Appendix A

FirstEnergy

SNEC CALCULATION COVER SHEET

CALCULATION DESCRIPTION

Calculation Number	Revision Number	Effective Date	Page Number
E900-05-018	0	3-24-05	1 of 8

Subject

Miscellaneous Area FSS Design – MA2

Question 1 - Is this calculation defined as "In QA Scope"? Refer to definition 3.5. Yes ☒ No ☐

Question 2 - Is this calculation defined as a "Design Calculation"? Refer to definitions 3.2 and 3.3. Yes ☒ No ☐

NOTES: If a "Yes" answer is obtained for Question 1, the calculation must meet the requirements of the SNEC Facility Decommissioning Quality Assurance Plan. If a "Yes" answer is obtained for Question 2, the Calculation Originator's immediate supervisor should not review the calculation as the Technical Reviewer.

DESCRIPTION OF REVISION

APPROVAL SIGNATURES

Calculation Originator	Tristan M. Tritch/ Tristan M. Tritch	Date	5/16/05
Technical Reviewer	W. J. Cooper, CHP/	Date	5/16/05
Additional Review	A. Paynter/	Date	16 May 2005
Additional Review		Date	

NOTE: CALC. ORIGINALLY SIGNED APPROX 3/23. ORIGINAL CANNOT BE LOCATED 5/16/05

APPENDIX A

1.0 PURPOSE

1.1 The purpose of this calculation is to develop a final status survey design for Miscellaneous Area MA2 at the Saxton Nuclear Experimental Corporation (SNEC) facility.

1.2 Survey Area MA2 is an Impacted Class 3 area located in the extreme northwestern portion of the SNEC facility decommissioning project. It covers approximately **600 square meters** (6 10m x 10m grids). Table 5-5 of the SNEC License Termination Plan (LTP) limits the physical size of Class 3 survey units to 10,000 square meters. Therefore, MA2 (also known as the SSGS Discharge Tunnel Outfall) will be surveyed as one area.

1.3 No soil samples were taken from MA-2; however, the discharge tunnel was surveyed extensively and even required remediation. Previous surveys indicated positive Cs-137 contamination levels, but they decreased with distance down the tunnel. The sample farthest down the tunnel, at approximately 700 feet, indicated 0.15 pCi/gram of Cs-137. All other radionuclides were <MDA at that location.

1.4 MA2 is bounded to the south by a pile of rubble; backfill covering the SSGS Discharge Tunnel. It is bounded on the north by the Raystown Branch of the Juniata River. The general layout of the MA2 is shown on **Attachment 1-1.**

2.0 SUMMARY OF RESULTS

Below is information that should be used to develop a Survey Request (SR) for the final status survey of Miscellaneous Area MA2.

The US NRC has reviewed and concurred with the methodology used to derive the effective DCGLw value listed below. See also **Attachments 2-1** through **2-6 (Reference 3.13)**.

Table 1, DCGLw Values

Volumetric DCGLw (pCi/g – Cs-137)
6.52 (4.89 A.L.)

NOTE: A.L. is the site Administrative Limit (75% of the effective DCGLw)

No samples were taken in any of the six grids in MA2. Ten samples were taken from an adjacent area inside the SSGS Discharge Tunnel. Analyses of four of those samples, closest to the outfall, were used to estimate the expected activity in the outfall soils and none were greater than 50% of the AL. This tunnel data was utilized in generating a sigma value (standard deviation) for determining the number of static measurements and soil samples to be taken for FSS of MA2.

2.1 Survey Design

2.1.1 Scanning of open lands shall be performed using a ***2" dia. by 2" long NaI detector*** with a Cs-137 window setting **(Reference 3.1)**. The window will straddle the Cs-137 662 keV full energy peak width (see typical calibration information on **Attachment 3-1**).

2.1.2 The instrument conversion factor/efficiency shall not be less than that assumed on **Attachment 4-1:** ***205.6 cpm/uR/h – Cs-137***.

2.1.3 Other instruments, of the type specified in Section 2.1.1 above, may be used during the final status survey (FSS), but they must demonstrate detection efficiencies at or above the value listed in Section 2.1.2.

Table 2, Soil Scanning Parameters

MDCscan (pCi/g) – Cs-137*	Scan Speed (cm/sec)	Maximum Distance from Surface	Action Level	% Coverage
5.67	25	4" (gap between detector face & soil surface)	> 160 ncpm	up to 10%

See Attachment 4-1 *

2.1.4 If a count rate greater than the action level in Table 2, which is based on the MDCscan, is encountered during the scanning process, then the surveyor shall stop and locate the boundary of the elevated area. The surveyor should then mark the elevated area with stakes or other appropriate marking methods and continue scanning. ***Sample the elevated areas(s)*** IAW SNEC procedure E900-IMP-4520.04 **(Reference 3.2)** and Section 2.2 of this document after investigation evaluation.

2.1.4.1 ***Class 3*** soils should be scanned using a serpentine pattern that is ~0.5 meters wide.

2.1.4.2 As this is a Class 3 survey area, up to 10% of all accessible surfaces are required to be scanned. Since this survey area is so small, one grid (BP136) must be surveyed. This single grid represents approximately 17% of the survey area. See **Attachment 6-1** for grid layout.

2.1.4.3 Portions of this survey area which cannot be accessed should be clearly noted along with the reason for not completing the survey.

2.1.5 The minimum number of soil sampling points indicated by the COMPASS computer program **(Reference 3.3)** is ***11*** for this survey area (see COMPASS output on **Attachments 7-1** to **7-3**). Sampling depth should be IAW Section 2.2. The MDCscan (soil) exceeds the effective administrative DCGLw $_{Cs\text{-}137}$ (5.67 pCi/g MDCscan @ 250 cpm background versus > 4.89 pCi/g AL); however, given the area factor for the assumed one meter squared elevated area, the scan MDC meets MARSSIM requirements.

2.1.6 VSP **(Reference 3.4)** is used to plot all sampling points on the included diagrams. The actual number of random start systematically spaced measurement points may be greater than that required by the Compass computer code because of any or all of the following:

- placement of the initial random starting point (edge effects),
- odd shaped diagrams, and/or
- coverage concerns

(see **Attachments 6-1 and 6-2** for VSP sampling point locations)

2.1.7 The starting points for physically locating sample sites in the survey unit are based on measurements from site grid pins (see diagram on **Attachment 6-1**). Remaining soil sampling points are positioned using coordinates developed from these markers and are listed on **Attachment 6-2**.

2.1.8 Some sampling points may need to be adjusted to accommodate obstructions within the survey area. Contact the SR coordinator to report any difficulties encountered when laying out systematic grid sampling points.

2.1.9 When an obstruction is encountered that will not allow collection of a sample, ***contact the cognizant SR coordinator*** for permission to delete the sampling point.

> **NOTE**
> If remediation actions are taken as a result of this survey, this survey design must be revised or re-written entirely.

2.2 Sample fixed points and elevated areas(s) IAW SNEC procedure E900-IMP-4520.04 **(Reference 3.2)** and the following.

> **NOTE**
> Since the site surface dose model is 1 meter in depth, samples representative of the entire one meter thick dose model layer must be collected to satisfy the sampling requirements of Section 2.1.5 (of this document). This should be done by obtaining a well mixed sample of an entire one meter deep core. Sections 4.2.3, 4.2.6, or 4.2.7 of site procedure E900-IMP-4520.04 are applicable when satisfying Section 2.1.5 of this document. Sampling due to an instrument alarm condition should also be of the entire one meter of soil/material.

2.2.1 Clearly mark, identify and document all sample locations.

2.3.1 Sample any location that is above the action level cited in Table 2.

2.3.2 Maintain chain-of custody requirements on all design fixed point and action level samples **(Reference 3.12)**.

3.0 REFERENCES

3.1 SNEC Calculation No. E900-03-018, "Optimize Window and Threshold Settings for the Detection of Cs-137 Using the Ludlum 2350-1 and a 44/10 NaI Detector", 8/7/03.

3.2 SNEC Procedure E900-IMP-4520.04, "Survey Methodology to Support SNEC License Termination".

3.3 COMPASS Computer Program, Version 1.0.0, Oak Ridge Institute for Science and Education.

3.4 Visual Sample Plan, Version 3.0, Copyright 2004, Battelle Memorial Institute.

3.5 SNEC Facility License Termination Plan.

3.6 SNEC Procedure E900-IMP-4500.59, "Final Site Survey Planning and DQA".

3.7 GPU Nuclear, SNEC Facility, "Site Area Grid Map", SNECRM-020, Sheet 1, Rev 4, 1/18/05.

3.8 SNEC Calculation No. E900-03-012, Effective DCGL Worksheet Verification.

3.9 SNEC Procedure E900-IMP-4520.06, "Survey Unit Inspection in Support of FSS Design".

3.10 NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual", August, 2000.

3.11 Microsoft Office Excel, Version 11.0.5612, Microsoft Corporation Inc., 1985-2003.

3.12 SNEC Procedure E900-ADM-4500.39 "Chain of Custody for Samples"

3.13 DCGL Calculation Logic – Discharge Tunnel, E900-04-007

3.14 Personal conversation between Tristan Tritch and with Rob Marquette, 3/22/05.

4.0 ASSUMPTIONS AND BASIC DATA

4.1 The COMPASS computer program is used to calculate the required number of random start systematic samples to be taken in the survey unit **(Reference 3.3)**.

4.2 Characterization soil samples from this area are used as the initial estimate of variability. These results are shown on **Attachment 8-1**.

4.3 The MARSSIM Sign Test will be applicable for this survey design. No background subtraction will be performed under this criterion during the DQA phase.

4.4 The required number of fixed survey points, determined by COMPASS, is located on the survey map for the survey unit by the Visual Sample Plan (VSP) computer code **(Reference 3.4)**.

4.5 **References 3.5** and **3.6** were used as guidance during the survey design development phase.

4.6 Background has been measured in the area, and averages approximately ***250 cpm*** **(Reference 3.14)**.

4.7 The determination of the physical extent of this area is based on the drawing **Reference 3.7**.

4.8 There has been no known remediation of Area MA2.

4.9 This survey design uses Cs-137 as a surrogate for all SNEC facility related radionuclides in the survey unit. The effective DCGLw is the Cs-137 DCGLw from the SNEC LTP (6.52 pCi/g) adjusted (lowered) to compensate for the presence (or potential presence) of other SNEC related radionuclides. In addition, an administrative limit (75%) has been set that further lowers the permissible Cs-137 concentration to an effective surrogate DCGLw for this survey area.

4.10 Since no samples were taken from MA2 proper, samples from an adjacent area were used to represent the activity expected to be encountered in MA2. The sample database, used to determine the effective radionuclide mix for Area MA2, has been drawn from samples that were assayed both on site and at off-site laboratories. These samples were drawn form the SSGS Discharge Tunnel. This list is shown on **Attachments 2-1 through 2-6**.

The decayed set of sample results were input to the spreadsheet titled "Effective DCGL Calculator for Cs-137" **(Reference 3.8)** to determine the effective volumetric DCGLw values for the five survey units. The output of this spreadsheet is shown on **Attachment 2-6**. **Attachment 2** was previously reviewed and was copied from **Reference 3.13**.

The NaI detector scan MDC calculation is determined based on a 25 cm/sec scan rate, a 1.38 index of sensitivity (95% correct detection probability and 60% false positive) and a detector sensitivity of 205.6 cpm/uR/h for Cs-137. Additionally, the detection system incorporates a Cs-137 window that lowers sensitivity to background in the survey unit. The resulting background is approximately ***250 cpm*** **(Reference 3.14)** in MA2.

4.11 The survey units described in this survey design were inspected. A copy of the MA2 specific portion of the SNEC facility post-remediation inspection report **(Reference 3.9)** is included as **Attachment 9-1**.

4.12 No special area characteristics including any additional residual radioactivity (not previously noted during characterization) have been identified in this survey area.

4.13 The decision error for this survey design is 0.05 for the α value and 0.1 for the β value.

4.14 "Special measurements", as described in the SNEC LTP sec 5.5.3.4, are not included in this survey design.

4.15 No additional sampling will be performed IAW this survey design beyond that described herein.

4.16 SNEC site radionuclides and their individual DCGLw values are listed on **Exhibit 1** of this calculation.

4.17 The survey design checklist is listed in **Exhibit 2**.

4.18 Area factors are shown as part of COMPASS output (see **Attachment 7-1**) and are based on the Cs-137 area factors from the SNEC LTP.

5.0 CALCULATIONS

5.1 All calculations are performed internal to applicable computer codes or within an Excel spreadsheet.

6.0 APPENDICES

6.1 **Attachment 1-1** is a diagram of Survey Area MA2.

6.2 **Attachments 2-1** through **2-6** show the DCGL Calculation Logic – Discharge Tunnel **(Reference 13)**.

6.3 **Attachment 3-1** is a copy of the calibration data from typical NaI radiation detection instrumentation that will be used in this survey area.

6.4 **Attachment 4-1** is the MDCscan calculation sheet for volumetric materials in pCi/g.

6.5 **Attachment 5-1** is the MicroShield dose rate calculation results for 6" thick soil used to determine the exposure rate from a 1 pCi/cm^3 Cs-137 source term in an end-cylinder geometry.

6.6 **Attachments 6-1** through **6-2** show the randomly picked scan locations (from VSP) and reference coordinates for Survey Area MA2.

6.7 **Attachments 7-1** through **7-3** are COMPASS outputs for Survey Area MA2 showing area factors, the number of sampling points in each survey unit, and prospective power.

6.8 **Attachment 8-1** shows the sediment variability results, for samples taken from the SSGS Discharge Tunnel, to be used for MA2.

6.9 **Attachment 9-1** is a copy of the inspection report for MA2.

Exhibit 1

SNEC Facility Individual Radionuclide DCGL Values [a]

Radionuclide	25 mrem/y Limit Surface Area ($dpm/100cm^2$)	25 mrem/y Limit (All Pathways) Open Land Areas (Surface & Subsurface) (pCi/g)	4 mrem/y Goal (Drinking Water) Open Land Areas [b] (Surface & Subsurface) (pCi/g)
Am-241	2.7E+01	9.9	2.3
C-14	3.7E+06	2	5.4
Co-60	7.1E+03	3.5	67
Cs-137	2.8E+04	6.6	397
Eu-152	1.3E+04	10.1	1440
H-3	1.2E+08	132	31.1
Ni-63	1.8E+06	747	1.9E+04
Pu-238	3.0E+01	1.8	0.41
Pu-239	2.8E+01	1.6	0.37
Pu-241	8.8E+02	86	19.8
Sr-90	8.7E+03	1.2	0.61

NOTES:

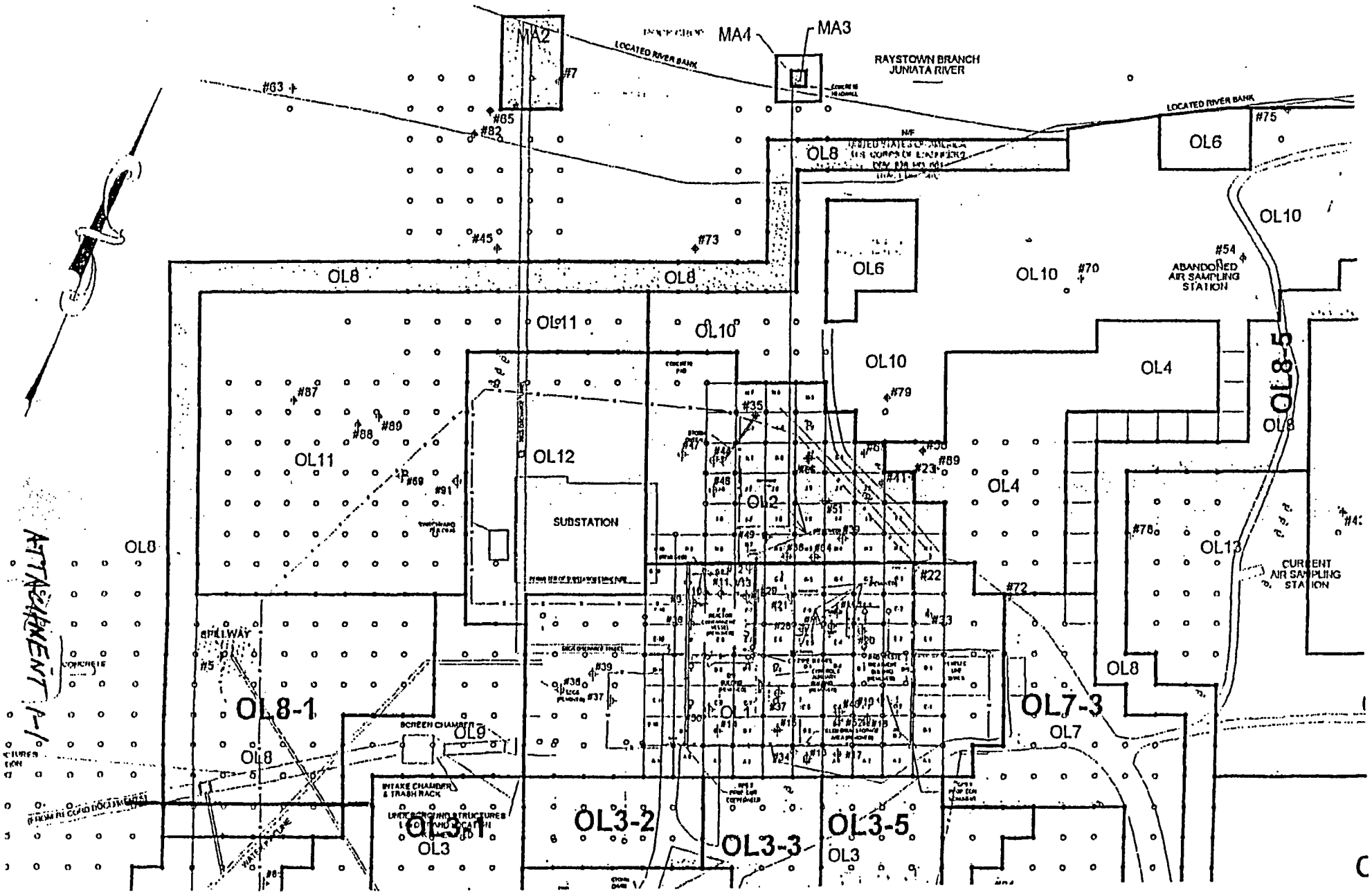
(a) While drinking water DCGLs will be used by SNEC to meet the drinking water 4 mrem/y goal, only the DCGL values that constitute the 25 mrem/y regulatory limit will be controlled under this LTP and the NRC's approving license amendment.

(b) Listed values are from the subsurface model. These values are the most conservative values between the two models (i.e., surface & subsurface).

Exhibit 2
Survey Design Checklist

Calculation No. E900-05-018	Location Codes MA2		
ITEM	**REVIEW FOCUS**	**Status (Circle One)**	**Reviewer Initials & Date**
1	Has a survey design calculation number been assigned and is a survey design summary description provided?	Yes, N/A	5/16/05
2	Are drawings/diagrams adequate for the subject area (drawings should have compass headings)?	Yes, N/A	
3	Are boundaries properly identified and is the survey area classification clearly indicated?	Yes, N/A	
4	Has the survey area(s) been properly divided into survey units IAW EXHIBIT 10	Yes, N/A	
5	Are physical characteristics of the area/location or system documented?	Yes, N/A	
6	Is a remediation effectiveness discussion included?	Yes, N/A	
7	Have characterization survey and/or sampling results been converted to units that are comparable to applicable DCGL values?	Yes, N/A	
8	Is survey and/or sampling data that was used for determining survey unit variance included?	Yes, N/A	
9	Is a description of the background reference areas (or materials) and their survey and/or sampling results included along with a justification for their selection?	Yes, N/A	
10	Are applicable survey and/or sampling data that was used to determine variability included?	Yes, N/A	
11	Will the condition of the survey area have an impact on the survey design, and has the probable impact been considered in the design?	Yes, N/A	
12	Has any special area characteristic including any additional residual radioactivity (not previously noted during characterization) been identified along with its impact on survey design?	Yes, N/A	
13	Are all necessary supporting calculations and/or site procedures referenced or included?	Yes, N/A	
14	Has an effective DCGLw been identified for the survey unit(s)?	Yes, N/A	
15	Was the appropriate $DCGL_{EMC}$ included in the survey design calculation?	Yes, N/A	
16	Has the statistical tests that will be used to evaluate the data been identified?	Yes, N/A	
17	Has an elevated measurement comparison been performed (Class 1 Area)?	Yes, N/A	
18	Has the decision error levels been identified and are the necessary justifications provided?	Yes, N/A	
19	Has scan instrumentation been identified along with the assigned scanning methodology?	Yes, N/A	
20	Has the scan rate been identified, and is the MDCscan adequate for the survey design?	Yes, N/A	
21	Are special measurements e.g., in-situ gamma-ray spectroscopy required under this design, and is the survey methodology, and evaluation methods described?	Yes, N/A	
22	Is survey instrumentation calibration data included and are detection sensitivities adequate?	Yes, N/A	
23	Have the assigned sample and/or measurement locations been clearly identified on a diagram or CAD drawing of the survey area(s) along with their coordinates?	Yes, N/A	
24	Are investigation levels and administrative limits adequate, and are any associated actions clearly indicated?	Yes, N/A	
25	For sample analysis, have the required MDA values been determined.?	Yes, N/A	
26	Has any special sampling methodology been identified other than provided in Reference 6.3?	Yes, N/A	

NOTE: a copy of this completed form or equivalent, shall be included within the survey design calculation.



ATTACHMENT A-1

DCGL Calculation Logic-Discharge Tunnel

I. **Survey Unit:** SNEC Discharge Tunnel

II. **Description:** The purpose of this calculation is to determine a representative isotopic mix for the Discharge Tunnel from available sample analyses. The effective surface area and volumetric $DCGL_w$s are then determined from the mean percent of applicable samples.

III. **Data Selection Logic Tables:** The radionuclide selection logic and subsequent DCGL calculations are provided in seven (7) tables. These tables were developed using Microsoft Excel spreadsheet software. Table explanation is as follows.

Table 1: Data Listing – This table, which has been extracted from a larger database, provides a list of the most representative Discharge Tunnel sample analyses. These results are from scoping, characterization, and pre/post remediation surveys. The samples consist of various sediments, scrapings and concrete cores that were taken in support of the aforementioned surveys. As applicable, a sample number, sample location/description, radionuclide concentration, analysis date are provided for each sample. Positive nuclide concentrations are noted with yellow/shaded background fields while MDAs are noted in the gray shaded fields.

Table 2: Decayed Listing – This table provides the best overall representation of data selected and decayed from Table 1. In Table 1 half-life values (days) are listed above each respective nuclide column. Samples are decayed to the date noted above Table 1 (e.g. January 15, 2004). Positive results are denoted in a yellow background field while MDA values are in a gray background.

Table 3: Decayed Listing of Positive Nuclides & MDAs Removed– This table provides the decayed values of positive nuclides selected in Table 2. In addition MDA values have been removed from this table.

Table 4: Mean Percent of Total for Positive Nuclides – This table provides the calculation methodology for determining the relative fractions of the total activity contributed by each radionuclide. From this information the mean, sigma, and mean % of total are calculated. The mean % of total values is used to calculate the surface gross activity $DCGL_w$ per MARSSIM equation 4-4. See Table 6. Note that the Co-60 mean percents were averaged using only samples 1 & 2. In addition, the mean percents calculated from sample 2 for Am-241, Pu-238, Pu-239 and Ni-63 were not averaged throughout the spreadsheet since there was only one sample where these respective nuclides were positive. This results in higher "mean percent of total" values in the mix, which are conservative.

Table 5: Ratio to Cs-137 for Positive Nuclides – This table provides the calculation methodology for determining the surrogate ratio to Cs-137 for each radionuclide. From this information the mean, sigma, and mean % of total are calculated. The mean % of total values is used to calculate the volumetric $DCGL_w$ per MARSSIM equation I-14. See Table 7. Note that the Co-60 ratios were averaged using only samples 1 & 2. In addition, the ratios calculated from sample 2 for Am-241, Pu-238, Pu-239 and Ni-63 were not averaged throughout the spreadsheet since there was only one sample where these respective nuclides were positive. This results in higher "mean percent of total" values in the mix, which are conservative.

Note: From Tables 4 and 5 only the "mean % of total" values are used as input to the "Effective DCGL Calculation Spreadsheet" as illustrated in Tables 6 and 7.

ATTACHMENT 2-1

Table 6: Effective DCGL Calculator for Cs-137 (dpm/100 cm^2) – This table provides the surface gross activity $DCGL_w$ calculation results from data inputted from Table 4.

Table 7: Effective DCGL Calculator for Cs-137 (in pCi/g) – This table provides the surrogate volumetric modified Cs-137 $DCGL_w$ calculation results from data inputted from Table 5.

IV. **Summary** – Since the Discharge Tunnel is a concrete structure the release limit is primarily based on the surface area $DCGL_w$. However, a small portion of the Discharge Tunnel ceiling Class 1 area has volumetric contamination. Using the above data selection logic tables the calculated gross activity $DCGL_w$ for surface area is 8,968 dpm/100 cm^2. The Cs-137 volumetric $DCGL_w$ is 6.52 pCi/g. These values would be reduced by 25% as part of SNEC's requirement to apply an administrative limit as required by the License Termination Plan (LTP).

ATTACHMENT 2-2

TABLE 1 - Data Listing (pCi/g)

														Decay Date	
			T12	T12	T12	T12	T12	T12	T12	T12	T12	T12	T12	January 15 2004	
			4485 27	10446 15	1925 23275	11019 5825	157861 05	32050 6875	8813847 75	5259 6	2492862 5	36861 525	4967 4		
	SIEC Sample No	Location-Description	H-3	Sr-90	Co-60	Cs-137	Am-241	Pu-238	Pu-239	Pu-241	C-14	Ni-63	Eu-152	Analysis Date	Elapsed Time (d)
1	[illegible]	Drainage Tunnel [illegible] Storage			0 84	120	0 2	0 04	0 04					July 29 1999	[illegible]
2	[illegible]	Drainage Tunnel [illegible] Storage	100	8	30	4800	5 4	1 6	2 5	60	6	55	20	July 22 1999	[illegible]
3	[illegible]	5505 Drainage Tunnel Floor Sediment-STC			0 2	1 6								November 22 1999	[illegible]
4	[illegible]	5505 Drainage Tunnel Floor Sediment-STC			0 3	2 3								November 22 1999	[illegible]
5	[illegible]	5505 Drainage Tunnel Floor Sediment-STC			0 16	2								November 22 1999	[illegible]
6	[illegible]	5505 Drainage Tunnel [illegible] Sediment [illegible]	0 732	0 0259	0 0237	25 8	0 0181	0 026	0 0159	2 52	0 141	0 54	0 13	October 16 2003	[illegible]
7	[illegible]	5505 Drainage Tunnel [illegible] Sediment-SR-88 Burning Structure	2 01	0 0138	0 0663	26 9	0 0376	0 148	0 0119	3 93	0 189	2 43	0 207	May 6 2003	[illegible]
8	[illegible]	5505 Drainage Tunnel [illegible] Sediment-SR-88 Burning Structure	1 99	0 0168	0 13	1 42	0 131	0 26	0 13	4 98	0 17	2 65	0 262	May 6 2003	[illegible]
9	[illegible]	5505 Tunnel [illegible] Floor Rubble	10 3	0 03	0 07	22 6	0 044	0 037	0 044	6 57	3 96	7 88	0 33	March 6 2001	[illegible]
10	[illegible]	5505 Tunnel Rubble [illegible] SR-[illegible]	3 69	0 05	0 01	0 15	0 006	0 003	0 003	0 549	0 064	7 02	0 05	May 22 2001	[illegible]

TABLE 2 - Decayed Listing (pCi/g)

	SIEC Sample No	Location Description	H-3	Sr-90	Co-60	Cs-137	Am-241	Pu-238	Pu-239	Pu-241	C-14	Ni-63	Eu-152	Analysis Date
1	[illegible]	Drainage Tunnel [illegible] Storage			4 67E-01	1 03E-02	1 99E-01	3 88E-02	4 00E-02					July 29 1999
2	[illegible]	Drainage Tunnel [illegible] Storage	7 76E+01	7 18E+00	1 66E-01	4 33E-03	5 36E-00	1 54E+00	2 50E-00	4 84E+01	6 00E+00	5 33E-01	1 59E+01	July 22 1999
3	[illegible]	5505 Drainage Tunnel Floor Sediment-STC			1 16E-01	1 45E+00								November 22 1999
4	[illegible]	5505 Drainage Tunnel Floor Sediment-STC			1 74E-01	2 09E-00								November 22 1999
5	[illegible]	5505 Drainage Tunnel Floor Sediment-STC			9 27E-02	1 82E-00								November 22 1999
6	[illegible]	5505 Drainage Tunnel [illegible] Sediment [illegible]	7 22E-01	2 57E-02	2 29E-02	2 57E-01	1 81E-02	2 55E-02	1 59E-02	2 49E+00	1 41E-01	5 39E-01	1 28E-01	October 16 2003
7	[illegible]	5505 Drainage Tunnel [illegible] Sediment-SR-88 Burning Structure	1 93E+00	1 36E-02	6 05E-02	2 65E-01	8 75E-02	1 47E-01	1 19E-02	3 83E+00	1 89E-01	2 42E+00	2 00E-01	May 6 2003
8	[illegible]	5505 Drainage Tunnel [illegible] Sediment-SR-88 Burning Structure	1 91E+00	1 65E-02	1 19E-01	1 40E-00	1 31E-01	0 26	1 30E-01	4 82E+00	1 70E-01	2 61E+00	2 53E-01	May 6 2003
9	[illegible]	5505 Tunnel [illegible] Floor Rubble	3 76E+00	2 80E-02	4 81E-02	2 12E-01	4 38E-02	4 59E-02	4 40E-02	5 72E+00	3 96E-00	7 73E+00	2 65E-01	March 6 2001
10	[illegible]	5505 Tunnel Rubble [illegible] SR-[illegible]	3 18E+00	4 69E-02	7 05E-03	1 41E-01	5 97E-03	2 94E-03	3 00E-03	4 83E-01	6 40E-02	6 89E-00	4 37E-02	May 22 2001
		Mean=	1 57E+01	1 22E+00	1 77E+00	4 52E+02	8 35E-01	2 95E-01	3 92E-01	1 10E+01	1 75E+00	1 23E+01	2 80E+00	499 84
		Sigma=	30 481	2 919	5 224	1363 036	1 597	0 558	0 930	18 414	2 580	20 308	6 423	
		Mean % of Sigma=	3 14%	0 24%	0 35%	90 40%	0 17%	0 06%	0 08%	2 19%	0 35%	2 45%	0 56%	100 00%

KEY

	Yellow Shaded Background = Positive Result
	Gray Shaded Background = ND

ATTACHMENT 2-3

TABLE 3 - Decayed Listing of Positive Nuclides & MDAs Removed (pCi/g)

	SIIEC Sample No	Location-Description	Co-60	Cs-137	Am-241	Pu-238	Pu-239	Ni-63	Total (pCi/g)
1	S[illegible]	Discharge Tunnel [illegible] Scraping	4 67E-01	1 08E-02					100 77
2	S[illegible]	Discharge Tunnel [illegible] Drain Line Scraping	1 66E+01	4 33E+03	5 36E+00	1 54E+00	2 50E+00	5 33E+01	4409 52
3	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		1 45E+00					1 45
4	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		2 09E+00					2 09
5	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		1 82E+00					1 82
6	S[illegible]	SSGS Discharge Tunnel SP-2, Ceiling, Sect 1, Slice 1		2 57E+01					25 65
7	S[illegible]	SSGS Discharge Tunnel # 2, Concrete Wall Core - SR-58, Building Structure		2 65E+01					26 47
8	S[illegible]	SSGS Discharge Tunnel # 2, Concrete Wall Core - SR-58, Building Structure		1 40E+00					1 40
9	S[illegible]	SSGS Tunnel North Wall - S-2 From Floor		2 12E+01					21 16
10	S[illegible]	SSGS Tunnel Rubble @ TCC, SR-CCCE		1 41E-01					0 14
		Mean→	8 55E+00	4 52E+02	5 36E+00	1 54E+00	2 50E+00	5 33E+01	523 14
		Sigma→	11 433	1363 086					
		Mean % of Total→	1 63%	86 38%	1 02%	0 30%	0 48%	10 19%	100 00%

TABLE 4 - Mean Percent of Total for Positive Nuclides

	SIIEC Sample No	Location-Description	Co-60	Cs-137	Am-241	Pu-238	Pu-239	Ni-63	Total
1	S[illegible]	Discharge Tunnel [illegible] Scraping	0 43%	99 57%					100 00%
2	S[illegible]	Discharge Tunnel [illegible] Drain Line Scraping	0 38%	98 20%	0 12%	0 04%	0 06%	1 21%	100 00%
3	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		100 00%					100 00%
4	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		100 00%					100 00%
5	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		100 00%					100 00%
6	S[illegible]	SSGS Discharge Tunnel SP-2, Ceiling, Sect 1, Slice 1		100 00%					100 00%
7	S[illegible]	SSGS Discharge Tunnel # 2, Concrete Wall Core - SR-58, Building Structure		100 00%					100 00%
8	S[illegible]	SSGS Discharge Tunnel # 2, Concrete Wall Core - SR-58, Building Structure		100 00%					100 00%
9	S[illegible]	SSGS Tunnel North Wall - S-2 From Floor		100 00%					100 00%
10	S[illegible]	SSGS Tunnel Rubble @ TCC, SR-CCCE		100 00%					100 00%
		Mean→	4 03E-03	9 98E-01	1 22E-03	3 50E-04	5 67E-04	1 21E-02	1 02
		Sigma→	0 0004	0 006					
		Mean % of Total→	0 40%	98 20%	0 12%	0 03%	0 06%	1 19%	100 00%

TABLE 5 - Ratio to Cs-137 for Positive Nuclides

	SIIEC Sample No	Location-Description	Co-60	Cs-137	Am-241	Pu-238	Pu-239	Ni-63	Total
1	S[illegible]	Discharge Tunnel [illegible] Scraping	4 31E-03	1 00E+00					1 00
2	S[illegible]	Discharge Tunnel [illegible] Drain Line Scraping	3 84E-03	1 00E+00	1 24E-03	3 57E-04	5 77E-04	1 23E-02	1 02
3	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		1 00E+00					1 00
4	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		1 00E+00					1 00
5	S[illegible]	SSGS Discharge Tunnel Floor Segment [illegible]		1 00E+00					1 00
6	S[illegible]	SSGS Discharge Tunnel SP-2, Ceiling, Sect 1, Slice 1		1 00E+00					1 00
7	S[illegible]	SSGS Discharge Tunnel # 2, Concrete Wall Core - SR-58, Building Structure		1 00E+00					1 00
8	S[illegible]	SSGS Discharge Tunnel # 2, Concrete Wall Core - SR-58, Building Structure		1 00E+00					1 00
9	S[illegible]	SSGS Tunnel North Wall - S-2 From Floor		1 00E+00					1 00
10	S[illegible]	SSGS Tunnel Rubble @ TCC, SR-CCCE		1 00E+00					1 00
		Mean→	4 08E-03	1 00E+00	1 24E-03	3 57E-04	5 77E-04	1 23E-02	1 02
		Sigma→	0 0003	0 0000					
		Mean % of Total→	0 40%	98 18%	0 12%	0 04%	0 06%	1 21%	100 00%

ATTACHMENT 2-4

Table 6

Effective DCGL Calculator for Cs-137 (dpm/100 cm^2)

Gross Activity DCGLw		Gross Activity Administrative Limit	
8968	dpm/100 cm^2	6726	dpm/100 cm^2

25.0 mrem/y TEDE Limit

SAMPLE ID(s)⇒ Discharge Tunnel

Cs-137 Limit		Cs-137 Administrative Limit	
8807	dpm/100 cm^2	6605	dpm/100 cm^2

SNEC AL	75%

	Isotope	Sample Input (pCi/g, uCi, etc.)	% of Total	Individual Limits (dpm/100 cm^2)	Allowed dpm/100 cm^2	mrem/y TEDE	Beta dpm/100 cm^2	Alpha dpm/100 cm^2	
1	Am-241	1.22E-03	0.120%	27	10.77	9.97	N/A	10.77	Am-241
2	C-14		0.000%	3,700,000	0.00	0.00	0.00	N/A	C-14
3	Co-60	4.03E-03	0.397%	7,100	35.56	0.13	35.56	N/A	Co-60
4	Cs-137	9.98E-01	98.203%	28,000	8806.99	7.86	8807.0	N/A	Cs-137
5	Eu-152		0.000%	13,000	0.00	0.00	0.00	N/A	Eu-152
6	H-3		0.000%	120,000,000	0.00	0.00	Not Detectable	N/A	H-3
7	Ni-63	1.21E-02	1.191%	1,800,000	106.78	0.00	Not Detectable	N/A	Ni-63
8	Pu-238	3.50E-04	0.034%	30	3.09	2.57	N/A	3.09	Pu-238
9	Pu-239	5.67E-04	0.056%	28	5.00	4.47	N/A	5.00	Pu-239
10	Pu-241		0.000%	880	0.00	0.00	Not Detectable	N/A	Pu-241
11	Sr-90		0.000%	8,700	0.00	0.00	0.00	N/A	Sr-90
			100.000%		8968	25.0	8843	19	
					Maximum Permissible dpm/100 cm^2				

This page is not used for this calculation.

ATTACHMENT 2-5

Table 7

Effective DCGL Calculator for Cs-137 (in pCi/g)

SHEC AL	75%	Total Activity Limit DCGLw		Administrative Limit	
		6.64	pCi/g	4.98	pCi/g

SAMPLE NUMBER(s)⇒ Discharge Tunnel

Cs-137 Limit		Cs-137 Administrative Limit	
6.52	pCi/g	4.89	pCi/g

15.34%	25.0 mrem/y TEDE Limit
0.55%	4.0 mrem/y Drinking Water (DW) Limit

☑ Check for 25 mrem/y

	Isotope	Sample Input (pCi/g, uCi/g, % of Total, etc.)	% of Total	25 mrem/y TEDE Limits (pCi/g)	4 mrem/y DW Limits (pCi/g)	A - Allowed pCi/g for 25 mrem/y TEDE	B - Allowed pCi/g for 4 mrem/y DW	Value Checked from Column A or B	This Sample mrem/y TEDE	This Sample mrem/y DW	
1	Am-241	0.001	0.122%	9.9	2.3	0.01	0.22	0.01	0.00	0.00	Am-241
2	C-14		0.000%	2.0	5.4	0.00	0.00	0.00	0.00	0.00	C-14
3	Co-60	0.0041	0.401%	3.5	67.0	0.03	0.74	0.03	0.03	0.00	Co-60
4	Cs-137	1.0000	98.178%	6.6	397	6.52	180.19	6.52	3.79	0.01	Cs-137
5	Eu-152		0.000%	10.1	1440	0.00	0.00	0.00	0.00	0.00	Eu-152
6	H-3		0.000%	132	31.1	0.00	0.00	0.00	0.00	0.00	H-3
7	Ni-63	0.0123	1.208%	747	19000	0.08	2.22	0.08	0.00	0.00	Ni-63
8	Pu-238	0.0004	0.035%	1.8	0.41	0.00	0.06	0.00	0.00	0.00	Pu-238
9	Pu-239	0.0006	0.057%	1.6	0.37	0.00	0.10	0.00	0.01	0.01	Pu-239
10	Pu-241		0.000%	86	19.8	0.00	0.00	0.00	0.00	0.00	Pu-241
11	Sr-90		0.000%	1.2	0.61	0.00	0.00	0.00	0.00	0.00	Sr-90
		1.02E+00	100.000%			6.64	183.53	6.64	3.835	0.022	
						Maximum Permissible pCi/g (25 mrem/y)	Maximum Permissible pCi/g (4 mrem/y)		To Use This Information, Sample Input Units Must Be in pCi/g *not % of Total.*		

ATTACHMENT 2-6

2350 INSTRUMENT AND PROBE EFFICIENCY CHART

7/01/04 (Typical 2" by 2" NaI (Cs-137 W) Conversion Factors)

Inst.#	Cal Due	AP #		Probe #	Cal Due	cpm/mR/h
98625	5/18/05	R & Y		211680 Pk	5/18/05	214.882
98647	5/18/05	G &Y		211667 Pk	5/18/05	218.807
129423	5/18/05	P &Y.		211687 Pk	5/18/05	213.539
117573	5/18/05	O &Y		211674 Pk	5/18/05	212.173
117566	4/9/05	G&R		185852 Pk	4/13/05	209.862
126183	11/19/04	B&R		206280 Pk	12/12/04	190,907
129429	11/3/04	Y&W		206283 Pk	10/31/04	177185
126198	11/03/04	R&W		196021Pk	5/25/05	209.194
126172	6/07/05	G&W		196022	6/07/05	208.302
129440	4/09/05	O&W		210938 Pk	4/14/05	205.603
120588	6/08/05	B&W		185844 Pk	6/09/05	216.654
95361	6.25/05	P&W		025686	6/28/05	211.799

ATTACHMENT 2-1

2350 INSTRUMENT AND PROBE EFFICIENCY CHART

7/01/04 (Typical 43-68 Beta Efficiency Factors)

Different Instrument/Probe Cal Due	Cesium only instruments [illegible]

INST #	INST C/D	43-68 PROBE #	PROBE C/D	44-10 PROBE #	PROBE C/D	BETA EFF	ALPHA EFF
79037	04/05/05	122014	04/23/05			25.2%	N/A
126188	1/27/05	099186	1/27/05			28.2%	N/A
126218	01/08/05	095080	01/09/05			27.9%	N/A

ATTACHMENT 3-1

NaI Scan MDC Calculation

MDCscan 5.6740 pCi/g for Miscellaneous Area MA2

b = background (cpm)
bi = background counts in the observation interval (counts)
Conv = NaI detector/meter calibrated response (cpm per uR/hr)
d = index of sensitivity from MARSSIM table 6.5 based on 95% detection and 60% false positive
HSd = elevated measurement spot diameter (centimeters)
MDCscan = Minimum Detectable Concentration for scanning (pCi/g)
MDCRi = Minimum Detectable Count Rate in (ncpm)
MDCRsurv = MDCRi adjusted for the human performance factor p (ncpm)
MDER = Minimum Detectable Exposure Rate (uR/hr)
MSoutput = MicroShield derived exposure rate for 1 pCi/g of contaminant (mR/hr)
Oi = Observation interval (seconds)
p = human performance adjustment factor (unitless)
SR = Scanning movement rate (cm/sec)
DCDLeq = net count rate equivalent to the adjusted DCGL (ncpm)

b = 250 cpm p = 0.5 HSd = 56 cm

SR = 25 cm d = 1.38 Conv = 205.6 cpm/uR/hr

MSoutput = 1.369E-04 mR/hr per pCi/g DCGL = 4.89 pCi/g

$\frac{HSd}{SR}$ = 2.2400 = Oi (sec)

$\frac{b*Oi}{60\ sec/min}$ = 9.3333 = bi (counts)

$\frac{d*sqrt(bi)*60}{Oi}$ = 112.9278 = MDCRi (ncpm)

$\frac{MDCRi}{sqrt(p)}$ = 159.7040 = MDCRsurv (ncpm)

$\frac{MDCRsurv}{Conv}$ = 0.7768 = MDER (uR/hr)

$\frac{MDER}{MSoutput*1000\ uR/mR}$ = 5.6740 = MDCscan (pCi/g)

$\frac{MDCsurv*DCGL}{MDCscan}$ = 137.6371 = DCGLeq (ncpm)

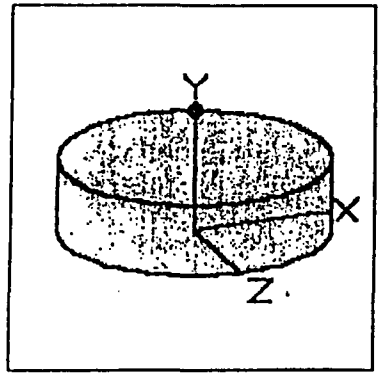
ATTACHMENT 4-1

MicroShield v5.05 (5.05-00121)
GPU Nuclear

Page	: 1
DOS File	: MODEL.MS5
Run Date	: September 23, 2003
Run Time	: 2:43:26 PM
Duration	: 00:00:02

File Ref:	
Date:	
By:	
Checked:	

Case Title: Cs-137 Soil
Description: Model for Scanning
Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions

Height	15.24 cm	6.0 in
Radius	28.0 cm	11.0 in

Dose Points

A	X	Y	Z
#1	0 cm	25.4 cm	0 cm
	0.0 in	10.0 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	3.75e+04 cm³	Concrete	1.6
Air Gap		Air	0.00122

Source Input
Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	5.6815e-008	2.1022e+003	1.5136e-006	5.6003e-002
Cs-137	6.0058e-008	2.2221e+003	1.6000e-006	5.9200e-002

Buildup
The material reference is : Source

Integration Parameters

Radial	50
Circumferential	50
Y Direction (axial)	50

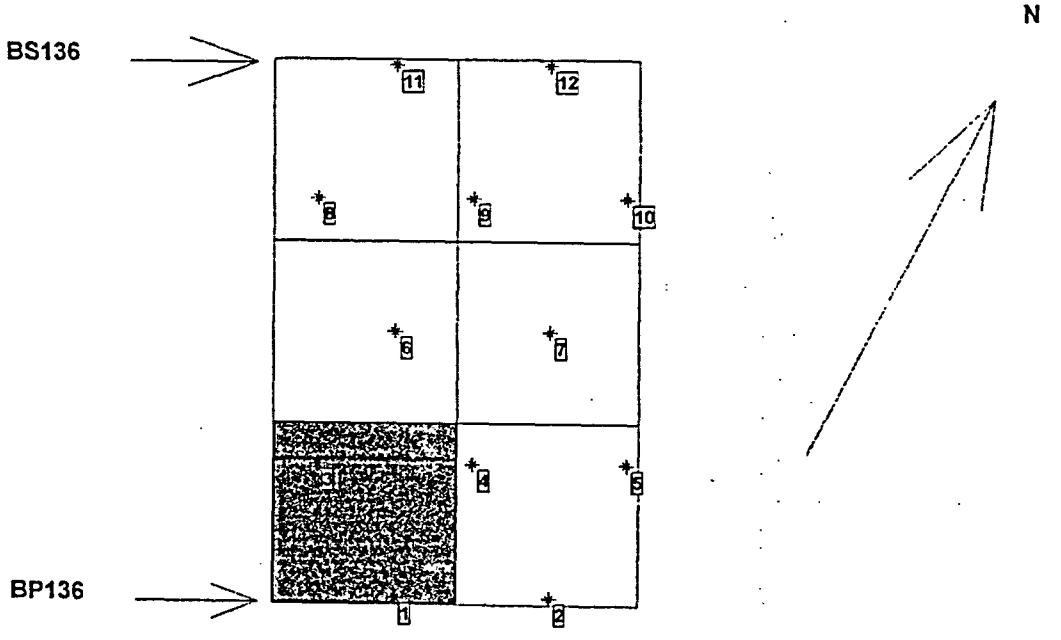
Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	4.352e+01	7.617e-06	9.220e-06	6.345e-08	7.680e-08
0.0322	8.030e+01	1.465e-05	1.784e-05	1.179e-07	1.436e-07
0.0364	2.922e+01	8.118e-06	1.060e-05	4.613e-08	6.024e-08
0.6616	1.892e+03	7.060e-02	1.260e-01	1.369e-04	2.443e-04
TOTALS:	2.045e+03	7.063e-02	1.261e-01	1.371e-04	2.446e-04

ATTACHMENT 4-1

ATTACHMENT 5-1

Survey Area MA2



ATTACHMENT 6-1

Soil Sample Survey Points for Miscellaneous Survey Area MA2

COMPASS provides survey points using a scale relative to the southwestern corner of the survey unit. This is cumbersome as field personnel must measure over large distances (sometimes hundreds of meters) from the single reference point. To remedy this situation, this spreadsheet provides the COMPASS survey points based on the actual location within each grid.

To use this spreadsheet, start at the grid marker. Go east the number of meters under the "E" column and then move north the number of meters in the "N" column. For simplicity, all measurements have been rounded to the nearest meter.

Location	Grid	E (meters)	N (meters)	X coordinate	Y coordinate
1	BP136	6.7	0.4	6.6635	0.3754
2	BP135	5.1	0.4	15.1282	0.3754
3	BP136	2.4	7.7	2.4312	7.7061
4	BP135	0.9	7.7	10.8959	7.7061
5	BP135	9.4	7.7	19.3606	7.7061
6	BQ136	6.7	5	6.6635	15.0367
7	BQ135	5.1	5	15.1282	15.0367
8	BR136	2.4	2.4	2.4312	22.3674
9	BR135	0.9	2.4	10.8959	22.3674
10	BR135	9.4	2.4	19.3606	22.3674
11	BR136	6.7	9.7	6.6635	29.698
12	BR135	5.1	9.7	15.1282	29.698

ATTACHMENT C-2

Site Report

Site Summary

Site Name: MA2

Planner(s): Tristan M. Tritch

Contaminant Summary

NOTE: Surface soil DCGLw units are pCi/g.
Building surface DCGLw units are dpm/100 cm².

Contaminant	Type	DCGLw	Screening Value Used?	Area (m²)	Area Factor
Cs-137	Surface Soil	4.89	No	1	28.7
				25	4.7
				100	3.6
				400	3
				2,500	2.3
				10,000	1

ATTACHMENT 7-1

Surface Soil Survey Plan

Contaminant Summary

Contaminant	DCGLw (pCi/g)	Inferred Contaminant	Ratio	Modified DCGLw (pCi/g)	Scan MDC (pCi/g)
Cs-137	4.89	N/A	N/A	N/A	N/A

Contaminant	Survey Unit Estimate (Mean ± 1-Sigma) (pCi/g)	Reference Area Estimate (Mean ± 1-Sigma) (pCi/g)
Cs-137	1.8 ± 0.9525	0.28 ± 0.39

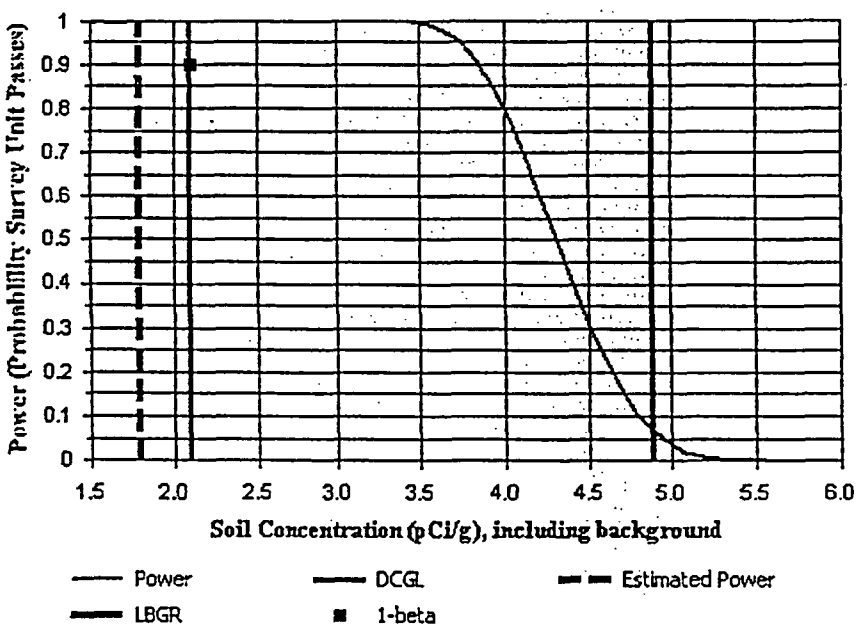
ATTACHMENT 7-2

Surface Soil Survey Plan

Survey Plan Summary

Site:	MA2		
Planner(s):	Tristan M. Tritch		
Survey Unit Name:	Miscellaneous Area		
Comments:	SSGS Discharge Tunnel Outfall		
Area (m²):	60	Classification:	3
Selected Test:	Sign	Estimated Sigma (pCi/g):	0.9525
DCGL (pCi/g):	4.89	Sample Size (N):	11
LBGR (pCi/g):	2.1	Estimated Conc. (pCi/g):	1.8
Alpha:	0.050	Estimated Power:	1
Beta:	0.100		

Prospective Power Curve



ATTACHMENT 7-3

SSGS Discharge Tunnel samples

MA2		
Sample ID	Cs-137 pCi/g	Approximate Location
SX5SD99267	2	SSGS Discharge Tunnel floor sediment @ 550'
SX5SD99266	2.3	SSGS Discharge Tunnel floor sediment @ 610'
SX5SD99264	1.6	SSGS Discharge Tunnel floor sediment @ 670'
SXSD923	0.15	SSGS Discharge Tunnel rubble @ 700'
TOTAL	6.05	
MAX	2.3	
MIN	0.15	
MEDIAN	1.8000	
AVG	1.5125	
STD DEV	0.9525	

ATTACHMENT 8-1

ORIGINAL

Exhibit 1
Survey Unit Inspection Check Sheet

SECTION 1 - SURVEY UNIT INSPECTION DESCRIPTION

Survey Unit #	MA2			Survey Unit Location	SSGS Discharge Tunnel Outfall (Land Area)
Date	3/21/05	Time	0900	Inspection Team Members	D.Sarge

SECTION 2 - SURVEY UNIT INSPECTION SCOPE

Inspection Requirements (Check the appropriate Yes/No answer.)	Yes	No	N/A
1. Have sufficient surveys (i.e., post remediation, characterization, etc.) been obtained for the survey unit?	X		
2. Do the surveys (from Question 1) demonstrate that the survey unit will most likely pass the FSS?	X		
3. Is the physical work (i.e., remediation & housekeeping) in or around the survey unit complete?	X		
4. Have all tools, non-permanent equipment, and material not needed to perform the FSS been removed?	X		
5. Are the survey surfaces relatively free of loose debris (i.e., dirt, concrete dust, metal filings, etc.)?	X		
6. Are the survey surfaces relatively free of liquids (i.e., water, moisture, oil, etc.)?	X		
7. Are the survey surfaces free of all paint, which has the potential to shield radiation?	X		
8. Have the Surface Measurement Test Areas (SMTA) been established? (Refer to Exhibit 2 for instructions.)			X
9. Have the Surface Measurement Test Areas (SMTA) data been collected? (Refer to Exhibit 2 for instructions.)			X
10. Are the survey surfaces easily accessible? (No scaffolding, high reach, etc. is needed to perform the FSS)	X		
11. Is lighting adequate to perform the FSS?	X		
12. Is the area industrially safe to perform the FSS? (Evaluate potential fall & trip hazards, confined spaces, etc.)		X	
13. Have photographs been taken showing the overall condition of the area?	X		
14. Have all unsatisfactory conditions been resolved?	X		

NOTE: If a "No" answer is obtained above, the inspector should immediately correct the problem or initiate corrective actions through the responsible site department, as applicable. Document actions taken and/or justifications in the "Comments" section below. Attach additional sheets as necessary.

Comments:

Response to Question 12: Slip/fall hazards are present in the survey unit. Personnel entering the area / performing the FSS will be briefed on the hazards present in the area.

Survey Unit Inspector (print/sign)	D. Sarge / [signature]	Date	3/21/05
Survey Designer (print/sign)		Date	

ATTACHMENT 9-1

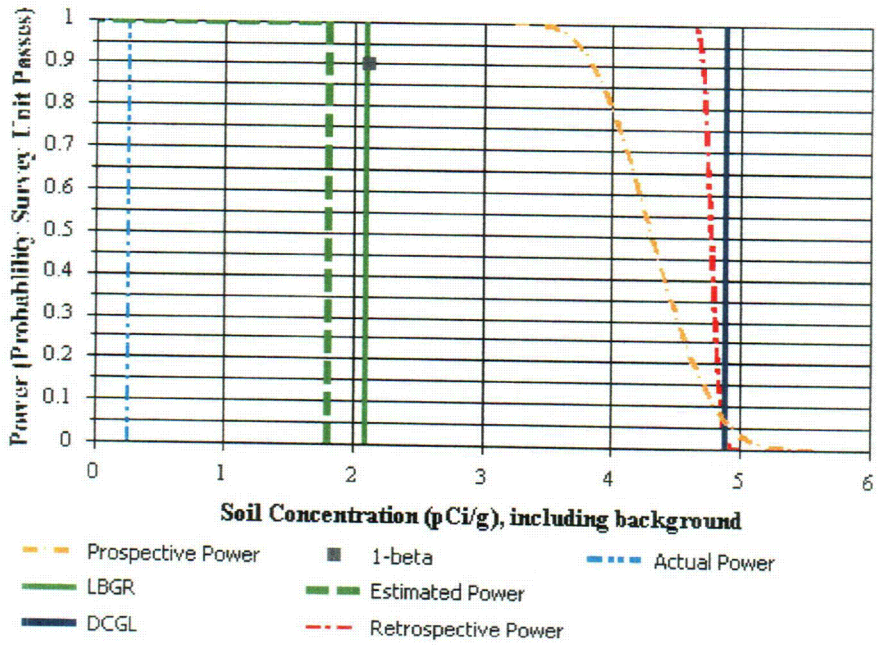
Appendix B

DQA Surface Soil Report

Assessment Summary

Site:	ma2		
Planner(s):	T Tritch		
Survey Unit Name:	MA2 SSGS discharge outfall		
Report Number:	1		
Survey Unit Samples:	10		
Reference Area Samples:	0		
Test Performed:	Sign	Test Result:	Not Performed
Judgmental Samples:	0	EMC Result:	Not Performed
Assessment Conclusion:	***Reject Null Hypothesis (Survey Unit PASSES)***		

Retrospective Power Curve



Appendix B – MA2

C01

DQA Surface Soil Report

Survey Unit Data

NOTE: Type = "S" indicates survey unit sample.
Type = "R" indicates reference area sample.

Sample Number	Type	Cs-137 (pCi/g)
1	S	0.42
2	S	0.21
3	S	0.54
4	S	0.45
5	S	0.07
6	S	0.24
7	S	0.31
8	S	0.26
9	S	0.22
10	S	0.25

Basic Statistical Quantities Summary

Statistic	Survey Unit	Background	DQO Results
Sample Number	10	N/A	N=11
Mean (pCi/g)	0.30	N/A	1.8
Median (pCi/g)	0.26	N/A	N/A
Std Dev (pCi/g)	0.14	N/A	0.9525
High Value (pCi/g)	0.54	N/A	N/A
Low Value (pCi/g)	0.07	N/A	N/A

Appendix B – MA2