FirstEnergy GPU

SNEC CALCULATION COVER SHEET

CALCULATION DESCRIPTION

Calculation Number	Revision Number	Effective Date	Page Number
E900-05-004	0	30 March 2005	1 of 9

Subject

PENELEC Switch Yard Class 3 Control Building – Survey Design

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	B. Brosey/ B. Brosey	Date	3/17/05
Technical Reviewer	R. Holmes/ R. D. Holmes	Date	3/24/05
Additional Review	A. Paynter/	Date	30 March 2005
Additional Review		Date	

1.0 PURPOSE

1.1 The purpose of this calculation is to develop a survey design for the PENELEC Switch Yard Control Building. This section of the Switch Yard is shown on **Attachment 1-1** through **1-3** and is composed of a Class 3 building structure housing electrical switching and control equipment. The following site designations apply (PS1 = building interior; PS2 = building exterior):

1.1.1 PS1-1 – Painted concrete surfaces (floor) ~45.3 m^2

1.1.2 PS1-2 - Painted steel surfaces (deck plate and doors) ~19 m^2

1.1.3 PS1-3 – Aluminum siding and ceiling materials (ceiling & wall covering) ~130.6 m^2

1.1.4 PS2-1 – Concrete block (exterior base wall) ~40.5 m^2

1.1.5 PS2-2 – Unpainted concrete (exterior base wall, side walk and steps) ~24.3 m^2

1.1.6 PS2-3 – Unpainted steel (roofing materials) ~67.7 m^2

1.1.7 PS2-4 – Aluminum siding (exterior upper walls) ~63.4 m^2

Items not included in this survey: handrails, window glass, awnings covering door entrance areas, switch gear/electrical cabinets, battery banks, desk/chair, file and equipment storage cabinets, spare parts, and interior of cable chase areas.

1.2 The PENELEC Switch Yard is an operational electrical distribution facility. The western portion of the Switch Yard (west of grid line 131), lies mainly in site area ***OL12***. Transformers, switching devices and cabling carry extremely dangerous levels of electricity up to ***~115,000 volts***. Therefore, SNEC management has designated only select items/areas to be the subject of a Final Status Survey. A detailed justification and basic safety considerations for a limited survey approach is provided in **Attachment 2-1**. The Switch Yard building is on the perimeter of the Switch Yard "Hazard Area". See **Attachment 1-1**.

2.0 SUMMARY OF RESULTS

The following information should be used to develop a survey request for these survey units.

2.1 The effective DCGLw value is listed below. The US NRC has reviewed and concurred with the methodology used to derive these values. See **Reference 3.1.** In this case, the area is assumed to contain a radionuclide mix similar to OL1 and OL2 which should be a conservative estimate of contaminant concentrations that could be present in the Switch Yard Control building.

Table 1, DCGLw Values

Gross Activity DCGLw (dpm/100 cm^2)	DCGLw (cpm – Painted Surface)	DCGLw (cpm – Unpainted Surface)
44,317 (33,238 A.L.)	4,607 (A.L.)	5,863 (A.L.)

NOTE 1: A.L. is the site Administrative Limit (75% of effective DCGLw).

NOTE 2: Decay date is December 15, 2004.

2.2 All building surfaces shall be scanned with a GFPC survey instrument. The detection efficiency for Cs-137 beta radiation shall be no less than 23.9% (εt).

2.3 GFPC Surface Measurements – All Survey Areas

2.3.1 The fraction of Cs-137 in this sample mix is presented in Table 2 as 0.599. Since this building is in good condition, no additional efficiency loss from structural defects is assumed for building surfaces. However, a paint thickness evaluation has been performed and beta radiation detection efficiency loss from a painted surface has been estimated (see **Attachment 3-1** to **3-3** and **Reference 3.2**).

2.3.2 **Table 2, GFPC Detection Efficiency Data – Unpainted Surfaces**

ε_i	ε_s	% Cs-137	Efficiency Loss Factor	counts/disintegration ε_t
0.478	0.5	59.9*	1	0.143

*Data from Reference 3.1.

Table 3, GFPC Detection Efficiency Data – Painted Surfaces

ε_i	ε_s	% Cs-137	Efficiency Loss Factor - Paint	counts/disintegration ε_t
0.478	0.5	59.9*	0.8*	0.115

*Data from Reference 3.1 and 3.2.

2.3.3 The calculated MDCscan results are shown below for each type of structural material.

Table 4, GFPC MDCscan Data

Material Type (1)	MDCscan (dpm/100 cm^2) (2)	Action Level - Phase 1 Scanning* (3)
Painted Concrete, PS1-1	1,154	700 gcpm
Painted Steel, PS1-2	1,052	600 gcpm
Interior Aluminum Siding & Ceiling, PS1-3	907	700 gcpm
Concrete Block, PS2-1	975	800 gcpm
Unpainted Concrete, PS2-2	924	700 gcpm
Unpainted Steel, PS2-3	841	600 gcpm
Exterior Aluminum Siding, PS2-4	907	700 gcpm

*Surveyor may use the lowest value from column 3 above as an action level for all material types (600 gcpm). See Attachments 4-1 through 4-8.

2.3.4 The Compass computer program (**Reference 3.3**) was used to calculate the minimum number of static measurement points shown below for each type of structural material.

Table 5, GFPC Random Start – Systematic Measurement Points

Material Type	Minimum No. of Static Measurements
Painted Concrete, PS1-1	8 (10 points provided)
Painted Steel, PS1-2	9 (10 points provided)
Interior Aluminum Siding & Ceiling, PS1-3	8 (10 points provided)
Concrete Block, PS2-1	8 (10 points provided)
Unpainted Concrete, PS2-2	8 (9 points provided)
Unpainted Steel, PS2-3	9 (18 points provided)
Exterior Aluminum Siding, PS2-4	8 (10 points provided)

*See Attachment 5-1 through 5-7 also Attachment 7-1 through Attachment 7-14.

2.3.5 Class 3 scan coverage is typically judgmental or random to ~10% of the accessible surface area IAW **Reference 3.4**. The following Table indicates the minimum degree of coverage expected for these survey units.

Table 6, Scan Coverage

Material Type	Minimum Scan Coverage/Area
Painted Concrete, PS1-1	Painted Concrete Floor @ Doors & Floor Around Desk Area (see Attachment 5-1)
Painted Steel, PS1-2	Steel Door Surfaces (both inside & outside surfaces, see Attachment 5-2)
Interior Aluminum Siding & Ceiling, PS1-3	Aluminum Wall & Ceiling Coverings (see Attachment 6-1 for Approximate locations)*
Concrete Block, PS2-1	Block Wall Areas (see Attachment 6-2 for Approximate locations)*
Unpainted Concrete, PS2-2	Unpainted Tops of Side Walk & Concrete Steps (see Attachment 5-5)
Unpainted Steel, PS2-3	Lower 20" of Unpainted Steel Roof - West & East Sides (see Attachment 5-6)
Exterior Aluminum Siding, PS2-4	Aluminum Wall Covering (see Attachment 6-3 for Approximate locations)*

*Note: Approximate locations are identified on the indicated diagrams as 1 m^2 areas. These locations were selected using a random selection process. Surveyor should survey the approximate locations indicated and cover about 1 m^2 of area at each location.

NOTE

If the > 10% of the DCGLw values (**Table 1**) is discovered in this Class 3 area, the survey unit should be re-classified and re-surveyed IAW **Reference 3.4**, Table 5-7. To ensure that an elevated count rate is the result of Cs-137 contamination, sample (if possible) any surface location above the action levels of **Table 4**, and gamma scan the sampled materials (core or scrape the surface to collect the sample IAW **Reference 3.5**).

3.0 REFERENCES

3.1 SNEC Calculation No. E900-05-002, PENELEC Switch Yard, Class 1 Area – Survey Design.

3.2 SNEC Calculation No. 6900-02-028, GFPC Instrument Efficiency Loss Study.

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

3.4 SNEC Facility License Termination Plan.

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

3.6 Visual Sample Plan, Version 2.0 (or greater), Copyright 2002, Battelle Memorial Institute.

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

3.8 GPU Nuclear, SNEC Facility, "Site Area Grid Map", SNECRM-020, Sheet 1, Rev 2, 1/29/03.

3.9 GPU Nuclear, SNEC Facility, "Switch Yard Control Building", SNECRM-017, Sheet 1 & 2, Rev 0, 12/03/99.

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

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

3.12 Microsoft Excel 97, Microsoft Corporation Inc., SR-2, 1985-1997.

3.13 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.

3.14 ISO 7503-1, Evaluation of Surface Contamination, Part 1: Beta-emitters (maximum beta energy greater than 0.15 MeV) and alpha-emitters, 1988.

4.0 ASSUMPTIONS AND BASIC DATA

4.1 The Compass computer program is used to calculate the required number of random start systematic measurements to be taken in these survey units (**Reference 3.3**).

4.2 Background values are taken from like materials shown in **Attachment 8-1** to **8-4**.

4.3 Switch Yard Control Building (SYCB) surface variability measurements are shown in **Attachment 9-1** to **9-5**.

4.4 Structural surface area survey designs require the WRS statistical testing criteria.

4.5 The number of points chosen by Compass are located on the survey maps for the respective survey units by the Visual Sample Plan (VSP) computer code (**Reference 3.6**). Additional points may have been added as deemed appropriate or as an internal operation of the VSP computer code.

4.6 **Reference 3.4** and **3.7** was used as guidance during the survey design development phase.

4.7 The site area drawings used to determine the physical extent of this area are listed as **Reference 3.8**, and **3.9**.

4.8 Remediation History

No remediation has been performed in these survey units.

4.9 The western portion of the PENELEC Switch Yard resides within the OL12 site area. The sample mix is assumed to be the same as that currently assigned to the OL1 and OL2 areas (CV yard). The sample list was decayed to December 15th, 2004. In all, twenty three (23) sample results were used to determine the best representative mix.

4.10 The sample database used to determine the effective radionuclide mix has been drawn from previous samples that were assayed at off-site laboratories. This list is shown in **Reference 3.1**, and includes (23) analysis results. Review of the data shows several radionuclides have not been positively identified at any significant concentration. These

radionuclides have been removed from the data set and will not be considered further. Radionuclides removed include Am-241, C-14, Eu-152, Ni-63, Pu-238, Pu-239 and Pu-41. Additionally, the data shows Cs-137 to be the predominant radioactive contaminant found in the area. Sr-90 on the other hand, was positively identified in only one (1) sample. H-3 was identified as a positive contaminant in six (6) samples, and Co-60 was identified in three (3) samples.

The decayed sample results were input to the spreadsheet titled "Effective DCGL Calculator for Cs-137" to determine both the effective volumetric DCGLw and gross activity DCGLw values for this area. The output of this spreadsheet is shown in **Reference 3.1**.

4.11 The survey units described in this survey design were inspected by SNEC personnel. A copy of portions of the SNEC facility inspection report (**Reference 3.10**), is included as **Attachment 10-1**.

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) 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 not applicable in Class 3 areas.

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 the PENELEC Switch yard area.

6.2 **Attachment 1-2** and **1-3**, are GPU Nuclear drawings of the PENELEC switch Yard Control Building.

6.3 **Attachment 2-1**, is the justification for a limited survey of the Switch Yard and some basic safety concerns for this area.

6.4 **Attachment 3-1** to **3-3**, are basic data showing first the thickness of paint on concrete surfaces in the SYCB, and then the impact of painted surfaces on beta radiation detection efficiency.

6.5 **Attachment 4-1** to **4-8**, are the MDCscan calculation sheets for these survey units.

6.6 **Attachment 5-1** to **5-5**, are the Compass indicated and VSP plotted static measurement points for these survey units. Judgmental scan areas are also located on select diagrams.

6.7 **Attachment 6-1** to **6-3**, are randomly located scan locations for three survey units.

6.8 **Attachment 7-1** to **7-14**, are Compass computer code output for these survey units.

6.9 **Attachment 8-1** to **8-4**, are generic background values for material types present in these survey units.

6.10 **Attachment 9-1** to **9-5**, are typical survey unit variability measurements for the SYCB.

6.11 **Attachment 10-1**, is a copy of the survey unit inspection report for the SYCB.

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) [b] Open Land Areas (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.

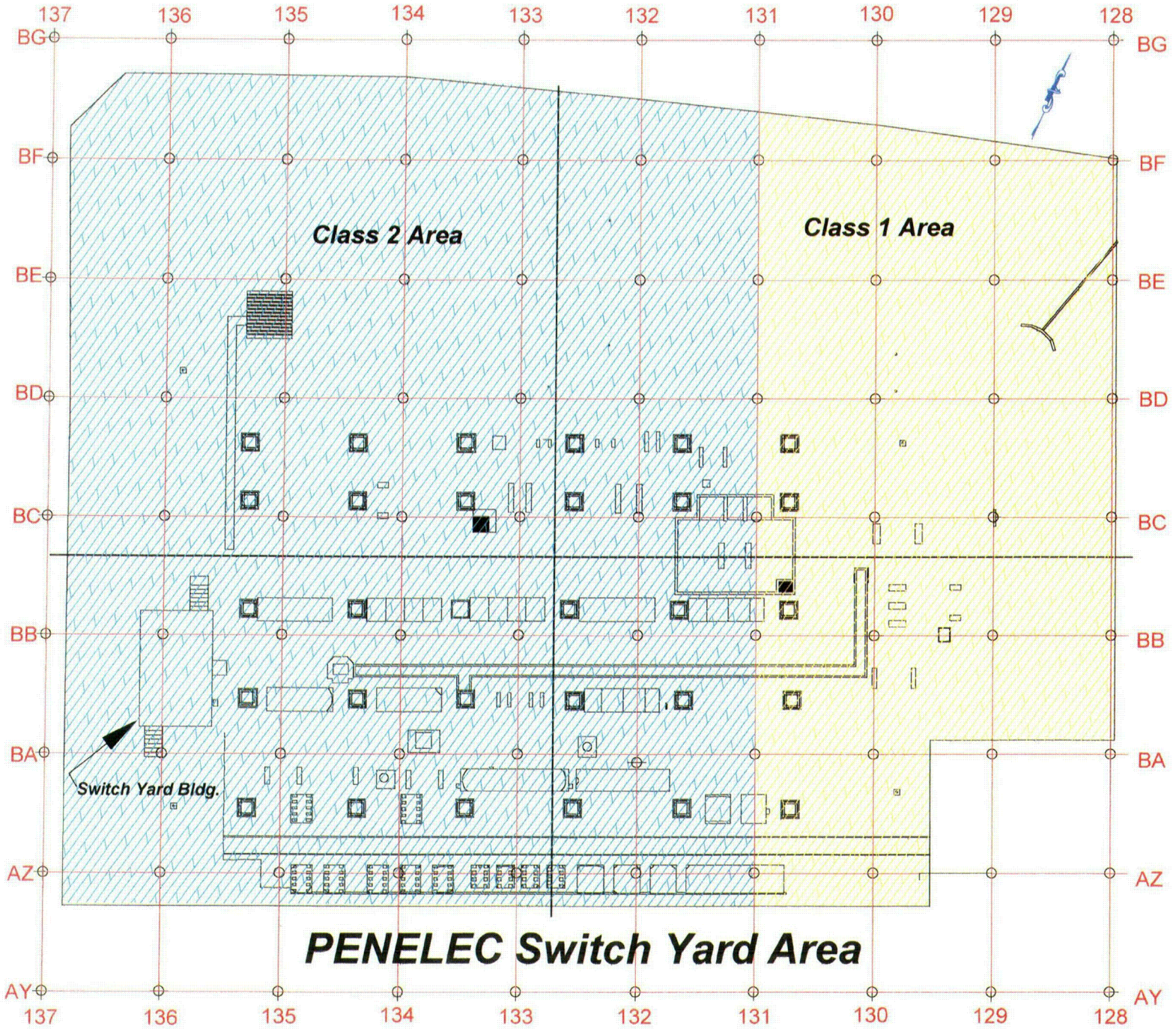
(b) Listed values are from the subsurface model. These values are the most conservative values between the two models (i.e., surface & subsurface).

Exhibit 2
Survey Design Checklist

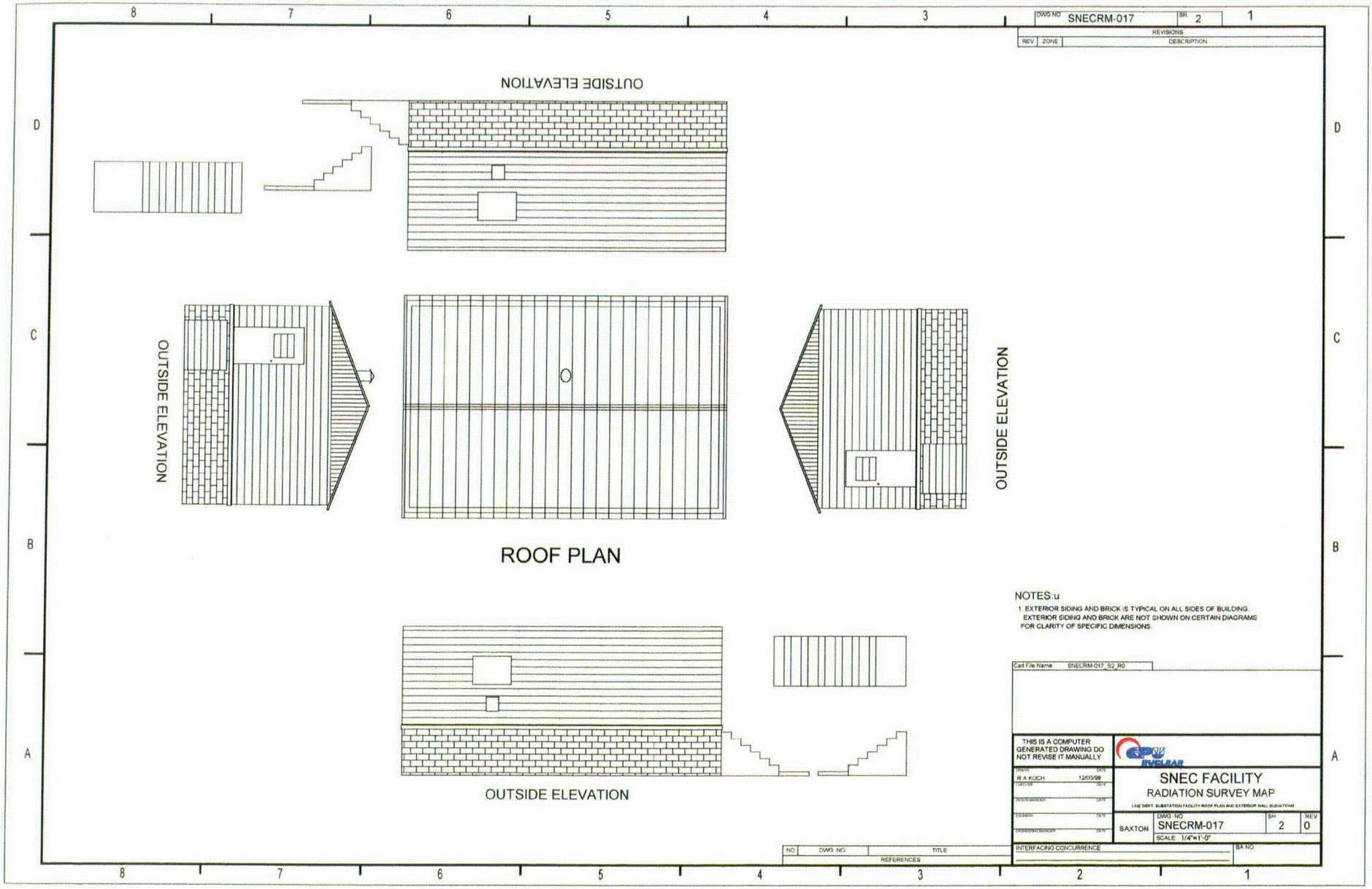
Calculation No. E900-05-004	Location Codes PS1-1, PS1-2, PS1-3. PS2-1, PS2-2, PS2-3 & PS2-4 (SYCB)		
ITEM	REVIEW FOCUS	Status (Circle One)	Reviewer Initials & Date
1	Has a survey design calculation number been assigned and is a survey design summary description provided?	(Yes), N/A	3/24/05
2	Are drawings/diagrams adequate for the subject area (drawings should have compass headings)?	(Yes), N/A	3/24/05
3	Are boundaries properly identified and is the survey area classification clearly indicated?	(Yes), N/A	3/24/05
4	Has the survey area(s) been properly divided into survey units IAW EXHIBIT 10	(Yes), N/A	3/24/05
5	Are physical characteristics of the area/location or system documented?	(Yes) N/A	3/24/05
6	Is a remediation effectiveness discussion included?	Yes, (N/A)	3/24/05
7	Have characterization survey and/or sampling results been converted to units that are comparable to applicable DCGL values?	(Yes) N/A	3/24/05
8	Is survey and/or sampling data that was used for determining survey unit variance included?	(Yes) N/A	3/24/05
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)	3/24/05
10	Are applicable survey and/or sampling data that was used to determine variability included?	(Yes) N/A	3/24/05
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)	3/24/05
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)	3/24/05
13	Are all necessary supporting calculations and/or site procedures referenced or included?	(Yes) N/A	3/24/05
14	Has an effective DCGLw been identified for the survey unit(s)?	(Yes) N/A	3/24/05
15	Was the appropriate $DCGL_{EMC}$ included in the survey design calculation?	Yes, (N/A)	3/24/05
16	Has the statistical tests that will be used to evaluate the data been identified?	(Yes) N/A	3/24/05
17	Has an elevated measurement comparison been performed (Class 1 Area)?	Yes, (N/A)	3/24/05
18	Has the decision error levels been identified and are the necessary justifications provided?	(Yes) N/A	3/24/05
19	Has scan instrumentation been identified along with the assigned scanning methodology?	(Yes) N/A	3/24/05
20	Has the scan rate been identified, and is the MDCscan adequate for the survey design?	(Yes), N/A	3/24/05
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)	3/24/05
22	Is survey instrumentation calibration data included and are detection sensitivities adequate?	(Yes) N/A	3/24/05
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	3/24/05
24	Are investigation levels and administrative limits adequate, and are any associated actions clearly indicated?	(Yes), N/A	3/24/05
25	For sample analysis, have the required MDA values been determined.?	Yes, (N/A)	3/24/05
26	Has any special sampling methodology been identified other than provided in Reference 6.3?	Yes (N/A)	3/24/05

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

ATTACHMENT 1 - 1

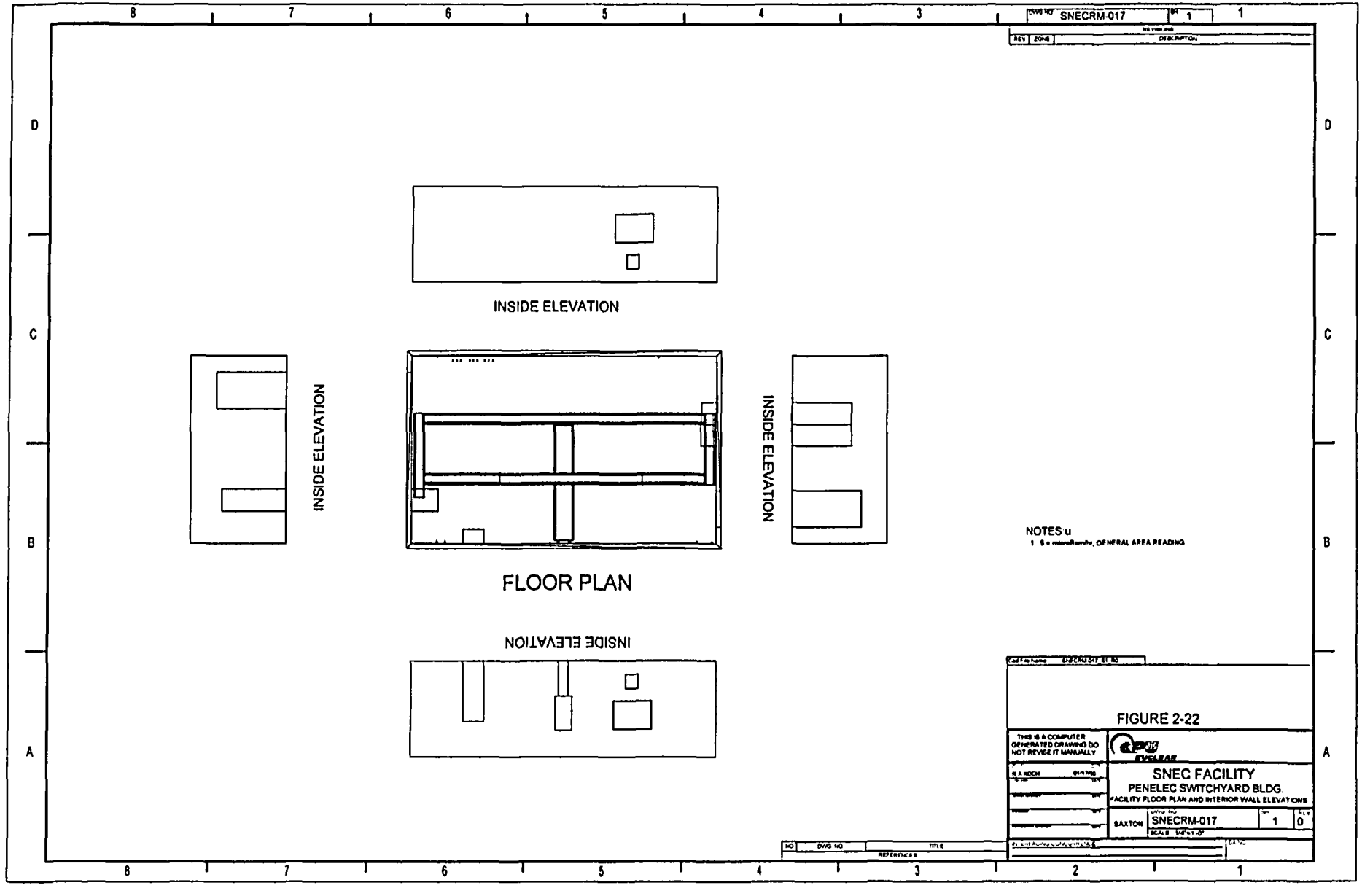


C01



ATTACHMENT 1 . 2

C 02



ATTACHMENT 1 . 3

The following are the FirstEnergy specific requirements applicable to entry and work in substations. Please note that other routine safety requirements such as use of PPE, switching & tagging, confined space, etc., are not covered here

From subsection 411 "Substations" of section 400 "Electrical Safety" of the FirstEnergy "Energy Delivery Accident Prevention Handbook" the following precautions are to be observed when working in or near Company substations that may be applicable to your question:

411.1 Employees assigned to work in substations or perform switching must be:

(a) Properly qualified through training or work experience.
(b) Familiar with the equipment being operated and knowledgeable of the "Manual of Operations".

411.5 When handling material and equipment, care must be taken to maintain minimum approach distances. (*Approach distances are covered in section 412*)

411.6 before driving into a substation, radio antennas on vehicles must be lowered and secured in place.

411.8 A qualified person must escort all unqualified personnel when entering a substation. (*Qualified persons are defined in OSHA 29 CFR 1910.269*)

412 Minimum Safe Working Distances from Energized Conductors or Equipment

412.1 Unless properly protected, qualified personnel must maintain minimum working distances and clear hot-stick distances from uninsulated and energized equipment as outlined in the following:

A table follows showing the minimum clearances. The shortest applicable is 2'-1" from 1.1 kV to 3'-2" for 115 kV. *Please note however that these distances only apply to "Qualified Personnel".*

412.3 Employees/contracted personnel ***not*** electrically qualified per the requirements of 29 CFR 1910.269 must maintain a minimum approach of at least 10 feet from energized conductors and equipment.

Note that except for some Company specific terminology, these requirements come from OSHA 29 CFR 1910.

For Final Status Survey (FSS) work in the Saxton Penelec Substation, Radiological Controls technicians who are not electrically qualified per the requirements of 29 CFR 1910.269 must maintain a minimum approach of at least 10 feet from energized conductors and equipment. Much of the lattice support structure and almost all of the components in the substation are inaccessible to personnel not so qualified. In addition, the ground surface within 10 feet of un-insulated energized equipment would be inaccessible for FSS.

Barry Brosey

From: "robby marquette" <onemanuke@yahoo.com>
To: "Barry Brosey" <bbrosey@msn.com>
Sent: Monday, March 07, 2005 2:27 PM
Subject: Paint test from SY bldg

Barry,

Mr. Lewis performed three (3) paint removal efforts on 2"X2" sections of the floor in the switch yard building. The results are as follows:

#1 0.2g
#2 0.4g
#3 0.4g

Hope this is sufficient

Rob

ATTACHMENT 3.1

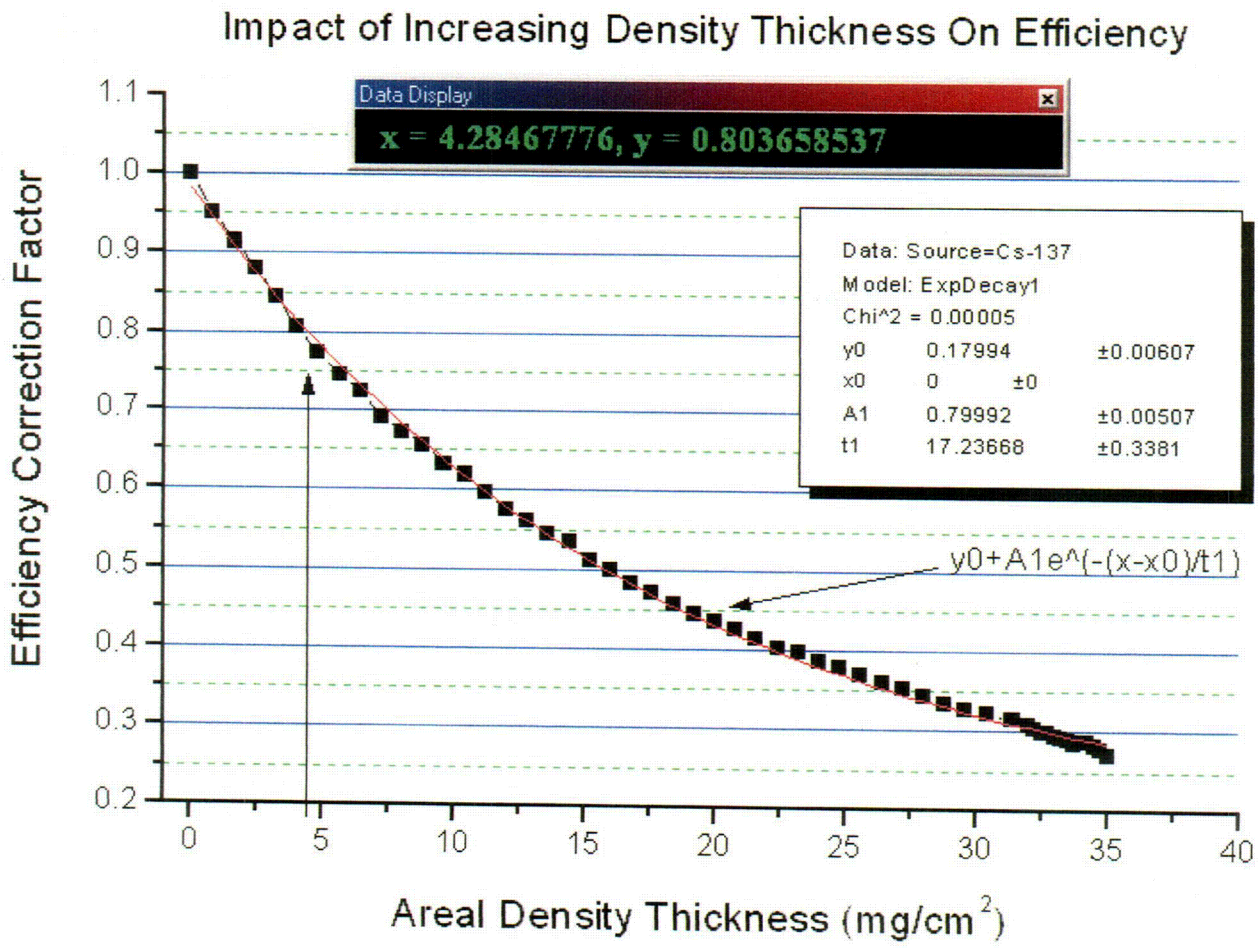
Paint Density Thickness Calculation

Three 2" by 2" square areas of paint were removed from the PENELEC Switch Yard Control building concrete floor.

The weight of each paint sample was:

1	0.2 grams			
2	0.4 grams			
3	0.4 grams			
Average=>	0.3 grams	per	12	square inches
		=	77.4	square centimeters
		=	0.004	grams/cm^2
		=	4.31	mg/cm^2

ATTACHMENT 3.2



ATTACHMENT 3 3

C03

Beta Scan Measurement MDC Calculation

Painted Concrete Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599 \cdot .8$ $b := 306$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{(b \cdot O_i)}{60}$

$\varepsilon_t := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_t = 0.1145$

$b_i = 20.4$ *Counts in observation Interval*

$C := \frac{1}{\left(\varepsilon_i \cdot \varepsilon_s \frac{A}{100}\right) \cdot \sqrt{p}}$

$C = 12.348$

$MDCR_i := \left(d \cdot \sqrt{b_i}\right) \frac{60}{O_i}$

$MDCR_i = 93.5$ *net counts per minute*

$MDCR_i + b = 399.494$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 23.4$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 1.154 \cdot 10^3$ *dpm per 100 cm^2*

where:

b = *background counts per minute*

b_i = *background counts in observation interval*

p = *human performance factor*

W_d = *detector width in centimeters*

S_r = *scan rate in centimeters per second*

d = *index of sensitivity (Table 6.5 MARSSIM), 1.38 = 95% of correct detection's, 60% false positives*

MDC_{scan} = *Minimum Detectable Concentration for scanning (dpm/100 square centimeters)*

C = *constant used to convert MDCR to MDC*

ε_i = *instrument efficiency (counts/emission)*

ε_s = *source efficiency (emissions/disintegration)*

A = *instrument physical probe area (in square centimeters)*

Beta Scan Measurement MDC Calculation

Painted Steel Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599 \cdot .8$ $b := 254$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{(b \cdot O_i)}{60}$

$\varepsilon_t := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_t = 0.1145$

$b_i = 16.9$ *Counts in observation Interval*

$C := \frac{1}{\left(\varepsilon_i \cdot \varepsilon_s \cdot \frac{A}{100}\right) \cdot \sqrt{p}}$

$C = 12.348$

$MDCR_i := \left(d \cdot \sqrt{b_i}\right) \cdot \frac{60}{O_i}$

$MDCR_i = 85.2$ *net counts per minute*

$MDCR_i + b = 339.181$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 21.3$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 1.052 \cdot 10^3$ *dpm per 100 cm^2*

Beta Scan Measurement MDC Calculation

Aluminum Siding & Ceiling Materials Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599$ $b := 295$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{(b \cdot O_i)}{60}$

$\varepsilon_t := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_t = 0.1432$

$b_i = 19.7$ *Counts in observation Interval*

$C := \frac{1}{(\varepsilon_i \cdot \varepsilon_s \cdot \frac{A}{100}) \cdot \sqrt{p}}$

$C = 9.878$

$MDCR_i := (d \cdot \sqrt{b_i}) \cdot \frac{60}{O_i}$

$MDCR_i = 91.8$ *net counts per minute*

$MDCR_i + b = 386.799$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 22.9$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 906.83$ *dpm per 100 cm^2*

Beta Scan Measurement MDC Calculation

Concrete Block Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599$ $b := 341$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{(b \cdot O_i)}{60}$

$\varepsilon_t := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_t = 0.1432$

$b_i = 22.7$ *Counts in observation Interval*

$C := \frac{1}{(\varepsilon_i \cdot \varepsilon_s \cdot \frac{A}{100}) \cdot \sqrt{p}}$

$C = 9.878$

$MDCR_i := (d \cdot \sqrt{b_i}) \cdot \frac{60}{O_i}$

$MDCR_i = 98.7$ *net counts per minute*

$MDCR_i + b = 439.697$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 24.7$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 974.972$ *dpm per 100 cm^2*

MARSSIM, Pages 6-38 to 6-43
Equations 6-9 & 6-10; and NUREG-1507, Pages 6-15 to 6-17

3/15/2005

ATTACHMENT 4 - 5

Beta Scan Measurement MDC Calculation

Unpainted Concrete Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599$ $b := 306$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{(b \cdot O_i)}{60}$

$\varepsilon_i := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_i = 0.1432$

$b_i = 20.4$ *Counts in observation Interval*

$C := \frac{1}{\left(\varepsilon_i \cdot \varepsilon_s \frac{A}{100}\right)\sqrt{p}}$

$C = 9.878$

$MDCR_i := \left(d \cdot \sqrt{b_i}\right) \cdot \frac{60}{O_i}$

$MDCR_i = 93.5$ *net counts per minute*

$MDCR_i + b = 399.494$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 23.4$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 923.583$ *dpm per 100 cm^2*

MARSSIM, Pages 6-38 to 6-43
Equations 6-9 & 6-10, and NUREG-1507, Pages 6-15 to 6-17

3/15/2005

ATTACHMENT 4 - 6

Beta Scan Measurement MDC Calculation

Unpainted Steel Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599$ $b := 254$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{b \cdot O_i}{60}$

$\varepsilon_t := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_t = 0.1432$

$b_i = 16.9$ *Counts in observation Interval*

$C := \frac{1}{\varepsilon_i \cdot \varepsilon_s \sqrt{\frac{A}{100}} \cdot \sqrt{p}}$

$C = 9.878$

$MDCR_i := \left(d \cdot \sqrt{b_i}\right) \cdot \frac{60}{O_i}$

$MDCR_i = 85.2$ *net counts per minute*

$MDCR_i + b = 339.181$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 21.3$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 841.457$ *dpm per 100 cm*^{2}

Beta Scan Measurement MDC Calculation

Aluminum Siding Criteria - 2350/43-68

$\varepsilon_i := .478$ $\varepsilon_s := .5 \cdot .599$ $b := 295$ $p := 0.5$ $W_d := 8.8$ $S_r := 2.2$ $d := 1.38$ $A := 100$

$\frac{W_d}{S_r} = 4$ *Observation Interval (seconds)*

$O_i := \frac{W_d}{S_r}$ *Observation Interval (seconds)*

$b_i := \frac{(b \cdot O_i)}{60}$

$\varepsilon_t := \varepsilon_i \cdot \varepsilon_s$

$\varepsilon_t = 0.1432$

$b_i = 19.7$ *Counts in observation Interval*

$C := \frac{1}{\left(\varepsilon_i \cdot \varepsilon_s \cdot \frac{A}{100}\right) \cdot \sqrt{p}}$

$C = 9.878$

$MDCR_i := \left(d \cdot \sqrt{b_i}\right) \cdot \frac{60}{O_i}$

$MDCR_i = 91.8$ *net counts per minute*

$MDCR_i + b = 386.799$ *gross counts per minute*

$\frac{MDCR_i}{O_i} = 22.9$ *net counts per minute in observation interval*

$MDC_{scan} := C \cdot MDCR_i$

$MDC_{scan} = 906.83$ *dpm per 100 cm^2*

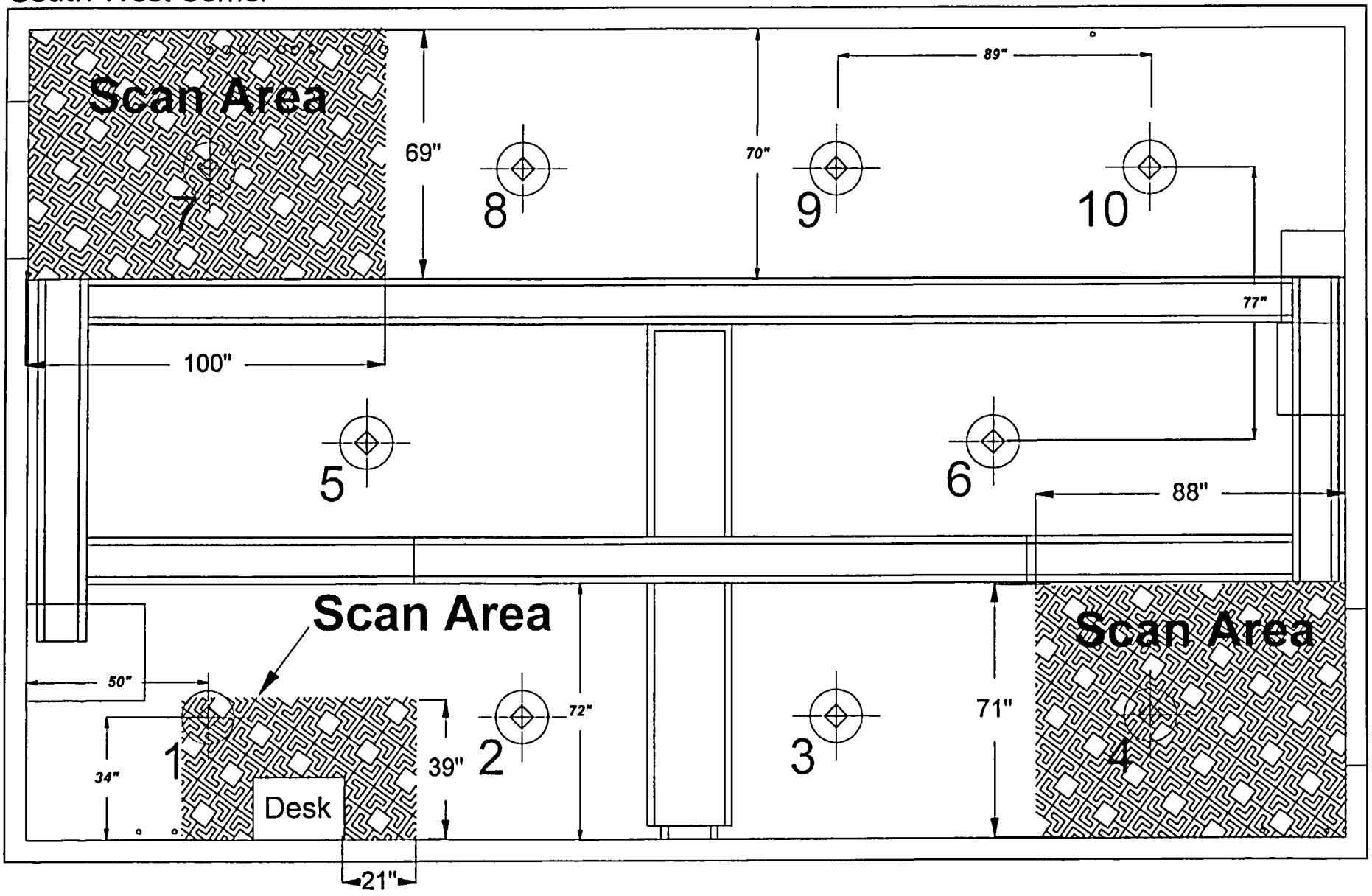
MARSSIM, Pages 6-38 to 6-43
Equations 6-9 & 6-10, and NUREG-1507, Pages 6-15 to 6-17

3/15/2005

ATTACHMENT 4 . B

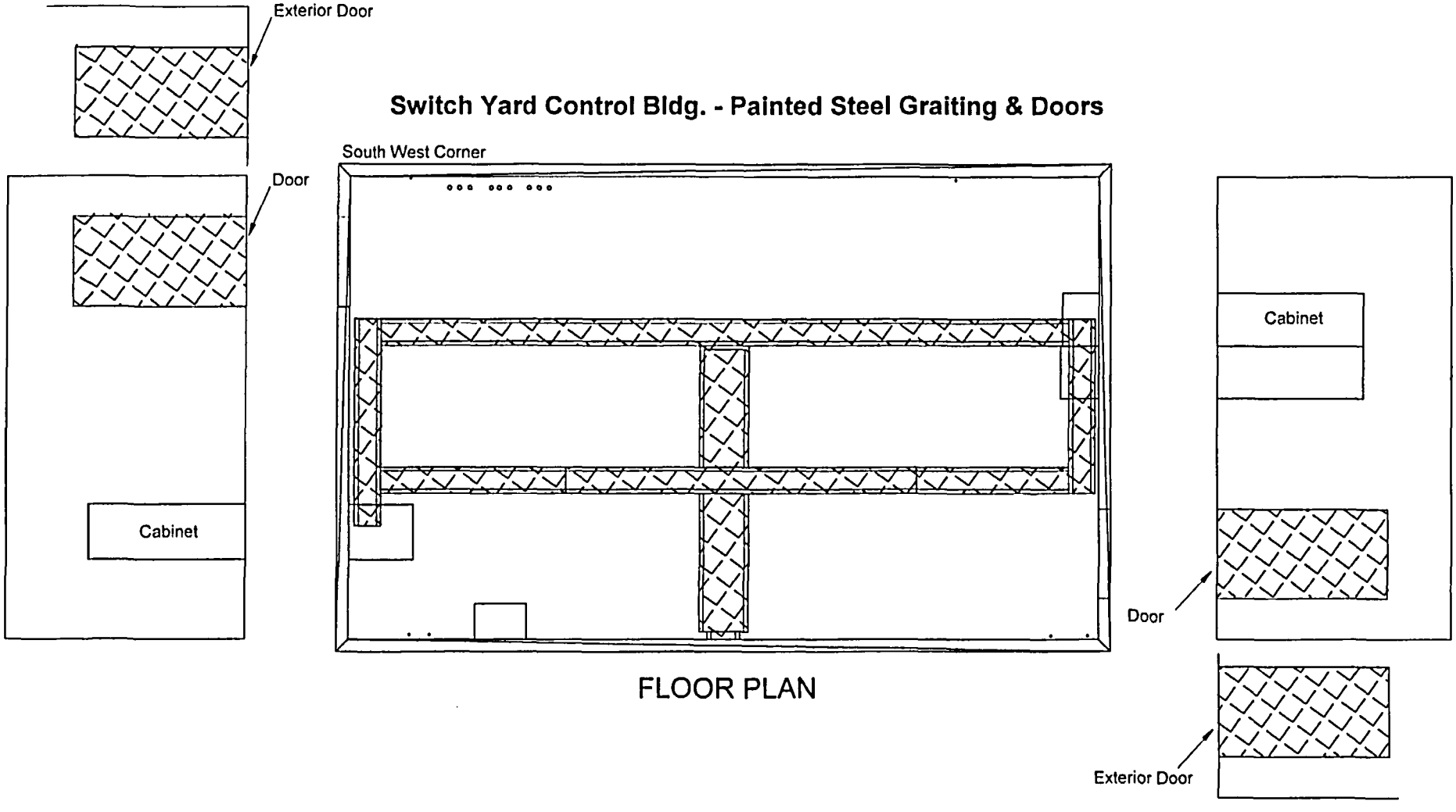
Switch Yard Control Bldg. - Painted Concrete Floor

South West Corner



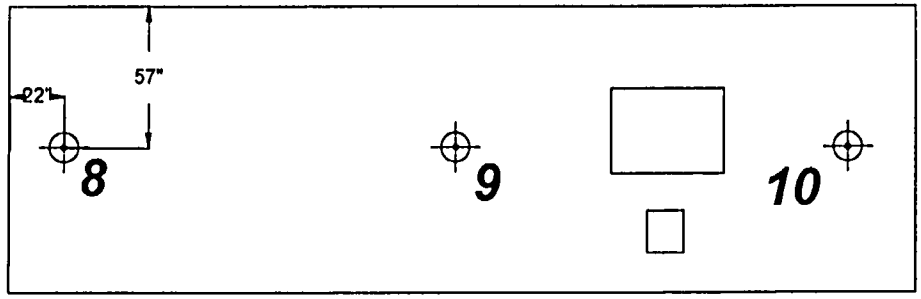
ATTACHMENT 5 - 1

Switch Yard Control Bldg. - Painted Steel Graiting & Doors

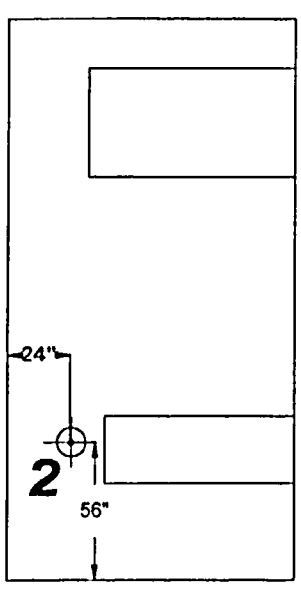


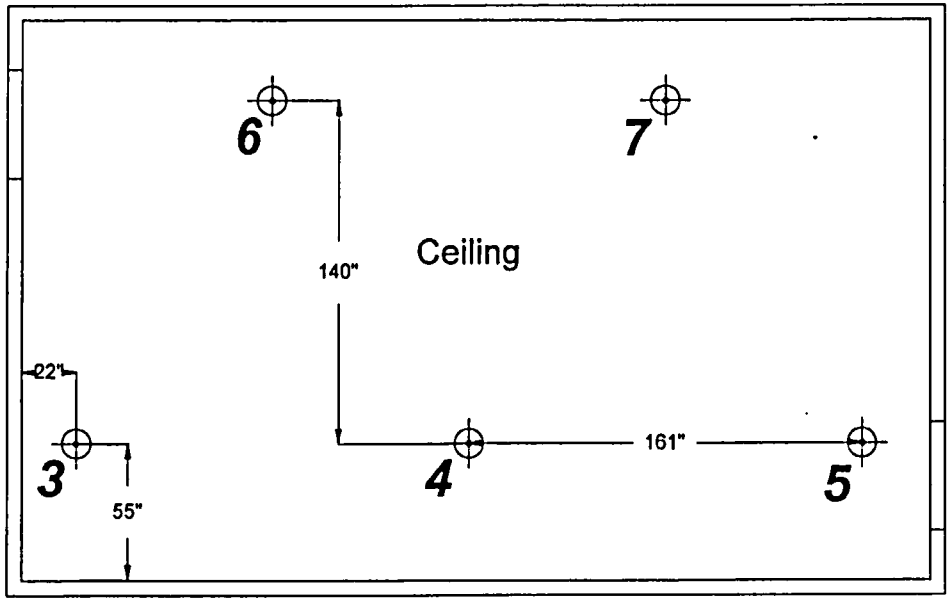
FLOOR PLAN

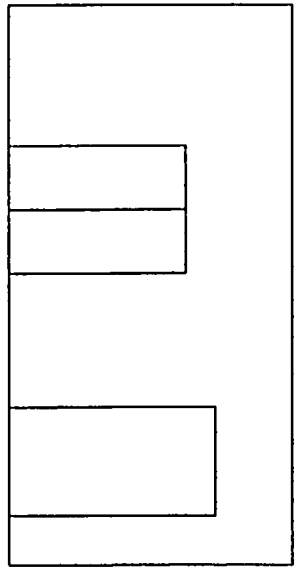
ATTACHMENT 5.2



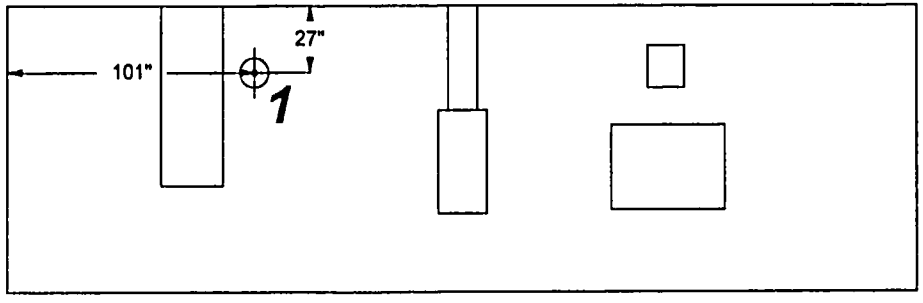
South West Corner



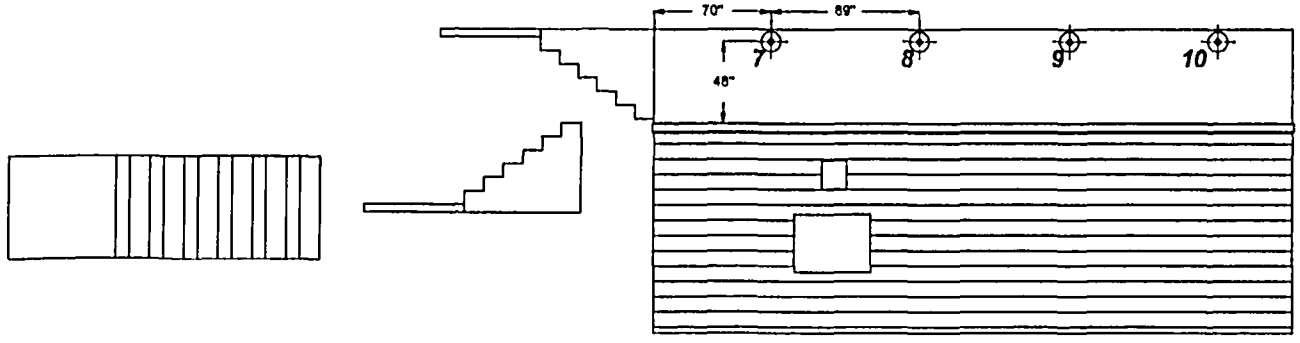




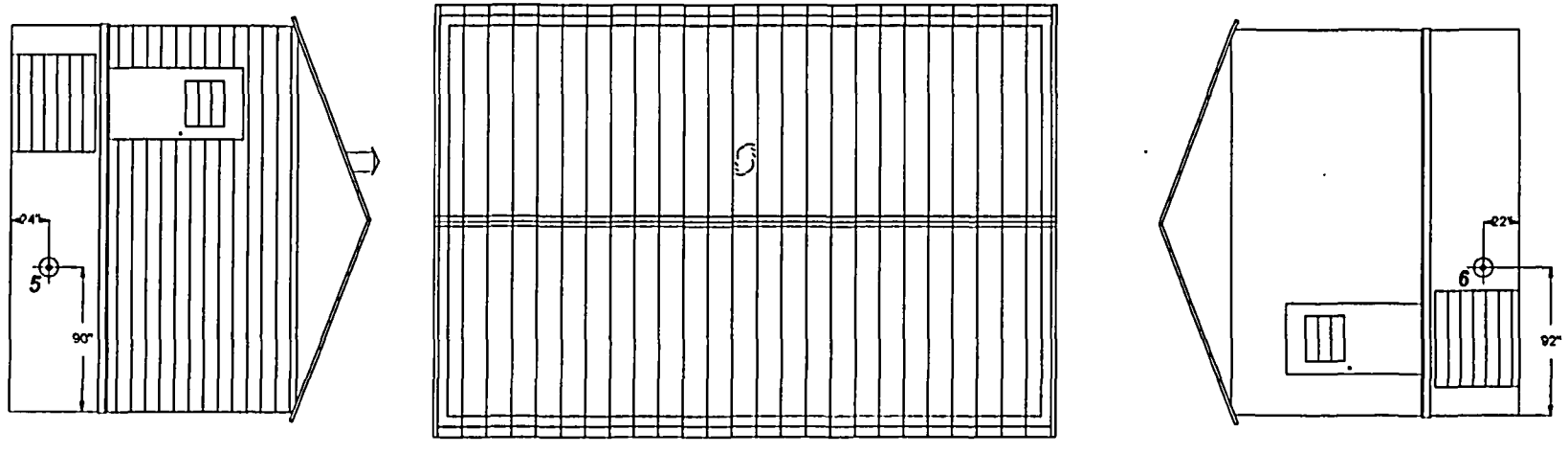
Aluminum Interior Walls & Ceiling



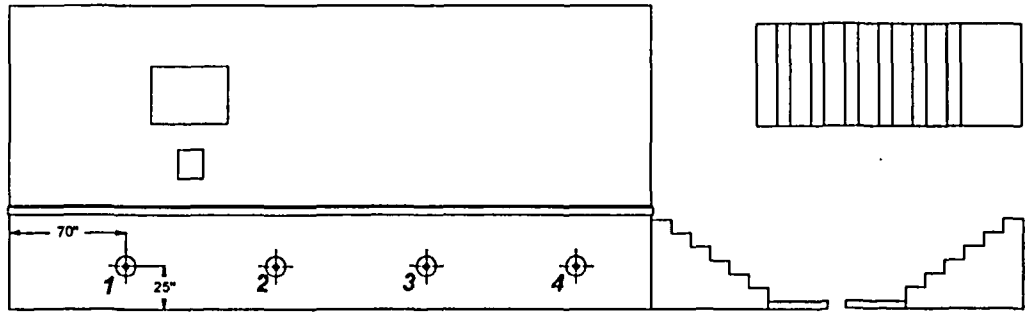
ATTACHMENT 5 . 3



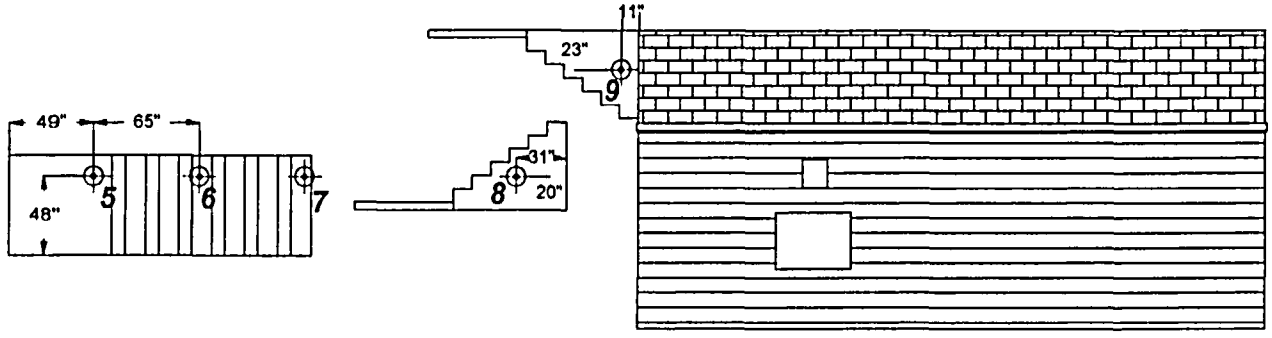
South West Corner



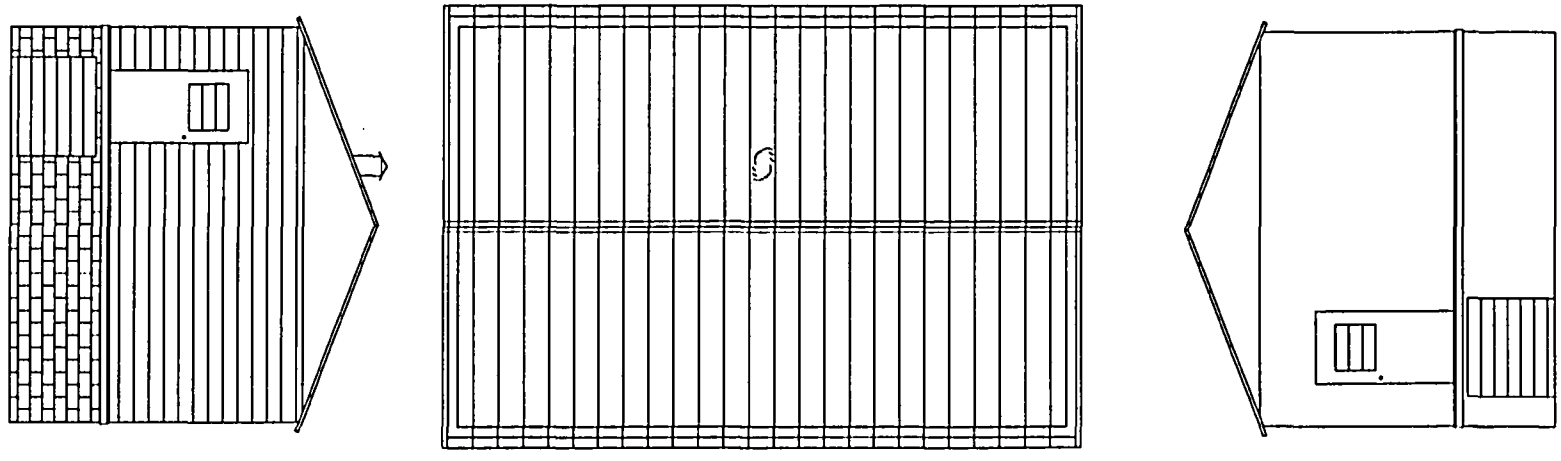
Switch Yard Control Bldg. - Concrete Block SD



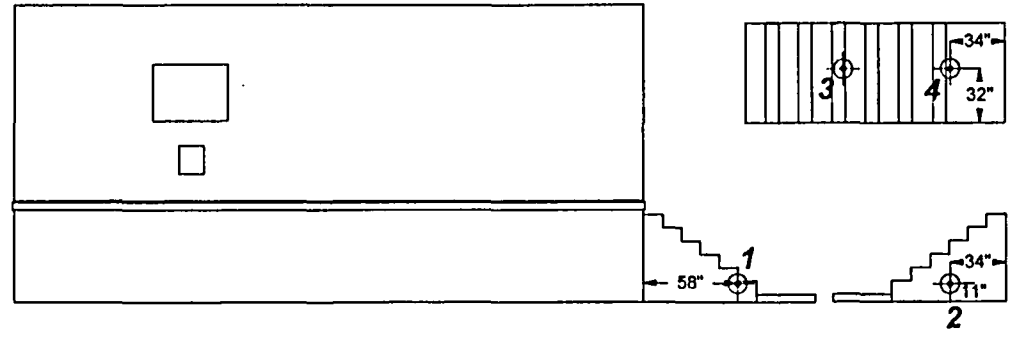
ATTACHMENT 5.4



SW Corner

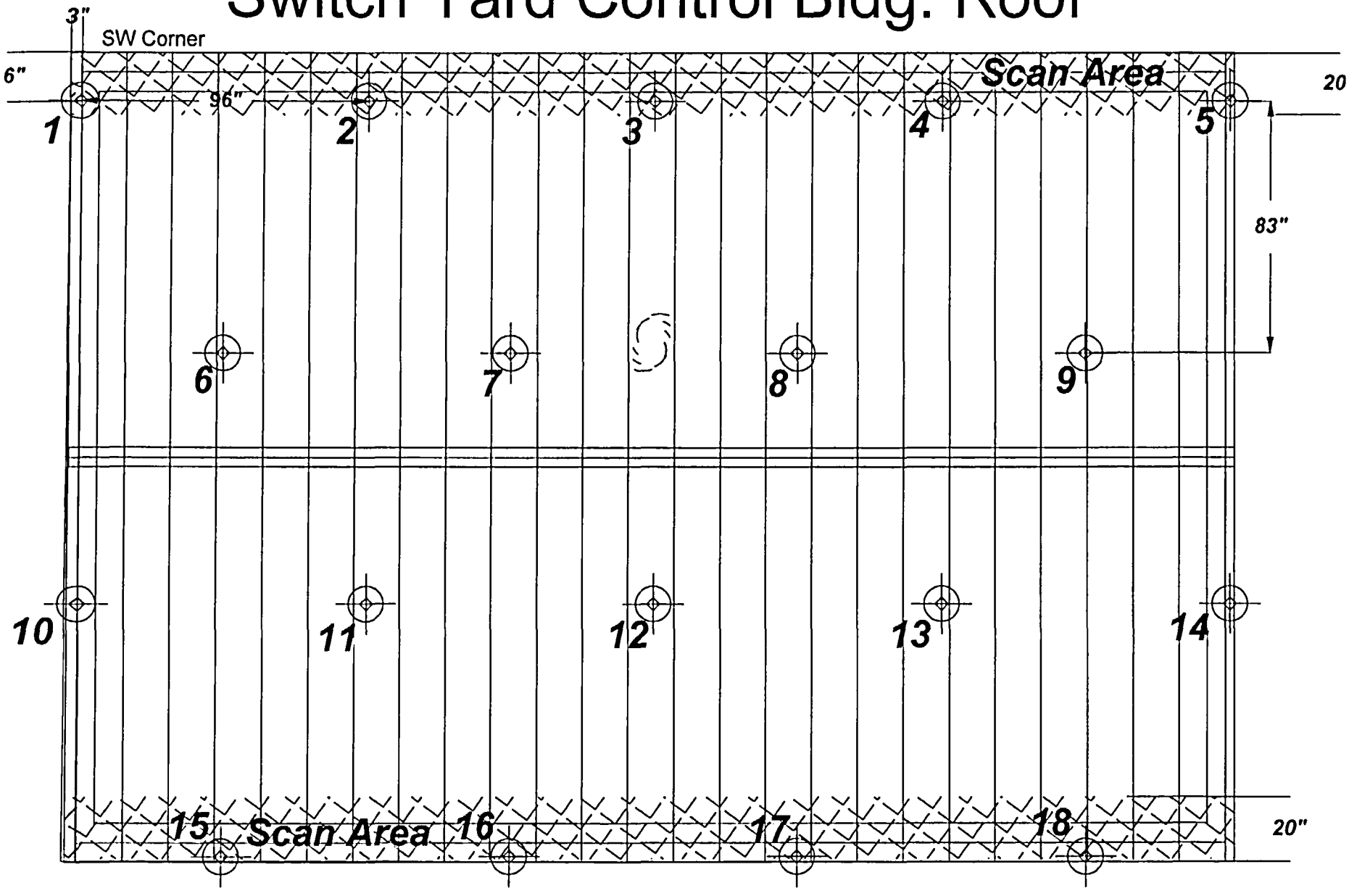


Switch Yard Control Bldg. - Unpainted Concrete

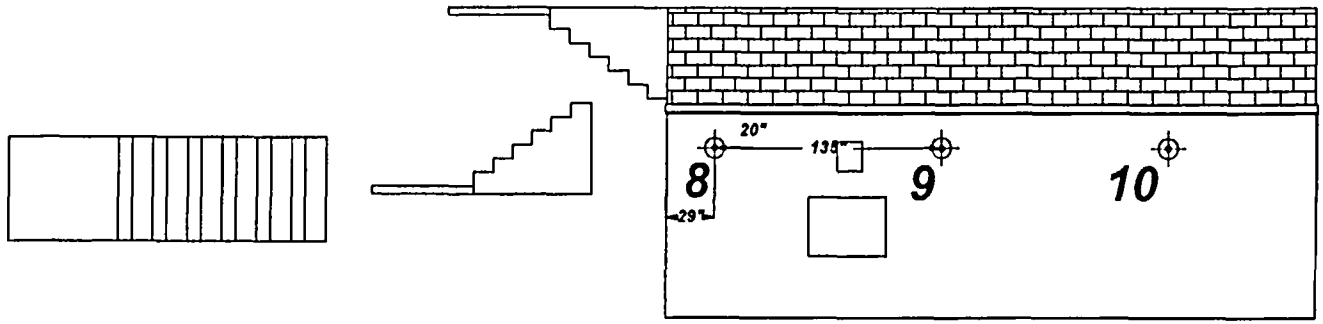


ATTACHMENT 5.5

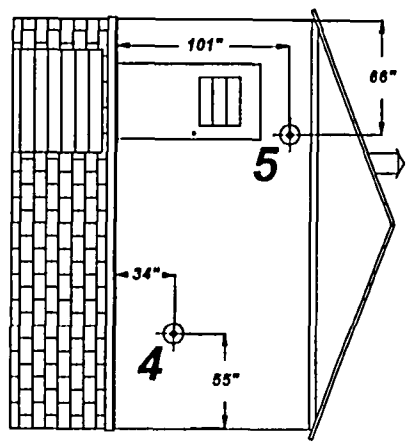
Switch Yard Control Bldg. Roof

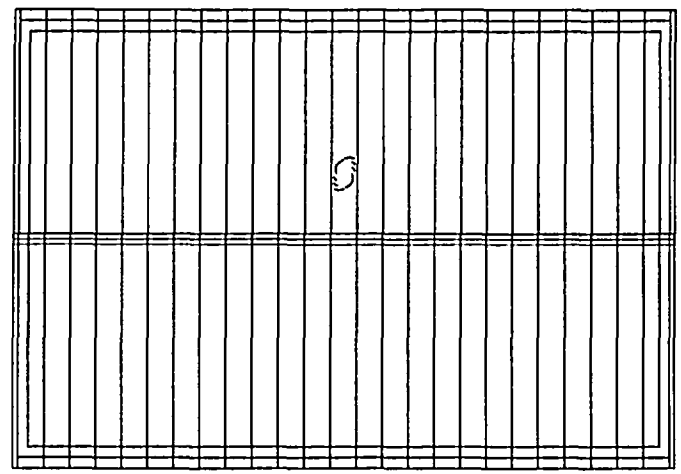


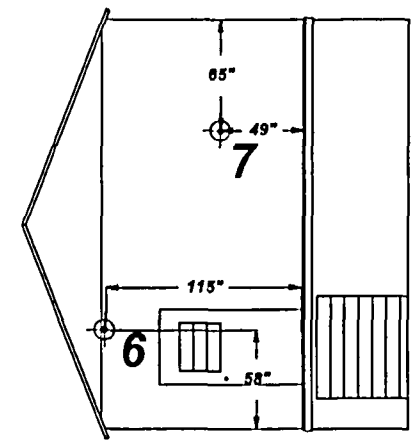
ATTACHMENT 5.6



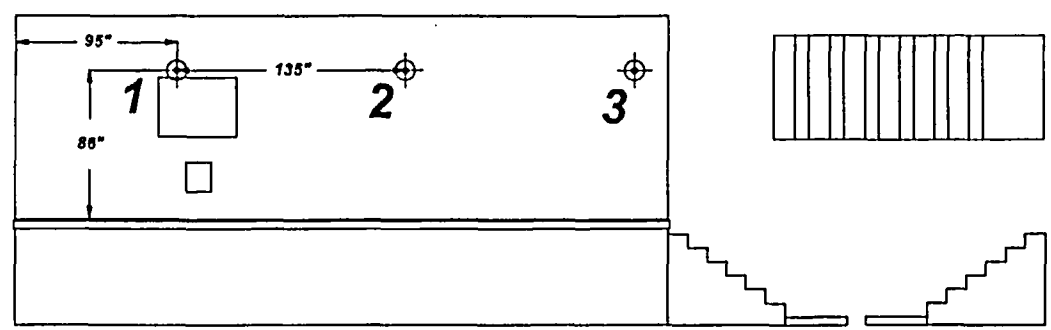
South West Corner



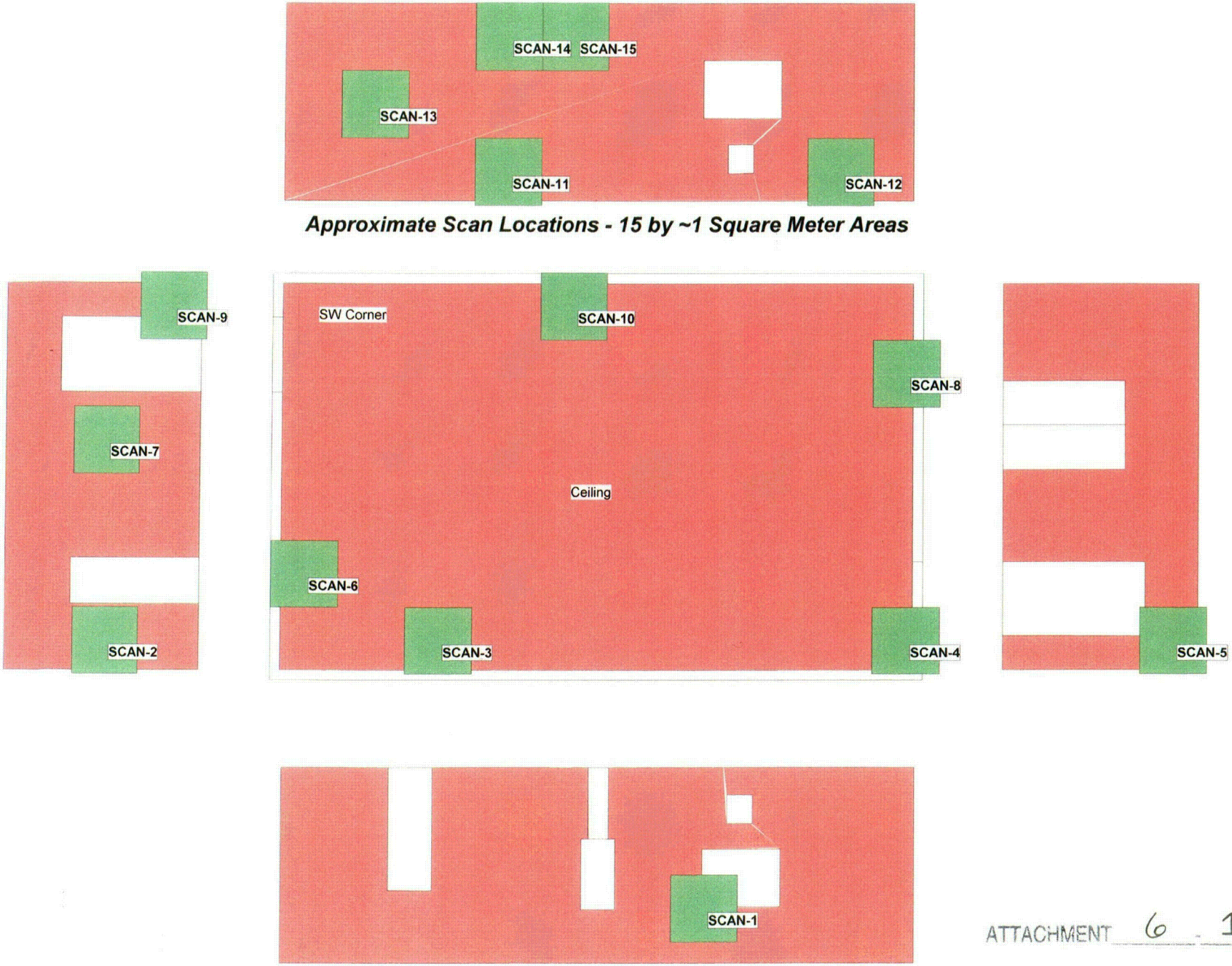




Switch Yard Control Building



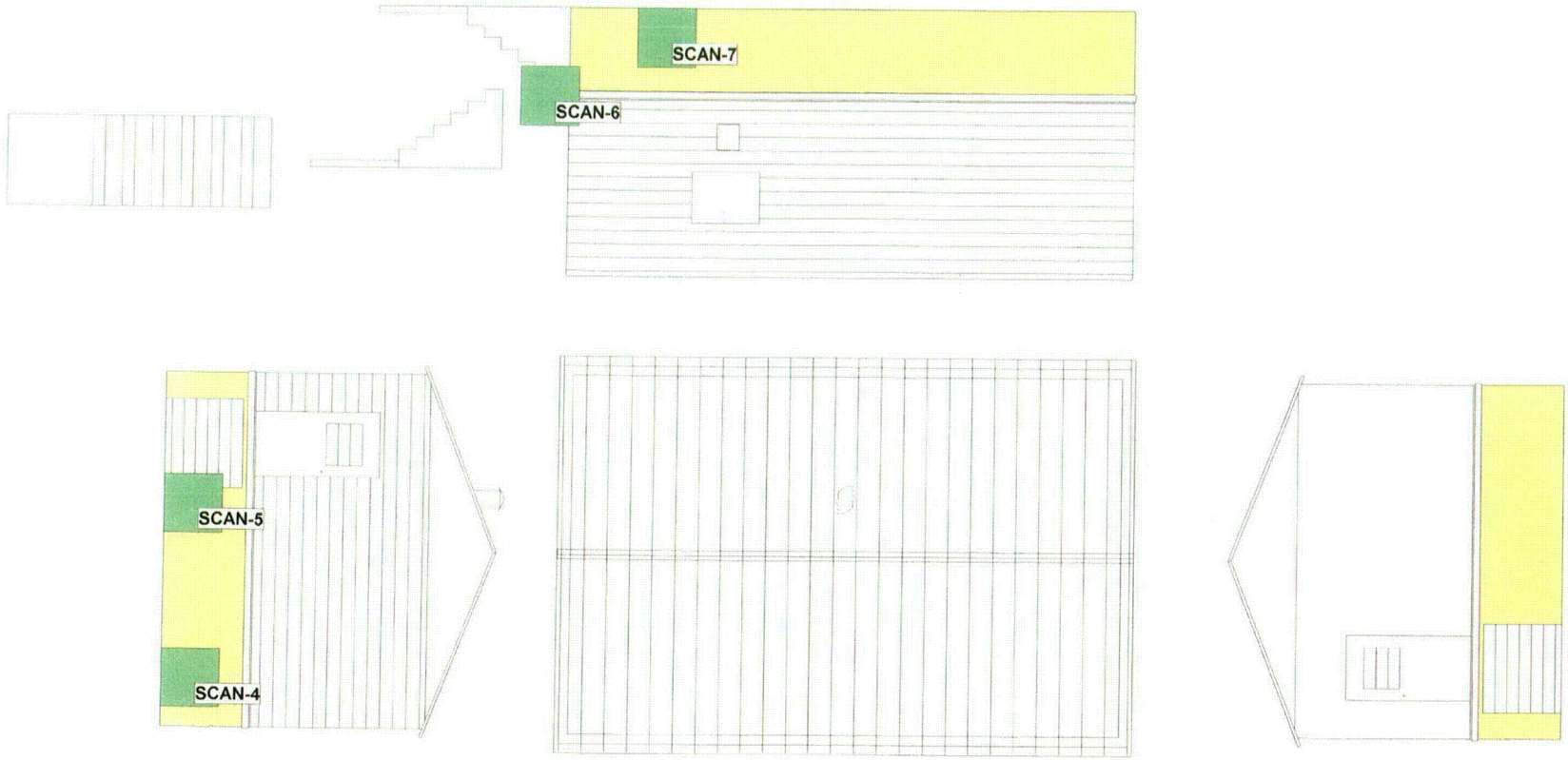
ATTACHMENT 5 . 7



Approximate Scan Locations - 15 by ~1 Square Meter Areas

ATTACHMENT 6 . 1

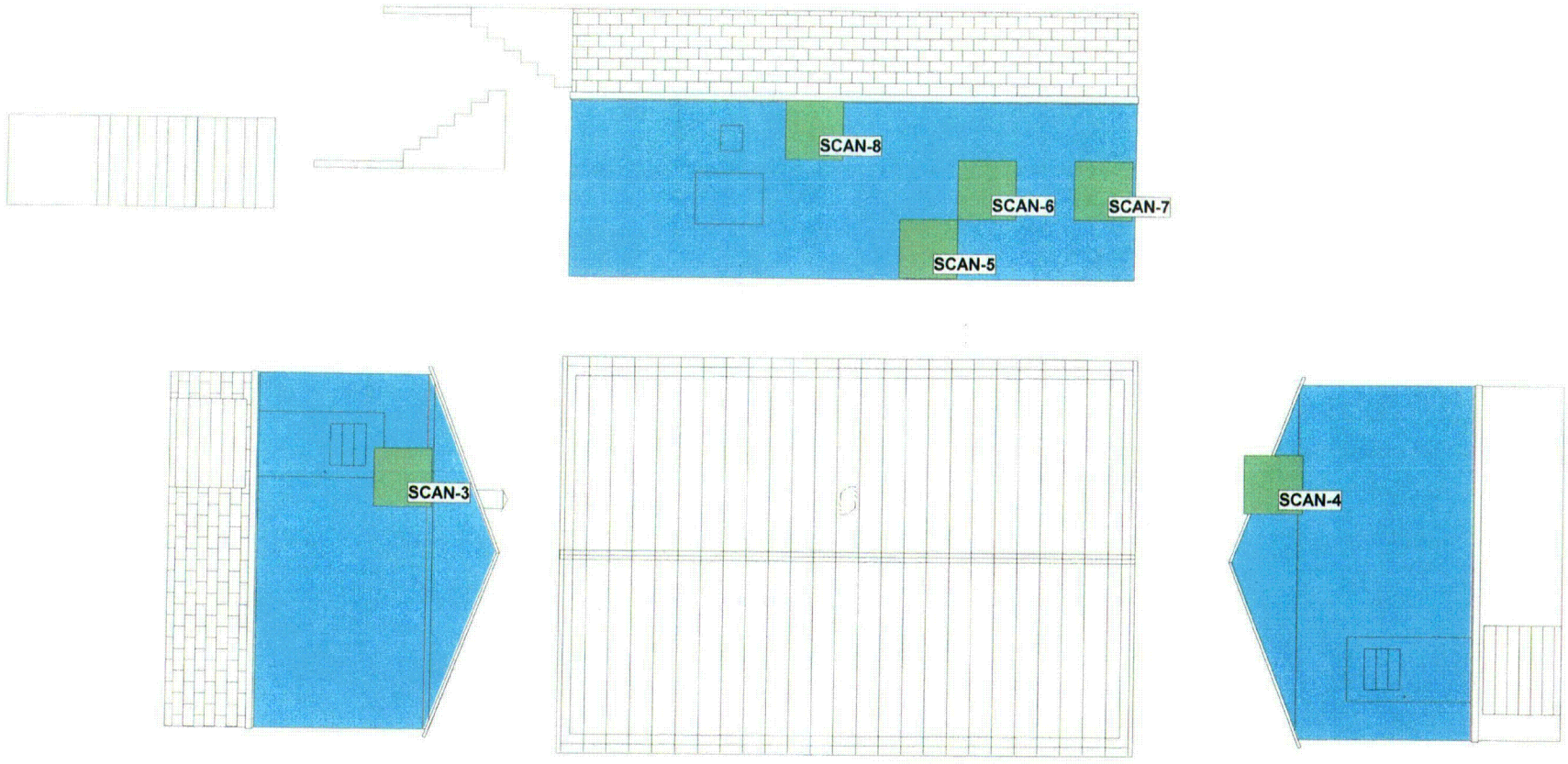
C04



Scan Locations for Concrete Block - SYCB ~1 Meter Square ea

ATTACHMENT 6 . 2

C05



SYCB - Aluminum Siding Scanning ~ 1 Square Meter Locations

ATTACHMENT 6 . 3

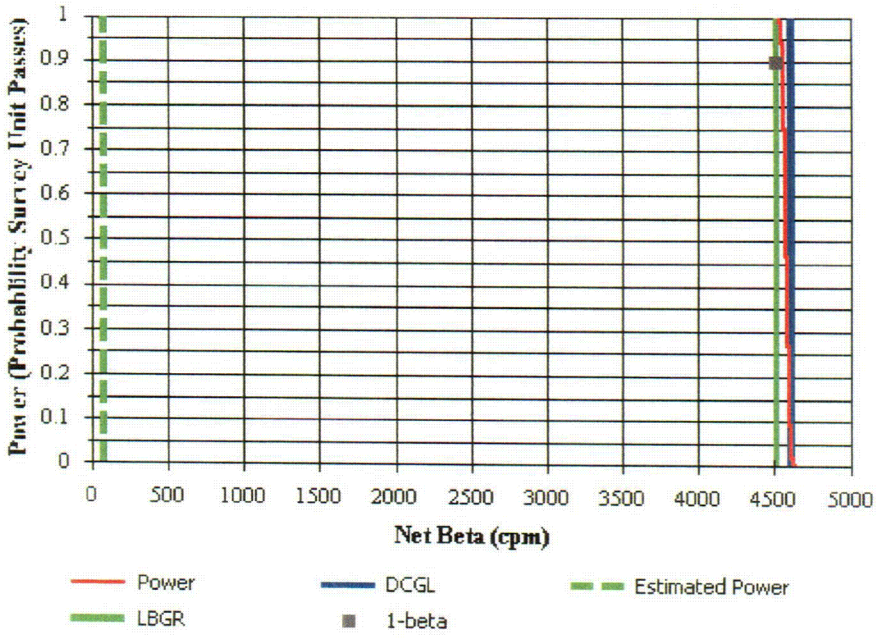
Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Painted Concrete PS1-1		
Comments:	Switch Yard Control Building		
Area (m²):	45	Classification:	3
Selected Test:	WRS	Estimated Sigma (cpm):	34.5
DCGL (cpm):	4,607	Sample Size (N/2):	8
LBGR (cpm):	4,510	Estimated Conc. (cpm):	74
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Δ/σ (2.8)

Prospective Power Curve



ATTACHMENT 7.2

C07

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.11
Gross Beta DCGLw (cpm): 4,607

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.24	0.1145

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 380 ± 29 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Concrete	31	306	34.5	609

ATTACHMENT 7.2

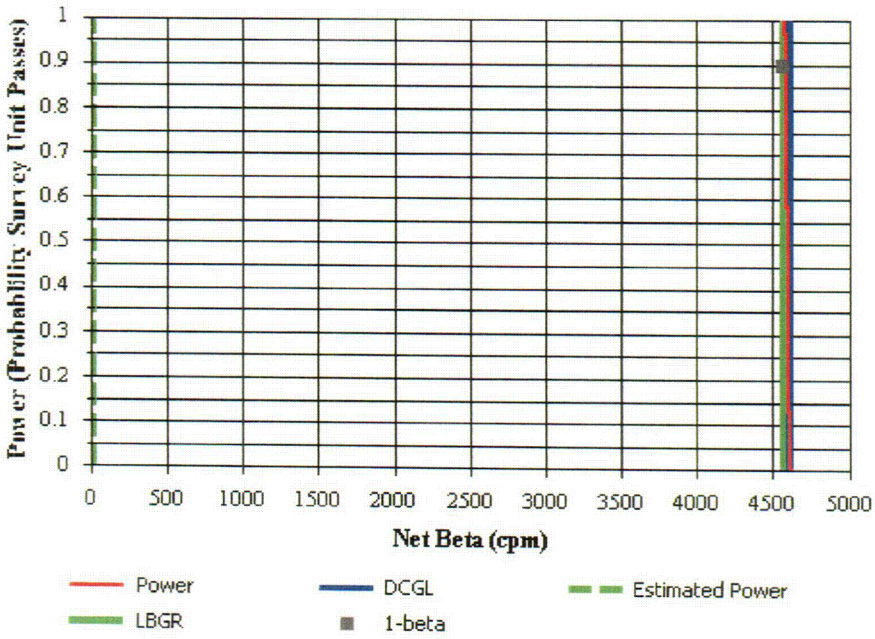
Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Painted Steel Surfaces PS1-2		
Comments:	Switch Yard Control Building		
Area (m²):	19	Classification:	3
Selected Test:	WRS	Estimated Sigma (cpm):	17.8
DCGL (cpm):	4,607	Sample Size (N/2):	9
LBGR (cpm):	4,560	Estimated Conc. (cpm):	21.6
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Δ/σ (2.2)

Prospective Power Curve



ATTACHMENT 7 - 3

C08

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.11
Gross Beta DCGLw (cpm): 4,607

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.24	0.1145

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 276 ± 12 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Steel	20	254.4	17.8	557

ATTACHMENT 7.4

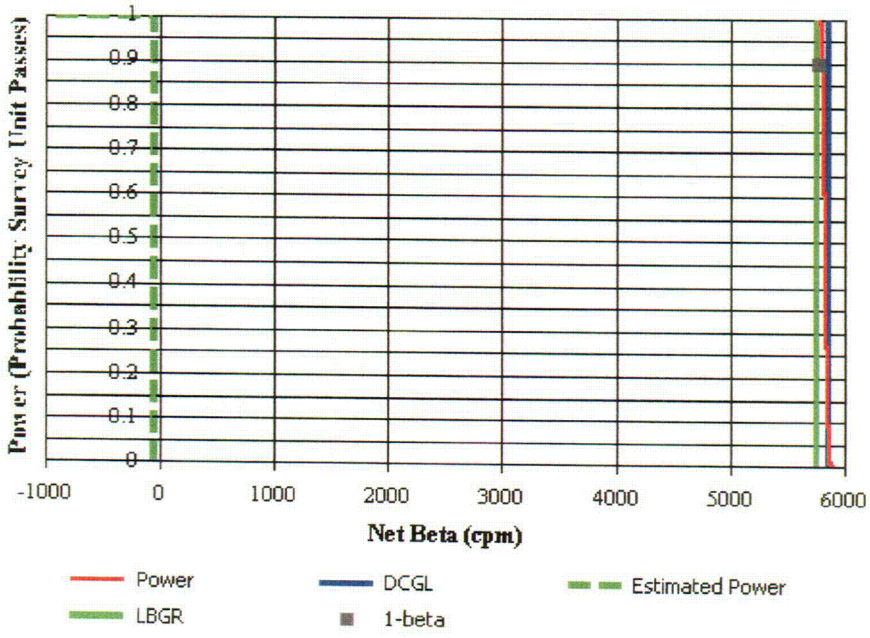
Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Aluminum Siding & Ceiling Materials PS1-3		
Comments:	Switch Yard Control Building		
Area (m²):	131	Classification:	3
Selected Test:	WRS	Estimated Sigma (cpm):	36.8
DCGL (cpm):	5,863	Sample Size (N/2):	8
LBGR (cpm):	5,760	Estimated Conc. (cpm):	-56.8
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Δ/σ (2.8)

Prospective Power Curve



ATTACHMENT 7.5

C09

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.14
Gross Beta DCGLw (cpm): 5,863

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.29	0.1379

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 238 ± 13 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Aluminum 2	16	294.8	36.8	470

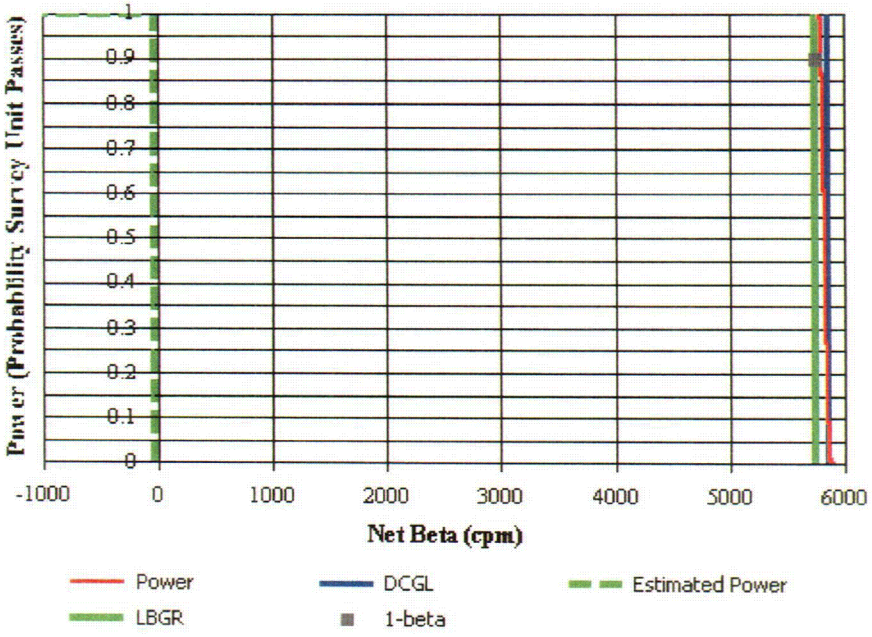
ATTACHMENT F-6

Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Concrete Block PS2-1		
Comments:	Switch yard Control Building		
Area (m²):	41	Classification:	3 A/0
Selected Test:	WRS	Estimated Sigma (cpm):	37.7 (2.99)
DCGL (cpm):	5,863	Sample Size (N/2):	8
LBGR (cpm):	5,750	Estimated Conc. (cpm):	-34.5
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Prospective Power Curve



ATTACHMENT 7.7

C10

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.14
Gross Beta DCGLw (cpm): 5,863

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.30	0.1432

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 306 ± 35 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Concrete Block	20	340.5	37.7	503

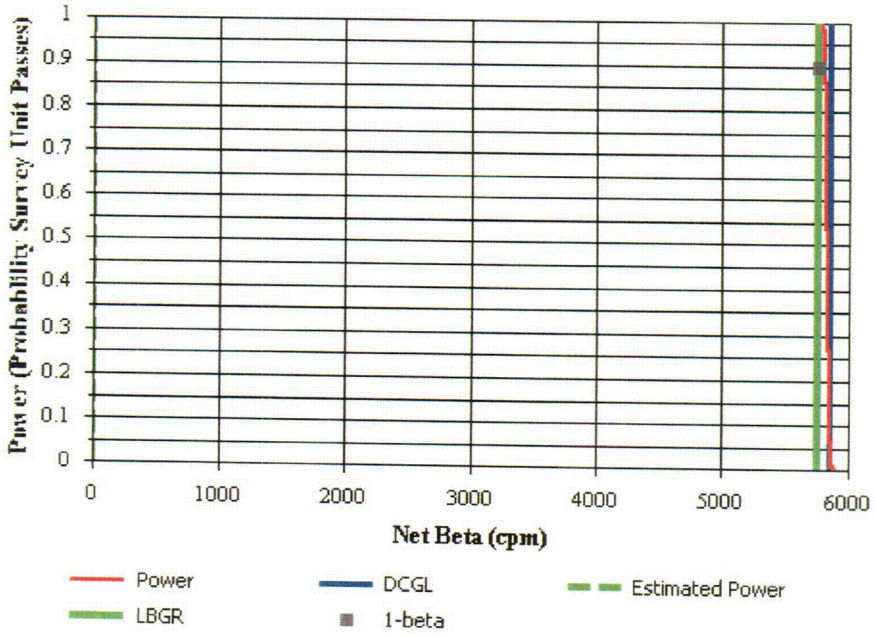
ATTACHMENT 7.8

Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Unpainted Concrete PS2-2		
Comments:	Switch Yard Control Building		
Area (m²):	24	Classification:	3 A/O
Selected Test:	WRS	Estimated Sigma (cpm):	34.5 (2.99)
DCGL (cpm):	5,863	Sample Size (N/2):	8
LBGR (cpm):	5,760	Estimated Conc. (cpm):	0
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Prospective Power Curve



ATTACHMENT 7.9

C11

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.14
Gross Beta DCGLw (cpm): 5,863

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.30	0.1432

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 306 ± 35 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Concrete	31	306	34.5	478

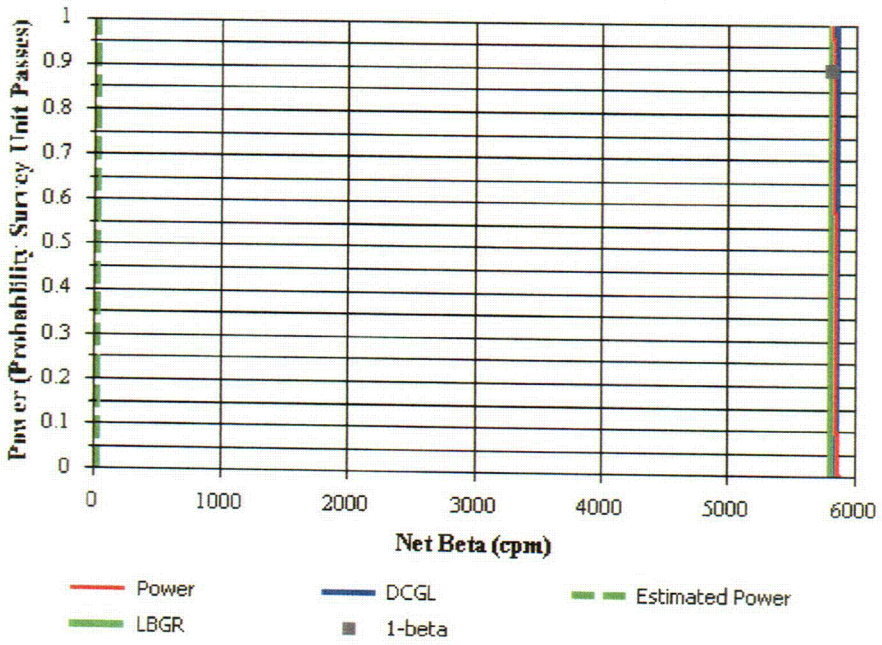
ATTACHMENT 7.10

Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Unpainted Steel PS2-3		
Comments:	Switch Yard Control Building		
Area (m²):	68	Classification:	3 Δ/σ
Selected Test:	WRS	Estimated Sigma (cpm):	20.3 (2.6)
DCGL (cpm):	5,863	Sample Size (N/2):	9
LBGR (cpm):	5,810	Estimated Conc. (cpm):	40.6
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Prospective Power Curve



ATTACHMENT 7.11

C12

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.14
Gross Beta DCGLw (cpm): 5,863

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.30	0.1432

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 295 ± 20 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Steel	20	254.4	17.8	437

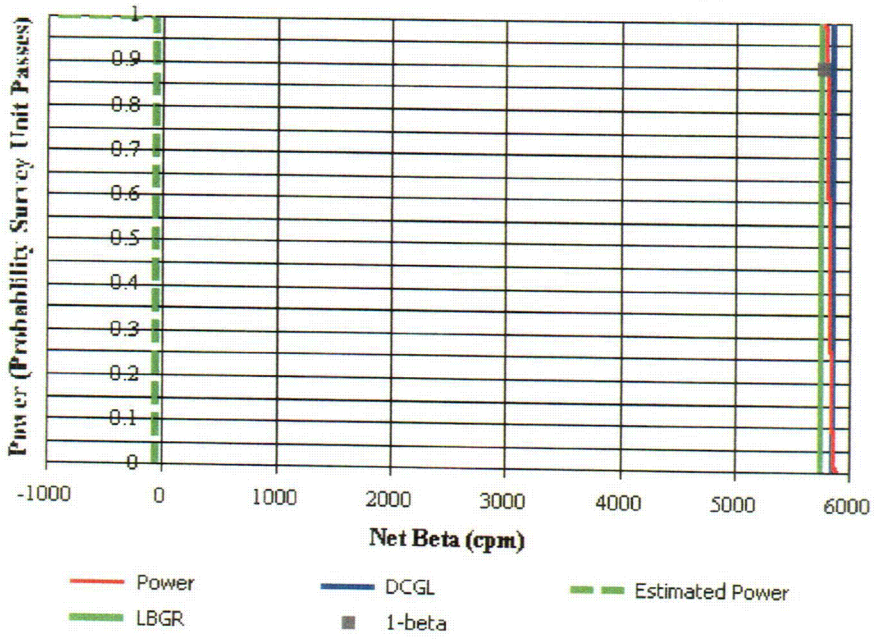
ATTACHMENT 7 . 12

Building Surface Survey Plan

Survey Plan Summary

Site:	PENELEC SY - Western Sector		
Planner(s):	BHB		
Survey Unit Name:	Aluminum Siding Exterior PS2-4		
Comments:	Switch Yard Control Building		
Area (m²):	63	Classification:	3 Δ/σ
Selected Test:	WRS	Estimated Sigma (cpm):	36.8 (2.8)
DCGL (cpm):	5,863	Sample Size (N/2):	8
LBGR (cpm):	5,760	Estimated Conc. (cpm):	-56.8
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.100		

Prospective Power Curve



ATTACHMENT 7.13

Building Surface Survey Plan

Contaminant Summary

Contaminant	DCGLw (dpm/100 cm²)
Gross Activity	33,238

Beta Instrumentation Summary

Gross Beta DCGLw (dpm/100 cm²): 33,238
Total Efficiency: 0.14
Gross Beta DCGLw (cpm): 5,863

ID	Type	Mode	Area (cm²)
31	GFPC	Beta	126

Contaminant	Energy[1]	Fraction[2]	Inst. Eff.	Surf. Eff.	Total Eff.
Gross Activity	187.87	1.0000	0.48	0.30	0.1432

[1] Average beta energy (keV) [N/A indicates alpha emission]
[2] Activity fraction

Gross Survey Unit Mean (cpm): 238 ± 13 (1-sigma)
Count Time (min): 1

Material	Number of BKG Counts	Average (cpm)	Standard Deviation (cpm)	MDC (dpm/100 cm²)
Aluminum 2	16	294.8	36.8	470

ATTACHMENT 7 . 13 4 GNB 3/17/05

Williamsburg Concrete Background Measurements

37122N21	Instrument 95348	RLM6220	Time	Detector	Counts	Count Time (sec)	Mode	Designator		FSS-001	BHB
0	BKGND	1/4/2002	8:52	1	7.26E+03	1800	SCL	Inital Background	β		
1	Source Check	1/4/2002	9:07	1	1.79E+05	60	SCL	Source	β		
2	BKGND	1/4/2002	10:05	2	4.40E+01	1800	SCL	Inital Background	α	Concrete CF(com) ⇒	0.00E+00
14	Source Check	1/4/2002	10:39	2	1.51E+05	60	SCL	Source	α	Shielded	Unshielded
15	CON A1S	1/4/2002	13:00	1	2.78E+02	60	SCL	Shielded	β	2.78E+02	
16	CON A1U	1/4/2002	13:02	1	3.88E+02	60	SCL	Unshielded	β		3.88E+02
17	CON A2S	1/4/2002	13:20	1	2.39E+02	60	SCL	Shielded	β	2.39E+02	
18	CON A2U	1/4/2002	13:21	1	2.22E+02	60	SCL	Unshielded	β		2.22E+02
19	CON A3S	1/4/2002	13:28	1	2.39E+02	60	SCL	Shielded	β	2.39E+02	
20	CON A3U	1/4/2002	13:30	1	2.62E+02	60	SCL	Unshielded	β		2.62E+02
21	CON A4S	1/4/2002	13:36	1	2.45E+02	60	SCL	Shielded	β	2.45E+02	
22	CON A4U	1/4/2002	13:38	1	2.71E+02	60	SCL	Unshielded	β		2.71E+02
23	CON A5S	1/4/2002	13:58	1	2.00E+02	60	SCL	Shielded	β	2.00E+02	
24	CON A5U	1/4/2002	14:00	1	2.82E+02	60	SCL	Unshielded	β		2.82E+02
25	CON A6S	1/4/2002	14:03	1	1.84E+02	60	SCL	Shielded	β	1.84E+02	
26	CON A6U	1/4/2002	14:05	1	3.10E+02	60	SCL	Unshielded	β		3.10E+02
27	CON A7S	1/4/2002	14:09	1	1.98E+02	60	SCL	Shielded	β	1.98E+02	
28	CON A7U	1/4/2002	14:10	1	3.15E+02	60	SCL	Unshielded	β		3.15E+02
29	CON A8S	1/4/2002	14:19	1	2.34E+02	60	SCL	Shielded	β	2.34E+02	
30	CON A8S	1/4/2002	14:22	1	2.31E+02	60	SCL	Shielded	β	2.31E+02	
31	CON A8U	1/4/2002	14:24	1	2.88E+02	60	SCL	Unshielded	β		2.88E+02
32	CON A9S	1/4/2002	14:31	1	2.65E+02	60	SCL	Shielded	β	2.65E+02	
33	CON A9U	1/4/2002	14:33	1	2.89E+02	60	SCL	Unshielded	β		2.89E+02
34	CON A10S	1/4/2002	14:42	1	2.46E+02	60	SCL	Shielded	β	2.46E+02	
35	CON A10U	1/4/2002	14:43	1	3.16E+02	60	SCL	Unshielded	β		3.16E+02
36	CON A11S	1/4/2002	15:10	1	1.95E+02	60	SCL	Shielded	β	1.95E+02	
37	CON A11U	1/4/2002	15:12	1	2.94E+02	60	SCL	Unshielded	β		2.94E+02
38	CON A12S	1/4/2002	15:13	1	2.21E+02	60	SCL	Shielded	β	2.21E+02	
39	CON A12U	1/4/2002	15:14	1	2.84E+02	60	SCL	Unshielded	β		2.84E+02
40	CON A13S	1/4/2002	15:23	1	1.74E+02	60	SCL	Shielded	β	1.74E+02	
41	CON A13U	1/4/2002	15:24	1	2.94E+02	60	SCL	Unshielded	β		2.94E+02
42	CON A14S	1/4/2002	15:25	1	1.96E+02	60	SCL	Shielded	β	1.96E+02	
43	CON A14U	1/4/2002	15:26	1	3.33E+02	60	SCL	Unshielded	β		3.33E+02
44	CON A15S	1/4/2002	15:28	1	2.16E+02	60	SCL	Shielded	β	2.16E+02	
45	CON A15U	1/4/2002	15:29	1	3.45E+02	60	SCL	Unshielded	β		3.45E+02
46	CON A16S	1/4/2002	15:30	1	1.83E+02	60	SCL	Shielded	β	1.83E+02	
47	CON A16U	1/4/2002	15:31	1	3.13E+02	60	SCL	Unshielded	β		3.13E+02
48	CON A17S	1/4/2002	15:33	1	1.82E+02	60	SCL	Shielded	β	1.82E+02	
49	CON A17U	1/4/2002	15:34	1	3.22E+02	60	SCL	Unshielded	β		3.22E+02
50	CON A18S	1/4/2002	15:35	1	1.84E+02	60	SCL	Shielded	β	1.84E+02	
51	CON A18U	1/4/2002	15:36	1	3.24E+02	60	SCL	Unshielded	β		3.24E+02
52	CON A19S	1/4/2002	15:37	1	1.91E+02	60	SCL	Shielded	β	1.91E+02	
53	CON A19U	1/4/2002	15:39	1	3.07E+02	60	SCL	Unshielded	β		3.07E+02
54	CON A20S	1/4/2002	15:40	1	1.94E+02	60	SCL	Shielded	β	1.94E+02	
55	CON A20U	1/4/2002	15:41	1	3.33E+02	60	SCL	Unshielded	β		3.33E+02
56	CON A21S	1/4/2002	15:57	1	2.23E+02	60	SCL	Shielded	β	2.23E+02	
57	CON A21U	1/4/2002	15:58	1	2.92E+02	60	SCL	Unshielded	β		2.92E+02
58	CON A22S	1/4/2002	15:59	1	1.72E+02	60	SCL	Shielded	β	1.72E+02	
59	CON A22U	1/4/2002	16:00	1	2.80E+02	60	SCL	Unshielded	β		2.80E+02
60	CON A23S	1/4/2002	16:01	1	1.94E+02	60	SCL	Shielded	β	1.94E+02	
61	CON A23U	1/4/2002	16:02	1	3.29E+02	60	SCL	Unshielded	β		3.29E+02
62	CON A24S	1/4/2002	16:04	1	1.87E+02	60	SCL	Shielded	β	1.87E+02	
63	CON A24U	1/4/2002	16:05	1	3.48E+02	60	SCL	Unshielded	β		3.48E+02
64	CON A25S	1/4/2002	16:06	1	2.07E+02	60	SCL	Shielded	β	2.07E+02	
65	CON A25U	1/4/2002	16:07	1	3.72E+02	60	SCL	Unshielded	β		3.72E+02
66	CON A26S	1/4/2002	16:09	1	2.09E+02	60	SCL	Shielded	β	2.09E+02	
67	CON A26U	1/4/2002	16:10	1	3.26E+02	60	SCL	Unshielded	β		3.26E+02
68	CON A27S	1/4/2002	16:11	1	2.07E+02	60	SCL	Shielded	β	2.07E+02	
69	CON A27U	1/4/2002	16:12	1	3.30E+02	60	SCL	Unshielded	β		3.30E+02
70	CON A28S	1/4/2002	16:14	1	2.30E+02	60	SCL	Shielded	β	2.30E+02	
71	CON A28U	1/4/2002	16:15	1	3.06E+02	60	SCL	Unshielded	β		3.06E+02
72	CON A29S	1/4/2002	16:20	1	2.13E+02	60	SCL	Shielded	β	2.13E+02	
73	CON A29U	1/4/2002	16:21	1	2.58E+02	60	SCL	Unshielded	β		2.58E+02
74	CON A30S	1/4/2002	16:24	1	2.33E+02	60	SCL	Shielded	β	2.33E+02	
75	CON A30U	1/4/2002	16:25	1	2.89E+02	60	SCL	Unshielded	β		2.89E+02
76	CON A31S	1/4/2002	16:28	1	1.84E+02	60	SCL	Shielded	β	1.84E+02	
77	CON A31U	1/4/2002	16:29	1	2.63E+02	60	SCL	Unshielded	β		2.63E+02
—	Source Check	1/4/2002	17:27	1	1.70E+05	60	SCL	—	β		
										Minimum ⇒	1.72E+02	2.22E+02
										Maximum ⇒	2.78E+02	3.88E+02
										Mean ⇒	2.11E+02	3.06E+02
										Sigma ⇒	2.69E+01	3.45E+01

ATTACHMENT 8.1

PENELEC LINE SHACK - BACKGROUND STEEL SIDING

LS6 126188 DH5959

No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		SR-138 Shielded	BHB Unshielded
86	SIDE FP1S	6/15/2004	12:57	1	232	60	SCL	Shielded	β		291
87	SIDE FP1U	6/15/2004	13:00	1	291	60	SCL	Unshielded	β	232	
88	SIDE FP2S	6/15/2004	13:01	1	228	60	SCL	Shielded	β		260
89	SIDE FP2U	6/15/2004	13:03	1	260	60	SCL	Unshielded	β	228	
90	SIDE FP3S	6/15/2004	13:05	1	248	60	SCL	Shielded	β		291
91	SIDE FP3U	6/15/2004	13:07	1	291	60	SCL	Unshielded	β	248	
92	SIDE FP1S	6/15/2004	13:08	1	213	60	SCL	Shielded	β		234
93	SIDE FP4U	6/15/2004	13:10	1	234	60	SCL	Unshielded	β	213	
94	SIDE FP5S	6/15/2004	13:11	1	245	60	SCL	Shielded	β		246
95	SIDE FP5U	6/15/2004	13:13	1	246	60	SCL	Unshielded	β	245	
96	SIDE FP6S	6/15/2004	13:15	1	243	60	SCL	Shielded	β		220
97	SIDE FP6U	6/15/2004	13:16	1	220	60	SCL	Unshielded	β	243	
98	SIDE FP7S	6/15/2004	13:19	1	239	60	SCL	Shielded	β		240
99	SIDE FP7U	6/15/2004	13:20	1	240	60	SCL	Unshielded	β	239	
100	SIDE FP8S	6/15/2004	13:22	1	190	60	SCL	Shielded	β		237
101	SIDE FP8U	6/15/2004	13:24	1	237	60	SCL	Unshielded	β	190	
102	SIDE FP9S	6/15/2004	13:25	1	239	60	SCL	Shielded	β		259
103	SIDE FP9U	6/15/2004	13:26	1	259	60	SCL	Unshielded	β	239	
104	SIDE FP10S	6/15/2004	13:28	1	278	60	SCL	Shielded	β		249
105	SIDE FP10U	6/15/2004	13:30	1	249	60	SCL	Unshielded	β	278	
106	SIDE FP11S	6/15/2004	13:32	1	185	60	SCL	Shielded	β		282
107	SIDE FP11U	6/15/2004	13:34	1	282	60	SCL	Unshielded	β	185	
108	SIDE FP12S	6/15/2004	13:35	1	236	60	SCL	Shielded	β		252
109	SIDE FP12U	6/15/2004	13:43	1	252	60	SCL	Unshielded	β	236	
110	SIDE FP13S	6/15/2004	13:44	1	245	60	SCL	Shielded	β		247
111	SIDE FP13U	6/15/2004	13:46	1	247	60	SCL	Unshielded	β	245	
112	SIDE FP14S	6/15/2004	13:47	1	211	60	SCL	Shielded	β		255
113	SIDE FP14U	6/15/2004	13:48	1	255	60	SCL	Unshielded	β	211	
114	SIDE FP15S	6/15/2004	13:49	1	223	60	SCL	Shielded	β		247
115	SIDE FP15U	6/15/2004	13:51	1	247	60	SCL	Unshielded	β	223	
116	SIDE FP16S	6/15/2004	13:52	1	258	60	SCL	Shielded	β		252
117	SIDE FP16U	6/15/2004	13:54	1	252	60	SCL	Unshielded	β	258	
118	SIDE FP17S	6/15/2004	13:55	1	259	60	SCL	Shielded	β		260
119	SIDE FP17U	6/15/2004	13:57	1	260	60	SCL	Unshielded	β	259	
120	SIDE FP18S	6/15/2004	13:58	1	262	60	SCL	Shielded	β		260
121	SIDE FP18U	6/15/2004	14:00	1	260	60	SCL	Unshielded	β	262	
122	SIDE FP19S	6/15/2004	14:01	1	235	60	SCL	Shielded	β		246
123	SIDE FP19U	6/15/2004	14:02	1	246	60	SCL	Unshielded	β	235	
124	SIDE FP20S	6/15/2004	14:04	1	201	60	SCL	Shielded	β		261
125	SIDE FP20U	6/15/2004	14:05	1	261	60	SCL	Unshielded	β	201	

	SR-138 Shielded	BHB Unshielded
Minimum ⇒	1.85E+02	2.20E+02
Maximum ⇒	2.78E+02	2.91E+02
Median ⇒	2.38E+02	2.52E+02
Mean ⇒	2.34E+02	2.54E+02
Sigma ⇒	2.41E+01	1.78E+01

ATTACHMENT 8.2

BACKGROUNDS FOR ALUMINUM SIDING

	126218	RS9041				37122N21		095080		FSS-1316	BHB
No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		Shielded	Unshielded
2	NWALL FP1S	2/22/05	13:49	1	241	60	SCL	Shielded	β		267
3	NWALL FP1U	2/22/05	13:50	1	267	60	SCL	Unshielded	β	241	
4	NWALL FP2S	2/22/05	13:52	1	244	60	SCL	Shielded	β		235
5	NWALL FP2U	2/22/05	13:54	1	235	60	SCL	Unshielded	β	244	
6	NWALL FP3S	2/22/05	13:56	1	262	60	SCL	Shielded	β		263
7	NWALL FP3U	2/22/05	13:57	1	263	60	SCL	Unshielded	β	262	
8	EWALL FP4S	2/22/05	13:59	1	276	60	SCL	Shielded	β		271
9	EWALL FP4U	2/22/05	14:01	1	271	60	SCL	Unshielded	β	276	
10	EWALL FP5S	2/22/05	14:02	1	265	60	SCL	Shielded	β		290
11	EWALL FP5U	2/22/05	14:03	1	290	60	SCL	Unshielded	β	265	
12	EWALL FP6S	2/22/05	14:05	1	275	60	SCL	Shielded	β		317
13	EWALL FP6U	2/22/05	14:06	1	317	60	SCL	Unshielded	β	275	
14	EWALL FP7S	2/22/05	14:08	1	286	60	SCL	Shielded	β		296
15	EWALL FP7U	2/22/05	14:09	1	296	60	SCL	Unshielded	β	286	
16	EWALL FP8S	2/22/05	14:10	1	263	60	SCL	Shielded	β		257
17	EWALL FP8U	2/22/05	14:12	1	257	60	SCL	Unshielded	β	263	
18	EWALL FP9S	2/22/05	14:13	1	266	60	SCL	Shielded	β		271
19	EWALL FP9U	2/22/05	14:14	1	271	60	SCL	Unshielded	β	266	
28	SWALL FP14S	2/22/05	14:29	1	282	60	SCL	Shielded	β		282
29	SWALL FP14U	2/22/05	14:30	1	282	60	SCL	Unshielded	β	282	
30	SWALL FP15S	2/22/05	14:31	1	281	60	SCL	Shielded	β		320
31	SWALL FP15U	2/22/05	14:33	1	320	60	SCL	Unshielded	β	281	
32	SWALL FP16S	2/22/05	14:34	1	326	60	SCL	Shielded	β		304
33	SWALL FP16U	2/22/05	14:35	1	304	60	SCL	Unshielded	β	326	
34	WWALL FP17S	2/22/05	14:37	1	340	60	SCL	Shielded	β		325
35	WWALL FP17U	2/22/05	14:38	1	325	60	SCL	Unshielded	β	340	
36	WWALL FP18S	2/22/05	14:40	1	349	60	SCL	Shielded	β		325
37	WWALL FP18U	2/22/05	14:41	1	325	60	SCL	Unshielded	β	349	
38	WWALL FP19S	2/22/05	14:42	1	319	60	SCL	Shielded	β		304
39	WWALL FP19U	2/22/05	14:43	1	304	60	SCL	Unshielded	β	319	
40	WWALL FP20S	2/22/05	14:45	1	307	60	SCL	Shielded	β		390
41	WWALL FP20U	2/22/05	14:46	1	390	60	SCL	Unshielded	β	307	

Minimum ⇒	2.41E+02	2.35E+02
Maximum ⇒	3.49E+02	3.90E+02
Median ⇒	2.79E+02	2.93E+02
Mean ⇒	2.86E+02	2.95E+02
Sigma ⇒	3.27E+01	3.68E+01

BACKGROUNDS FOR CONCRETE BLOCK

LS6	126188 DH5959									SR-138	BHB
No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		Shielded	Unshielded
2	CONC FP1S	6/15/2004	8:40	1	244	60	SCL	Shielded	β		272
3	CONC FP1U	6/15/2004	8:42	1	272	60	SCL	Unshielded	β	244	
4	CONC FP2S	6/15/2004	8:44	1	207	60	SCL	Shielded	β		319
5	CONC FP2U	6/15/2004	8:45	1	319	60	SCL	Unshielded	β	207	
6	CONC FP3S	6/15/2004	8:58	1	281	60	SCL	Shielded	β		337
7	CONC FP3U	6/15/2004	9:00	1	337	60	SCL	Unshielded	β	281	
8	CONC FP4S	6/15/2004	9:01	1	264	60	SCL	Shielded	β		314
9	CONC FP4U	6/15/2004	9:03	1	314	60	SCL	Unshielded	β	264	
10	CONC FP5S	6/15/2004	9:04	1	267	60	SCL	Shielded	β		348
11	CONC FP5U	6/15/2004	9:06	1	348	60	SCL	Unshielded	β	267	
12	CONC FP6S	6/15/2004	9:09	1	224	60	SCL	Shielded	β		366
13	CONC FP6U	6/15/2004	9:10	1	366	60	SCL	Unshielded	β	224	
14	CONC FP7S	6/15/2004	9:12	1	268	60	SCL	Shielded	β		388
15	CONC FP7U	6/15/2004	9:13	1	388	60	SCL	Unshielded	β	268	
16	CONC FP8S	6/15/2004	9:15	1	252	60	SCL	Shielded	β		248
17	CONC FP8U	6/15/2004	9:16	1	248	60	SCL	Unshielded	β	252	
18	CONC FP9S	6/15/2004	9:18	1	266	60	SCL	Shielded	β		337
19	CONC FP9U	6/15/2004	9:20	1	337	60	SCL	Unshielded	β	266	
20	CONC FP10S	6/15/2004	9:21	1	258	60	SCL	Shielded	β		347
21	CONC FP10U	6/15/2004	9:22	1	347	60	SCL	Unshielded	β	258	
22	CONC FP11S	6/15/2004	9:24	1	256	60	SCL	Shielded	β		328
23	CONC FP11U	6/15/2004	9:25	1	328	60	SCL	Unshielded	β	256	
24	CONC FP12S	6/15/2004	10:15	1	270	60	SCL	Shielded	β		381
25	CONC FP12U	6/15/2004	10:16	1	381	60	SCL	Unshielded	β	270	
26	CONC FP13S	6/15/2004	10:17	1	232	60	SCL	Shielded	β		363
27	CONC FP13U	6/15/2004	10:18	1	363	60	SCL	Unshielded	β	232	
28	CONC FP14S	6/15/2004	10:20	1	279	60	SCL	Shielded	β		368
29	CONC FP14U	6/15/2004	10:21	1	368	60	SCL	Unshielded	β	279	
30	CONC FP15S	6/15/2004	10:22	1	270	60	SCL	Shielded	β		334
31	CONC FP15U	6/15/2004	10:24	1	334	60	SCL	Unshielded	β	270	
32	CONC FP16S	6/15/2004	10:25	1	293	60	SCL	Shielded	β		371
33	CONC FP16U	6/15/2004	10:26	1	371	60	SCL	Unshielded	β	293	
34	CONC FP17S	6/15/2004	10:29	1	240	60	SCL	Shielded	β		344
35	CONC FP17U	6/15/2004	10:30	1	344	60	SCL	Unshielded	β	240	
36	CONC FP18S	6/15/2004	10:31	1	267	60	SCL	Shielded	β		355
37	CONC FP18U	6/15/2004	10:33	1	355	60	SCL	Unshielded	β	267	
38	CONC FP19S	6/15/2004	10:34	1	224	60	SCL	Shielded	β		294
39	CONC FP19U	6/15/2004	10:35	1	294	60	SCL	Unshielded	β	224	
40	CONC FP20S	6/15/2004	10:36	1	333	60	SCL	Shielded	β		396
41	CONC FP20U	6/15/2004	10:38	1	396	60	SCL	Unshielded	β	333	

Minimum ⇒	2.07E+02	2.48E+02
Maximum ⇒	3.33E+02	3.96E+02
Median ⇒	2.65E+02	3.46E+02
Mean ⇒	2.60E+02	3.41E+02
Sigma ⇒	2.77E+01	3.77E+01

ATTACHMENT 8 - 4

SY CONTROL BUILDING PAINTED CONCRETE FLOOR

BB	126188	99186								FSS-1060	BHB
No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		Shielded	Unshielded
10	CF FP 5S	11/17/2004	12:44	1	286	60	SCL	Shielded	β		373
11	CF FP 5U	11/17/2004	12:46	1	373	60	SCL	Unshielded	β	286	
12	CF FP 6S	11/17/2004	12:48	1	317	60	SCL	Shielded	β		422
13	CF FP 6U	11/17/2004	12:50	1	422	60	SCL	Unshielded	β	317	
14	CF FP 7S	11/17/2004	12:52	1	309	60	SCL	Shielded	β		358
15	CF FP 7U	11/17/2004	12:53	1	358	60	SCL	Unshielded	β	309	
16	CF FP 8S	11/17/2004	12:55	1	282	60	SCL	Shielded	β		368
17	CF FP 8U	11/17/2004	12:57	1	368	60	SCL	Unshielded	β	282	

Minimum ⇒	2.82E+02	3.58E+02
Maximum ⇒	3.17E+02	4.22E+02
Median ⇒	2.98E+02	3.71E+02
Mean ⇒	2.99E+02	3.80E+02
Sigma ⇒	1.71E+01	2.85E+01

ATTACHMENT 9 . 1

SY CONTROL BUILDING PAINTED STEEL GRATING

BB	126188	99186								FSS-1060	BHB
No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		Shielded	Unshielded
2	ST GR FP 1S	11/17/2004	12:29	1	243	60	SCL	Shielded	β		287
3	ST GR FP 1U	11/17/2004	12:30	1	287	60	SCL	Unshielded	β	243	
4	ST GR FP 2S	11/17/2004	12:32	1	258	60	SCL	Shielded	β		264
5	ST GR FP 2U	11/17/2004	12:34	1	264	60	SCL	Unshielded	β	258	
6	ST GR FP 3S	11/17/2004	12:36	1	251	60	SCL	Shielded	β		286
7	ST GR FP 3U	11/17/2004	12:38	1	286	60	SCL	Unshielded	β	251	
8	ST GR FP 4S	11/17/2004	12:40	1	273	60	SCL	Shielded	β		267
9	ST GR FP 4U	11/17/2004	12:41	1	267	60	SCL	Unshielded	β	273	

Minimum ⇒	2.43E+02	2.64E+02
Maximum ⇒	2.73E+02	2.87E+02
Median ⇒	2.55E+02	2.77E+02
Mean ⇒	2.56E+02	2.76E+02
Sigma ⇒	1.27E+01	1.22E+01

ATTACHMENT 9.2

SY CONTROL BUILDING INTERIOR ALUMINUM

BB	126188	99186								FSS-1060	BHB
No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		Shielded	Unshielded
18	NWALL FP 9S	11/17/2004	12:59	1	233	60	SCL	Shielded	β		243
19	NWALL FP 9U	11/17/2004	13:03	1	243	60	SCL	Unshielded	β	233	
20	NWALL FP 10S	11/17/2004	13:05	1	228	60	SCL	Shielded	β		220
21	NWALL FP 10U	11/17/2004	13:07	1	220	60	SCL	Unshielded	β	228	
22	NWALL FP 11S	11/17/2004	13:09	1	243	60	SCL	Shielded	β		250
23	NWALL FP 11U	11/17/2004	13:11	1	250	60	SCL	Unshielded	β	243	
24	NWALL FP 12S	11/17/2004	13:13	1	218	60	SCL	Shielded	β		240
25	NWALL FP 12U	11/17/2004	13:15	1	240	60	SCL	Unshielded	β	218	

Minimum ⇒	2.18E+02	2.20E+02
Maximum ⇒	2.43E+02	2.50E+02
Median ⇒	2.31E+02	2.42E+02
Mean ⇒	2.31E+02	2.38E+02
Sigma ⇒	1.04E+01	1.29E+01

ATTACHMENT 9.3

PENELEC GFPC Switch Yard Concrete Measurements

37122N21	Instrument 95348	RLM6220	Time	Detector	Counts	Count Time (sec)	Mode	Designator		FSS-1131	BHB
0	BKGND	1/4/2002	8:52	1	7.26E+03	1800	SCL	Inital Background	β		
1	Source Check	1/4/2002	9:07	1	1.79E+05	60	SCL	Source	β		
2	BKGND	1/4/2002	10.05	2	4.40E+01	1800	SCL	Inital Background	α	Concrete CF(cpm) ⇒	0.00E+00
										Shielded	Unshielded
15	CON A1S	1/4/2002	13:00	1	2.78E+02	60	SCL	Shielded	β	2.78E+02	
16	CON A1U	1/4/2002	13:02	1	3.88E+02	60	SCL	Unshielded	β		3.88E+02
17	CON A2S	1/4/2002	13:20	1	2.39E+02	60	SCL	Shielded	β	2.39E+02	
18	CON A2U	1/4/2002	13:21	1	2.22E+02	60	SCL	Unshielded	β		2.22E+02
19	CON A3S	1/4/2002	13:28	1	2.39E+02	60	SCL	Shielded	β	2.39E+02	
20	CON A3U	1/4/2002	13:30	1	2.62E+02	60	SCL	Unshielded	β		2.62E+02
21	CON A4S	1/4/2002	13:36	1	2.45E+02	60	SCL	Shielded	β	2.45E+02	
22	CON A4U	1/4/2002	13:38	1	2.71E+02	60	SCL	Unshielded	β		2.71E+02
23	CON A5S	1/4/2002	13:58	1	2.00E+02	60	SCL	Shielded	β	2.00E+02	
24	CON A5U	1/4/2002	14:00	1	2.82E+02	60	SCL	Unshielded	β		2.82E+02
25	CON A6S	1/4/2002	14:03	1	1.84E+02	60	SCL	Shielded	β	1.84E+02	
26	CON A6U	1/4/2002	14:05	1	3.10E+02	60	SCL	Unshielded	β		3.10E+02
27	CON A7S	1/4/2002	14:09	1	1.98E+02	60	SCL	Shielded	β	1.98E+02	
28	CON A7U	1/4/2002	14:10	1	3.15E+02	60	SCL	Unshielded	β		3.15E+02
29	CON A8S	1/4/2002	14:19	1	2.34E+02	60	SCL	Shielded	β	2.34E+02	
30	CON A8S	1/4/2002	14:22	1	2.31E+02	60	SCL	Shielded	β	2.31E+02	
31	CON A8U	1/4/2002	14:24	1	2.88E+02	60	SCL	Unshielded	β		2.88E+02
32	CON A9S	1/4/2002	14:31	1	2.65E+02	60	SCL	Shielded	β	2.65E+02	
33	CON A9U	1/4/2002	14:33	1	2.89E+02	60	SCL	Unshielded	β		2.89E+02
34	CON A10S	1/4/2002	14:42	1	2.46E+02	60	SCL	Shielded	β	2.46E+02	
35	CON A10U	1/4/2002	14:43	1	3.16E+02	60	SCL	Unshielded	β		3.16E+02
36	CON A11S	1/4/2002	15:10	1	1.95E+02	60	SCL	Shielded	β	1.95E+02	
37	CON A11U	1/4/2002	15:12	1	2.94E+02	60	SCL	Unshielded	β		2.94E+02
38	CON A12S	1/4/2002	15:13	1	2.21E+02	60	SCL	Shielded	β	2.21E+02	
39	CON A12U	1/4/2002	15:14	1	2.84E+02	60	SCL	Unshielded	β		2.84E+02
40	CON A13S	1/4/2002	15:23	1	1.74E+02	60	SCL	Shielded	β	1.74E+02	
41	CON A13U	1/4/2002	15:24	1	2.94E+02	60	SCL	Unshielded	β		2.94E+02
42	CON A14S	1/4/2002	15:25	1	1.96E+02	60	SCL	Shielded	β	1.96E+02	
43	CON A14U	1/4/2002	15:26	1	3.33E+02	60	SCL	Unshielded	β		3.33E+02
44	CON A15S	1/4/2002	15:28	1	2.16E+02	60	SCL	Shielded	β	2.16E+02	
45	CON A15U	1/4/2002	15:29	1	3.45E+02	60	SCL	Unshielded	β		3.45E+02
46	CON A16S	1/4/2002	15:30	1	1.83E+02	60	SCL	Shielded	β	1.83E+02	
47	CON A16U	1/4/2002	15:31	1	3.13E+02	60	SCL	Unshielded	β		3.13E+02
48	CON A17S	1/4/2002	15:33	1	1.82E+02	60	SCL	Shielded	β	1.82E+02	
49	CON A17U	1/4/2002	15:34	1	3.22E+02	60	SCL	Unshielded	β		3.22E+02
50	CON A18S	1/4/2002	15:35	1	1.84E+02	60	SCL	Shielded	β	1.84E+02	
51	CON A18U	1/4/2002	15:36	1	3.24E+02	60	SCL	Unshielded	β		3.24E+02
52	CON A19S	1/4/2002	15:37	1	1.91E+02	60	SCL	Shielded	β	1.91E+02	
53	CON A19U	1/4/2002	15:39	1	3.07E+02	60	SCL	Unshielded	β		3.07E+02
54	CON A20S	1/4/2002	15:40	1	1.94E+02	60	SCL	Shielded	β	1.94E+02	
55	CON A20U	1/4/2002	15:41	1	3.33E+02	60	SCL	Unshielded	β		3.33E+02
56	CON A21S	1/4/2002	15:57	1	2.23E+02	60	SCL	Shielded	β	2.23E+02	
57	CON A21U	1/4/2002	15:58	1	2.92E+02	60	SCL	Unshielded	β		2.92E+02
58	CON A22S	1/4/2002	15:59	1	1.72E+02	60	SCL	Shielded	β	1.72E+02	
59	CON A22U	1/4/2002	16:00	1	2.80E+02	60	SCL	Unshielded	β		2.80E+02
60	CON A23S	1/4/2002	16:01	1	1.94E+02	60	SCL	Shielded	β	1.94E+02	
61	CON A23U	1/4/2002	16:02	1	3.29E+02	60	SCL	Unshielded	β		3.29E+02
62	CON A24S	1/4/2002	16:04	1	1.87E+02	60	SCL	Shielded	β	1.87E+02	
63	CON A24U	1/4/2002	16:05	1	3.48E+02	60	SCL	Unshielded	β		3.48E+02
64	CON A25S	1/4/2002	16:06	1	2.07E+02	60	SCL	Shielded	β	2.07E+02	
65	CON A25U	1/4/2002	16:07	1	3.72E+02	60	SCL	Unshielded	β		3.72E+02
66	CON A26S	1/4/2002	16:09	1	2.09E+02	60	SCL	Shielded	β	2.09E+02	
67	CON A26U	1/4/2002	16:10	1	3.26E+02	60	SCL	Unshielded	β		3.26E+02
68	CON A27S	1/4/2002	16:11	1	2.07E+02	60	SCL	Shielded	β	2.07E+02	
69	CON A27U	1/4/2002	16:12	1	3.30E+02	60	SCL	Unshielded	β		3.30E+02
70	CON A28S	1/4/2002	16:14	1	2.30E+02	60	SCL	Shielded	β	2.30E+02	
71	CON A28U	1/4/2002	16:15	1	3.06E+02	60	SCL	Unshielded	β		3.06E+02
72	CON A29S	1/4/2002	16:20	1	2.13E+02	60	SCL	Shielded	β	2.13E+02	
73	CON A29U	1/4/2002	16:21	1	2.58E+02	60	SCL	Unshielded	β		2.58E+02
74	CON A30S	1/4/2002	16:24	1	2.33E+02	60	SCL	Shielded	β	2.33E+02	
75	CON A30U	1/4/2002	16:25	1	2.89E+02	60	SCL	Unshielded	β		2.89E+02
76	CON A31S	1/4/2002	16:28	1	1.84E+02	60	SCL	Shielded	β	1.84E+02	
77	CON A31U	1/4/2002	16:29	1	2.63E+02	60	SCL	Unshielded	β		2.63E+02
—	Source Check	1/4/2002	17:27	1	1.70E+05	60	SCL	—	β		
										Minimum ⇒	1.72E+02	2.22E+02
										Maximum ⇒	2.78E+02	3.88E+02
										Mean ⇒	2.11E+02	3.06E+02
										Sigma ⇒	2.69E+01	3.45E+01

ATTACHMENT 9 - 4

SY CONTROL BUILDING EXTERIOR STEEL ROOFING

BB	126188	99186								FSS-1060	BHB
No.	Location	Date	Time	Detector	Counts	Count Time (sec)	Mode	Designator		Shielded	Unshielded
30	WROOF FP 15S	11/17/2004	12:59	1	287	60	SCL	Shielded	β		306
31	WROOF FP 15U	11/17/2004	13:03	1	306	60	SCL	Unshielded	β	287	
32	WROOF FP 16S	11/17/2004	13:05	1	298	60	SCL	Shielded	β		302
33	WROOF FP 16U	11/17/2004	13:07	1	302	60	SCL	Unshielded	β	298	
34	WROOF FP 17S	11/17/2004	13:05	1	303	60	SCL	Shielded	β		327
35	WROOF FP 17U	11/17/2004	13:07	1	327	60	SCL	Unshielded	β	303	
36	WROOF FP 18S	11/17/2004	13:05	1	260	60	SCL	Shielded	β		285
37	WROOF FP 18U	11/17/2004	13:07	1	285	60	SCL	Unshielded	β	260	
38	WROOF FP 19S	11/17/2004	13:05	1	255	60	SCL	Shielded	β		280
39	WROOF FP 19U	11/17/2004	13:07	1	280	60	SCL	Unshielded	β	255	
40	WROOF FP 20S	11/17/2004	13:05	1	306	60	SCL	Shielded	β		329
41	WROOF FP 20U	11/17/2004	13:07	1	329	60	SCL	Unshielded	β	306	
42	EROOF FP 21S	11/17/2004	13:05	1	264	60	SCL	Shielded	β		279
43	EROOF FP 21U	11/17/2004	13:07	1	279	60	SCL	Unshielded	β	264	
44	EROOF FP 22S	11/17/2004	13:05	1	268	60	SCL	Shielded	β		284
45	EROOF FP 22U	11/17/2004	13:07	1	284	60	SCL	Unshielded	β	268	
46	EROOF FP 23S	11/17/2004	13:09	1	294	60	SCL	Shielded	β		277
47	EROOF FP 23U	11/17/2004	13:11	1	277	60	SCL	Unshielded	β	294	
48	EROOF FP 24S	11/17/2004	13:13	1	245	60	SCL	Shielded	β		277
49	EROOF FP 24U	11/17/2004	13:15	1	277	60	SCL	Unshielded	β	245	
								Minimum ⇒		2.45E+02	2.77E+02
								Maximum ⇒		3.06E+02	3.29E+02
								Median ⇒		2.78E+02	2.85E+02
								Mean ⇒		2.78E+02	2.95E+02
								Sigma ⇒		2.21E+01	2.03E+01

ATTACHMENT 9.5

ORIGINAL

Exhibit 1
Survey Unit Inspection Check Sheet

SECTION 1 - SURVEY UNIT INSPECTION DESCRIPTION

Survey Unit #	PS1, PS2	Survey Unit Location	Penelec Switchyard Control Building
Date	11/22/04	Time	1400
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 4:

Misc. equipment/material is present inside the building. Notified L. Shamenek.

Response to Question 5:

Floor needs to be swept prior to FSS. Notified L. Shamenek.

Survey Unit Inspector (print/sign)	D. Sarge /	Date	11/22/04
Survey Designer (print/sign)	F. Brosey / B. Downing	Date	11/23/04

ATTACHMENT 10 - 1

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	0195	AREA/LOCATION	PS1-1, 2, 3
SPECIFIC SAMPLING/SURVEY INSTRUCTIONS OR COMMENTS			

RESULTS SUMMARY FOR SR-0195

SR-0195 was issued to obtain radiological survey and sampling data to ensure Final Site Survey activities are complete. The survey unit covered under this SR is PS1-1, 2, 3. The SR required the following radiological measurements.

- Surface scan measurements using a 43-68 gas flow proportional counter (GFPC) or equivalent. Survey techniques will be IAW the SR.
- Surface static measurements using a 43-68 gas flow proportional counter (GFPC) or equivalent. Survey techniques will be IAW the SR.
- For PS1-1 a total of 10 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 8 samples to be taken. For PS1-2 a total of 10 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 9 samples to be taken. For PS1-3 a total of 10 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 8 samples to be taken.
- QC Repeat Measurements: A minimum of 5% of all surface scan and static measurements were re-performed using identical methodology.
- Additional sampling/surveys were not performed.

1. Summary of Results

A. Surface Scan Measurements (GFPC Detector)

A 100% surface scan was required of all accessible areas in certain locations, IAW the SR. A total of 18.89% of this Class 3 area was surveyed, which is well within design basis.

Results: No areas indicated activity above the action level of >600 GCPM (gross counts per minute)

B. Surface Static Measurements

For PS1-1, ten (10) static measurements were obtained. For PS1-2, ten (10) static measurements were obtained. For PS1-3, ten (10) static measurements were obtained. These locations were statistically spaced based on a random starting point due to the lack of noticeable elevated activity during final post remediation scan/static surveys.

Results: No areas indicated activity above the action level of >600 GCPM (gross counts per minute).

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	0195	AREA/LOCATION	PS1-1, 2, 3
SPECIFIC SAMPLING/SURVEY INSTRUCTIONS OR COMMENTS			

2. Quality Control (QC) Measurements and Comparisons

- **Repeat Scan measurements and Repeat Static measurements** were performed and met the applicable acceptance criteria established in Section 4.6 of E900-IMP-4520.04. QC scan measurements were repeated for 18.55% of the area scanned. QC static measurements were repeated for 10.00% of static measurements.

3. Exceptions and Discrepancies

- None.

4. Special Note(s)

- As stated previously, as this is a Class 3 area, scan coverage of approximately 10% in addition to the thirty (30) static measurement point readings will suffice to show due diligence in survey technique for release of the site for unrestricted use.

Chris A. Marthaller CAM Shuler 6-15-05

Print/Signature Date

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	0203	AREA/LOCATION	PS2-1, 2, 3, 4
SPECIFIC SAMPLING/SURVEY INSTRUCTIONS OR COMMENTS			

RESULTS SUMMARY FOR SR-0203

SR-0203 was issued to obtain radiological survey and sampling data to ensure Final Site Survey activities are complete. The survey unit covered under this SR is PS2-1, 2, 3, 4. The SR required the following radiological measurements.

- Surface scan measurements using a 43-68 gas flow proportional counter (GFPC) or equivalent. Survey techniques will be IAW the SR.
- Surface static measurements using a 43-68 gas flow proportional counter (GFPC) or equivalent. Survey techniques will be IAW the SR.
- For PS2-1 a total of 10 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 8 samples to be taken. For PS2-2 a total of 9 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 8 samples to be taken. For PS2-3 a total of 18 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 9 samples to be taken. For PS2-4 a total of 10 Static Measurement locations were provided for measurements to be taken. SNEC Calculation Sheet using "COMPASS" program required 8 samples to be taken.
- QC Repeat Measurements: A minimum of 5% of all surface scan and static measurements were re-performed using identical methodology.
- Additional sampling/surveys were not performed.

1. Summary of Results

A. Surface Scan Measurements (GFPC Detector)

A 100% surface scan was required of all accessible areas in certain locations, IAW the SR. A total of 14.27% of this Class 3 area was surveyed, which is well within design basis.

Results: No areas indicated activity above the action level of > 700 GCPM (gross counts per minute). In the survey area PS2-3 (unpainted steel roof) the action level is > 600 GCPM. No areas exceeding this level found.

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	0203	AREA/LOCATION	PS2-1, 2, 3, 4
SPECIFIC SAMPLING/SURVEY INSTRUCTIONS OR COMMENTS			

B. Surface Static Measurements

For PS2-1, ten (10) static measurements were obtained. For PS2-2, nine (9) static measurements were obtained. For PS2-3, eighteen (18) static measurements were obtained. For PS2-4, ten (10) static measurements were obtained. These locations were statistically spaced based on a random starting point due to the lack of noticeable elevated activity during final post remediation scan/static surveys.

Results: No areas in area PS2-3 indicated activity above the action level of > 600 GCPM (gross counts per minute). No areas in area PS2-1, PS2-2, or PS2-4 indicated activity above the action level of > 700 GCPM

2. Quality Control (QC) Measurements and Comparisons

- **Repeat Scan measurements and Repeat Static measurements** were performed and met the applicable acceptance criteria established in Section 4.6 of E900-IMP-4520.04. QC scan measurements were repeated for 6.70% of the area scanned. QC static measurements were repeated for 8.51% of static measurements.

3. Exceptions and Discrepancies

- Total of 0.65 meters of the roof grid to be surveyed inaccessible due to safety concerns..

4. Special Note(s)

- As stated previously, as this is a Class 3 area, scan coverage of approximately 10% will suffice to show due diligence in survey technique for release of the site for unrestricted use.

Chris A. Matthaller — 6/29/05

Print/Signature — Date