ATTACHMENT 3

CONSUMERS ENERGY
BIG ROCKPOINT

DOCKET NUMBERS 50-155 AND 72-043

TRANSMITTAL OF SURVEY PACKAGES IN SUPPORT OF BIG ROCK POINT PHASED LICENSE TERMINATION

CLASS 1 FINAL STATUS SURVEY, CANALC$_1$1,
DISCHARGE CANAL

October 9, 2006

61 Pages

Final Status Survey Canal$C_1$1

Survey of Discharge Canal

Survey Unit: Canal
Survey Date: 08-10-04

SURVEY PACKAGE CLOSURE

Final Status Survey Documentation is authorized for closure. All required reviews are completed and data analysis results meets the criteria established for unrestricted release as specified in the License Termination Plan (LTP).

Signed: _____ Date: 8/19/04
(ESSG Supervisor)

Signed: _____ Date: 9/16/04
(ES Superintendent)

Signed: _____ Date: 1-27-05
(RP & ES Manager)

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Final Status Survey Area Requirements
for Survey Canal$C_1$1
Discharge Canal

Survey Description

Final Status Survey Canal$C_1$1 encompasses a 1300 m^2 area that served as the discharge canal during plant operation. The discharge canal has been dewatered and reclaimed as part of the owner controlled property in accordance with a permit issued by the Michigan Dept. of Environmental Quality and US Army Corps of Engineers. This survey unit includes the former canal shoreline and the bathymetric surface of the canal, which extends approximately 2.6 m below the OHWM (ordinary high water mark). Subsurface piping, components, and structures do not exist in this survey unit.

History

During plant operation the Discharge Canal was the permitted release pathway for plant effluent water discharge into Lake Michigan. Characterization and Remedial Action surveys have identified residual radioactivity above the release criterion in this survey unit. Elevated levels of residual radioactivity identified in canal sediment, soil, and biological material have been remediated.

Current Radiological Status

Surveys conducted following remediation of the Discharge Canal have not identified residual radioactivity above DCGL values. Input for this evaluation includes the following remediation and characterization survey data:

- Survey Canal$A_1$1, Characterization of Canal during low flow, dated 05/02/2000.
- Survey Canal$A_2$1, Characterization of Sediment at Canal Bottom, dated 09/26/2000.
- Survey Canal$A_3$1, Characterization of Canal Prior to Algal Sediment Removal, dated 06/30/2004.
- Survey Canal$A_4$1, Characterization of Sediment Adjacent to Screenhouse Apron, dated 07/07/2004.
- Survey Canal$A_5$1, Remedial Action Survey Post-Zebra Muscle Removal, dated 07/12/2004.
- Survey Canal$A_6$1, Remedial Action Survey of Canal, Post-Algal Sediment Removal, dated 07/13-14/2004.
- Survey Canal$A_7$1, Characterization of NW Canal, Grassy Area, dated 08/03/2004.
- Survey Canal$A_8$1, Readiness Survey, dated 08/06/2004.

Quality Assurance/Quality Control

As a minimum 5% of the sample population of this survey shall be selected for QA/QC verification in accordance with BRP Procedure RM-79, *Final Status Survey Quality Control.* Both split samples and sample recounts will take place. In addition, a minimum of 5% of the

survey area will receive a verification scan. QA/QC soil samples and verification scan locations will be selected using the RAND function in Microsoft 2000 software program.

Additional Sample Analysis Requirements

The Discharge Canal intersects the identified waterborne pathway for Tritium migration and shall require Tritium in soil analyses for a minimum of 10% of the sample population. Soil for Tritium analysis will be collected in the same locations as those collected for QA/QC evaluation. Tritium samples will be sent to an independent laboratory for analysis.

Post-Construction Expectations

Survey Canal$C_1$1 will be performed in the following activity sequence:

1. Walkdown: Site Characterization personnel will perform a walkdown assessment to insure survey area preparations are complete and confirm that the following post-construction expectations have been satisfied:

    - Groundwater and Surface water control is adequate
    - All construction debris has been removed from the survey area
    - The current survey area status meets all applicable safety requirements

2. Survey Area Isolation and Control: Control measures will be established to ensure that any potential ongoing decommissioning activities in adjacent locations do not impact the current survey area status. Isolation and control measures include postings, barriers, access points, and the evaluation of ongoing work activities in adjacent areas.

3. Survey Design and Execution: Survey design and execution will follow the Data Quality Objectives for Survey Canal$C_1$1 in accordance with the survey requirements established in RM-76, *Final Status Survey Design,* RM-77, *Final Status Survey Implementation,* and LTP, Chapter 5. Survey size will be based on the statistical requirements of the Sign Test for Class 1 areas with soil samples collected in random start, systematic data point locations. Surface scanning will be performed with 100% survey area coverage. This survey will be conducted in accordance with approved BRP procedures and follow the guidance of NUREG 1575.

4. Data Quality Assessment: Isolation and control of the survey area will be maintained until the survey Data Quality Assessment demonstrates that the regulatory requirements for unrestricted site release have been satisfied. Once released for unrestricted use, this area will be restored to original grade elevation.

DATA QUALITY OBJECTIVES

Survey CanalC$_1$1
Discharge Canal

1. STATE THE PROBLEM

The Problem:
To demonstrate that the level of residual radioactivity in the excavated area of the former Discharge Canal does not exceed the release criteria of 25 mrem/year Total Effective Dose Equivalent (TEDE) as specified in the License Termination Plan (LTP). This Class 1 survey area includes all exposed sub-surface soils in the former location of the discharge canal. It must be demonstrated that the area in this survey unit meets the criteria established for unrestricted release prior to backfill and return to original grade elevation.

Stakeholders:
The primary stakeholders interested in the answer to this problem are Consumers Energy Co., and the general public as represented by the Michigan Department of Environmental Quality (MDEQ), and the US Nuclear Regulatory Commission (USNRC).

The Planning Team:
The planning team consists of members of the BRP Environmental Services Survey Group (ESSG). The primary decision maker will be the Final Status Survey (FSS) Supervisor. The Final Status Survey Supervisor will obtain input from the site Construction Group and Scheduling Group for issues relating to schedule and costs.

Schedule:
Approximately five (5) working days are projected to implement the Final Status Survey to collect and analyze field data.

Resources:
The primary resources needed to determine the answer to the problem are two (2) technicians to perform fieldwork, one (1) technician to prepare the samples and conduct laboratory analyses, and two (2) FSS team members to prepare and review the design, generate maps, coordinate field activities and evaluate data.

2. IDENTIFY THE DECISION

Several decisions need to be defined to address the stated problem.

Principal Study Question (1):
Does the mean concentration of residual radioactivity in the survey unit exceed the release criteria stated above?

Decision (1):
Determine whether the mean concentration of residual radioactivity in the survey exceeds the release criteria stated in the problem.

Actions (1):
Alternative actions include failure of the survey unit, remediation, or no action required.

Principal Study Question (2):
Do any areas of elevated activity in the survey unit exceed the release criteria?

The Decision (2):
Determine if any areas of elevated activity in the survey unit exceed the release criteria.

Actions (2):
Alternative actions include confirmation and investigation, performing the elevated measurement comparison (EMC), remediation, or no action required.

Principal Study Question (3):
Is the potential dose from residual radioactivity in the survey unit ALARA as stated?

The Decision (3):
Determine if the potential dose from residual radioactivity in the survey unit is ALARA. ALARA requirements for soil remediation are defined in Chapter 4 of the LTP.

Actions (3):
Alternative actions include remediation or no action required.

3. IDENTIFY INPUTS TO THE DECISION

Information Needed:
Characterization measurements are required to define the radionuclides present and determine the extent and variability of residual radioactivity in the survey area for design and implementation of the FSS. Survey area classification, ALARA analysis, potential radionuclides of interest, and site-specific DCGL values are also required inputs to the decision process. The primary information required for evaluation is the analytical results of FSS measurements.

Source of the Information:
The soil sample data to be used for FSS development are the radionuclide-specific measurements of soil samples collected within the affected local coordinate grids during the characterization process. The soil samples obtained are both judgmentally and statistically selected as a result of multiple surveys across the area affected by decommissioning activities. The ALARA analysis for potential soil remediation is provided in LTP, Section 4.4. Site-specific DCGL values and BRP radionuclides of interest are defined in LTP Section 5, Table 5-1 and BRP Procedure RM-76, *Final Status Survey Design.*

The FSS will be conducted in accordance with applicable regulatory guidance as established in LTP Section 5 for Class 1 areas. Soil samples will be utilized for radionuclide-specific measurements in this evaluation.

4. BOUNDARIES OF THE STUDY

Boundaries of the Survey:
The target population for this survey is the upper 15 cm of soil within the survey area. The physical boundary includes the bathymetric surface of the discharge canal and surrounding affected shoreland in a defined survey area of 1,300 m^2. The Canal survey area can be identified on site maps in an area defined by site local coordinates 0N-6N by 12E-17E.

Temporal Boundaries:
Scanning and sampling in this survey unit will only be performed during daylight hours under dry weather conditions. Collection of data will take place when surface conditions are most favorable. Surface soils must be free of significant snow cover and standing water prior to surface scanning. Soils must be in a non-frozen state or fragmented for collection to satisfy BRP procedural sampling requirements. The anticipated start date for the survey is 08-10-04.

Constraints:
Cold ambient temperatures or rainy conditions may effect the operation of electronic equipment. Adverse weather conditions that include accumulations of rain or snow may limit area access and delay survey efforts.

5. DEVELOP A DECISION RULE

The following decision rules have been developed to define a logical process for choosing among alternative actions for the principal study questions associated with this survey area.

Decision Rule (1):
If all reported concentrations for residual radioactivity are less than the site-specific DCGL's and the unity rule has been satisfied for each sample, then the survey unit meets release criteria. No further action is required.

Decision Rule (2):
If the mean value of activity in the survey unit is greater than the DCGL, then the survey unit fails to meet the release criteria.[1] Remediate, resurvey, and evaluate the results relative to the decision rule.

Decision Rule (3):
If the mean activity in the survey unit is less than the DCGL and any individual sample measurement exceeds this value, conduct the Sign Test and the elevated measurement comparison (EMC) per LTP, Chapter 5, and Procedure RM-76, *Final Status Survey Design*. If the EMC and the Sign Test have been satisfied then the survey unit meets the release criteria and no further action is required. If the EMC or the Sign Test has not been satisfied then remediate the area(s) of elevated activity, resurvey as appropriate, and evaluate the results relative to the decision rule.

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[1] When multiple radionuclides are present the mean activity value is determined as the average of the weighted sum. The DCGL of the weighted sum is 1.

Decision Rule (4):
If the potential dose from residual radioactivity in the survey unit is ALARA, then no further action is necessary. If the potential dose from residual radioactivity in the survey unit is not ALARA, then remediate and resurvey.

6. SPECIFY TOLERABLE LIMITS ON DECISION ERRORS

The Null Hypothesis:
It is assumed that residual radioactivity in the survey unit exceeds the release criterion.

Type I Error (α):
The α error is the maximum probability of rejecting the null hypotheses when it is true. The α error is defined in the LTP at a value of at 0.05 (5%) and cannot be changed to a less restrictive value unless prior approval is granted by the USNRC. The α error value of 0.05 will be used for survey planning and data assessment for this survey area.

Type II Error (β):
The β error is the probability of accepting the null hypothesis when it is false. A value of 0.05 (5%) will be used for survey planning and data assessment for this survey area.

The Lower Bound of the Gray Region (LBGR):
The LBGR is initially set at 0.5 for this survey unit. The LBGR may be adjusted during survey design to achieve an optimum relative shift between 1.0 and 3.0.

Relative Shift (Δ/σ):
The relative shift will be maintained within the range of 1.0 and 3.0 by adjusting the LBGR as appropriate.

7. OPTIMIZE DESIGN FOR OBTAINING DATA

Statistical Test

Sign Test:
Radionuclides of potential plant origin also present in soil as background activity resulting from fallout constitute only a small fraction of the DCGL. Therefore, the Sign Test will be used where applicable in the FSS evaluation to determine if the survey area meets the requirements for unrestricted release.

Number of Samples Determined:
The number of samples required for this survey will be determined based on the relative shift as defined by the requirements of the Sign Test (LTP, Chapter 5) and Procedure RM-76, *Final Status Survey Design.* The LBGR is initially set at 0.5 and may be adjusted as necessary for optimizing the survey design to achieve a relative shift between 1.0 and 3.0. Sample point locations are to be determined using a random start, systematic square grid spacing. For sample point locations where access is impractical or unsafe, alternate locations will be randomly selected to achieve the sample size requirement.

Biased Sampling:
Co-60 is the most limiting radionuclide for identification by surface scanning; biased surface and subsurface core samples will be collected in any location that exceeds the scan investigation level.

Scan Coverage:
Scanning for this survey area will provide 100% coverage.

Number of Samples for Quality Control:
A minimum of 5% of the sample population will be collected for quality evaluation. These samples may include sample splits, sample recounts, or 3rd party sample analysis. Quality analyses will be conducted as defined in LTP, Chapter 5 and Procedure RM-79, *Final Status Survey Quality Control.*

Additional Sample Analysis Requirements:
An additional quantity of soil shall be collected for Tritium Analysis in the same locations as samples selected for QA/QC. A minimum of 10% of the sample population will be collected for Tritium Analysis. Tritium analyses will be performed by an independent laboratory. Data results will be provided in the FSS package.

Investigation Levels:
Investigation levels are defined in LTP, Chapter 5 and Procedure RM-76, *Final Status Survey Design,* by individual survey area classification; however, prior to regulatory approval of the LTP a more conservative approach for investigation will be established for this survey as shown below.

Investigation Levels for Survey CanalC$_1$1

Classification	Scan Measurement	Soil Sample Analysis
Class 1	> DCGL	> $DCGL_w$

The investigation levels for soil sample measurements are meant to include any individual radionuclide result greater than the site-specific DCGL or where the combined radionuclide values exceed the unity rule. Co-60 is the most limiting radionuclide for identification by surface scanning; further investigation will be initiated at any location that exceeds the Co-60 Scan $_{DCGL}$ of 1818 CPM above background as detailed in the survey design.

SURVEY DESIGN

Survey Canal$C_1$1
Final Status Survey Design
Discharge Canal

Survey Unit Description

Final Status Survey Canal$C_1$1 encompasses a 1300 m^2 area that served as the discharge canal during plant operation. The discharge canal has been dewatered and reclaimed as part of the owner controlled property in accordance with permits by the Michigan Dept. of Environmental Quality (MDEQ) and the US Army Corps of Engineers (USACE). This survey unit includes the former canal shoreline and the bathymetric surface of the canal, which extends approximately 2.6 m below the OHWM (ordinary high water mark). Subsurface piping, components, and structures do not exist in this survey unit.

Soil Sample Design

Scoping Data

Input for survey design was developed from the information obtained in Readiness Survey Canal$A_8$1, which was conducted within the former bathymetric surface of the canal. Survey data and sample point locations are detailed in Attachment 1. Readiness survey findings and associated DCGL values for identified radionuclides are presented in Table 1 below:

Table 1
Input Data for Survey Design
(pCi/g)

Radionuclides	Cs-137	Co-60
σ	1.25	0.74
DCGL	11.93	3.21

Sample Requirements

The number of sample data points for this survey is based on the requirements of the Sign Test. The Unity Rule is used for the presence of multiple radionuclides. The Standard Deviation of the weighted sum is described by the following:

$$\sigma = \sqrt{\left(\frac{\sigma_{CS137}}{DCGL_{CS137}}\right)^2 + \left(\frac{\sigma_{CO60}}{DCGL_{CO60}}\right)^2}$$

$$\sigma = \sqrt{\left(\frac{1.25}{11.93}\right)^2 + \left(\frac{0.74}{3.21}\right)^2}$$

$$\sigma = 0.25$$

Relative Shift

The DCGL for the weighted sum is 1.0. The relative shift is determined using an LBGR value set at 50% of the $DCGL_w$.

$$\text{Relative Shift} = \frac{DCGL - LBGR}{\sigma}$$

$$\text{Relative Shift} = \frac{1 - 0.50}{0.25}$$

$$\text{Relative Shift} = 2.0$$

With α and β error levels set at 0.05 and the relative shift of 2.0, the Sign Test requires 15 sample data points (Table 5.5 NUREG 1575). As a conservative measure 18 samples will be collected in this survey unit.

Sample Locations

Sample locations are selected in a random start, systematic square grid pattern with the southwest corner of the survey unit as origin (X=0, Y=0). Two random numbers between 0 and 1 are generated using the RAND function within Microsoft 2000 Excel software program (Table 2). The numbers are applied to the survey unit maximum X and Y dimensions to determine the random start location.

Table 2
Random Numbers

Random #, X Axis	Random #, Y Axis
0.252521	0.222227

Survey Unit Canal$C_1$1 Dimensions: X (E/W) = 44 meters
Y (N/S) = 53 meters

Random Start Location: X = (0.252521)(44) = 11.1 meters
Y = (0.222227)(53) = 11.8 meters

Using the site local coordinate grid, the origin of this survey unit is placed in Grid 141, X= 1.4 meters, Y= 8.5 meters. The random start location is located in Grid 123, X= 2.6 meters, Y= 0.3 meters.

Sample Spacing

Samples are located in a systematic square grid pattern with sample spacing determined by the following:

$$L = \sqrt{\frac{A}{n}}, \quad \textit{where } A = \text{area of survey unit } \textit{and}$$

$$n = \text{number of samples.}$$

$$L = \sqrt{\frac{1300}{18}} = 8.5 \text{ meters}$$

With sample spacing established at 8.5 meters, 19 data point locations are available for survey as identified in Attachment 2.

QA/QC Sampling

A minimum of 5% of the sample population and 5% of the scan survey area are required to be selected for QA/QC verification in accordance with BRP Procedure RM-79 *Final Status Survey Quality Control*. As a conservative measure, three (3) soil samples and 10% of the scan survey area will be selected for QA/QC evaluation. Soil samples will be selected using the RAND function in the Microsoft 2000 Excel software program:

RAND()*(b-a)+a *where* a = 1 *and* b = total number of soil samples to be collected.

Verification scan start point and track direction is determined using the above function. The first sample location selected will determine the start point of the verification scan, and the second sample location will determine the direction in which the scan will track. QA/QC location results are listed in Table 3:

Table 3
Random Numbers Generated for QA/QC

QA/QC Soil Samples	Random Sample Number	Verification Scan	Random Sample Number
Split Sample:	**18**	**Start Point:**	**14**
Sample Recount:	**3**	**Scan Towards :**	**11**
Sample Recount:	**9**	**Minimum Scan Area Requirement:**	**130 m^2**

Surface Scanning

The coverage requirement for surface scanning in this Class 1 area is 100%. The Scan $_{MDC}$ has been established at fractional values of the $DCGL_W$ for typical background activity levels at Big Rock Point. Scan $_{MDC}$ values for varying backgrounds are provided in Attachment 3. The investigation level for identification of potential areas of elevated activity in this survey area will be the Scan $_{DCGL}$ as defined by the following:

$$SCAN_{DCGL} = \text{Detector Rating } \frac{CPM}{uR/hr} * \text{Exposure Model } \frac{uRi/hr}{pCi/g} * DCGL_w$$

Scan $_{DCGL}$ for Co-60 = 1818 CPM

Scan $_{DCGL}$ for Cs-137 = 3518 CPM

Where:[1]

$$\text{Detector Rating} = \frac{1200\ CPM}{uR/hr}_{Cs-137} \text{ and } \frac{565\ CPM}{uR/hr}_{Co-60}$$

$$\text{Exposure Model} = \frac{1.229\ uRi/hr}{5\ pCi/g}_{Cs-137} \text{ and } \frac{5.029\ uRi/hr}{5\ pCi/g}_{Co-60}$$

$DCGL_w$ = 11.93 pCi/g Cs-137 and 3.21 pCi/g Co-60

The $DCGL_w$ for Co-60 is the most limiting value for scanning measurements performed to identify areas of potentially elevated activity. Scanning conducted for this Final Status Survey will assume all residual radioactivity to originate from Co-60 and the instrument response at the Co-60 $DCGL_w$ (1818) will be used as the scanning investigation level for Survey Canal$C_1$1.

[1] These values established in EA-BRP-SC-0201, *NaI Scanning Sensitivity For Open Land Survey.*

Attachment 1
Scoping Data
Survey $CanalC_1 1$

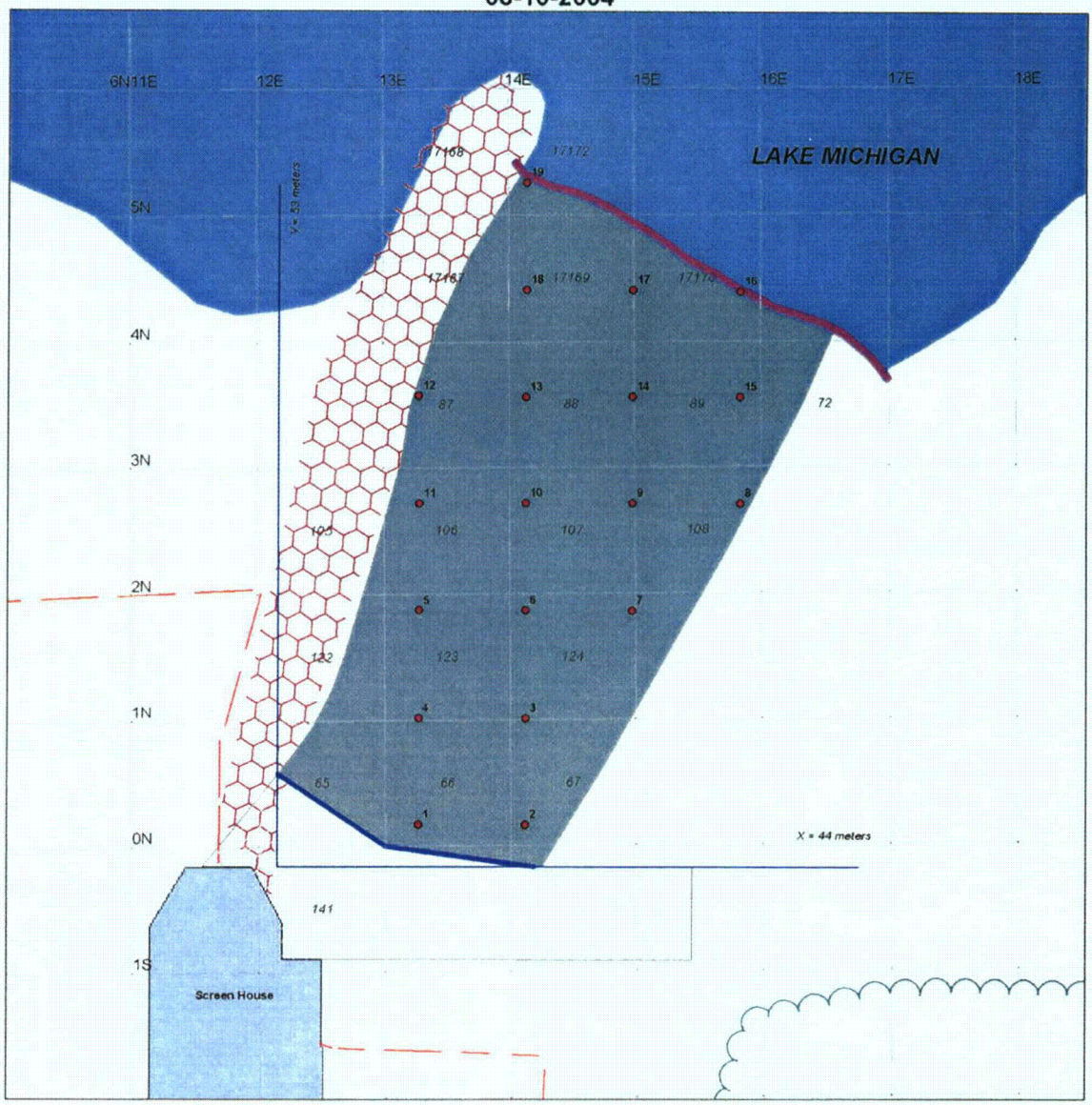
Sample No.	Survey	Grid	X Coord.	Y Coord.	Cs-137 (pCi/g)		Co-60 (pCi/g)	
					Activity	MDA	Activity	MDA
1	$CanalA_8 1$	141	2.7	8.8	2.84		1.66	
2	$CanalA_8 1$	66	1.1	8	2.07		0.43	
3	$CanalA_8 1$	141	6.3	9.3	0.19		0.10	
4	$CanalA_8 1$	66	2.9	2.9	1.32		1.70	
5	$CanalA_8 1$	123	5.1	0.6	3.21		0.48	
6	$CanalA_8 1$	106	3.5	0.3	4.83		0.55	
7	$CanalA_8 1$	107	2.4	2	0.51		0.57	
8	$CanalA_8 1$	106	8.6	2.7	0.54		1.69	
9	$CanalA_8 1$	87	3.3	1.3	1.37		0.49	
10	$CanalA_8 1$	106	1.7	9.5	1.18		0.55	
11	$CanalA_8 1$	87	1.7	0.9	2.13		2.27	
12	$CanalA_8 1$	87	2.7	2.7	1.66		0.98	
13	$CanalA_8 1$	17169	9	0.7	1.29		0.09	
14	$CanalA_8 1$	107	0.8	3.4	0.81		1.98	

Note: nd indicates activity not detected.

Note: All measurement values are in SI Units.

Mean:	1.71	0.97
St. Dev.:	1.25	0.74
Median:	1.35	0.56

Attachment 2
Final Status Survey CanalC$_1$1
Soil Sample Locations
08-10-2004



Scale: 0 5 10 20 Meters

Legend

- Soil Sample Locations
- Local Coordinate Grid, 10X10 meters
- Screenhouse Demolition Work Area
- Extent of Survey Area
- Canal/Screenhouse Work Boundary
- Canal Coffer Dam

Soil Sample Locations

Sample No.	Grid	X Coord.	Y Coord.
1	66	2.6	1.8
2	67	1.1	1.8
3	124	1.1	0.3
4	123	2.6	0.3
*5	122	4.1	0.3
6	123	2.6	8.8
7	124	1.1	8.8
8	124	9.6	8.8
9	108	8.1	7.3
10	107	9.6	7.3

Sample No.	Grid	X Coord.	Y Coord.
11	107	1.1	7.3
12	106	2.6	7.3
13	88	1.1	8.8
14	88	9.6	5.8
15	89	8.1	5.8
16	17170	8.1	4.3
17	17169	9.6	4.3
18	17169	1.1	4.3
19	17172	1.1	2.8

Sample No. 5 is the Random Start Location

Attachment 3

Scan MDC In Varying Backgrounds

				CPM	MDER uR/hr		Scan MDC pCi/g	
Background	d'	i	s_i	$MDCR_{surveyor}$	Cs-137	Co-60	Cs-137	Co-60
2000	2.48	4	28.64	607.47	0.51	1.08	2.06	1.07
2500	2.48	4	32.02	679.18	0.57	1.20	2.30	1.20
3000	2.48	4	35.07	744.00	0.62	1.32	2.52	1.31
3500	2.48	4	37.88	803.61	0.67	1.42	2.72	1.41
4000	2.48	4	40.50	859.10	0.72	1.52	2.91	1.51
4500	2.48	4	42.95	911.21	0.76	1.61	3.09	1.60
5000	2.48	4	45.28	960.50	0.80	1.70	3.26	1.69
5500	2.48	4	47.49	1,007.38	0.84	1.78	3.42	1.77
6000	2.48	4	49.60	1,052.17	0.88	1.86	3.57	1.85
6500	2.48	4	51.63	1,095.14	0.91	1.94	3.71	1.93
7000	2.48	4	53.57	1,136.48	0.95	2.01	3.85	2.00
7500	2.48	4	55.45	1,176.37	0.98	2.08	3.99	2.07
8000	2.48	4	57.27	1,214.95	1.01	2.15	4.12	2.14
8500	2.48	4	59.04	1,252.34	1.04	2.22	4.25	2.20
9000	2.48	4	60.75	1,288.65	1.07	2.28	4.37	2.27
9500	2.48	4	62.41	1,323.96	1.10	2.34	4.49	2.33
10000	2.48	4	64.03	1,358.35	1.13	2.40	4.61	2.39
10500	2.48	4	65.61	1,391.90	1.16	2.46	4.72	2.45
11000	2.48	4	67.16	1,424.65	1.19	2.52	4.83	2.51
11500	2.48	4	68.67	1,456.67	1.21	2.58	4.94	2.56
12000	2.48	4	70.14	1,488.00	1.24	2.63	5.04	2.62
12500	2.48	4	71.59	1,518.68	1.27	2.69	5.15	2.67
13000	2.48	4	73.01	1,548.76	1.29	2.74	5.25	2.73
13500	2.48	4	74.40	1,578.26	1.32	2.79	5.35	2.78
14000	2.48	4	75.77	1,607.22	1.34	2.84	5.45	2.83
14500	2.48	4	77.11	1,635.67	1.36	2.89	5.55	2.88
15000	2.48	4	78.42	1,663.63	1.39	2.94	5.64	2.93
Modeled Exposure (uR/hr) @ 5 pCi/g								
	Cs-137	1.23E+00						
	Co-60	5.03E+00						

Attachment 4

Area Factors for Open Land Survey Evaluation

Contaminated Area (m^2)	Calculated Area Factors at Time of Peak Dose								
	H-3	Mn-54	Fe-55	Co-60	Sr-90	Cs-137	Eu-152	Eu-154	Eu-155
8094	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4047	1.00	1.01	1.00	1.01	1.00	1.02	1.02	1.01	1.02
2024	1.00	1.03	1.00	1.03	1.00	1.03	1.03	1.03	1.03
1012	1.35	1.04	1.00	1.04	1.00	1.04	1.05	1.04	1.04
506	2.91	1.09	1.98	1.08	1.98	1.13	1.07	1.07	1.06
253	6.05	1.14	3.95	1.13	3.94	1.20	1.11	1.11	1.09
126	12.4	1.20	7.93	1.20	7.87	1.29	1.17	1.16	1.14
63	24.9	1.30	15.8	1.30	15.6	1.41	1.27	1.26	1.23
32	49.2	1.49	31.2	1.49	30.5	1.62	1.44	1.45	1.39
16	98.9	1.78	62.0	1.78	59.9	1.93	1.72	1.73	1.63
8	198	2.38	123	2.38	117	2.58	2.30	2.31	2.14
4	397	3.61	243	3.62	230	3.91	3.49	3.52	3.19
2	794	5.68	473	5.75	452	6.14	5.48	5.55	4.90
1	1590	9.57	905	9.73	887	10.3	9.24	9.39	7.88

RM-76-5
FINAL STATUS SURVEY APPROVAL
AND AUTHORIZATION FOR IMPLEMENTATION

Survey Code FSS Canal$C_1$1

Survey Area Description:

Final Status Survey Canal$C_1$1 encompasses a 1300 m^2 area that served as the discharge canal during plant operation. The discharge canal has been dewatered and reclaimed as part of the owner controlled property . This survey unit is a Class 1 area.

The survey area is authorized for Final Status Survey Implementation.

Designed by	8-9-04 Date
Technical Review by	8-9-04 Date

RM-77-1
SURVEY IMPLEMENTATION CHECKLIST
Page 1 of 3

Step (✓)		Initial	Date
1.0	PREPARATION FOR SURVEY Canal C, 1 (Survey #)		
1.1	Survey Area Status:		
✓	a. Final Status Survey Design has been approved for implementation (see RM-76-5, Final Status Survey Approval and Authorization for Supplementation). 1. Survey area walkdown complete 2. Survey area determined ready for FSS 3. Decommissioning activities that may impact the environmental status of the survey area have been completed. 4. Survey area environment is controlled by barriers and postings or other approved method to restrict access.	[illegible] (ESSG)	8-9-04
✓	b. Survey area has been turned over to the Environmental Services Survey Group (ESSG) in acceptable condition for FSS.	[illegible] (ESSG)	08-09-04
1.2	Field Preparation:		
✓	a. Survey unit boundaries delineated (Step 6.1.1)		
✓	b. Statistical soil samples predetermined in the survey design are located and marked within the survey unit. (Step 6.1.2)		
✓	c. Soil sample locations verified (Step 6.1.2.c)		
✓	d. Instruments and equipment have been collected and calibrated for data measurement and collection (Step 6.1.3)		
✓	e. Field documentation is prepared (Step 6.1.4)	[illegible] (ESSG)	09-10-04

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RM-77-1
SURVEY IMPLEMENTATION CHECKLIST

		Initial	Date
2.0	DATA COLLECTION		
2.1	Soil Survey:		
✓	All soil samples collected and controlled (Step 6.2.1).	ESSG	08-10-04
2.2	Surface Scan:		
✓	Surface Scan complete. Action response requirements have been conducted on any identified areas exceeding the investigation level (Step 6.3).	ESSG	08-10-04
2.3	Judgmental Soil Samples:		
✓	a. Judgmental soil samples have been collected and controlled (Step 6.2.3).		
✓	b. Deep core profiles performed in areas identified to contain elevated residual activity (Step 6.2.3).	ESSG	08-10-04
3.0	SAMPLE PREPARATION AND LABORATORY ANALYSIS		
3.1	Sample Preparation (Step 6.4.1):		
✓	a. Soil samples are homogenous		
✓	b. Soil samples are visibly dry prior to packing		
✓	c. Non-soil materials have been removed from sample		
✓	d. Soil samples have been transferred to one-liter Marinelli containers and are labeled and sealed.	ESSG	08-11-04

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RM-77-1
SURVEY IMPLEMENTATION CHECKLIST
Page 2 of 3

		Initial	Date
3.2	Laboratory Analysis:		
✓	Isotopic analyses are complete. The spectroscopy report requires a signature of completion by the laboratory analyst and a signature of evaluation documenting that a second level review has been performed (Step 6.4.2).	ESSG	8/13/04
3.3	Sample Control and Documentation:		
	Chain of custody documentation exhibits control of soil samples (Step 6.4.3).	ESSG	8/13/04

Reviewed by 8-19-04 Date

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ATTACHMENT RM-59-1
SAMPLING AND ANALYSIS REPORT

Date: 08-10-2004	Time: 13:00	Location: Canal	Tech: mjk/dwp

SURVEY IDENTIFICATION / DESCRIPTION

Survey Canal$C_1$1, Final Status Survey of Discharge Canal.

SURVEY TYPE

Survey Type: _____ Characterization __X__ Scan (Motive)
_____ Remediation
__X__ Final _____ Scan (Static)

SURVEY DESIGN

Sample Collection: _____ Judgmental _____ Random __X__ Systematic
Scan Coverage: 100 %

ANALYSIS

Inst./Serial No. Detector 6 DAILY CHECK: __X__ SAT _____ UNSAT INIT: MJK
Scan 23501/186201
Investigation Of Unidentified Peaks:
_____ N/A __X__ SAT _____ UNSAT INIT: MJK

Minimum Detectable Activity (Section 5.3.3) __X__ SAT _____ UNSAT INIT: MJK

COMMENTS

Final status survey of the discharge canal involved 100% mobile scan with a NaI Detector and soil samples. Dample Design: Random start with a square grid systematic pattern. Nineteen statistical soil samples were collected all of which showed concentrations of radioactivity at a fraction of the $DCGL_w$. 100% mobile scan identified 21 locations of activity above established background. Judgmental surface samples were taken at each location and deep cores were collected in areas of highest activity. Sample J19 contained an elevated discrete particle which was remediated. Follow-up investigation scan and soil sample comfirmed that the particle had been removed from the survey unit.

Technician Signature: [signature] Date: 8-18-04

Second Level Review:
Signature: [signature] Date: 8-19-04

Activity Summary of Statistical Samples
Final Status Survey Canal$C_1$1
08-10-2004

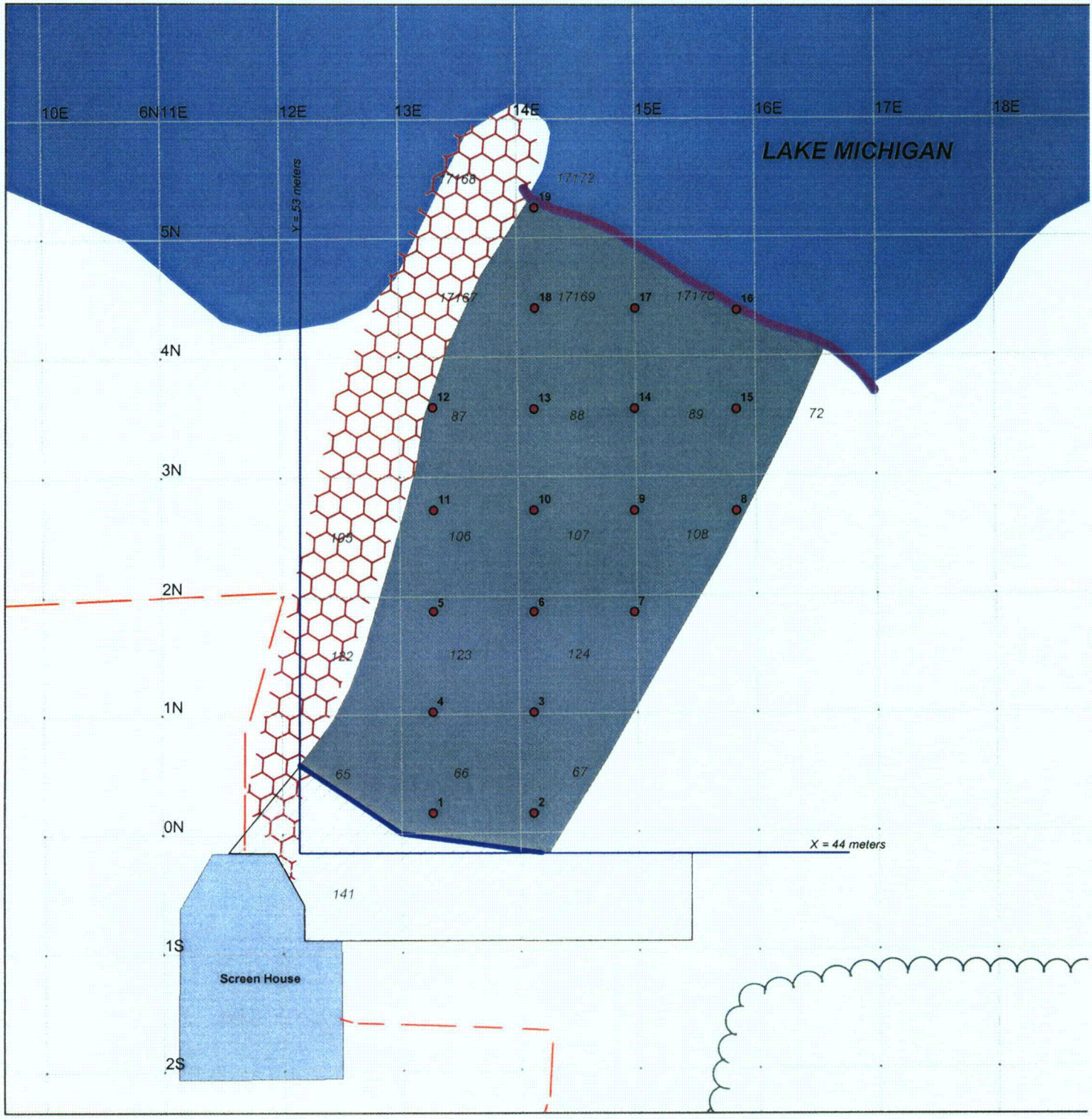
Sample No.	Grid	X Coord.	Y Coord.	Cs-137 (pCi/g)		Co-60 (pCi/g)	
				Activity	MDA	Activity	MDA
1	66	2.6	1.8	0.48		0.13	
2	67	1.1	1.8	0.18		0.11	
3	124	1.1	0.3	0.87		nd	0.05
4	123	2.6	0.3	2.81		0.57	
5	123	2.6	8.8	0.54		0.07	
6	124	1.1	8.8	0.38		0.14	
7	124	9.6	8.8	0.21		0.10	
8	108	8.1	7.3	0.19		nd	0.08
9	107	9.6	7.3	0.52		1.51	
10	107	1.1	7.3	0.82		0.10	
11	106	2.6	7.3	1.67		0.26	
12	87	2.6	8.8	0.54		0.17	
13	88	1.1	8.8	0.41		1.61	
14	88	9.6	5.8	1.11		0.26	
15	89	8.1	5.8	nd	0.05	nd	0.06
16	17170	8.1	4.3	0.40		0.13	
17	17169	9.6	4.3	1.04		0.20	
18	17169	1.1	4.3	0.13		0.23	
19	17172	1.1	2.8	0.67		0.12	

Note: nd indicates activity not detected.

Note: All measurement values are in SI Units.

Mean:	0.72	0.36
St. Dev.:	0.65	0.48
Median:	0.53	0.16

Final Status Survey Canal$C_1$1
Statistical Soil Sample Locations
08-10-2004



Scale: 0 4 8 16 Meters

Legend

- Soil Sample Locations
- Local Coordinate Grid, 10X10 meters
- Screenhouse Demolition Work Area
- Extent of Survey Area
- Canal/Screenhouse Work Boundary
- Canal Coffer Dam

Soil Sample Locations

Sample No.	Grid	X Coord.	Y Coord.
1	66	2.6	1.8
2	67	1.1	1.8
3	124	1.1	0.3
*4	123	2.6	0.3
5	123	2.6	8.8
6	124	1.1	8.8
7	124	9.6	8.8
8	108	8.1	7.3
9	107	9.6	7.3
10	107	1.1	7.3

Sample No.	Grid	X Coord.	Y Coord.
11	106	2.6	7.3
12	87	2.6	8.8
13	88	1.1	8.8
14	88	9.6	5.8
15	89	8.1	5.8
16	17170	8.1	4.3
17	17169	9.6	4.3
18	17169	1.1	4.3
19	17172	1.1	2.8

Activity Summary
Judgmental Soil Samples
Final Status Survey Canal$C_1$1
08-10-2004

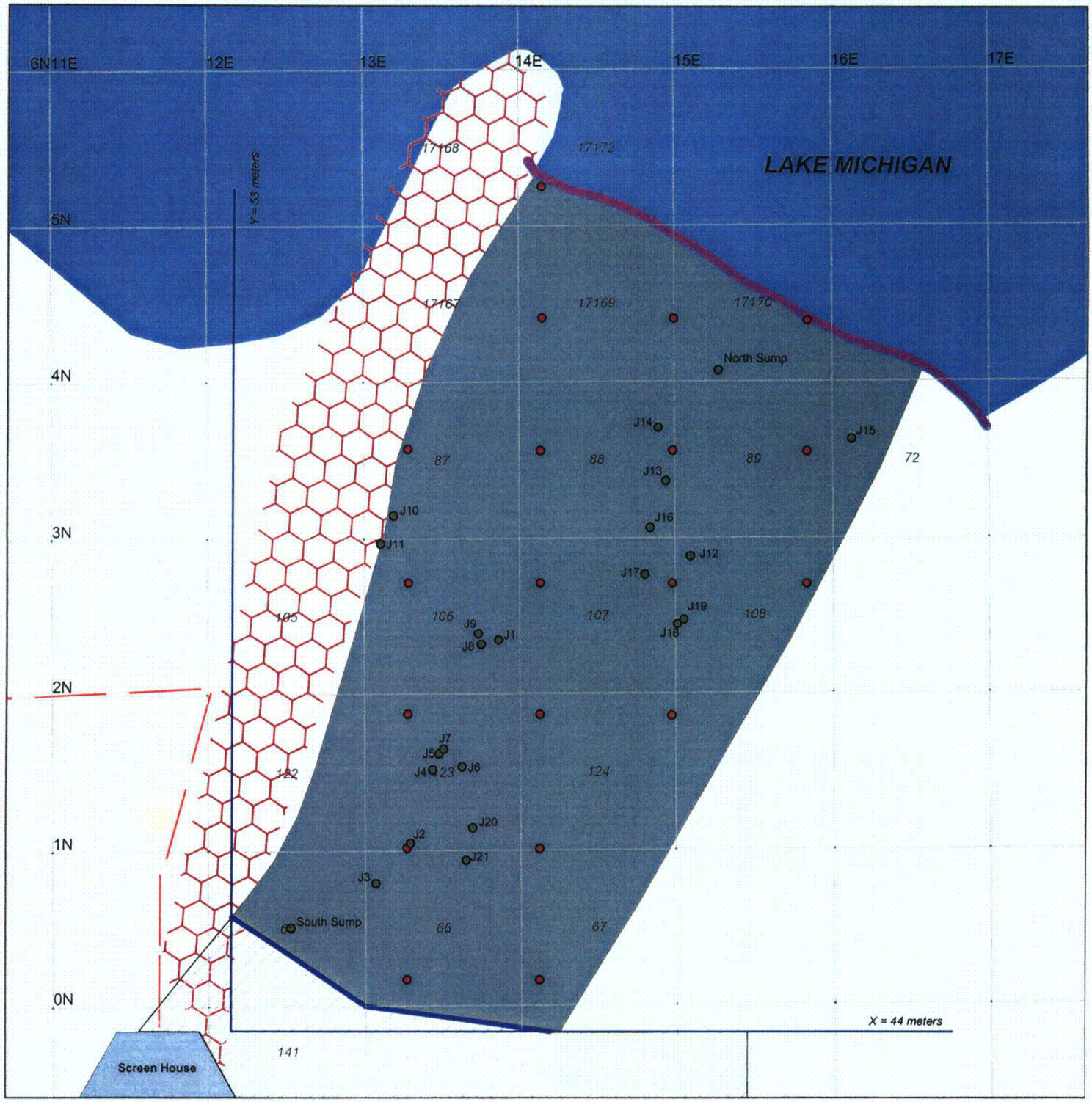
Sample No.	Grid	X Coord.	Y Coord.	Cs-137 (pCi/g) Activity	Cs-137 (pCi/g) MDA	Co-60 (pCi/g) Activity	Co-60 (pCi/g) MDA
J1, surface	106	8.6	3.5	4.85		0.43	
J2, surface	123	2.9	0.5	3.45		0.65	
J2, 15-30 cm.	123	2.9	0.5	3.94		0.45	
J3	66	0.6	7.9	4.96		0.65	
J3, 15-30 cm.	66	0.6	7.9	3.99		0.34	
J4	123	4.3	5.2	1.72		0.20	
J5	123	4.7	6.2	2.05		0.34	
J6	123	6.2	5.4	2.30		0.45	
J7	123	5.0	6.5	1.85		0.29	
J7, 15-30 cm.	123	5.0	6.5	0.36		nd	0.08
J8	106	7.5	3.2	0.84		2.73	
J9	106	7.3	3.9	0.31		0.86	
J10	87	1.9	1.5	1.64		1.19	
J11	106	1.0	9.7	2.25		0.56	
J12	108	0.9	8.8	0.11		0.14	
J13	88	9.4	3.6	1.30		1.50	
J13, 15-30 cm.	88	9.4	3.6	1.67		0.58	
J14	88	8.9	7.1	1.61		0.80	
J15	72	1.2	6.3	0.45		0.24	
J16	88	8.4	0.7	1.46		0.28	
J17	107	8.0	7.7	0.40		0.72	
J18	108	0.1	4.4	7.52		0.69	
J19	108	0.5	4.7	0.64		0.46	
J19, 15-30 cm.	108	0.5	4.7	0.20		0.11	
J20	123	6.9	1.5	0.65		0.92	
J21	66	6.4	9.4	1.10		1.13	
south sump	65	5.2	5.1	0.62		0.24	
north sump	17170	2.8	0.7	3.03		0.09	

Note: nd indicates activity not detected.

Note: All measurement values are in SI Units.

	Cs-137	Co-60
Mean:	1.97	0.63
St. Dev.:	1.77	0.55
Median:	1.63	0.46

Final Status Survey Canal$C_1$1
Judgmental Soil Sample Locations
08-10-2004



Scale: 0 4.5 9 18 Meters

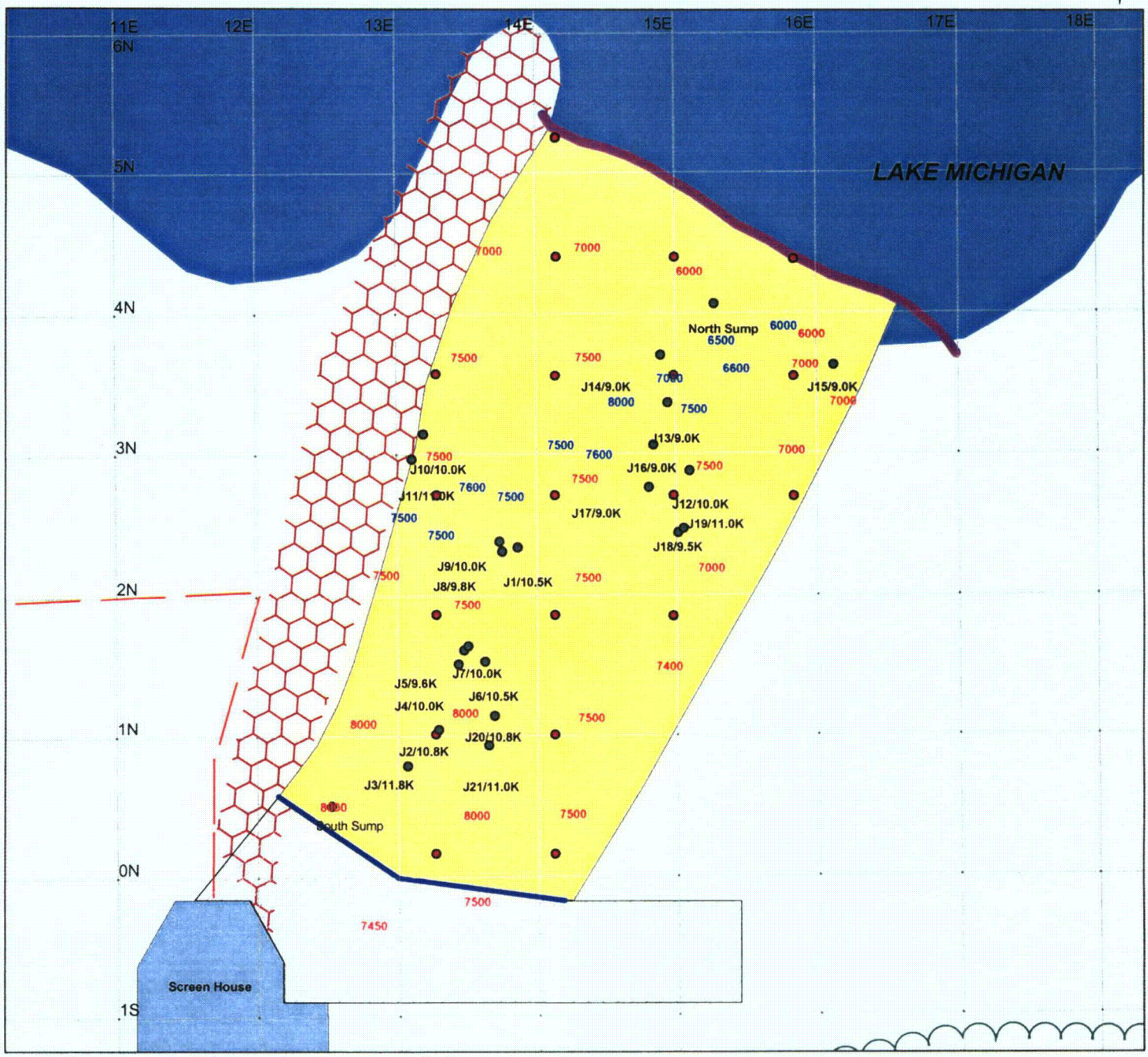
Legend

- Judgmental Soil Samples
- Statistical Soil Sample Locations
- Local Coordinate Grid, 10X10 meters
- Screenhouse Demolition Work Area
- Extent of Survey Area
- Canal/Screenhouse Work Boundary

Sample No.	Grid	X Coord.	Y Coord.
J1	106	8.6	3.5
J2	123	2.9	0.5
J3	66	0.6	7.9
J4	123	4.3	5.2
J5	123	4.7	6.2
J6	123	6.2	5.4
J7	123	5	6.5
J8	106	7.5	3.2
J9	106	7.3	3.9
J10	87	1.9	1.5
J11	106	1	9.7

Sample No.	Grid	X Coord.	Y Coord.
J12	108	0.9	8.8
J13	88	9.4	3.6
J14	88	8.9	7.1
J15	72	1.2	6.3
J16	88	8.4	0.7
J17	107	8	7.7
J18	108	0.1	4.4
J19	108	0.5	4.7
J20	123	6.9	1.5
J21	66	6.4	9.4
Sump S	65	5.2	5.1
Sump N	17170	2.8	0.7

Final Status Survey CanalC 1
Mobile Scan Survey
08-10-2004



Scale: 0 4.5 9 18 Meters

Legend

- Judgmental Sample w/ Scan Activity
- Statistical Soil Sample Locations
- Local Coordinate Grid, 10X10 meters
- Screenhouse Demolition Work Area
- Extent of Survey Area
- Canal/Screenhouse Work Boundary
- Canal Coffer Dam

Primary Scan : 100 %

Technician Signature: MJK/TAGoble **Date:** 8-10-04
Time: 10:30

QC Verification Scan: 10 %

Technician Signature: [illegible] **Date:** 8-11-04
Time: 09:30

Numbers in **Red** indicate Average General Area Activity (cpm) Identified During Mobile Scan

Numbers in **Blue** indicate Average General Area Activity (cpm) Identified During QC Verification Scan

FSS Canal Cell

RM-72-1
CHAIN-OF-CUSTODY RECORD

Sample Number	Sampling Location	Date	Time	Final Disposition of Sample
1	G210 66, (2.6)(1.8)	8-10-04	13:08	76A
2	G210 67, (1.1)(1.8)	8-10-04	13:11	76A
3 QA SPLIT	G210 124, (1.1)(0.3)	8-10-04	13:15	76A
* 4 RANDOM STAGE	G210 123 (2.6)(0.3)	8-10-04	13:20	76A
5	G210 123, (2.6)(8.8)	8-10-04	13:23	76A
6	G210 124, (1.1)(8.8)	8-10-04	13:25	76B
7	G210 124, (9.6)(8.8)	8-10-04	13:28	76B
8	G210 108, (8.1)(7.3)	8-10-04	13:30	76B
9 QA SPLIT	G210 107, (9.6)(7.3)	8-10-04	13:32	76B
10	G210 107, (1.1)(7.3)	8-10-04	13:37	76B
11	G210 106, (2.6)(7.3)	8-10-04	13:39	76C
12	G210 87, (2.6)(8.8)	8-10-04	13:41	76C
13	G210 88, (1.1)(8.8)	8-10-04	13:43	76C
14	G210 88, (9.6)(5.8)	8-10-04	13:48	76C
15	G210 89, (8.1)(5.8)	8-10-04	13:50	76C
16	G210 1770, (8.1)(4.3)	8-10-04	13:53	mole 76D
17	G210 1769, (9.6)(4.3)	8-10-04	13:55	76D
18	G210 1769, (1.1)(4.3)	8-10-04	14:09	76B
19	G210 1772, (1.1)(2.8)	8-10-04	14:05	76D
18 QA SPLIT	G210 1769, (1.1)(4.3)	8-10-04	14:09	76D

(Samples may be analyzed and stored, shipped for offsite evaluation or analyzed and disposed of.)

1. Relinquished by:	Date 8-10-04	Time 16:00	Received in good condition by:
2. Relinquished by: Jodie L Reed	Date 8-11-04	Time 10:30	Received in good condition by:
3. Relinquished by:	Date 8-18-04	Time 15:00	Received in good condition by: Permanent Storage
4. Relinquished by:	Date	Time	Received in good condition by:

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FSS CANAL C,1
SUPPLEMENTAL SAMPLES

RM-72-1
CHAIN-OF-CUSTODY RECORD

PAGE 1 OF 2

Sample Number	Sampling Location	Date	Time	Final Disposition of Sample
J-1 NRC SPLIT	GRID 106, (8.6)(3.5)	8-10-04	14:16	NOTE: SURFACE SAMPLE TAKEN W/ SHOVEL 69A
J-2 NRC SPLIT	GRID 123, (2.9)(0.5)	8-10-04	14:27	NOTE: SURFACE SAMPLE TAKEN W/ SHOVEL 69A
J-2, 6-12"	GRID 123, (2.9)(0.5)	8-10-04	14:30	69A
J-3	GRID 66, (0.6)(7.9)	8-10-04	14:45	69A
J-3, 6-12"	GRID 66, (0.6)(7.9)	8-10-04	14:48	69A
J-4	GRID 123, (4.3)(5.2)	8-10-04	14:49	69B
J-5	GRID 123, (4.7)(6.2)	8-10-04	14:50	69B
J-6	GRID 123, (6.2)(5.4)	8-10-04	14:52	69B
J-7	GRID 123, (5.0)(6.5)	8-10-04	14:55	69B
J-7, 6-12"	GRID 123, (5.0)(6.5)	8-10-04	14:57	69B
J-8	GRID 106, (7.5)(3.2)	8-10-04	15:00	69C
J-9	GRID 106, (7.3)(3.9)	8-10-04	15:02	69C
J-10	GRID 87, (1.9)(1.5)	8-10-04	15:07	69C
J-11	GRID 106, (1.0)(9.7)	8-10-04	15:10	69C
J-12	GRID 108, (0.9)(8.2)	8-10-04	15:12	69C
J-13	GRID 88, (9.4)(3.6)	8-10-04	15:15	69D
J-13, 6-12"	GRID 88, (9.4)(3.6)	8-10-04	15:16	69D
J-14	GRID 88, (8.9)(7.1)	8-10-04	15:18	69D
J-15	GRID 72, (1.2)(6.3)	8-10-04	15:20	69D
J-16	GRID 88, (8.1)(0.7)	8-10-04	15:27	69D

(Samples may be analyzed and stored, shipped for offsite evaluation or analyzed and disposed of.)

1. Relinquished by:	Date 8-10-04	Time 16:00	Received in good condition by:
2. Relinquished by:	Date 8-18-04	Time 15:00	Received in good condition by:
3. Relinquished by:	Date	Time	Received in good condition by:
4. Relinquished by:	Date	Time	Received in good condition by:

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RM-72-1
CHAIN-OF-CUSTODY RECORD

PAGE 2 OF 2

Sample Number	Sampling Location	Date	Time	Final Disposition of Sample
J-17	GRID 109, (8.0)(7.7)	8-10-04	15:27	69E
J-18	GRID 108, (0.1)(4.7)	8-10-04	15:31	69E
J-19	GRID 108, (0.5)(4.7)	8-10-04	15:33	69E
J-20	GRID 123, (6.9)(1.5)	8-10-04	15:37	69E
J-21	GRID 66, (6.4)(9.4)	8-10-04	15:40	69F
SOUTH SUMP	GRID 65, (5.2)(5.1)	8-11-04	09:38	69F
NORTH SUMP	GRID 17170, (2.8)(0.7)	8-11-04	09:43	69F
J-19 15-30	GRID 108, (0.5)(4.7)	8-11-04	09:50	69E

(Samples may be analyzed and stored, shipped for offsite evaluation or analyzed and disposed of.)

1. Relinquished by:	Date 8-10-04	Time 16:00	Received in good condition by: Jodie L. Reed
2. Relinquished by:	Date 8-13-04	Time 15:00	Received in good condition by: Permanent Storage
3. Relinquished by:	Date	Time	Received in good condition by:
4. Relinquished by:	Date	Time	Received in good condition by:

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RM-79-1
FSS QUALITY CONTROL EVALUATION RESULTS

FSS Package # CANAL C.1 QC Package # CANAL C.1

QC Measurement Type	Acceptance Criteria Met*?	Reference
✓ 1. Replicate Scan	Yes / No	Step 5.1.3
2. Sample Recounts		Step 5.1.4.1
✓ a. In-house	Yes / No	
____ b. Third party	Yes / No	
3. Split Samples		Step 5.1.4.2
✓ c. In-house	Yes / No	
____ d. Third party	Yes / No	

*NOTE: If Acceptance Criteria is not met, completion of Attachment RM-79-2, FSS Quality Control Investigation Results, is required.

Comments:
1. Replicate Verification Scan Information is documented in the Implementation Section of this package.
2. In-house Sample Recount Worksheet Attached
In house
3. Split Sample worksheet attached

Reviews:

Evaluator — Date 08-17-04

Technical Review — Date 8-19-04

FSS QA Verification Worksheet
In-House Sample Recounts

Date: 8/11/2004

QA Package: CanalC$_1$1, Final Status Survey of Discharge Canal

Type of QA: Sample Recounts

Lab: In House

Table 1:
NRC 84750 Criteria

Resolution	Ratio
<4	N/A
4-7	0.5-2.0
8-15	0.6-1.66
16-50	0.75-1.33
51-200	0.8-1.25
>200	0.85-1.18

			A	B	C		D	E	F	G	
Sample No.	**Plant Nuclide**	**BRP Result Below MDA**	**BRP Results (pCi/g)**	**BRP 1-sigma Error (pCi/g)**	**BRP Resolution (pCi/g) A/B**	**Recount Result Below MDA**	**Recount Results (pCi/g)**	**Ratio A/D**	**Resolution (Compare C w/ Table 1)**	**Ratio (Table 1)**	***Results in Agreement (Compare E with G)**
3	Co-60	<	0.0047	0.01330	0.35	<	-0.0026	1.84	<4	N/A	YES
3	Cs-137		0.8731	0.04470	19.53		0.9107	0.96	16-50	0.75-1.33	YES
9	Co-60		1.5140	0.07200	21.03		1.1519	1.31	16-50	0.75-1.33	YES
9	Cs-137		0.5221	0.04420	11.81		0.4516	1.16	8-15	0.6-1.66	YES

< Indicates results less than the MDA.

**Note: All analyses comparisons not in agreement must be investigated per RM-79.*

FSS QA Verification Worksheet
In-House Split Samples

Date: 8/11/2004

QA Package: CanalC$_1$1 Final Status Survey Discharge Canal

Soil Sample Type: Split Samples

Lab: In-House

Table 1:
NRC 84750 Criteria

Resolution	Ratio
<4	N/A
4-7	0.5-2.0
8-15	0.6-1.66
16-50	0.75-1.33
51-200	0.8-1.25
>200	0.85-1.18

			A	B	C		D	E	F	G	
Sample No.	Plant Nuclide	BRP Result Below MDA	BRP Results (pCi/g)	BRP 1-sigma Error (pCi/g)	BRP Resolution (pCi/g) A/B	Split Sample Result Below MDA	Split Sample Results (pCi/g)	Ratio A/D	Resolution (Compare C w/ Table 1)	Ratio (Table 1)	*Results in Agreement (Compare E with G)
18	Co-60		0.2283	0.0312	7.32		0.2742	0.83	8-15	0.6-1.66	YES
18	Cs-137		0.1308	0.0235	5.57		0.1809	0.72	4-7	0.5-2.0	YES

< Indicates results less than the MDA.

**Note: All analyses comparisons not in agreement must be investigated per RM-79.*

RM-79-1
FSS QUALITY CONTROL EVALUATION RESULTS

FSS Package # 15(2R)C,1 QC Package # 15(2R)C,1

QC Measurement Type	Acceptance Criteria Met*?	Reference
✓ 1. Replicate Scan	(Yes) / No	Step 5.1.3
2. Sample Recounts		Step 5.1.4.1
✓ a. In-house	(Yes) / No	
N/A b. Third party	Yes / No	
3. Split Samples		Step 5.1.4.2
✓ c. In-house	(Yes) / No	
N/A d. Third party	Yes / No	

*NOTE: If Acceptance Criteria is not met, completion of Attachment RM-79-2, FSS Quality Control Investigation Results, is required.

Comments:
Findings of independent in-process Surveys were Consistent with the BRP evaluation for unrestricted release.

Reviews:

Jodie L. Reed — 4-24-06
Evaluator — Date

[illegible] — 4/24/06
Technical Review — Date

QA Verification
Split Sample Analysis

Date: 4/17/2006

QA: 15(2R)$C_1$1

Type: Split Sample

Lab: In-House

Table 1

Acceptance Criteria	
Resolution	Ratio
<4	N/A
4-7	0.5-2.0
8-15	0.6-1.66
16-50	0.75-1.33
51-200	0.8-1.25
>200	0.85-1.18

Sample	Radionuclide	BRP Result Below MDA	A BRP Results (pCi/g)	B BRP % Error (Sigma)	C BRP Resolution	D Acceptance Ratio (Table 1)	E Split Results Below MDA	F Split Results (pCi/g)	G Comparison Ratio F/A	Results in Agreement Compare G with D)
15	Co-60	<	0.0515	n/a	n/a	n/a	<	0.0451	0.88	YES
15	Cs-137		0.4355	7.85	12.74	0.6-1.66		0.4325	0.99	YES

$$\text{Resolution } C = \frac{A}{(A)(B/100)}$$

< Indicates results less than the MDA.

**Note Results are considered in agreement for MDA and near-MDA measurement comparisons*
Results fthat fail agreement must be investigated per RM-79.

QA Verification
Sample Recount Analysis

Date: 4/17/2006

QA: 15(2R)C$_1$1

Type: Sample Recounts

Lab: In- House

Table 1

Acceptance Criteria	
Resolution	Ratio
<4	N/A
4-7	0.5-2.0
8-15	0.6-1.66
16-50	0.75-1.33
51-200	0.8-1.25
>200	0.85-1.18

			A	B	C	D	E	F	G	
Sample	Radionuclide	BRP Result Below MDA	BRP Results (pCi/g)	BRP % Error (Sigma)	BRP Resolution	Acceptance Ratio (Table 1)	Recount Result Below MDA	Recount Results (pCi/g)	Comparison Ratio F/A	Results in Agreement Compare G with D)
3	Co-60	<	0.0505	n/a	n/a	n/a	<	0.0617	1.22	YES
3	Cs-137		0.3611	9.68	10.33	0.6-1.66		0.3686	1.02	YES
4	Co-60	<	0.0753	n/a	n/a	n/a	<	0.0428	0.57	YES
4	Cs-137		1.2590	10.32	9.69	0.6-1.66		1.2200	0.97	YES

$$\text{Resolution C} = \frac{A}{(A)(B/100)}$$

< Indicates results less than the MDA.

**Note Results are considered in agreement for MDA and near-MDA measurement comparisons*
Results fthat fail agreement must be investigated per RM-79.

Tritium in Soil
Analysis of Data Results
Final Status Survey Canal$C_1$1
Survey of Discharge Canal
08-10-2004

Sample Number	Tritium in Soil (pCi/g)
3	-0.003
9	0.011
18	0.023

Mean:	**0.01**
Median:	**0.01**
St. Dev:	**0.01**

Note: DCGL for Tritium is 327 pCi/g.
Sample data results are a fraction of the DCGL.

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Big Rock Nuclear Facility
Address : 10269 US 31 North
Charlevoix, Michigan 49720--9436

Report Date: August 25, 2004

Contact: Mr. Chuck Barsy
Project: Routine Analytical-Chuck

Client Sample ID: SAMPLE #3 300197
Sample ID: 119142001
Matrix: Soil
Collect Date: 11-AUG-04 10:00
Receive Date: 13-AUG-04
Collector: Client

Project: ROCK2000
Client ID: ROCK001

Parameter	Qualifier	Result		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Gravimetric Solids											
ASTM D 2216 % Moisture											
Moisture		3.13				percent		BSW1 08/16/04	1356	357870	1
Rad Liquid Scintillation Analysis											
LSC, Tritium Vacuum, Solid											
Tritium	U	-72.2	+/-140	242	500	pCi/L		AB1 08/20/04	1518	357941	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	ASTM D2216	
2	GL-RAD-A-002	

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Rad results: Estimated value, result activity is less than the MDA + 2-sigma uncertainty.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.
+/- Rad results: Uncertainty 2-sigma.

The above sample is reported on an "as received" basis.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Patti Carson

Reviewed by

GENERAL ENGINEERING LABORATORIES, LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Big Rock Nuclear Facility
Address : 10269 US 31 North
Charlevoix, Michigan 49720--9436

Report Date: August 25, 2004

Contact: Mr. Chuck Barsy
Project: Routine Analytical-Chuck

Client Sample ID:	SAMPLE #9 300194	Project:	ROCK2000
Sample ID:	119142002	Client ID:	ROCK001
Matrix:	Soil		
Collect Date:	11-AUG-04 10:00		
Receive Date:	13-AUG-04		
Collector:	Client		

Parameter	Qualifier	Result		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Gravimetric Solids											
ASTM D 2216 % Moisture											
Moisture		6.43				percent		BSW1 08/16/04	1356	357870	1
Rad Liquid Scintillation Analysis											
LSC, Tritium Vacuum, Solid											
Tritium	U	172	+/-146	244	500	pCi/L		AB1 08/20/04	1723	357941	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	ASTM D2216	
2	GL-RAD-A-002	

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Rad results: Estimated value, result activity is less than the MDA + 2-sigma uncertainty.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.
+/- Rad results: Uncertainty 2-sigma.

The above sample is reported on an "as received" basis.
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Certificate of Analysis

Company : Big Rock Nuclear Facility
Address : 10269 US 31 North
Charlevoix, Michigan 49720--9436

Report Date: August 25, 2004

Contact: Mr. Chuck Barsy
Project: Routine Analytical-Chuck

Client Sample ID: SAMPLE #18 300201
Sample ID: 119142003
Matrix: Soil
Collect Date: 11-AUG-04 10:00
Receive Date: 13-AUG-04
Collector: Client

Project: ROCK2000
Client ID: ROCK001

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Gravimetric Solids												
ASTM D 2216 % Moisture												
Moisture		37.6				percent		BSW1	08/16/04	1356	357870	1
Rad Liquid Scintillation Analysis												
LSC, Tritium Vacuum, Solid												
Tritium	U	91.3	+/-145	245	500	pCi/L		AB1	08/20/04	1927	357941	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	ASTM D2216	
2	GL-RAD-A-002	

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Rad results: Estimated value, result activity is less than the MDA + 2-sigma uncertainty.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.
+/- Rad results: Uncertainty 2-sigma.

The above sample is reported on an "as received" basis.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Patti Carson
Reviewed by

TRITIUM WATER/SOIL

Using the Vacuum Distillation Rig

Filename : H3VAC.WAT
File type : Excel
Version # : 13
Batch : 357941
Analyst : AB1
Date : 8/17/2004
BKG Count time : 120 min

Procedure Code : LSC_VH3S
Parmname : Tritium
Batch Counted on : LSCRED

Sample ID	Sample Dup
1200684197	119142001
1200684198	119142001
1200684199	

BRP Sample ID	Sample ID	Sample Volume mL	Position#	Count Time min	Raw CPM	Net Sample CPM	Counting Efficiency %	Bkg CPM
#3 CANAL C,1	119142001	10.0000	5-2	120	7.41	-0.36	22.45	7.77
#9 CANAL C,1	119142002	10.0000	5-3	120	8.62	0.85	22.29	7.77
#18 CANAL C,1	119142003	10.0000	5-4	120	8.22	0.45	22.21	7.77
	1200684196	10.0000	5-5	120	7.68	-0.09	22.98	7.77
	1200684197	10.0000	5-6	120	8.07	0.30	22.45	7.77
	1200684198	10.0000	5-7	117	85.61	77.84	22.53	7.77
	1200684199	10.0000	5-8	120	43.30	35.53	22.34	7.77

T357941

Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
8/20/2004 23:35	DUP				**0%**
8/21/2004 1:36	MS	0134-H	16.13	pCi/mL	**96%**
8/21/2004 3:41	LCS	0134-H	8.07	pCi/mL	**89%**

BRP Sample ID	Time Counted	Tritium MDA pCi/mL	**Tritium RESULT pCi/mL**	Tritium ERROR pCi/mL	**MDA Met?**	**Error Met?**	Tritium MDA pCi/G	**Tritium RESULT pCi/G**	Tritium ERROR pCi/G	**TOTAL Moisture**	Initial Wt. grams	Final Wt. grams
#3	8/20/2004 15:18	0.2424	-0.07	0.1399	Yes	Yes	0.0104	-0.003	0.0060	67.30	1568.01	1500.71
#9	8/20/2004 17:23	0.2442	0.17	0.1464	Yes	Yes	0.0152	0.011	0.0091	43.14	694.48	651.34
#18	8/20/2004 19:27	0.2451	0.09	0.1451	Yes	Yes	0.0610	0.023	0.0361	78.87	316.69	237.82
	8/20/2004 21:31	0.2369	-0.02	0.1379	Yes	Yes	0.2369	-0.018	0.1379	20	20.00	
	8/20/2004 23:35	0.2424	0.06	0.1429	Yes	Yes	0.0104	0.003	0.0061	67.3	1568.01	1500.71
	8/21/2004 1:36	0.2446	15.56	0.3500	Yes	Yes	0.0105	0.668	0.0150	67.3	1568.01	1500.71
	8/21/2004 3:41	0.2436	7.16	0.2578	Yes	Yes	0.2436	7.164	0.2578	20	20.00	

EXECUTIVE SUMMARY

Consumers Energy Company
Big Rock Point Restoration Project
NRC Inspection Report 05000155/2004-002(DNMS)

These routine decommissioning inspections involved a review of the Consumers Energy Company's and its contractors' current performance related to decommissioning support activities and radiological safety. During the inspection period, major activities reviewed included facility demolition and decontamination, and radiological and environmental surveys.

Decommissioning Support Activities

- The inspectors concluded that the licensee and its contractors conducted decommissioning activities in accordance with appropriate regulatory requirements and in a safe manner. Management oversight of decommissioning activities was commensurate with the scope and complexity of the activities observed. (Section 1.0)

Radiation Protection Program

- The inspectors concluded that the licensee and its contractors conducted decommissioning activities in a safe manner and in accordance with procedural requirements. The inspectors also concluded that the daily briefings included the radiological information necessary to conduct decommissioning activities in accordance with regulatory requirements. (Section 2.0)

Final Status Survey

- The inspectors determined that the licensee's final status survey of the discharge canal was consistent with procedural requirements and that the procedures used were consistent with the Final Survey Plan found in Chapter 5 of the License Termination Plan. The inspectors concluded that the licensee implemented the survey program in accordance with approved decommissioning procedures. (Section 3.0)

Corrective Action Program

- The inspectors concluded that the licensee's use of the corrective action program enabled the staff to identify, resolve, and preclude issues from degrading safety or the quality of decommissioning activities. (Section 4.0)

Safety Reviews

- The inspectors determined that the licensee appropriately evaluated proposed facility changes through established procedures in conformance with the NRC regulatory requirements in 10 CFR 50.59, and 10 CFR 72.48. (Section 5.0)

Emergency Plan Exercise

- The licensee staff responded to a simulated emergency in a timely manner, followed by effective hazard assessment, communications, and control. The licensee's critique findings were consistent with those identified by the inspectors. The inspectors concluded that the exercise adequately tested the licensee's emergency plan response capability. (Section 6.0)

Report Details[1]

1.0 Decommissioning Support Activities (71801)

a. Inspection Scope

The inspectors evaluated decommissioning activities to verify that the licensee and its contracted workforce were conducting work in accordance with licensed requirements. In addition, the inspectors evaluated the licensee's management and oversight of decommissioning activities.

b. Observations and Findings

The inspectors conducted numerous site tours to observe licensee staff conduct decommissioning activities such as scabbling of contaminated concrete surfaces, decontamination and surveys of equipment and building surfaces, final status surveys of the discharge canal area, radiation protection work practices, movement of heavy loads, activated concrete removal, and demolition of the Administration Building.

The inspectors noted that the licensee and its contractors were knowledgeable of their work assignments and attentive to their individual tasks. The inspectors determined that the licensee and its contractors' staff were cognizant of the radiological conditions in their work area and aware of what actions could cause the radiation or contamination levels to change. The inspectors determined that the licensee and its contractors communicated effectively, demonstrated appropriate concern for industrial and radiological safety, conducted work in accordance with procedural requirements, and employed good work practices. The inspectors discussed work activities with health physics (HP) technicians and contractors during the tours to verify they understood the radiological issues pertinent to their assigned activities.

The inspectors observed the material condition of facilities and equipment and determined it to be commensurate with the current decommissioning activities. The inspectors noted that general housekeeping was adequate.

c. Conclusion

The inspectors concluded that the licensee and its contractors conducted decommissioning activities in accordance with appropriate regulatory requirements and in a safe manner. Management oversight of decommissioning activities was commensurate with the scope and complexity of the activities observed.

---

[1]A list of acronyms used in the report is included at the end of the Report Details.

2.0 Radiation Protection Program (83750)

a. Inspection Scope

The inspectors reviewed selected radiation protection procedures, observed licensee and contractor staff implement the program requirements, and interviewed licensee and contractor staff, to verify that the program was commensurate with the radiological hazards associated with decommissioning the facility.

b. Observations and Findings

The inspectors observed the licensee conduct daily briefings prior to the beginning of authorized work activities. The inspectors noted that the briefings, as a minimum, consisted of current industrial and radiological conditions at the work sites.

The inspectors observed the licensee and its contractors perform decommissioning activities within the turbine building, containment sphere, and the discharge canal. The workers performed the decommissioning activities in accordance with approved radiation work permits (RWPs), and/or procedures.

c. Conclusion

The inspectors concluded that the licensee and its contractors conducted decommissioning activities in a safe manner and in accordance with procedural requirements. The inspectors also concluded that the daily briefings included the radiological information necessary to conduct decommissioning activities in accordance with regulatory requirements.

3.0 Final Status Survey (83801)

a. Inspection Scope

The inspectors evaluated final status survey documentation to verify that areas had been decontaminated to radiological levels consistent with procedural requirements. In addition, the inspectors conducted independent confirmatory surveys during the discharge canal final status survey.

b. Observations and Findings

The inspectors observed the licensee's environmental compliance group conduct the discharge canal final status survey. The discharge canal final status survey encompassed approximately 1300 square meters and included the former canal shoreline and bathymetric surface that extended approximately 2.6 meters below the normal high water mark. The licensee staff prepared the discharge canal for the final status survey in accordance with approved procedures, which included, erecting a temporary dike to de-water the area. The workers then evaluated the aquatic life, which had concentrated in the discharge canal, for deposition of radioactive materials. Radiological analysis of the aquatic life determined that a layer of zebra mussels had levels of cobalt-60 contamination in excess of the approved release criteria. The zebra mussels were removed and transferred to a waste broker for final disposition in a

licensed radioactive waste facility. The licensee staff confirmed that the cobalt-60 contamination present in the zebra mussels was the result of normal plant operations.

The licensee staff conducted the survey in accordance with the survey criteria specified in the License Termination Plan (LTP) and approved procedures. The inspectors conducted side-by-side independent confirmatory surveys with the licensee staff and a representative from the Michigan Department of Environmental Quality. The inspectors performed the independent confirmatory surveys using radiation detection equipment (Ludlum Model 2241-2 with sodium-iodide probe) which was comparable to the licensee's radiation detection equipment (Ludlum Model 2350-1 with sodium-iodide probe). The NRC detection instruments were calibrated at the appropriate periodicity, December 16, 2003, and April 13, 2004, respectively.

The inspectors initiated the confirmatory survey by conducting a background check of the instruments concurrent with the licensee staff. The inspectors noted that both the NRC and licensee radiation detection instrumentation indicated similar backgrounds of 5,000 to 7,000 disintegrations per minute (dpm). The inspectors then conducted side-by-side scanning surveys covering approximately 95 percent of the discharge canal surface area. The remaining area was under water and could not be surveyed at that time; however, the area was previously characterized and found to be below the applicable release criteria.

The licensee staff determined that cobalt-60 was the most limiting radioisotope expected to be present and assumed that all residual radioactivity was cobalt-60. The licensee staff established an instrument response value of background plus 1818 counts per minute (cpm) based on the cobalt-60 Derived Concentration Guideline Level (DCGL) as the scanning investigation level for this area. The inspectors observed that the licensee staff denoted survey points found to be greater than 1818 cpm above background for the collection of "judgmental samples" and subjected them to further radiological analysis in accordance with the previously established investigation levels.

The inspectors noted that one of the judgmental sample results was determined to exceed the DCGL for cobalt-60. The licensee determined that a zebra mussel shell fragment was present in the soil sample. The licensee removed the shell fragment and re-analyzed the sample. The result was less than the applicable DCGL.

The site specific DCGL for the radioisotopes expected to be present were: 11.93 picocuries per gram (pCi/g) for cesium-137 and 3.21 pCi/g for cobalt-60. The licensee staff collected 19 random statistical soil samples for the discharge canal survey unit. The licensee staff selected 5 percent of these samples for quality assurance/quality control (QA/QC) in accordance with approved procedures.

The inspectors collected split soil samples for three of the QA/QC samples and two judgmental samples. The inspectors sent the samples to the Oak Ridge Institute for Science and Engineering (ORISE) for analysis. The analytical results for the soil samples collected are documented in Table 1. The inspectors noted that there was a discrepancy in the sample results for Sample J1 and attributed the discrepancy to the fact that these were split samples, which meant that cobalt-60 and cesium-137 contamination existed in both samples, but in different concentrations. In all cases, the results were below the DCGL levels.

Table 1 - Final Status Survey Soil Sample Results[1]

Sample No.	Licensee cobalt-60	Licensee cesium-137	NRC cobalt-60	NRC cesium-137
1	0.13	0.48		
2	0.11	0.18		
3	ND[2]	0.87	0.01	0.83
4	0.57	2.81		
5	0.07	0.54		
6	0.14	0.38		
7	0.10	0.21		
8	ND	0.19		
9	1.51	0.52	1.68	0.56
10	0.10	0.82		
11	0.26	1.67		
12	0.17	0.54		
13	1.61	0.41		
14	0.26	1.11		
15	ND	ND		
16	0.13	0.40		
17	0.20	1.04		
18	0.23	0.13	0.29	0.21
19	0.12	0.67		
J1	0.43	4.85	2.54	1.70
J2	0.65	3.45	0.58	3.54

[1] sample results are in picocuries per gram soil (pCi/g)
[2] non-detectable

The inspectors verified by observation that the survey was conducted in accordance with the approved procedures found in the licensee's "Final Status Survey Program." These procedures were: Procedure No. RM-77, entitled "Final Status Survey Implementation;" Procedure No. RM-76, entitled "Final Status Survey Design;" and Procedure No. RM-78, entitled "Final Status Survey Assessment."

The inspectors reviewed the following information, survey, and verification work packages: 2003-0088, entitled "Turbine Building Room 114 Pipe Tunnel;" 2003-0102, entitled "Condenser Area Room 117/119/119 Turbine Building;" 2003-0092, entitled

"Turbine Building, B3, West Wall;" 2003-0095, entitled "Turbine Building, South Wall;" 2003-0108, entitled "Turbine Building, B3, Room 325/326, Turbine Deck;" and 2003-0110, entitled "Turbine Building, B3, Room 324, Passage."

c. Conclusion

The inspectors determined that the licensee's final status survey of the discharge canal was consistent with procedural requirements and that the procedures used were consistent with the Final Survey Plan found in Chapter 5 of the License Termination Plan. The inspectors concluded that the licensee implemented the survey program in accordance with approved decommissioning procedures.

4.0 Corrective Action Program (40801)

a. Scope

The inspectors reviewed the corrective action program (CAP) to evaluate the effectiveness of licensee controls in identifying, resolving, and preventing issues that degrade safety or the quality of decommissioning. The inspectors interviewed selected licensee staff and reviewed selected CAP issues.

b. Observations and Findings

The licensee's CAP facilitated the staff's prompt reporting of deficiencies to management and the NRC, as required, the tracking of issue-specific corrective actions to completion, and the conducting of self-audits of decommissioning performance or facility systems.

The inspectors reviewed the licensee's organizational chart and noted that the CAP manager reported directly to the site manager. The CAP manager maintained independence from those directly responsible for issues, functional areas, or systems audited. The inspectors reviewed several recent CAP issues and determined that all issues were evaluated commensurate with the safety significance and impact on future decommissioning activities.

c. Conclusion

The inspectors concluded that the licensee's use of the CAP enabled the staff to identify, resolve, and preclude issues from degrading safety or the quality of decommissioning.

5.0 Safety Reviews (37801)

a. Inspection Scope

The inspectors reviewed the licensee's safety review process and procedures to determine whether the program conformed to 10 CFR 50.59.

b. Observations and Findings

The inspectors reviewed Procedure 05, of Volume 31A, entitled "Safety Review and Independent Safety Review Committee." The licensee developed this procedure to ensure compliance with the design basis from changes that affect the following requirements and/or evaluations: the Updated Final Hazards Summary Report (UFHSR) or BNFL Fuel Solutions Safety Analysis Reports (SARs); the Post Shutdown Decommissioning Activities Report (PSDAR); the Dry Fuel Storage Certificate of Compliance (CoC); changes, tests, or experiments that require prior NRC approval for implantation; and the Defueled Technical Specifications or Dry Fuel Storage Technical Specifications.

The licensee staff used Form BRP021, entitled "Quality Review Form," to identify items requiring a nuclear safety review pursuant to 10 CFR 50.59 and/or 10 CFR 72.48. The licensee staff documented design basis changes that may affect the following: the PSDAR; amendments to the Technical Specification or the CoC; a reduction in the effectiveness of plans covered by 10 CFR 50.54 (Security Plan, Fire Plan, or Emergency Plan); or a reduction in commitments that require NRC approval.

The inspectors selected five completed quality review forms for review, which included: a revision of the Off-Site Dose Calculation Manual; the cancellation of administrative Procedure D1.4, entitled "Safety Review Committee;" a cancellation of the monitoring station annunciator tabulation; a revision of procedure RIP 59, entitled "Operation, Calibration and Maintenance of Gamma Scintillation Probes Used for General testing in Field Conditions;" and a revision of the retention basin release operation. The inspectors determined that changes implemented by the licensee were consistent with site procedures and the applicable NRC regulations.

The inspectors noted that the Independent Site Safety Review Committee (ISSRC) provides independent oversight and review of activities involving the safe operation of the Independent Spent Fuel Storage Installation (ISFSI), and 10 CFR Part 20, 10 CFR Part 50, and 10 CFR Part 71 activities. The ISSRC formulates conclusions, concerns, and recommendations based on review of site documents to maintain appropriate protection of the health and safety of the public and employees.

c. Conclusion

The inspectors determined that the licensee appropriately evaluated proposed facility changes through established procedures in conformance with the NRC regulatory requirements in 10 CFR 50.59, and 10 CFR 72.48.

6.0 Emergency Plan Exercise (36801 & 81700)

a. Scope

The inspectors observed the licensee exercise its emergency plan. Observations included the pre-exercise brief, response to the exercise scenario by licensee staff, and the post-exercise critique. The inspectors also evaluated the licensee's actions related to NRC Bulletins and Commission Orders.

b. Observations and Findings

The exercise scenario simulated an intruder and subsequent explosion at the ISFSI pad. The licensee developed the scenario with sufficient detail to test its full emergency plan response capability.

The exercise began with a communication from the security force indicating that an intruder was seen exiting the wooded area and throwing a backpack onto the ISFSI pad. Security personnel then communicated that an explosion had occurred at the base of a spent fuel vertical storage unit. Within several minutes, the Emergency Coordinator and other command and control and response staff manned the Emergency Control Center and the Emergency Coordinator was informed about the accident using facility communications. The response staff assessed the radiological hazards at the scene and determined the extent to which the spent fuel vertical storage unit was damaged. The exercise was terminated following the completion of the required objectives.

The licensee staff who observed but did not participate in the exercise conducted an exercise critique. The licensee staff candidly discussed the positive and negative findings associated with the emergency plan, facilities, equipment, licensee staff training, and overall event response effectiveness. The critique findings were used as a means of improving emergency response and were consistent with those identified by the inspectors.

c. Conclusion

The licensee staff responded to a simulated emergency in a timely manner, followed by effective hazard assessment, communications, and control. The licensee's critique findings were consistent with those identified by the inspectors. The inspectors concluded that the exercise adequately tested the licensee's emergency plan response capability.

7.0 Exit Meeting Summary

The inspectors presented preliminary inspection findings to members of the licensee management team at the conclusion of onsite inspection activities on July 22, August 12, and September 3 and 22, 2004. The licensee acknowledged the findings presented. The licensee did not identify any documents or processes reviewed by the inspector as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Consumers Energy Company
* Kurt Haas, Site General Manager
* Ken Pallagi, Radiation Protection & Environmental Services Manager
* Greg Withrow, Engineering, Operations & Licensing Manager
* William Trubilowicz, Cost, Scheduling and Purchase Manager

State of Michigan
*T.R. Wentworth, Michigan Department of Environmental Quality

* Indicates those individuals present at the preliminary and/or final exit meetings.

INSPECTION PROCEDURES USED

IP 36801	Organization, Management & Cost Controls
IP 37801	Safety Reviews, Design Changes, and Modifications
IP 40801	Self-Assessment, Audits
IP 71801	Decommissioning Performance and Status Review
IP 81700	Physical Security Assessment
IP 83750	Occupational Radiation Exposure
IP 83801	Inspection of Final Surveys at Permanently Shutdown Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	None
Closed	None
Discussed	None

PARTIAL LIST OF DOCUMENTS REVIEWED

Licensee documents reviewed and utilized during the course of this inspection are specifically identified in the "Report Details" above.

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
BRP	Big Rock Point
CAP	Corrective action program
CFR	Code of Federal Regulations
CoC	Certificate of Compliance
cpm	Counts per Minute
DCGL	Derived Concentration Guideline Level
DNMS	Division of Nuclear Material Safety
dpm	disintegrations per minute
HP	Health Physics
ISFSI	Independent Spent Fuel Storage Installation
ISSRC	Independent Site Safety Review Committee
LTP	License Termination Plan
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute of Science and Education
pCi/g	picoCuries per gram
PSDAR	Post Shutdown Decommissioning Activities Report
RWP	Radiation Work Permit
SARs	Safety Analysis Reports
UFHSR	Updated Final Hazards Summary Report

"Theodore Wentworth" <wentwort@michigan.gov>

08/27/04 09:19 AM

To: <dwparish@cmsenergy.com>
cc:
Subject: Split Sample Results

Dave,
Here are our results for the canal FSS.

Sample ID	Co-60 (pCi/g)	Cs-137 (pCi/g)
J1, Grid 106	1.95 +/- 0.07	1.34 +/- 0.07
J2, Grid 123	0.61 +/- 0.04	3.5 +/- 0.1

How do these compare with your results? Also, did you use GPS on the judgemental sample locations to get a better fix than the grid number?

T.R. Wentworth (wentwort@michigan.gov)
Physicist
Hazardous Waste & Radiological Protection Section
Radioactive Material & Standards Unit
Michigan Department of Environmental Quality
525 W. Allegan St.
PO Box 30241
Lansing, MI 48909-7741
Phone: 517-241-1438
Fax: 517-373-4797