results), are below the EPA derived limits for drinking water (which are 2000, 20, and 8 pCi/L, respectively) as well as 10CFR20, Appendix B, Table 2, Column 2 limits (which are less restrictive). The highest tritium concentration seen at the storm drains prior to release to the plant's canals was 99,000 pCi/L in DSP-132 on 9-3-04, which is also below 10CFR20 limits. The canals are not a potential drinking water supply.

To determine the dose to the public as a result of a liquid release of tritium to the environment, estimates were performed using the current ODCM methodology using the activities calculated above, again assuming a constant 2.0 gpm leak rate and no removal due to decay or the filtering effects of the soil. The dose was attributed to a continuous release from Unit 3 in December of 2004, which does not affect the calculated annual dose or critical organ. Resultant doses (in mrem) and most the conservative receptor is:

Whole body	2.17E-4	Child
Organ	2.18E-4	Child
Critical organ	Liver	

The following are the limits on dose from liquid effluents from Chapter 12.3.A.2 of the ODCM:

1. Less than or equal to 10 mrem to any organ during any calendar quarter. ✓
2. Less than or equal to 20 mrem to any organ during any calendar year. ✓
3. Less than or equal to 3 mrem to whole body during any calendar quarter. ✓
4. Less than or equal to 6 mrem to whole body during any calendar year. ✓

The calculated doses are well below all regulatory limits. Assuming a constant release rate, the annual whole body dose limit of less than or equal to 6 mrem to the whole body and 20 mrem to any organ per year are the most restrictive ODCM limits in this scenario. The dose to the public from the release of a 2.0 gpm CST leak DTM nuclides is several orders of magnitude below these limits.

****
* DELIVER TO HEALTH PHYSICS *
****

AQUATIC Effluents- 10CFR50 Listing 19-oct-2004 17:50:27

STATION: DRESDEN STATION
UNIT: 3
PERIOD: 01/01/04 12/31/04
NAME: MOORE
REPORT: ANNUAL
MODE: ACTUAL

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
INFANT RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.01
CRIT. ORGAN(MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

2004 ANNUAL REPORT
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
INFANT RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.005
INTERNAL ORGAN	4.0 MREM	0.005
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
CHILD RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	2.17E-04	2.17E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	2.18E-04 LIVER	2.18E-04 LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.01
CRIT. ORGAN(MREM)	5.0	0.00	0.00	0.00	0.00 LIVER	10.0	0.00 LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

2004 ANNUAL REPORT
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
CHILD RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	2.11E-04	2.11E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	2.11E-04	2.11E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.005
INTERNAL ORGAN	4.0 MREM	0.005
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
TEENAGER RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	1.16E-04	1.16E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	1.17E-04	1.17E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.00
CRIT. ORGAN(MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

2004 ANNUAL REPORT
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
TEENAGER RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	1.10E-04	1.10E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	1.10E-04	1.10E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.003
INTERNAL ORGAN	4.0 MREM	0.003
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
ADULT RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	1.64E-04	1.64E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	1.65E-04	1.65E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.01
CRIT. ORGAN (MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

2004 ANNUAL REPORT
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 01/01/04 TO 12/31/04 CALCULATED 10/19/04
ADULT RECEPTOR

DOSE TYPE	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	0.00E+00	0.00E+00	0.00E+00	1.56E-04	1.56E-04
INTERNAL ORGAN	0.00E+00	0.00E+00	0.00E+00	1.56E-04	1.56E-04
				LIVER	LIVER

THIS IS A REPORT FOR THE CALENDAR YEAR 2004

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.004
INTERNAL ORGAN	4.0 MREM	0.004
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

****
* DELIVER TO HEALTH PHYSICS *
****

19-oct-2004 17:49:01

AQUATIC Effluents - 10CFR50 Listing

STATION: DRESDEN STATION
UNIT: 3
PERIOD: 12/01/04 12/31/04
NAME: MOORE
REPORT: MONTHLY
MODE: ACTUAL

For INFANT dose calculations, the included pathways are:

DRINKING WATER

For ADULT dose calculations, the included pathways are:
DRINKING WATER
FISH

NUCLIDES (uCURIES)

NUCLIDE	VALUE
H-3	3.44E+07
Fe-55	3.34E+03
Sr-89	4.15E+01
Sr-90	2.91E+00

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
INFANT RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	2.10E-04	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
INTERNAL ORGAN	2.10E-04	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.01
CRIT. ORGAN(MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004

*PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM **

PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04

INFANT RECEPTOR

DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	2.10E-04	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
INTERNAL ORGAN	2.10E-04	0.00E+00	0.00E+00	0.00E+00	2.10E-04	2.10E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.005
INTERNAL ORGAN	4.0 MREM	0.005
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
CHILD RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	2.17E-04	0.00E+00	0.00E+00	0.00E+00	2.17E-04	2.17E-04
INTERNAL ORGAN	2.18E-04	0.00E+00	0.00E+00	0.00E+00	2.18E-04	2.18E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.01
CRIT. ORGAN(MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
CHILD RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	2.11E-04	0.00E+00	0.00E+00	0.00E+00	2.11E-04	2.11E-04
INTERNAL ORGAN	2.11E-04	0.00E+00	0.00E+00	0.00E+00	2.11E-04	2.11E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.005
INTERNAL ORGAN	4.0 MREM	0.005
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
TEENAGER RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	1.16E-04	0.00E+00	0.00E+00	0.00E+00	1.16E-04	1.16E-04
INTERNAL ORGAN	1.17E-04	0.00E+00	0.00E+00	0.00E+00	1.17E-04	1.17E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.00
CRIT. ORGAN (MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
TEENAGER RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	1.10E-04	0.00E+00	0.00E+00	0.00E+00	1.10E-04	1.10E-04
INTERNAL ORGAN	1.10E-04	0.00E+00	0.00E+00	0.00E+00	1.10E-04	1.10E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.003
INTERNAL ORGAN	4.0 MREM	0.003
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
MAXIMUM DOSES (MREM) RESULTING FROM AQUATIC EFFLUENTS
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
ADULT RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	1.64E-04	0.00E+00	0.00E+00	0.00E+00	1.64E-04	1.64E-04
INTERNAL ORGAN	1.65E-04	0.00E+00	0.00E+00	0.00E+00	1.65E-04	1.65E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 10 CFR 50 APP. I

	QTRLY OBJ	1ST QTR JAN-MAR	2ND QTR APR-JUN	3RD QTR JUL-SEP	4TH QTR OCT-DEC	YRLY OBJ	% OF APP. I
	---------- % OF APP I. ----------						
TOTAL BODY (MREM)	1.5	0.00	0.00	0.00	0.01	3.0	0.01
CRIT. ORGAN(MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.00
					LIVER		LIVER

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

DRESDEN STATION UNIT THREE

ACTUAL 2004
PROJECTED DOSE AT NEAREST COMMUNITY WATER SYSTEM *
PERIOD OF RELEASE - 12/01/04 TO 12/31/04 CALCULATED 10/19/04
ADULT RECEPTOR
DATABASE CONTAINS DATA THROUGH 12/31/04

DOSE TYPE	CURRENT MONTH	1ST QUARTER JAN-MAR	2ND QUARTER APR-JUN	3RD QUARTER JUL-SEP	4TH QUARTER OCT-DEC	ANNUAL
TOTAL BODY	1.56E-04	0.00E+00	0.00E+00	0.00E+00	1.56E-04	1.56E-04
INTERNAL ORGAN	1.56E-04	0.00E+00	0.00E+00	0.00E+00	1.56E-04	1.56E-04
	LIVER				LIVER	LIVER

THIS REPORT CONTAINS RELEASES FOR THE FOURTH QUARTER

COMPLIANCE STATUS - 40 CFR 141

TYPE	ANNUAL LIMIT	% OF LIMIT
TOTAL BODY	4.0 MREM	0.004
INTERNAL ORGAN	4.0 MREM	0.004
		LIVER

* THIS CALCULATION OF DOSE IS BASED ON TECHNIQUES DESCRIBED IN THE COMMONWEALTH EDISON OFFSITE DOSE CALCULATION MANUAL. THESE TECHNIQUES DIFFER FROM THOSE DESCRIBED IN 40 CFR 141.

RESULTS BASED UPON: ODCM ANNEX REVISION 1.1 JULY 1994
ODCM SOFTWARE VERSION 1.1 January 1995
ODCM DATABASE VERSION 1.1 January 1995

		Leakage rate (gpm)	0.5	2	0.5	2
		Volume (gal)	263520	1054080		
		Volume (L)	997423.2	3989692.8		
Scaling factors (6-29-04)		CST (uCi/ml)	Activity (uCi)		Activity (Ci)	
Co-60	NA	3.128E-07				
H-3	NA	8.624E-03	8.602E+06	3.441E+07	8.602E+00	3.441E+01
Fe-55	2.68	8.383E-07	8.361E+02	3.344E+03	8.361E-04	3.344E-03
Sr-89	3.33E-02	1.041E-08	1.038E+01	4.154E+01	1.038E-05	4.154E-05
Sr-90	2.33E-03	7.288E-10	7.269E-01	2.908E+00	7.269E-07	2.908E-06

$\mu Ci/ml \times 1E9 = pCi/l$

2/3 CST	Co-60 (uCi/ml)
10/08/04 01:00	6.55E-08
10/08/04 01:00	9.25E-08
10/06/04 00:15	
10/04/04 02:00	5.80E-08
09/30/04 23:01	
09/29/04 15:20	
09/26/04 21:30	9.04E-08
09/23/04 23:30	
09/22/04 00:05	
09/20/04 00:15	
09/17/04 00:06	8.28E-08
09/15/04 00:20	6.38E-08
09/13/04 00:15	
09/10/04 00:03	1.65E-07
09/08/04 00:07	
09/06/04 01:30	
09/03/04 01:15	
09/01/04 02:10	1.30E-07
08/30/04 01:15	
08/27/04 00:05	
08/25/04 03:39	
08/23/04 00:08	8.70E-08
08/20/04 00:10	2.39E-07
08/18/04 08:00	
08/16/04 02:00	
08/12/04 14:15	
08/08/04 23:30	1.37E-07
08/06/04 00:20	1.13E-07
08/04/04 00:00	1.10E-07
08/02/04 00:10	8.46E-08
07/29/04 23:15	
07/28/04 00:30	
07/26/04 00:25	1.21E-07
07/23/04 00:05	1.33E-07
07/21/04 00:05	1.89E-07
07/19/04 00:55	1.37E-07
07/19/04 00:15	1.37E-07
07/15/04 23:05	2.68E-07
07/13/04 23:04	1.94E-07
07/11/04 23:04	1.64E-07
07/09/04 00:14	2.60E-07
07/07/04 00:10	2.81E-07
07/05/04 00:00	3.33E-07
07/02/04 02:36	1.84E-07
06/30/04 05:06	2.70E-07
06/28/04 04:08	3.89E-07
06/28/04 00:15	5.80E-07
06/24/04 23:30	5.92E-07
06/23/04 00:00	6.09E-07
06/20/04 23:40	7.47E-07
06/18/04 01:10	1.10E-06
06/16/04 01:40	1.68E-06
06/14/04 02:25	2.94E-06
06/11/04 01:30	9.01E-07
06/09/04 00:15	2.01E-07
06/07/04 01:45	9.83E-08
06/04/04 00:15	1.11E-07
06/02/04 00:55	2.52E-07
05/31/04 00:15	3.32E-07
05/28/04 01:16	2.57E-07
05/26/04 00:20	8.13E-07
05/24/04 00:20	4.82E-07
05/21/04 00:10	2.01E-07
05/19/04 00:05	1.69E-07
05/17/04 00:15	1.77E-07
05/17/04 00:15	2.36E-07
05/14/04 16:05	2.48E-07
05/12/04 00:38	3.67E-07
05/06/04 18:10	2.26E-07
05/04/04 19:50	7.81E-08
05/03/04 01:00	9.27E-08
04/29/04 23:29	2.95E-07
04/28/04 00:14	1.79E-07
04/26/04 00:12	
04/19/04 00:35	
04/16/04 00:10	
04/14/04 00:20	2.64E-07
04/12/04 01:00	3.85E-07
04/09/04 04:05	6.60E-08
04/09/04 01:40	
04/07/04 01:45	
04/05/04 02:00	
04/02/04 01:05	1.72E-07
03/31/04 01:30	1.40E-07
03/31/04 01:30	1.14E-07
03/29/04 02:30	1.57E-07
03/24/04 00:59	1.50E-07
03/22/04 03:00	1.50E-07
03/18/04 23:10	1.56E-07
03/17/04 00:00	8.55E-08
03/14/04 23:45	1.17E-07
03/12/04 00:10	
03/10/04 01:14	9.02E-08
03/08/04 00:43	1.13E-07
03/03/04 01:00	
03/01/04 02:10	
02/27/04 05:30	
02/25/04 00:55	
02/20/04 00:35	
02/18/04 00:00	
02/11/04 00:38	
02/09/04 00:47	
02/06/04 00:10	7.51E-08
02/04/04 04:45	6.63E-08
02/02/04 02:50	5.93E-08
02/02/04 02:50	7.78E-08
01/30/04 00:00	1.55E-07
01/27/04 23:05	9.82E-08
01/26/04 23:10	1.12E-07
01/25/04 23:50	1.62E-07
01/23/04 00:25	8.84E-08
01/21/04 00:25	7.07E-08
01/18/04 21:30	
01/18/04 00:10	1.11E-07
01/16/04 01:30	4.32E-07
01/14/04 02:00	1.50E-07
01/12/04 00:40	3.86E-07
01/09/04 01:00	4.35E-07
01/07/04 01:00	3.16E-07
01/05/04 00:20	3.32E-07
01/02/04 03:15	4.21E-07
12/31/03 00:30	3.92E-07
12/29/03 00:40	3.46E-07
12/23/03 22:25	8.46E-07
12/21/03 22:20	1.04E-06
12/18/03 22:25	1.37E-06
12/16/03 23:30	1.24E-06
12/15/03 18:50	2.19E-07
12/14/03 19:00	2.91E-07
12/13/03 22:02	2.54E-07
12/13/03 00:50	2.66E-07
12/12/03 00:03	2.04E-07
12/11/03 08:55	2.05E-07
12/08/03 00:15	2.81E-07
12/05/03 00:00	2.45E-07
12/03/03 00:15	1.99E-07
12/01/03 00:16	1.62E-07
11/28/03 00:15	2.26E-07
11/26/03 00:05	2.82E-07
11/24/03 00:15	2.85E-07
11/20/03 23:30	3.90E-07
11/18/03 23:10	4.68E-07
11/16/03 23:30	4.47E-07
11/12/03 00:20	5.17E-07

Average 3.1279E-07

DATA SHEET 4

SCALING FACTOR RESULTS

Waste Stream(s) U-3 RESIN (RWCU AND CONDENSATE)

Base Nuclide	Scaled Nuclide	Scaling Factor
Co-60	C-14	1.81E-2
Co-60	Fe-55	1.40
Co-60	Ni-63	2.44E-2
Co-60	Sr-90	2.33E-3
~~Co-60 Tc-99~~	Tc-99	2.45E-3
Co-60	I-129	N/A RECENT LLD VALUE WILL BE USED
Co-60	Pu-239	1.12E-5
Pu-239	Pu-238	1.19
~~Pu-239 Pu-241~~	Pu-241	1.40E+2
Pu-239	Am-241	1.77
Pu-239	Cm-242	1.04
Pu-239	Cm-243/ Cm-244	2.58E-1

Prepared By: Stephen J Beers / 6.29.04

Reviewed By: [signature] / 6/29/04

DATA SHEET 3

LIQUID DISCHARGE SCALING FACTOR SUMMARY

Nuclide Ratio	Scaling factor
Fe-55/Co-60	2.68
Sr-89/Co-60	0
Sr-90/Co-60	0

Prepared by/Date: 6-17-04

Reviewed by/Date: 6/17/04

DATA SHEET 1

LIQUID RADWASTE SCALING FACTOR DETERMINATION WORKSHEET

Difficult to Measure (DTM) Radionuclide (Circle): (Fe-55) Sr-89 Sr-90

Date	Co-60 uCi/ml	DTM uCi/ml	Ratio DTM /Co-60	Log(DTM/Co-60)	Log Upper range	Log Lower Range	Outlier (yes or no)
20-Jul-02	1.684E-06	6.540E-06	3.884E+00	0.5893	1.4285	-0.5715	no
14-Aug-02	6.209E-07	LLD	N/A	N/A	1.4285	-0.5715	N/A
12-Sep-02	1.745E-06	3.300E-06	1.891E+00	0.2766	1.4285	-0.5715	no
19-Oct-02	7.676E-07	LLD	N/A	N/A	1.4285	-0.5715	N/A
7-Nov-02	1.640E-07	LLD	N/A	N/A	1.4285	-0.5715	N/A
13-Jan-03	1.698E-07	LLD	N/A	N/A	1.4285	-0.5715	N/A
3-Feb-03	2.809E-07	7.380E-07	2.628E+00	0.4196	1.4285	-0.5715	no
			Average of Logs	0.4285			
			Scaling Factor	**2.68E+00**			

Prepared By: 6-17-04

Reviewed By: 6/17/04

DATA SHEET 1

LIQUID RADWASTE SCALING FACTOR DETERMINATION WORKSHEET

Difficult to Measure (DTM) Radionuclide (Circle): Fe-55 Sr-89 (Sr-90)

Date	Co-60 uCi/ml	DTM uCi/ml	Ratio DTM /Co-60	Log(DTM/Co-60)	Log Upper range	Log Lower Range	Outlier (yes or no)
20-Jul-02	1.684E-06	LLD	N/A		1.0000	-1.0000	N/A
14-Aug-02	6.209E-07	LLD	N/A		1.0000	-1.0000	N/A
12-Sep-02	1.745E-06	LLD	N/A		1.0000	-1.0000	N/A
19-Oct-02	7.676E-07	LLD	N/A		1.0000	-1.0000	N/A
07-Nov-02	1.640E-07	LLD	N/A		1.0000	-1.0000	N/A
13-Jan-03	1.698E-07	LLD	N/A		1.0000	-1.0000	N/A
03-Feb-03	2.809E-07	LLD	N/A		1.0000	-1.0000	N/A
			Average of Logs	0.0000			
			Scaling Factor	**0.00E+00**			

Prepared By: 10-17-04

Reviewed by: 10/19/04

DATA SHEET 1

LIQUID RADWASTE SCALING FACTOR DETERMINATION WORKSHEET

Difficult to Measure (DTM) Radionuclide (Circle): Fe-55 (Sr-89) Sr-90

Date	Co-60 uCi/ml	DTM uCi/ml	Ratio DTM /Co-60	Log(DTM/Co-60)	Log Upper range	Log Lower Range	Outlier (yes or no)
20-Jul-02	1.6837E-06	0	N/A		1.0000	-1.0000	N/A
14-Aug-02	6.20941E-07	LLD	N/A		1.0000	-1.0000	N/A
12-Sep-02	1.74539E-06	LLD	N/A		1.0000	-1.0000	N/A
19-Oct-02	7.67607E-07	LLD	N/A		1.0000	-1.0000	N/A
7-Nov-02	0.000000164	LLD	N/A		1.0000	-1.0000	N/A
13-Jan-03	1.698E-07	LLD	N/A		1.0000	-1.0000	N/A
3-Feb-03	2.8086E-07	LLD	N/A		1.0000	-1.0000	N/A
			Average of Logs	0.0000			
			Scaling Factor	**0**			

Prepared By: 6-17-04

Reviewed By: 6/17/04