

May 23, 2006

Mr. Mike McCann
U.S. Nuclear Regulatory Commission
Region III
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Suite 210
Lisle, IL 60532-4352

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Dear Mr. McCann:

Subject: Response to Request for More Information on the Battelle West Jefferson North Site Groundwater as Directed by NRC Telephone Conference Record Dated March 21, 2006.

The purpose of this letter is to provide the NRC with the detailed information on the West Jefferson North Site groundwater status as requested in the March 21, 2006 NRC/Battelle telephone conference. This information is provided in the following summary which is segregated by each of the four (4) individual groundwater layers present on the West Jefferson North Site. There are three water bearing units within the unconsolidated material above the bedrock at the West Jefferson Site and one shallow groundwater area. The three water bearing units consist of the "885 ft Mean Sea Level", "855 ft Mean Sea Level", and "805 ft Mean Sea Level". The shallow groundwater layer consists of the "Bog Area."

It is Battelle's position that the standards that apply to the groundwater layers above the 805 ft Mean Sea Level layer are the 10 CFR Part 20 Appendix B standards because the yields in these layers are too low to be suitable as a drinking water supply. As described below, the data shows that the Part 20 Appendix B standards are met for each of these layers. For reference purposes, the data is compared to the U. S. Environmental Protection Agency's (EPA's) Maximum Contaminant Levels MCLs for radionuclides in drinking water. In addition, the calculated effective dose equivalent that could be received from the groundwater pathway for each of the four (4) layers is below the 25 mRem standard in 10 CFR Section 20.1402, for unrestricted use. Finally, the sampling data from the period of 1993 to the present have shown no radioactive contamination above EPA's MCLs for radionuclides in drinking water in Battelle's drinking water wells.

Bog Area Groundwater Layer

Hydrogeology- The unconsolidated glacial deposits underlying the West Jefferson North Site are approximately 100 feet thick. These deposits overlie the regional limestone aquifer. From land surface to the limestone, the geological deposits consist of very dense, over compacted glacial till consisting of 70% to 99% clay. At approximately 30 ft below land surface, the sand/silt content in the clay is in the range of 30%. This horizon will seep groundwater into a well at a rate of approximately 0.25 gallons per minute (gpm). In the "Bog Area" this horizon is at about 7 ft below land surface. Due to the nature of the soils in the "Bog Area", the flow of water in this area is essentially non-existent. Any flow which does occur is in the direction of Silver Creek Reservoir. Any discharge of water from this layer is local along the reservoir shore and below and in the lowlands to the east of the facility. Both the low yield and shallow depth to this water table would make it unsuitable as a source of water and it is considered non-potable as the state requires wells used for drinking water purposes to be at a minimum depth of 25 feet.

Wells in Layer: There are currently two operating monitoring wells (C09 and 168) in this layer with depths of 10-12 feet (see attached figure 1). Since 1993, the wells have provided semi annual monitoring locations for the following radiological analyses: gross alpha/beta, gamma spectroscopy, alpha spectroscopy, and Sr-90 analysis. The wells have met all 10 CFR Part 20 Appendix B standards and have only shown levels greater than EPA MCLs of licensed materials for Sr-90 with the last monitoring interval in December of 2005 recorded at 29 pCi/liter of Sr-90. The well sampling results are summarized in attached Table 1.

Remedial Action History in the Area: During the site remedial action work in the fall of 2005, the unsaturated, historically contaminated soils above this groundwater layer were successfully remediated and final status surveys performed to verify that the residual soils meet the Battelle SNM-7 Decommissioning Plan criteria for unrestricted release.

Well Sampling Plans: Battelle has sampled the two available wells located in the "Bog Area" in April 2006 for the same radiological analyses as discussed above with sample results expected in June.

Evaluation of Source Term in the Water Table: An evaluation of the Sr-90 levels currently present in this water table has been performed through the use of the dose assessment model detailed in Federal Guidance Report No. 11, Report No. EPA-520/1-88-020 September 1988. This report was selected because it is based on the International Commission for Radiation Protection (ICRP) Reports 26 and 30 as well as the dose conversion factors used are the same as those used in RESRAD. The result of the evaluation demonstrated an annual effective dose equivalent of approximately 3 mRem/year if used as a singular drinking water source by a member of the public, which meets the 10 CFR Section 20.1402 standard. Battelle believes that the Sr-90 is present by itself in this water table due to its nature as a beta emitter, which has a tendency to move quicker through soils to the water table by action of rain and melting snow in the area. This action provides a hydraulic mechanism for transport to the shallow water table. Due to the nature of the water flow in this area (see above), any migration of the Sr-90 contamination would be towards Silver Creek Reservoir, which is located entirely on the Battelle West Jefferson Site. Water samples from the Silver Creek Reservoir spillway and Big Darby Creek are routinely taken and monitored with no quantities of licensed material above EPA MCLs observed (see Table 2 for representative data). Over time the levels of Sr-90 in this water layer should slowly decline due to the facts that the site has been remediated to the Battelle SNM-7 Decommissioning Plan unrestricted release criteria thus eliminating any future contaminating source, radiological decay of the Sr-90, and the continued water flow, even though slow.

885 ft Mean Sea Level Sand layer

Hydrogeology: The unconsolidated glacial deposits underlying the West Jefferson North Site are approximately 100 feet thick. These deposits overlie the regional limestone aquifer. From land surface to the limestone, the geological deposits consist of very dense, over compacted glacial till consisting of 70% to 99% clay. The 885 sand layer is a very thin glacial deposit composed of sandy till identified at approximately 885 feet in elevation within the thick, clay-rich till deposits that underlie the Site. This sand layer is approximately 30 ft below the land surface. In a few locations, the horizon has the ability to slowly seep groundwater into wells. The sandy horizon outcrops along embankments at the site. In these areas the soil is moist. The horizon likely represents a short period of slightly higher energy glacial melt water occurring in between long periods of clay-rich till deposition. This sandy zone has been detected in about half of the soil borings at the Site. In most of the borings it has yielded such low volumes of water that it is not possible to collect a sample of the groundwater. The lateral extent of the deposit beyond the Site is not known, and vertically it is very thin, an inch or two at best, under the Site. The water in this layer is suspected to be hydraulically connected to the Silver Creek Reservoir with a directional flow towards the west to northwest from the Site as the higher hydraulic head in the Silver Creek Reservoir regulates the flow of this layer of groundwater away from it. Estimated lateral groundwater flow velocity in the layer is 5-50 feet/year. Estimated vertical groundwater flow velocity is 0.3 feet/year. The transmissivity of the unit/horizon is extremely low making the unit completely unsuitable for a domestic water supply (i.e. insufficient flow to be considered a potable water source). Slug testing conducted in 2002-2003 have estimated hydraulic conductivity values in the 0.001 to 0.0001 cm/sec. The well logs from the domestic water supplies in the region have not identified the 885 sand layer.

Wells in Layer: There is currently one monitoring well (300) available on Site for this layer at a finished depth of approximately 37 feet (see attached figure 2). This well has provided a monitoring location since 1997 and has had radiological analyses semi-annually for gross beta/alpha, gamma spectroscopy, alpha spectroscopy, and Sr-90. This well has a history of being within the EPA MCLs for licensed materials as was last demonstrated in the December 2005 sampling interval. The well sampling results are summarized in attached Table 3.

In calendar year 2002 and 2003, a total of twenty-two (22) wells were put in place on Site in this groundwater layer to evaluate underground water flow patterns in preparation for the Site remedial action work (see attached figure 2). Some of these wells were sampled once and radiological analyses were taken for either gamma spectroscopy and/or gross alpha/beta activity measurements. The wells all met the 10 CFR Part 20 Appendix B standards. The gamma spectroscopy results were all less than or equal to Minimum Detectable Activity (MDA) with the Cs-137 MDA being approximately 2-3 pCi/liter. The range of activity results for gross alpha measurements was from < 3-13 pCi/liter. The range of gross beta measurements was from 92-446 pCi/liter. The well sampling results are summarized in attached Table 4. All twenty-two (22) of these wells were abandoned using state well closure rules in calendar year 2004 after it was determined that further underground water flow pattern testing was not necessary.

Remedial Action History: During the course of Site remediation activities there were various areas on site that had contaminated soil and substructures removed below grade to a maximum depth of approximately 20 feet. There was no contact between the contaminated areas and this groundwater layer observed during remedial action activities. At this time, all final status surveys have been completed on site and the surveys demonstrate that the Battelle SNM-7 Decommissioning Plan criteria for unrestricted release have been met.

Well Sampling Plans: Battelle has sampled the available well located in the 885 ft Mean Sea Level in April 2006 for the same radiological analyses as discussed above with sample results expected in June.

Evaluation of Source Term in the Water Table: Based on the available wells historical and current data, a source term of interest is not present in this layer. Furthermore, the final status surveys have been completed for the Site and they confirm that the Site meets the unrestricted release criteria under the Battelle SNM-7 Decommissioning Plan. In addition, if a conservative ratio of gross beta to Sr-90 were to be applied to the twenty-two flow pattern wells, a conservative dose assessment model could be performed as detailed in Federal Guidance Report No. 11, Report No. EPA-520/1-88-020 September 1988. This report was selected because it is based on the *International Commission for Radiation Protection (ICRP) Reports 26 and 30* as well as the dose conversion factors used are the same as those used in RESRAD. The result of this conservative evaluation demonstrated an annual effective dose equivalent of approximately 15.7 mRem/year if used as a singular drinking water source by a member of the public, which meets the 10 CFR Section 20.1402 standard.

855 ft Mean Sea Level Sand Layer

Hydrogeology: The unconsolidated glacial deposits underlying the West Jefferson North Site are approximately 100 feet thick. These deposits overlie the regional limestone aquifer. From land surface to the limestone, the geological deposits consist of very dense, over compacted glacial till consisting of 70% to 99% clay. The 855 sand layer is a glacial deposit identified at approximately 855 feet in elevation within the thick, clay-rich till deposits that underlie the Site. The layer is approximately 60 feet below the land surface. The unit is about midway in depth in the till deposits. The sand unit itself varies from approximately 0.5 to 3.0 feet in thickness and consists of both medium and coarse sand layers. It likely represents a period of high energy glacial melt water depositing outwash sand in between long periods of clay-rich till deposition. The sand unit has been detected in several borings at the Site and appears to be a continuous deposit formed from overlapping braided stream channels. The lateral extent of the deposit beyond the Site is not known, but its vertical thickness is well defined and limited under the Site. The water in this layer is suspected to be hydraulically connected to the Silver Creek Reservoir with a general directional flow which is northerly from the Site as the higher hydraulic head in the Silver Creek Reservoir regulates the flow of groundwater away from it. Estimated lateral groundwater flow velocity in the layer is 5-50 feet/year. Estimated vertical groundwater flow velocity is 0.3 feet/year. The limited thickness of the layer makes the *transmissivity of the unit very low and unsuitable for domestic water supply*. Slug testing performed in 2002-2003 has estimated the hydraulic conductivity in the range of 0.001 to 0.0001 cm/sec. Sustained yields from the unit would likely be in the range of 0.5 to 2 gallons per minute, making this layer unsuitable for a drinking water source (i.e. insufficient flow to be considered a potable water source).

Wells in Layer: There are currently two caisson wells from the former JN-1B Facility area available on site for access to this layer (see attached figure 3). These large diameter (36 inch) wells were originally put in place during the JN-1B Facility construction in 1970 to serve as a mechanical method for assisting with water pressure removal during the construction of the deep fuel pool in the JN-1B Facility. Figure 3 also shows the location of the two caisson wells in relation to the other portions of the JN-1B facility. Since their installation, the groundwater present in the caisson wells has been periodically monitored under the surveillance and maintenance program for radiological conditions through gross beta/alpha analyses. A review of past radioanalytical data from the past sampling for calendar year 2000 through 2003 revealed a range of <3 - 12 pCi/liter alpha and 42-131 pCi/liter beta. Two (2) grab samples were collected from the caisson wells in December of 2005 and analyzed for gamma spectroscopy, alpha spectroscopy, gross alpha/beta, and Sr-90. The results of this sampling meet the 10 CFR Part 20 Appendix B standards and are within the EPA MCLs for all licensed materials except for Sr-90 which averaged 57.4 pCi/liter. The well sampling results are summarized in attached Table 5.

In calendar year 2002 and 2003 a total of ten (10) wells were put in place on Site in this groundwater layer to evaluate underground water flow patterns in preparation for site remedial action work (see attached figure 3). These wells were sampled once and radiological analyses were taken for either gamma spectroscopy and/or gross alpha/beta activity measurements. The wells all met the 10 CFR Part 20 Appendix B standards. The gamma spectroscopy results were all less than or equal to MDA with the Cs-137 MDA being approximately 2-3 pCi/liter. The range of activity for gross alpha measurements was <3-12 pCi/liter. The range of activity results for gross beta measurements was from 90-481 pCi/liter. The well sampling results are summarized in attached Table 6. All ten (10) of these wells were abandoned using state well closure rules in calendar year 2004 after it was determined that further underground water flow pattern testing was not necessary.

Remedial Action History: During the course of Site remediation activities there were various areas on Site that had contaminated soils and structures removed to a maximum depth of approximately 20 feet. This included the areas around the two caisson wells. As a part of the Site remediation activities, the physical structure of the caisson wells themselves and the base soils surrounding the caissons were surveyed and demonstrated to meet the Battelle SNM-7 Decommissioning Plan criteria for free release as documented in the final status survey report "*Columbus Closure Project Characterization and Final Status Survey Report for the JN-1B Foundation Excavation*". There was no contact between the contaminated areas and this groundwater layer observed during remedial action activities. However, it is possible that during the remedial action work around the caisson wells that additional Sr-90 contamination was brought to the water table by hydraulic action created during the extensive misting that was done as part of the remediation activities for dust control. At this time, all final status surveys have been completed on site and the surveys demonstrate that the Battelle SNM-7 Decommissioning Plan criteria for unrestricted release have been met.

Well Sampling Plans: Battelle has plans to collect additional samples of the caisson well in the 855 layer later this summer.

Evaluation of Source Term in the Water Table: An evaluation of the Sr-90 levels currently present in this water table has been performed through the use of the dose assessment model detailed in Federal Guidance Report No. 11, Report No. EPA-520/1-88-020 September 1988. This report was selected because it is based on the International Commission for Radiation Protection (ICRP) Reports 26 and 30, as well as the dose conversion factors used are the same as what is used in RESRAD. The result of the evaluation demonstrated an annual effective dose equivalent of approximately 6.4 mRem/year if used as a singular drinking source by a member of the public, which meets the 10 CFR Section 20.1402 standard. Battelle believes that the Sr-90 is present by itself in this water table for similar reasons as presented in the "Bog Area" evaluation section. Over time the levels of Sr-90 in this water layer should slowly decline due to the facts that the site has been remediated to the Battelle SNM-7 Decommissioning Plan unrestricted release criteria thus eliminating any future contaminating source, radiological decay of the Sr-90, and the continued water flow, even though slow.

In addition to the dose assessment model for the caisson wells, if a conservative ratio of gross beta to Sr-90 were to be applied to the ten (10) flow pattern wells, a conservative dose assessment model could be

performed as detailed in Federal Guidance Report No. 11, Report No. EPA-520/1-88-020 September 1988. This report was selected because it is based on the International Commission for Radiation Protection (ICRP) Reports 26 and 30 as well as the dose conversion factors used are the same as those used in RESRAD. The result of this conservative evaluation demonstrated an annual effective dose equivalent of approximately 17 mRem/year if used as a singular drinking water source by a member of the public, which meets the 10 CFR Section 20.1402 standard.

805ft Mean Sea Level Limestone Layer

Hydrogeology: The unconsolidated glacial deposits underlying the West Jefferson North Site are approximately 100 feet thick. These deposits overlie the regional limestone aquifer. From land surface to the limestone, the geological deposits consist of very dense, over compacted glacial till consisting of 70% to 99% clay. This layer is known as the basal sand layer on Site and is considered to lie above the regional limestone aquifer. This layer starts at approximately 100 feet below land surface. The water in this layer is suspected to be hydraulically connected to the bedrock layer with a general directional flow easterly from the site. Estimated lateral groundwater flow velocity in the layer is 5-50 feet/year. Estimated vertical groundwater flow velocity is 0.3 feet/year. Slug testing performed in 2002-2003 has estimated the hydraulic conductivity in the range of 0.001 to 0.0001 cm/sec. It is important to note that the hydraulic head in the basal sand is five to eight (5-8) feet higher than the head in the 855 sand layer indicating that ground water flow is upward under the facility and likely upward also under the floor of the Big Darby Creek Valley, flowing from the basal/regional limestone aquifer upward towards the 855 sand layer.

Wells in Layer: There is currently one (1) active supply well available on Site for access to this layer (see attached figure 4 for location of West Jefferson North Site drinking water source). Additionally, there are two (2) other active supply wells located on the Battelle West Jefferson property in this layer. These wells serve as the drinking water source for the Battelle West Jefferson Property and have been developed to levels up to 162 feet in depth. These wells have been under a semi annual radiological monitoring program since 1993 for: gamma spectroscopy, alpha spectroscopy, gross alpha/beta, and Sr-90. These sampling results have always met the EPA MCLs for radionuclides in drinking water. The well sampling results are summarized in attached Table 7.

In calendar year 2002 and 2003 a total of four (4) wells were put in place in this layer on Site to evaluate underground water flow patterns in preparation for the Site remedial action work (see attached figure 4). The majority of these wells were sampled once radiologically and analyses were taken for either gamma spectroscopy and/or gross alpha/beta activity measurements. The wells all met the 10 CFR Part 20 Appendix B standards. The gamma spectroscopy results were all less than or equal to MDA with the Cs-137 MDA being 2-3 pCi/liter. The maximum activity for the gross alpha measurements was 8 pCi/liter. The range of gross beta measurements was from 35-70 pCi/liter. The well sampling results are summarized in attached Table 8. All four (4) of these wells were abandoned in place in 2004 using state well closure rules after it was determined that further underground water flow pattern testing was not necessary.

Remedial Action History: During the course of Site remediation activities there were various areas on Site that had contaminated soils and structures removed to a maximum depth of approximately 20 feet. There was no contact between the contaminated areas and this groundwater layer observed during remedial action activities. At this time, all final status surveys have been completed on site and the surveys demonstrate that the Battelle SNM-7 Decommissioning Plan criteria for unrestricted release have been met.

Well Sampling Plans: Battelle sampled the site supply wells in April 2006 for the same radiological analyses as discussed above with sample results expected in June.

Evaluation of Source Term in This Layer: Based on the available wells historical and current data, a source term of interest is not present in this layer. The final status surveys have been completed for the Site and they confirm that the Site meets the unrestricted release criteria under the Battelle SNM-7 Decommissioning Plan. In addition, if a conservative ratio of gross beta to Sr-90 were to be applied to the four flow pattern wells, a conservative dose assessment model could be performed as detailed in Federal Guidance Report No. 11, Report No. EPA-520/1-88-020 September 1988. This report was selected because

it is based on the International Commission for Radiation Protection (ICRP) Reports 26 and 30 as well as the dose conversion factors used are the same as those used in RESRAD. The result of this conservative evaluation demonstrated an annual effective dose equivalent of approximately 2.5 mRem/year if used as a singular drinking water source by a member of the public, which meets the 10 CFR Section 20.1402 standard. Finally, Battelle's on-site drinking water wells, which are hydraulically connected to the 805 layer, have shown no radioactive contamination above the EPA MCLs for radionuclides in drinking water.

Summary

The Battelle West Jefferson Site has four groundwater layers. The top three layers (Bog Area, 885 ft, and 855 ft) are not suitable for use as drinking water sources due to their very low yield volumes. These three upper groundwater layers meet the 10 CFR Part 20 Appendix B standards. The deepest layer (805 ft) is above the area aquifer and monitoring data shows no source term requiring evaluation. In addition, evaluations performed for each of the 4 layers indicate that even if they were used as a sole source of drinking water by a member of the public that they would meet 10 CFR Section 20.1402 criteria established by the NRC for unrestricted use. Finally, Battelle's on-site drinking water wells have shown no radioactive contamination above the EPA MCLs for radionuclides in drinking water.

If you have any questions or comments concerning this information please do not hesitate to call me at 614-424-4098.

Sincerely,



Joe Jacobsen
BCLDP Radiation Safety Officer

Attachments: As stated (12)

Cc: John Sattler, U.S. Department of Energy

Battelle West Jefferson North

Monitoring Wells/Surface Water Sampling Locations

Bog Area Groundwater Layer

Legend

- Monitoring Wells (Installed 1989/90)

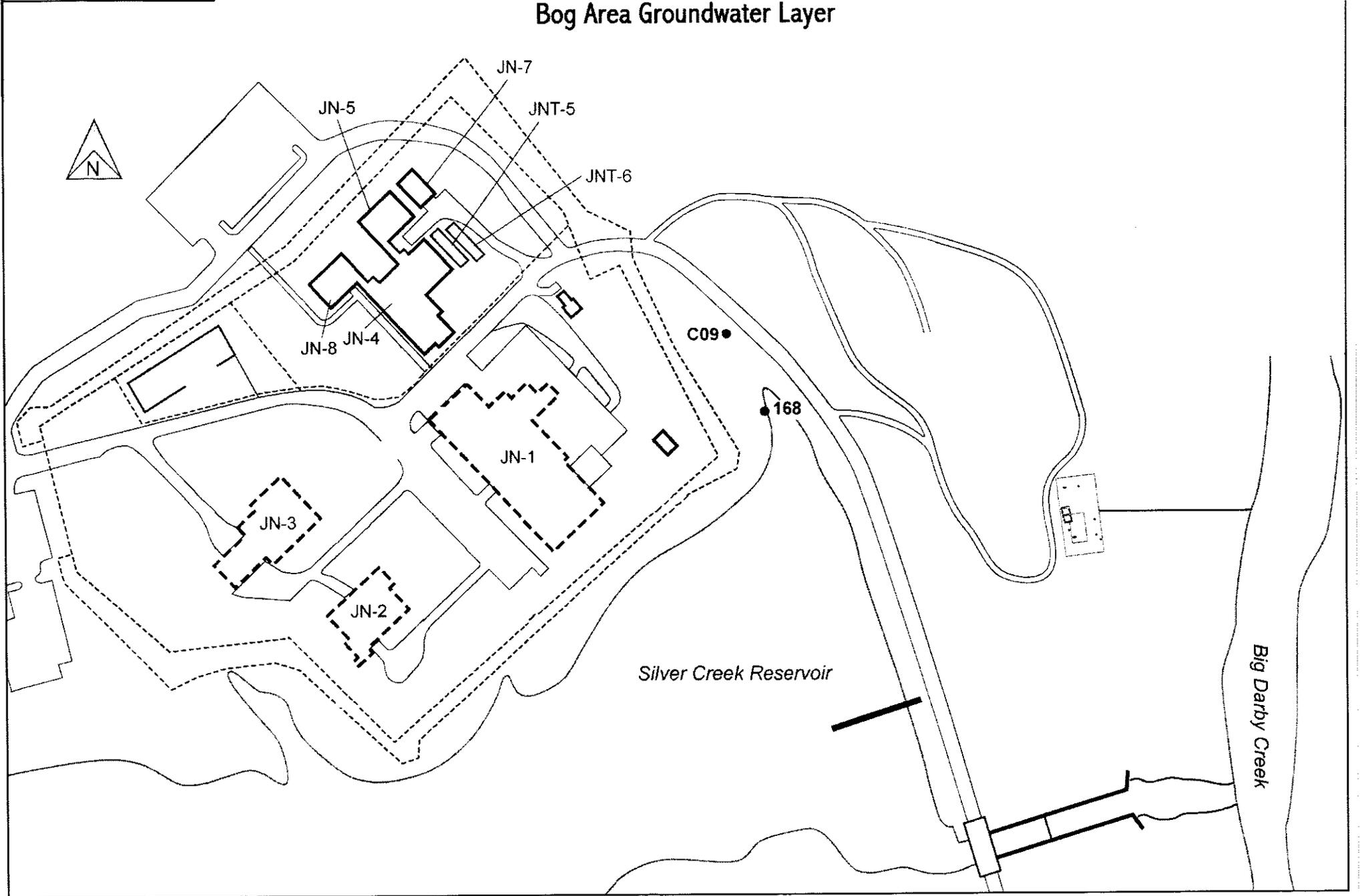


TABLE 1
RADIOLOGICAL ANALYSES OF BOG AREA MONITORING WELLS
WEST JEFFERSON SITE - CY 2005
pCi/Liter

May 2005

NUCLIDE	WELL 168	WELL C-09
Gross Alpha	236+/- 13.5	2.68 +/- 3.80
Gross Beta	122 +/- 5.17	68.9 +/- 5.17
Co-60	4.47E+00	7.24E+00
Sr-90	4.49E+00 Note 1	1.71E+01 Note 1
Sb-125	1.32E+01	1.51E+01
Cs-134	4.35E+00	5.65E+00
Cs-137	4.79E+00	6.34E+00
Eu-152	1.18E+01	1.37E+01
Eu-154	8.00E+00	9.66E+00
Am-241	1.36E+01	1.46E+01
Pu-238	6.60E-02	8.90E-02
Pu-239	1.24E-01 Note 1	1.53E-01 Note 1
U-235 (g)	2.86E+01	3.54E+01
U-238 (g)	1.27E+02	1.58E+02
U-234 (a)	1.21E+01 Note 1	1.13E+00 Note 1
U-235 (a)	9.00E-01 Note 1	8.80E-02 Note 1
U-238 (a)	1.43E+01 Note 1	7.90E-01 Note 1

Note 1: DENOTES CALCULATED VALUE, ALL OTHER VALUES ARE LESS THAN OR EQUAL TO MDA

(a) DENOTES ANALYSIS PERFORMED BY ALPHA SPECTROSCOPY

(g) DENOTES ANALYSIS PERFORMED BY GAMMA SPECTROSCOPY

December 2005

NUCLIDE	WELL 168	WELL C-09
Gross Alpha	No Data Available	3.00E+00
Gross Beta	No Data Available	8.10E+01
Co-60	No Data Available	1.92E+00
Sr-90	No Data Available	2.90E+01 Note 1
Sb-125	No Data Available	4.14E+00
Cs-134	No Data Available	3.41E+00
Cs-137	No Data Available	1.84E+00
Eu-152	No Data Available	9.48E+00
Eu-154	No Data Available	2.72E+00
Am-241	No Data Available	1.37E+01
Pu-238	No Data Available	1.00E+00
Pu-239	No Data Available	1.00E+00
U-235 (g)	No Data Available	1.00E+01
U-238 (g)	No Data Available	2.38E+02
U-234 (a)	No Data Available	2.33E+00 Note 1
U-235 (a)	No Data Available	1.00E+00
U-238 (a)	No Data Available	2.43E+00 Note 1

Note 1: DENOTES CALCULATED VALUE, ALL OTHER VALUES ARE LESS THAN OR EQUAL TO MDA

(a) DENOTES ANALYSIS PERFORMED BY ALPHA SPECTROSCOPY

(g) DENOTES ANALYSIS PERFORMED BY GAMMA SPECTROSCOPY

TABLE 2

BCLDP ENVIRONMENTAL WATER SUMMARY

Reporting Units = pCi/Liter

Sample Location	Analyses	# of Samples	CY 2000	CY 2001	CY 2002	CY 2003	CY 2004
EW-3 Big Darby Creek 18.3 m above sanitary outfall	Gross Alpha	12	1.37 +/- 7.22	1.41 +/- 6.70	-1.09 +/- 7.22	-0.59 +/- 7.62	-0.40 +/- 3.55
	Gross Beta	12	4.78 +/- 5.92	4.03 +/- 6.70	1.46 +/- 8.42	1.48 +/- 8.80	2.86 +/- 4.46
EW-4 Big Darby Creek 18.3 m below sanitary outfall	Gross Alpha	12	2.88 +/- 7.78	2.22 +/- 7.14	-0.38 +/- 7.54	1.59 +/- 8.40	0.62 +/- 3.79
	Gross Beta	12	5.84 +/- 6.06	5.95 +/- 6.90	2.15 +/- 8.46	2.97 +/- 8.92	3.59 +/- 4.50
EW-10 Battelle Lake Spillway 18.3 m below dam	Gross Alpha	12	1.04 +/- 6.56	1.65 +/- 6.62	-0.48 +/- 6.96	0.73 +/- 7.60	-0.13 +/- 3.98
	Gross Beta	12	4.36 +/- 5.78	3.83 +/- 6.66	2.74 +/- 8.48	1.96 +/- 8.80	4.22 +/- 4.53
EW-11 Big Darby Creek Downstream 186.3 m below sanitary outfall	Gross Alpha	12	2.57 +/- 7.40	1.91 +/- 6.74	1.33 +/- 7.90	-0.13 +/- 7.20	0.44 +/- 3.65
	Gross Beta	12	5.48 +/- 6.00	4.72 +/- 6.74	3.24 +/- 8.52	2.61 +/- 8.86	4.30 +/- 4.52

Big Darby Creek and Battelle Lake Spillway samples are monthly composites of weekly collections.

Figure 2

Battelle West Jefferson North

Monitoring Wells/Surface Water Sampling Locations

885 Ft Mean Sea Level Sand Layer

- Legend**
- Monitoring Wells (Installed 1989/90)
 - Flow Pattern Wells (Installed 2002/03)

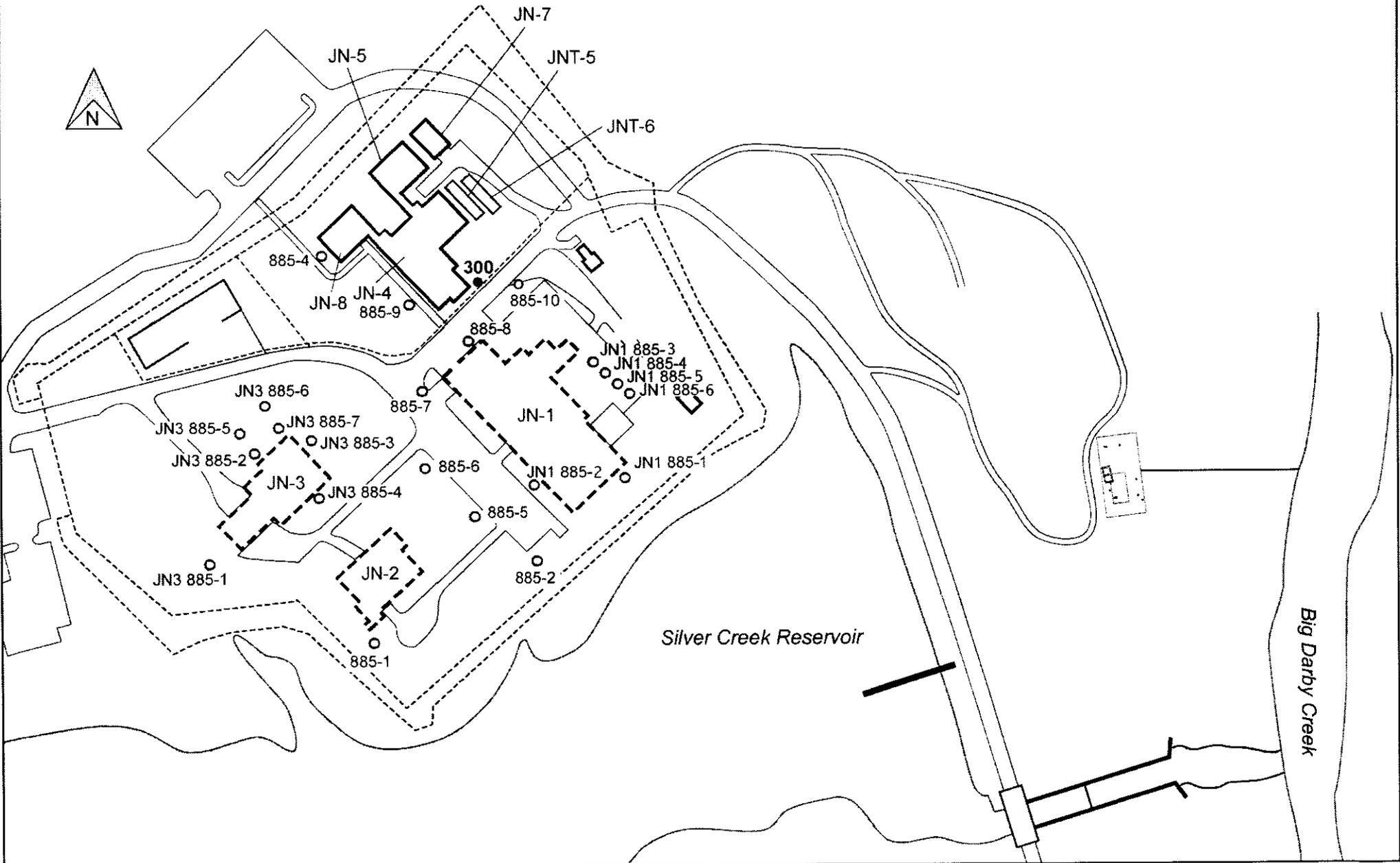


TABLE 3
GROUNDWATER MONITORING WELL #300

<i>June 2005</i>		<i>Dec 2005</i>	
NUCLIDE	ACTIVITY pCi/Liter	NUCLIDE	ACTIVITY pCi/liter
Gross Alpha	5.21 +/- 4.42	Gross Alpha	5.00E+00
Gross Beta	8.53 +/- 3.19	Gross Beta	7.00E+00
Co-60	4.88E+00	Co-60	1.71E+00
Sr-90	6.70E-01	Sr-90	1.00E+00
Sb-125	1.28E+01	Sb-125	4.19E+00
Cs-134	4.81E+00	Cs-134	1.61E+00
Cs-137	5.10E+00	Cs-137	1.59E+00
Eu-152	1.06E+01	Eu-152	8.73E+00
Eu-154	7.44E+00	Eu-154	2.50E+00
Am-241	1.28E+01	Am-241	1.42E+01
Pu-238	6.90E-02	Pu-238	1.00E+00
Pu-239	4.70E-02	Pu-239	1.00E+00
U-235 (g)	3.13E+01	U-235 (g)	9.91E+00
U-238 (g)	1.33E+02	U-238 (g)	2.28E+02
U-234 (a)	1.00E+00	U-234 (a)	1.00E+00
U-235 (a)	4.80E-02	U-235 (a)	1.00E+00
U-238 (a)	4.70E-01	U-238 (a)	1.00E+00

Note 1: DENOTES CALCULATED VALUE. ALL OTHER VALUES ARE LESS THAN OR EQUAL TO MDA.

(a) DENOTES ANALYSIS PERFORMED BY ALPHA SPECTROSCOPY

(g) DENOTES ANALYSIS PERFORMED BY GAMMA SPECTROSCOPY

TABLE 4

**RADIOLOGICAL ANALYSES OF FLOW PATTERN WELLS
WEST JEFFERSON SITE - 885 WELLS**

pCi/Liter for Gamma Spectrometry Values

pCi/Liter +/- 2 sigma for Gross Alpha & Gross Beta

SU 2002 NUCLIDE	WELL 885 #1	WELL 885 #2	WELL 885 #4	WELL 885 #5	WELL 885 #6	WELL 885 #7	WELL 885 #8	WELL 885 #9	WELL 885 #10
Gross Alpha	n/a	13.3 +/- 13.4	0.681 +/- 3.70	n/a	n/a	n/a	n/a	n/a	n/a
Gross Beta	n/a	446 +/- 20	91.8 +/- 5.95	n/a	n/a	n/a	n/a	n/a	n/a
Co-60	1.90E+00	2.31E+00	1.51E+00	1.91E+00	1.49E+00	1.99E+00	1.68E+00	1.96E+00	1.52E+00
Sb-125	4.52E+00	5.33E+00	4.03E+00	4.95E+00	3.82E+00	5.03E+00	4.30E+00	5.16E+00	3.93E+00
Cs-134	1.60E+00	1.89E+00	1.41E+00	1.69E+00	1.40E+00	1.83E+00	1.58E+00	1.89E+00	1.38E+00
Cs-137	1.92E+00	2.16E+00	1.52E+00	1.98E+00	1.58E+00	2.03E+00	1.80E+00	2.05E+00	1.52E+00
Eu-152	4.15E+00	4.70E+00	3.84E+00	4.37E+00	3.78E+00	4.10E+00	3.88E+00	4.65E+00	3.84E+00
Eu-154	2.90E+00	3.35E+00	2.73E+00	3.04E+00	2.58E+00	2.94E+00	2.74E+00	3.13E+00	2.68E+00
Am-241	4.83E+00	5.35E+00	4.23E+00	4.72E+00	4.07E+00	4.45E+00	4.59E+00	5.12E+00	4.14E+00
U-235	2.78E+00	3.12E+00	2.60E+00	3.06E+00	2.57E+00	3.02E+00	2.69E+00	3.11E+00	2.62E+00
U-238	3.60E+01	4.08E+01	3.35E+01	3.96E+01	3.36E+01	4.07E+01	3.51E+01	4.07E+01	3.37E+01

ALL GAMMA VALUES ARE LESS THAN OR EQUAL TO MDA

2002/2003 NUCLIDE	WELL JN3 #1	WELL JN3 #2	WELL JN3 #3	WELL JN3 #4	WELL JN3 #5	WELL JN3 #6
Gross Alpha	n/a	6.32 +/- 4.28	0.551 +/- 3.85	n/a	11.4 +/- 4.24	2.42 +/- 2.73
Gross Beta	n/a	17.3 +/- 3.47	13.7 +/- 3.21	n/a	16.1 +/- 3.26	3.19 +/- 2.93
Co-60	0.00E+00	1.51E+00	1.66E+00	0.00E+00	2.04E+00	0.00E+00
Sb-125	0.00E+00	3.99E+00	3.93E+00	0.00E+00	5.31E+00	0.00E+00
Cs-134	0.00E+00	1.38E+00	1.51E+00	0.00E+00	1.78E+00	0.00E+00
Cs-137	0.00E+00	1.52E+00	1.67E+00	0.00E+00	2.17E+00	0.00E+00
Eu-152	0.00E+00	3.90E+00	3.79E+00	0.00E+00	4.61E+00	0.00E+00
Eu-154	0.00E+00	2.73E+00	2.61E+00	0.00E+00	3.26E+00	0.00E+00
Am-241	0.00E+00	4.24E+00	4.36E+00	0.00E+00	5.33E+00	0.00E+00
U-235	0.00E+00	2.64E+00	2.60E+00	0.00E+00	3.17E+00	0.00E+00
U-238	0.00E+00	3.41E+01	3.47E+01	0.00E+00	4.03E+01	0.00E+00

ALL GAMMA VALUES ARE LESS THAN OR EQUAL TO MDA

SU 2003 NUCLIDE	WELL JN1 #1	WELL JN1 #2	WELL JN1 #3	WELL JN1 #4	WELL JN1 #5	WELL JN1 #6
Gross Alpha	n/a	n/a	n/a	n/a	n/a	n/a
Gross Beta	n/a	n/a	n/a	n/a	n/a	n/a
Co-60	2.06E+00	1.51E+00	2.09E+00	1.48E+00	2.01E+00	2.03E+00
Sb-125	5.12E+00	4.05E+00	5.10E+00	4.07E+00	5.11E+00	5.06E+00
Cs-134	1.80E+00	1.36E+00	1.80E+00	1.40E+00	1.90E+00	1.89E+00
Cs-137	1.91E+00	1.59E+00	2.03E+00	1.55E+00	2.00E+00	2.05E+00
Eu-152	4.50E+00	3.83E+00	4.52E+00	3.81E+00	4.27E+00	4.10E+00
Eu-154	3.11E+00	2.64E+00	3.16E+00	2.69E+00	2.94E+00	2.89E+00
Am-241	4.95E+00	4.09E+00	5.17E+00	4.13E+00	4.92E+00	4.74E+00
U-235	3.08E+00	2.63E+00	3.09E+00	2.57E+00	3.07E+00	2.95E+00
U-238	3.87E+01	3.36E+01	3.97E+01	3.43E+01	4.01E+01	3.88E+01

ALL GAMMA VALUES ARE LESS THAN OR EQUAL TO MDA

Battelle West Jefferson North

Monitoring Wells/Surface Water Sampling Locations

855 Ft Mean Sea Level Sand Layer

Legend

- Caisson Wells/Wells (Installed 1970)
- Flow Pattern Wells (Installed 2002/03)

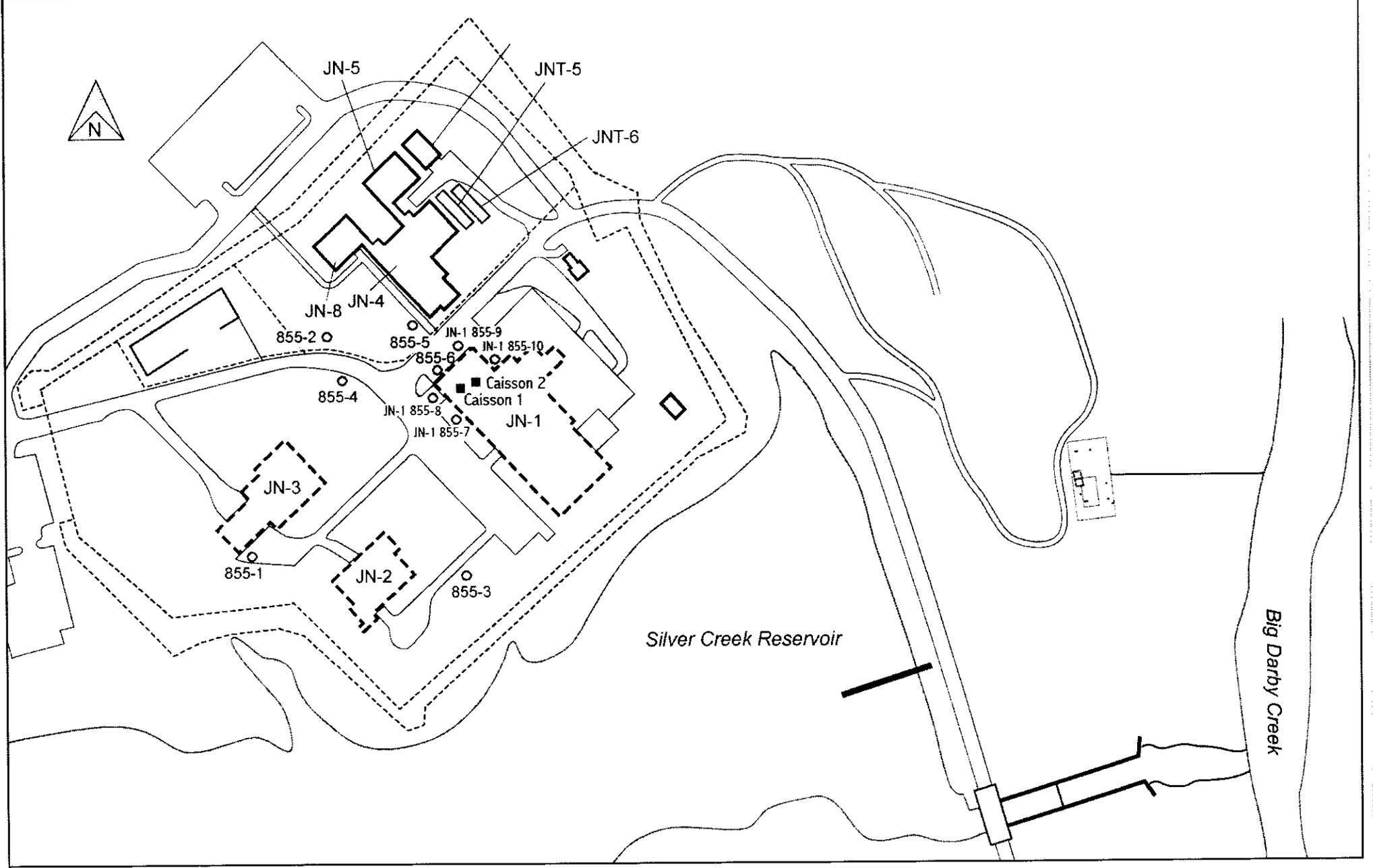


TABLE 5

SUMMARY OF RADIOLOGICAL ANALYSES OF JN-1B CAISSONS BCLDP S&M HISTORICAL DATA

	Gross Alpha pCi/Liter	Gross Beta pCi/Liter
CY 2000 - 1st QUARTER	3	106
CY 2000 - 2nd QUARTER	9	88
CY 2000 - 3rd QUARTER	6	85
CY 2000 - 4th QUARTER	n/a	n/a
CY 2001 - 1st QUARTER	8	114
CY 2001 - 2nd QUARTER	12	69
CY 2001 - 3rd QUARTER	7	93
CY 2001 - 4th QUARTER	9	97
CY 2002 - 1st QUARTER	n/a	n/a
CY 2002 - 2nd QUARTER	5	42
CY 2002 - 3rd QUARTER	4	42
CY 2002 - 4th QUARTER	4	55
CY 2003 - 1st QUARTER	3	131
CY 2003 - 2nd QUARTER	4	46
CY 2003 - 3rd QUARTER	n/a	n/a
CY 2003 - 4th QUARTER	n/a	n/a

SUMMARY OF RADIOLOGICAL ANALYSES OF JN-1B CAISSONS WEST JEFFERSON SITE - DECEMBER 2005

Reporting units: pCi/Liter

NUCLIDE	WELL JN1B East	WELL JN-1B West
Gross Alpha	6.00E+00	3.00E+00
Gross Beta	1.75E+02	1.71E+02
Co-60	1.95E+00	1.32E+00
Sr-90	5.69E+01 Note 1	5.79E+01 Note 1
Sb-125	4.68E+00	3.51E+00
Cs-134	1.63E+00	1.06E+00
Cs-137	1.90E+00	5.39E+00 Note 1
Eu-152	9.24E+00	5.90E+00
Eu-154	3.31E+00	2.29E+00
Am-241	1.42E+01	5.91E+00
Pu-238	1.00E+00	1.00E+00
Pu-239	1.00E+00	1.00E+00
U-235 (g)	1.25E+01	8.86E+00
U-238 (g)	2.39E+02	1.64E+02
U-234 (a)	2.72E+00 Note 1	1.00E+00
U-235 (a)	2.43E-01 Note 1	1.00E+00
U-238 (a)	1.87E+00 Note 1	1.00E+00

Note 1: DENOTES CALCULATED VALUE. ALL OTHER VALUES ARE LESS THAN OR EQUAL TO MDA

(g) DENOTES ANALYSIS PERFORMED BY GAMMA SPECTROSCOPY

(a) DENOTES ANALYSIS PERFORMED BY ALPHA SPECTROSCOPY

TABLE 6

**RADIOLOGICAL ANALYSES OF FLOW PATTERN WELLS
WEST JEFFERSON SITE - 855 WELLS**

pCi/Liter for Gamma Spectrometry Values

pCi/Liter +/- 2 sigma for Gross Alpha & Gross Beta

2002/2003 NUCLIDE	WELL 855 #1	WELL 855 #2	WELL 855 #3	WELL 855 #4	WELL 855 #5	WELL 855 #6
Gross Alpha	-2.44E-01 +/- 3.50	1.73 +/- 6.46	12.5 +/- 14	n/a	n/a	n/a
Gross Beta	89.6 +/- 5.96	306 +/- 11.5	481 +/- 20.8	n/a	n/a	n/a
Co-60	2.00E+00	1.53E+00	1.78E+00	2.17E+00	1.93E+00	1.74E+00
Sb-125	5.26E+00	4.12E+00	4.43E+00	5.05E+00	4.29E+00	3.97E+00
Cs-134	1.81E+00	1.42E+00	1.55E+00	1.75E+00	1.65E+00	1.45E+00
Cs-137	2.12E+00	1.60E+00	1.82E+00	2.09E+00	1.89E+00	1.71E+00
Eu-152	4.43E+00	3.93E+00	3.90E+00	4.08E+00	4.07E+00	3.71E+00
Eu-154	3.11E+00	2.76E+00	2.78E+00	2.85E+00	2.86E+00	2.64E+00
Am-241	5.01E+00	4.28E+00	4.72E+00	4.75E+00	4.74E+00	4.14E+00
U-235	3.05E+00	2.74E+00	2.75E+00	2.93E+00	2.71E+00	2.60E+00
U-238	3.94E+01	3.44E+01	3.60E+01	3.92E+01	3.57E+01	3.45E+01

ALL VALUES ARE LESS THAN OR EQUAL TO MDA

SU 2003 NUCLIDE	WELL JN1 #7	WELL JN1 #8	WELL JN1 #9	WELL JN1 #10
Gross Alpha	n/a	n/a	n/a	n/a
Gross Beta	n/a	n/a	n/a	n/a
Co-60	1.64E+00	1.93E+00	1.45E+00	2.11E+00
Sb-125	4.23E+00	5.01E+00	4.02E+00	5.23E+00
Cs-134	1.50E+00	1.85E+00	1.46E+00	1.80E+00
Cs-137	1.70E+00	2.10E+00	1.48E+00	2.04E+00
Eu-152	3.67E+00	4.52E+00	3.87E+00	4.12E+00
Eu-154	2.58E+00	3.22E+00	2.71E+00	2.85E+00
Am-241	4.23E+00	5.02E+00	4.22E+00	4.63E+00
U-235	2.57E+00	3.20E+00	2.64E+00	2.99E+00
U-238	3.46E+01	3.96E+01	3.49E+01	3.99E+01

ALL VALUES ARE LESS THAN OR EQUAL TO MDA

Battelle West Jefferson North

Monitoring Wells/Surface Water Sampling Locations

805 Ft Mean Sea Level Sand Layer

Legend

- Drinking Water Source (Installed 1954)
- Monitoring Wells (Installed 2002 - 2003)

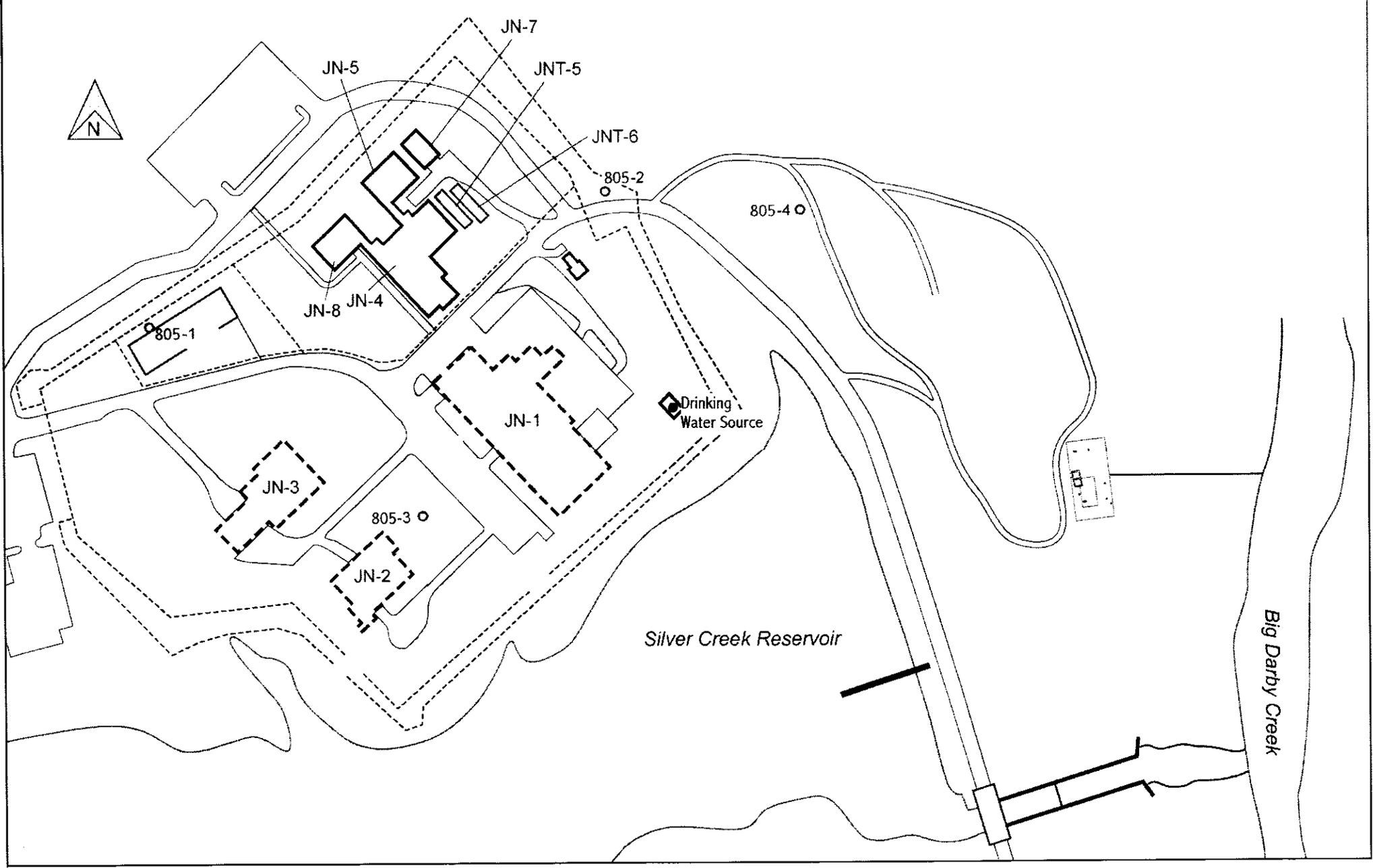


TABLE 7

SUMMARY OF RADIOLOGICAL ANALYSES OF SUPPLY WELLS WEST JEFFERSON SITE - CY 2005

pCi/Liter

<i>May-05</i> NUCLIDE	NORTH JN-W	MIDDLE JM-W	SOUTH JS-W
Gross Alpha	2.40E+00	4.15	5.81
Gross Beta	4.37	2.69	5.94
Co-60	1.59E+00	2.25E+00	1.62E+00
Sr-90	2.31E+00	2.62E+00	2.54E+00
Sb-125	4.25E+00	5.52E+00	4.30E+00
Cs-134	1.50E+00	2.02E+00	1.51E+00
Cs-137	1.66E+00	2.31E+00	1.68E+00
Eu-152	4.05E+00	4.73E+00	3.97E+00
Eu-154	2.83E+00	3.29E+00	2.77E+00
Am-241	4.53E+00	5.37E+00	4.46E+00
Pu-238	9.67E-02	1.60E-01	1.29E-01
Pu-239	3.56E-02	1.05E-01	7.26E-02
U-235 (g)	2.73E+00	3.26E+00	2.76E+00
U-238 (g)	3.54E+01	4.16E+01	3.56E+01
U-234 (a)	1.88E+00 *	1.90E+00 *	1.96E+00 *
U-235 (a)	1.04E-01	3.09E-02	3.71E-02
U-238 (a)	7.13E-01 *	5.12E-01 *	5.20E-01 *

* DENOTES CALCULATED VALUE, ALL OTHER VALUES ARE LESS THAN OR EQUAL TO MDA

(a) DENOTES ANALYSIS PERFORMED BY ALPHA SPECTROSCOPY

(g) DENOTES ANALYSIS PERFORMED BY GAMMA SPECTROSCOPY

SUMMARY OF RADIOLOGICAL ANALYSES OF SUPPLY WELLS WEST JEFFERSON SITE - CY 2005

pCi/Liter

<i>Dec-05</i> NUCLIDE	NORTH JN-W	MIDDLE JM-W	SOUTH JS-W
Gross Alpha	3.00E+00	3.00E+00	3.00E+00
Gross Beta	4.00E+00	4.00E+00	4.00E+00
Co-60	1.76E+00	1.27E+00	1.17E+00
Sr-90	1.00E+00	1.00E+00	1.00E+00
Sb-125	NO DATA AVAILABLE	NO DATA AVAILABLE	NO DATA AVAILABLE
Cs-134	1.38E+00	1.06E+00	9.87E+00
Cs-137	1.66E+00	1.12E+00	1.22E+00
Eu-152	9.13E+00	5.34E+00	6.33E+00
Eu-154	NO DATA AVAILABLE	NO DATA AVAILABLE	NO DATA AVAILABLE
Am-241	NO DATA AVAILABLE	NO DATA AVAILABLE	NO DATA AVAILABLE
Pu-238	1.00E+00	1.00E+00	1.00E+00
Pu-239	1.00E+00	1.00E+00	1.00E+00
U-235 (g)	9.02E+00	7.06E+00	6.61E+00
U-238 (g)	2.05E+02	1.46E+02	1.54E+02
U-234 (a)	1.45E+00 *	1.90E+00 *	1.68E+00 *
U-235 (a)	1.00E+00	1.00E+00	1.00E+00
U-238 (a)	1.00E+00	1.00E+00	1.00E+00

* DENOTES CALCULATED VALUE, ALL OTHER VALUES ARE LESS THAN OR EQUAL TO MDA

(a) DENOTES ANALYSIS PERFORMED BY ALPHA SPECTROSCOPY

(g) DENOTES ANALYSIS PERFORMED BY GAMMA SPECTROSCOPY

TABLE 8

RADIOLOGICAL ANALYSES OF FLOW PATTERN WELLS WEST JEFFERSON SITE - 805 WELLS

*pCi/Liter for Gamma Spectrometry Values
pCi/Liter +/- 2 sigma for Gross Alpha & Gross Beta*

<i>Feb-03</i> NUCLIDE	WELL 805 #1	WELL 805 #2	WELL 805 #3
Gross Alpha	7.79+/-3.64	-2.16 +/- 3.35	0.784+/-4.87
Gross Beta	34.9 +/- 3.94	40.5 +/- 3.90	69.3 +/- 4.69
Co-60	2.09E+00	2.09E+00	1.46E+00
Sb-125	5.20E+00	5.03E+00	4.14E+00
Cs-134	1.85E+00	1.80E+00	1.40E+00
Cs-137	2.05E+00	2.00E+00	1.58E+00
Eu-152	4.35E+00	4.41E+00	4.02E+00
Eu-154	3.03E+00	3.11E+00	2.83E+00
Am-241	4.84E+00	4.91E+00	4.39E+00
U-235	1.25E+01	3.08E+00	2.69E+00
U-238	5.09E+01	3.98E+00	3.41E+01

ALL GAMMA SPECTROMETRY VALUES ARE LESS THAN OR EQUAL TO MDA