

SUB-491  
04003149

Date: 6-1-16

TO: DENNIS LAWYER

J6

RE: FSS - FENTON ART GLASS

Mr. Lawyer,

Enclosed is REVISED FINAL STATUS SURVEY PLAN.  
Please advise if acceptable or provide comments.  
We are prepared to move forward with the plan  
once approved.

*George W Fenton*

George Fenton  
President

589275  
NMSS/RONI MATERIALS-002

REC'D IN LAT 6-2-16



**Plexus Scientific Corporation**

*Nuclear Solutions Division*  
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Columbia, Maryland 21045  
(443) 319-8055  
[www.plexsci.com](http://www.plexsci.com)

May 31, 2016

George Fenton  
Fenton Art Glass Company  
700 Elizabeth Street  
Williamstown, WV 26187

**Re: Response to Request for Additional Information Concerning Application for  
a License Amendment, Control 589275**

Dear Mr. Fenton:

As we discussed, Mr. Dennis Lawyer, Nuclear Regulatory Commission, reviewed the final status survey plan, RSP-123, Revision 1, dated May 13, 2016. We discussed several questions during a phone call on May 26. Attached are the responses that we discussed, regarding the details of the final status survey plan.

Please let me know if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads 'Bill Thomas'.

Bill Thomas, CHP  
Vice President, Nuclear Solutions Division

Attachment

Attachment 1

Response to Comments

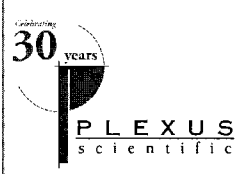
Fenton Art Glass, Control 589275

The NRC reviewed the final status survey plan, RSP-123, Rev 1, dated May 13, 2016, and provided the following comments. A response is provided for each comment. And the survey plan was revised as described in the Response.

	Comment	Response
1	Step 5.3.4 states that the release of equipment and construction debris for unrestricted release shall be consistent with the limits established by Regulatory Guide 1.86. This is the guide for release of equipment and items but is not allowed for volumetrically contaminated material. If release criteria is needed for volumetrically contaminated debris material, the criteria will need to be submitted and reviewed.	The text was revised. Based on the site characterization, the potential impacts are on the surface only. It is assumed that there is no volumetric impacts. However, if the release of equipment and construction debris identifies potential impacts, discrete samples will be collected and analyzed by a qualified radiochemistry laboratory. Fenton Glass will request a specific volumetric DCGL from the NRC
2	Step 5.8.2.6 states that the surveyor starts the initial stationary measurement in a random manner. What guidance is given to the surveyor to pick a random spot?	The text was revised. The grid will be established using an approved computer program, Visual Sample Plan. The initial stationary measurement will be selected randomly by VSP and the remaining grid nodes will be established using a triangular grid, with the equal distance between each survey location.
3	Step 5.9.5 states that the surveyor must listen to alpha and beta counts. As the DCGL is in terms of alpha, the scan surveys sensitivity is normally done by section 6.7.2.2 of NUREG-1575. If the beta counts are on, please describe full detail on how scans are performed and how it can meet sensitivity criteria. Please describe or provide procedure when the surveyor obtains an alpha count.	The text was revised. In the event that 2 to 3 alpha counts are detected, the surveyor will stop and survey in a static mode for a duration equal to the probability of getting another count is at least 90%. This time interval is calculated by using MARSSIM, Chapter 6.7.2.2, Eq 6-13 (Ref 3.9). For the Ludlum 239-1F, with a detector area of 584 cm <sup>2</sup> , the delay is approximately 2 seconds.
4	The WRS test requires the use of a reference area in order to evaluate the survey results.	Step 5.10.3 was added to include the evaluation of a non-impacted area (reference area) for static measurements and the Wilcoxon Rank Sum.

	<b>Comment</b>	<b>Response</b>
5	Step 5.15 gives the survey steps for evaluating the refractory brick. The bricks' uranium content will be variable. Please describe the statistical tests what will be used to evaluate the results.	Static measurements will be collected inside Furnace 8 and at least 2 other accessible furnaces that have not processed uranium. The results from the two non impacted furnaces will be compared using the Wilcoxon Rank Sum.

# Plexus Scientific Corporation



**FINAL STATUS SURVEY OF  
THE FENTON GLASS  
FACILITY**

Procedure: RSP-123

Revision No.: 2

Page: 1 of 21

Date: May 31, 2016

Approved by (Project Manager):

Approved by (Vice President):

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**THIS DOCUMENT IS A CONTROLLED COPY IF SIGNED IN RED BELOW (SEE RSP-003)**

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### FINAL STATUS SURVEY OF THE FENTON GLASS FACILITY

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## 1 PURPOSE

This Radiation Safety Procedure (RSP) is intended for use in the final status survey (FSS) and release for unrestricted use at the Fenton Art Glass (Fenton Glass) facility located at 700 Elizabeth Street Williamstown, West Virginia.

## 2 SCOPE

This RSP is applicable to the acquisition of data by Plexus Scientific Corporation (Plexus) personnel that are necessary for decision-making regarding the release of building surfaces (i.e., walls, structural elements, floor) used or associated with depleted uranium and the production of Vaseline glass at Fenton Glass, hereinafter referred to as the "decommissioning project". Surveys performed for other purposes are exempt from the provisions of this RSP.

**Note:** Plexus is under contract to Fenton Glass to provide radiological support during the decommissioning project. Plexus' point of contact for this action is Mr. George Fenton (Direct (304) 375-6122 ext 233, Cell [REDACTED], e-mail [gffenton@fentonartglass.com](mailto:gffenton@fentonartglass.com)).

**Note:** Fenton Glass possesses a radioactive materials license issued by the U.S. Nuclear Regulatory Commission (USNRC) Number SUB-491, Docket Number 04003149. The license expired on November 30, 2015.

## 3 REFERENCES

- 3.1 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-002, "Definitions".
- 3.2 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-007, "Training in Radiation Protection".
- 3.3 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-008, "Instrumentation".
- 3.4 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-009, "Contamination Control".
- 3.5 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-018, "Surveillance".
- 3.6 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-019, "Smear and Leak Test Swab Counting".
- 3.7 Plexus Scientific Corporation, Radiation Safety Procedure No. RSP-020, "Tailgate Safety Training".
- 3.8 Plexus Scientific Corporation, Standard Operating Procedure No. SOP-013, "Field Project Management".
- 3.9 MARSSIM - U. S. Nuclear Regulatory Commission, NUREG-1575 (Rev. 1), "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)", August, 2000.
- 3.10 USNRC - U. S. Nuclear Regulatory Commission, USNRC Regulatory Guide No. 1.86, "Termination of Operating Licenses for Nuclear Reactors", June, 1974.
- 3.11 USNRC - U. S. Nuclear Regulatory Commission, NUREG-5512, "Residual Radioactive Contamination From Decommissioning - Parameter Analysis", Draft, October, 1999.

**PERSONAL INFORMATION WAS REMOVED  
BY NRC. NO COPY OF THIS INFORMATION  
WAS RETAINED BY THE NRC.**

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- 3.12 USNRC - U. S. Nuclear Regulatory Commission, NUREG-1757, "Consolidated Decommissioning Guidance Decommissioning Process for Materials Licensees", Volume 1, Revision 2, September, 2006.
- 3.13 USNRC - U. S. Nuclear Regulatory Commission, NUREG-1507, "Minimum Detectable Concentrations With Typical Radiation Survey Instruments For Various Contaminants and Field Conditions", June, 1998.
- 3.14 Matzke BD et al, 2014. Visual Sample Plan Version 7.0 User's Guide, PNNL-23211, Pacific Northwest National Laboratory, Richland, Washington.

#### 4 DEFINITIONS

The definition of terms used in this RSP that may not be commonly understood shall be found in RSP-002.

#### 5 PROCEDURE

##### 5.1 Responsibilities

5.1.1 The Vice President shall supply adequate resources to ensure compliance with this RSP.

5.1.2 The Project Manager shall:

5.1.2.1 Ensure current and proper calibration of all radiation detection instruments in the active inventory for this project.

5.1.2.2 Ensure the instrument being used meets the requirements outlined herein.

5.1.2.3 Maintain instrument calibration certificates on file for all radiation detection instruments used to implement this RSP.

5.1.2.4 Assure that all Health Physics Technicians acquiring data in support of restricted area release are properly trained in the provisions of this RSP.

5.1.2.5 Verify compliance with this RSP throughout the decommissioning project.

5.1.2.6 The Field Site Manager and Health Physics Technicians shall:

5.1.2.6.1 Verify that only calibrated radiation detection instruments are used;

5.1.2.6.2 Follow this RSP when acquiring data for use in demonstrating the release status of equipment, components and building surfaces;

5.1.2.6.3 Periodically review this RSP; and.

5.1.2.6.4 Ensure there is a controlled copy of this RSP in the field for the duration of the Decommissioning project.

##### 5.2 Activity Coordination and Scheduling

5.2.1 Characterization, decontamination (as necessary), survey and release of building surfaces.

**Note: All Characterization, segregation, decontamination, survey and release of equipment, machines and components in the restricted areas were**

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**completed prior to the release surveys of building surfaces that are the subject of this procedure.**

5.2.2 Dates for completion of the building surface surveys in the following subsections shall be set by the Field Site Manager.

**Note: The date for completion of the Decommissioning project is to be determined but is expected to be before July 31, 2016.**

5.3 Release Criteria

5.3.1 The release criteria at the restricted areas shall assume the presence of depleted uranium on surfaces (i.e., Uranium-238, depleted in U235 and U234, and the decay progeny are not in secular equilibrium).

5.3.2 The criteria for release of building surfaces for unrestricted use shall be as shown in the following table (Ref. 3.11, Table 5.19):

Matrix	Radionuclide or Radiation Type	DCGL
Building Surfaces	Total (fixed plus removable) alpha activity	100 dpm/100 cm <sup>2</sup>
	Removable alpha activity	10 dpm/100 cm <sup>2</sup>
Direct Exposure Rates in Accessible Areas	Beta/gamma radiation	10 microR/hr above background

5.3.3 Individual measurement detection levels that exceed 50% of the criteria shown in 5.3.2, above shall have an accompanying explanation.

5.3.4 The criteria for release of equipment surfaces for unrestricted use shall be consistent with the limits established by the USNRC, Reg Guide 1.86 (Ref. 3.10).

5.4 Instrumentation and Detection Limits

5.4.1 The following instruments (or equivalent) shall be used for general survey or data acquisition purposes:

Probe Model	Meter Model	Detector Area (cm <sup>2</sup> )	Purpose
Ludlum 44-10 Pancake GM	Ludlum Model 12 (or equivalent)	15	Gross beta/gamma stationary measurements of total beta/gamma activity on surfaces.
Ludlum Model 43-89 Alpha/Beta Phoswich	Ludlum Model 2224 Scaler, Ratemeter (or equivalent)	125	Gross alpha and beta/gamma scans and stationary measurements of total alpha or beta/gamma activity on surfaces.
Ludlum Model 43-93 Alpha/Beta Phoswich	Ludlum Model 2360 Scaler, Ratemeter, Data Logger (or equivalent)	100	Gross alpha and beta/gamma scans and stationary measurements of total alpha or beta/gamma activity on surfaces.



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Probe Model	Meter Model	Detector Area (cm <sup>2</sup> )	Purpose
Ludlum Model 239-1F Alpha/Beta Proportional Detector (floor monitor)	Ludlum Model 2360 Scaler, Ratemeter, Data Logger (or equivalent)	584	Scans for total gross alpha and beta activity
NA	Ludlum Model 19 MicroR Meter (or equivalent)	NA	Exposure rate determinations and gross categorization/segregation of items for radiological/non-radiological management.
Ludlum Model 43-10-1	Ludlum 2929 Dual Scaler (or equivalent)	NA	Removable contamination surveys (i.e., gross alpha or beta activity on smears).

5.4.2 As applicable, detectors shall be connected to a rate meter capable of providing the necessary voltage to the detector and providing a read-out in "counts per minute".

**Note: The detector voltage should be set according to the manufacturer's recommendations and at the voltage used during the most recent calibration.**

5.4.3 Detectors and rate meter pairs shall be calibrated daily before each use and as necessary to confirm instrument response as described in Section 5.5, below.

5.4.4 The nominal detection limits for the survey instruments was calculated using the guidance in NUREG 1507 (Ref 3.13) and is as follows:

Probe Model	Background (cpm)		Efficiency (c/d)		Scanning MDA (dpm/100cm <sup>2</sup> )		Static MDA (dpm/100cm <sup>2</sup> )	
	α	β	α	β	α	β	α	β
Ludlum 44-10 Pancake GM	NA	40	NA	0.19	NA	NA	NA	1,129
Ludlum Model 43-89 Alpha/Beta Phoswich (125 cm <sup>2</sup> )	2	134	0.18	0.13	177	1,006	3	7
Ludlum Model 43-93 Alpha/Beta Phoswich (100 cm <sup>2</sup> )	1	158	0.22	0.19	114	833	3	7
Ludlum Model 239-1F Alpha/Beta Proportional Detector (584 cm <sup>2</sup> )	4	480	0.13	0.19	56	210	3	4
Ludlum Model 43-10-1	0	48	0.38	0.33	NA	NA	3	4

5.4.5 Scan speed is no faster than 2 cm/sec. See Section 5.9.

5.4.6 Stationary count time is assumed to be no less than two (2) minutes unless modified. See Section 5.10.

5.4.7 Count time for samples of removable activity is at least two (2) minutes. See Section 5.11.

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5.5 Daily Instrument Response Checks

5.5.1 Response checks shall be performed and documented daily before use, at the end of the day, and whenever instrument performance is questioned in order to:

- 5.5.1.1 Assure constancy in instrument response;
- 5.5.1.2 Verify the detector is operating properly;
- 5.5.1.3 Determine efficiencies and detection limits, as applicable;
- 5.5.1.4 Confirm its response is similar to its calibrated response; and

**Note: Constancy is determined by comparing the background and source count rates to the  $2\sigma$  and  $3\sigma$  values on the applicable 10-point sheet (see RSP-008, Attachment 8.17).**

5.5.1.5 Demonstrate that measurement results are not the result of detector contamination or failure.

5.5.2 If an instrument fails a response check or if the response exceeds the  $3\sigma$  range, it shall not be used until the problem is resolved.

5.5.3 Check Sources

5.5.3.1 All sealed radiation sources used for daily instrument response checks shall be representative of the instrument's response to the identified radionuclides and, as applicable, traceable to NIST.

**Note: Photon instrument daily response checks do not require NIST-traceable sources.**

5.5.3.2 The following sources shall be made available on-site for the duration of the Decommissioning project:

- 5.5.3.2.1 NIST-traceable Thorium-230 for alpha-sensitive instruments;
- 5.5.3.2.2 NIST-traceable Technetium-99 for beta-sensitive instruments; and
- 5.5.3.2.3 Cesium-137 for functionality testing only of photon-sensitive instruments.

5.5.3.3 The Field Site Manager shall control the use and storage of radiation sources throughout the Decommissioning project.

5.5.4 Response Check Procedure

5.5.4.1 The numerical response (or functionality determination) of each instrument shall be entered into a spreadsheet entitled "Daily Instrument Response Checks" (see Attachment 8.1).

5.5.4.2 One spreadsheet shall be maintained for each instrument (detector plus meter) in use.

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5.6 Mobilization

5.6.1 See the Field Project Authorization Form (SOP-013) prepared by the Project Manager for the listing of equipment, supplies, licensing and other instructions.

5.6.2 All field personnel shall:

5.6.2.1 Participate in a readiness review lead by the Field Site Manager;

5.6.2.2 Receive training in the requirements of this RSP;

5.6.2.3 Receive radiation safety training as required in RSP-007;

5.6.2.4 Participate in any Fenton Glass mandated safety training the first day on site;

5.6.2.5 Participate in a daily safety briefing as required in RSP-020; and

5.6.2.6 Perform work or collect data as so assigned by the Field Site Manager.

5.7 Coordination of Facility Release Surveys

5.7.1 Release surveys of building surfaces shall be performed in the following specific order within each survey unit:

**Note: The specific order is necessary in order to ensure one measurement does not interfere with accurate data acquisition for any follow-up measurements.**

5.7.1.1 Marking of survey unit numbers, measurement locations on surfaces and locations with coverings (e.g., chalk, paint).

**Caution: Do not mark stationary measurement locations in the exact spot where the measurements are to be performed. Magnets, magnetic tags or chalk outlines using templates that are larger than detector dimensions are preferred in these locations.**

5.7.1.2 Surface scans (if required, refer to note in 5.9.1)

5.7.1.3 Stationary measurements.

5.7.1.4 Removable contamination survey measurements (smear collection).

5.7.1.5 Quality control measurements (duplicate or biased smears and stationary measurements).

5.7.1.6 Evaluation of residual radioactivity for painted surfaces as described in 5.13, below.

5.7.1.7 Smear counting.

5.7.2 Each survey unit shall be assigned a unique number by the Project Manager that is recorded on a "Survey Unit Log".

**Note: The survey unit number may be assigned at a later date.**

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5.7.3 Each measurement location (i.e., stationary count and smear) shall be assigned a unique location number as shown on the "Survey Unit Log" (see Attachment 8.2), or equivalent.

5.7.4 Measurement location markings shall be protected to the extent practical from removal or fading until authorized by the USNRC.

5.8 Survey Unit Dimensions and Measurement Locations

5.8.1 The following are the survey unit classifications and survey coverage:

Area Classification	Maximum Dimensions of a Survey Unit (m2)	No. Stationary Measurement and Smears per Survey Unit	Scan Coverage per Survey Unit
1	100	18 + dup	100%
2	1,000	18 + dup	10-30%
3	No limit (surveyor judgement)	18 + dup	Surveyor judgement

5.8.2 Survey unit assignments shall be as shown in Attachment 8.3.

5.8.2.1 Measurement locations shall be marked as follows:

5.8.2.2 18 systematic locations will be selected using a triangular grid pattern within each survey unit.

**Note: If area is reclassified Class 1 or Class 2, then the number of measurements (NR) for the survey unit shall be determined using method per NUREG 1575.**

5.8.2.3 Systematic spacing on a triangular grid using a grid spacing of less than 2.5 meters shall be used to position measurement locations within each SU.

5.8.2.4 The location of the static measurements will be evenly distributed over the SU on a triangular grid and placed around fixed furniture and structural members.

5.8.2.5 The location of the initial stationary measurement will be selected in a random manner, using the computer program Visual Sample Plan (Ref 3.14).

5.8.2.6 Biased measurement locations identified during surface scans may, at the discretion of the surveyor and included in the data set as additional measurements beyond the required minimum number.

5.9 Performing Surface Scans of Building Surfaces

5.9.1 Scan data for alpha activity shall be acquired as instructed in RSP-018.

**Note: For purposes of this procedure, the room under the Feldspar Silo, the Color Mixing Room, hallway and travel path to Furnace Tank 8 are currently considered to be Class 1. Surface scans will be performed on 100% of the floor and applicable walls. The adjacent areas, the laboratory, the Batch Mixing room, floor area surrounding Furnace Tank 8 are classified as Class 3. As such, surface scans will only be performed if biased, fixed readings are found to be above the release criterion in 5.3.2 above. Furthermore, if measurement results are found to be above the 5.3.2 criterion, then this**

**procedure will be revised to reflect the reclassification to a Class 1 or Class 2, as appropriate.**

5.9.2 A data logger shall be used to capture scan data.

5.9.3 Scans within a single survey unit shall be completed within one day and with the same detector/rate meter pair.

**Note: The data interpretation process becomes significantly more complicated when multiple people/instruments/days acquire data in a single survey unit, thus instrument/day limitations should be enforced except in the case of instrument failure or if there is a need to supplement scan data at later dates.**

5.9.4 Scan speeds shall be no faster than two (2) centimeters per second.

5.9.5 In the event that 2 to 3 counts are detected, the surveyor will stop and survey in a static mode for a duration equal to the probability of getting another count is at least 90%. This time interval is calculated by using MARSSIM, Chapter 6.7.2.2, Eq 6-13 (Ref 3.9).

**Note: Scanning for alpha emitters differs significantly from scanning for beta and gamma emitters in that the expected background response of most alpha detectors is very close to zero. It is not practical to determine a fixed MDC for scanning. Instead, it is more useful to determine the probability of detecting an area of contamination at a predetermined DCGL for given scan rates.**

5.9.6 The following time interval is adequate to detect additional counts with a probability that exceeds 90%. Use Equation 6-13 in Reference 3.9:

Detector	Detector Area	Nominal Efficiency (4π)	Time Interval (t) seconds
239-1F	584	0.13	2
43-93	100	0.22	6
43-89	125	0.18	6

5.9.7 Locations exhibiting elevated alpha count rates shall be marked during the performance of the scan, with the maximum measured alpha count rate location clearly identified and marked.

**Caution: Surveyors should monitor the audible signal from the alpha channel during scans to ensure no elevated areas are missed. If elevated count rates are noted, confirmation that they are the result of the alpha radiation should be made. If so, the dimensions of the elevated area should be marked, measured, and recorded.**

**Note: Stationary measurements as directed in Section 5.11 must be performed in all marked locations.**

5.9.8 After scanning is complete, or if 400 collection units are reached, data shall be downloaded onto the designated personal computer.

5.9.9 After scans are complete:

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**Note: To optimize data management, conversion of data as described herein should take place once each day but no less frequent than once every three days.**

5.9.9.1 Scan data shall be converted into spreadsheet format as instructed in RSP-039.

**Note: The Field Site Manager may elect to e-mail the field data spreadsheets to the Project CHP for entry into the FSS workbooks. The Project CHP, after reviewing those spreadsheets, will contact the Field Site Manager if there are any issues, areas that require additional data acquisition, or other corrective actions, such as decontamination.**

5.9.10 One spreadsheet shall be maintained for each survey unit.

5.9.11 If the detection levels calculated in the FSS Workbook for the survey unit in question are not sufficiently low (Attachment 8.5), then area shall be re-surveyed using a slower scan speed.

**Note: Contact the Project CHP for assistance in optimizing scan speeds to ensure the detection level requirement in Section 5.3.2 is achieved.**

5.10 Performing Stationary Counts on Building Surfaces

5.10.1 Stationary count data for alpha radiation shall be acquired as instructed in RSP-018.

5.10.2 Stationary counts within a single survey unit shall be completed within one day and with the same detector/rate meter pair.

**Note: The data interpretation process becomes significantly more complicated when multiple people/instruments/days acquire data in a single survey unit, thus instrument/day limitations should be enforced except in the case of instrument failure or if there is a need to supplement stationary count data at later dates.**

5.10.3 Establish a reference area in the facility that is not impacted and depleted uranium was not previously used in the area. Conduct a radiation survey in the reference area in a manner similar with the approach described in 5.10.5. Survey at least 18 different reference area locations.

5.10.4 The starting point (location) for the first stationary count is selected in a random manner by the surveyor. See Section 5.8.

5.10.5 The following data shall be acquired at each stationary count location:

5.10.5.1 Gross alpha counts with the detector in an open window configuration.

5.10.5.2 Gross alpha counts with the detector in a shielded window configuration.

5.10.5.3 Raw data may be captured by one of the following methodologies:

5.10.5.3.1 In a data logger as instructed in RSP-039; or

5.10.5.3.2 On a "Raw Data Capture Sheet" (see Attachment 8.4) if data loggers are not used.

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**Note: To minimize data handling time and the potential for transcription errors, the use of data loggers is preferred.**

5.10.5.4 Data acquisition times (i.e., integration times or count times) shall be no less than two (2) minutes.

**Note: Count times may be adjusted up or down by the Project CHP depending on background count rates and the resulting detection levels. If the detection levels are achievable with lesser count times, they may be so authorized.**

5.10.5.5 Duplicate measurements shall be performed at the following minimum frequency:

5.10.5.5.1 Once per survey unit; or

5.10.5.5.2 Once every 18 measurements.

5.10.5.6 After stationary counts are complete, data shall:

5.10.5.7 Be converted into spreadsheet format as instructed in RSP-039 if captured in a data logger; and

5.10.5.8 Entered into a FSS Workbook upon return to the Plexus office (see Attachment 8.5).

5.10.6 If the detection levels calculated in the FSS Workbook greater than the measurement criteria shown in 5.3.2, above, that location shall be re-surveyed with a longer data acquisition time.

**Note: Contact the Project CHP for assistance in optimizing count times to ensure the detection level requirement in Section 5.3.2 is achieved.**

5.10.7 If any data points are greater than the applicable measurement criterion shown in 5.3.2, above, the dimensions of the elevated area and the survey unit dimensions shall be recorded and an Elevated Measurement Comparison (EMC) evaluation shall be performed.

**Note: For stationary measurements, the EMC is equal to 4.0 times the DCGL. However, SU-specific EMCs, using the area factors in Table 5.7 of MARSSIM (Ref 3.9), can be used if so approved by the Project CHP.**

5.11 Performing Removable Contamination Surveys (smears)

5.11.1 Removable contamination surveys shall be performed as instructed in RSP-018.

5.11.2 Smears collected within a single survey unit shall be analyzed on the same day and with the same smear counter.

**Note: The data interpretation process becomes significantly more complicated when smears are counted with multiple instruments/days, thus instrument/day limitations should be enforced except in the case of instrument failure or if there is a need to supplement smear data at later dates.**

5.11.3 Duplicate smears shall be collected immediately adjacent to the previous collection location at the following minimum frequency:

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5.11.3.1 Once per survey unit: or

5.11.3.2 Once every 18 smears.

5.11.4 Smears shall be numbered as [SU No.- Location No. - Dup Status]

**Note: For example, a smear collected from survey unit 1 at location 14 would be numbered 1-14. A duplicate smear from the same location would be numbered 1-14-d.**

5.11.5 Smears shall be analyzed as instructed in RSP-019.

5.11.6 Count times for smears shall be two (2) minutes.

**Note: Count times may be adjusted up or down by the Project CHP depending on background count rates and the resulting detection levels. If the detection levels are achievable with lesser count times, they may be so authorized.**

5.11.7 Smear data shall be entered into the FSS Workbook for the survey unit in question (see Attachment 8.5).

5.11.8 If the detection levels calculated in the FSS Workbook are greater than the measurement criteria shown in 5.3.2, above, the smear shall be re-counted using a longer count time.

**Note: Contact the Project CHP for assistance in optimizing count times to ensure the detection level requirement in Section 5.3.2 is achieved.**

#### 5.12 Evaluating Inaccessible Areas

**Note: An inaccessible area is one that is too small to permit access by a radiation detector.**

5.12.1 An attempt shall be made to collect removable activity from each inaccessible location using a smear.

5.12.2 The location and dimensions of the obstacle or covering shall be documented on the applicable survey map.

5.12.3 The obstacle shall be photographed.

#### 5.13 Evaluating Painted or Covered Surfaces

5.13.1 If painted or covered surfaces are not evaluated, justification for that decision shall be documented for inclusion in the final status survey report.

5.13.2 Small area evaluations:

**Note: A small area is one that is less than 100 cm<sup>2</sup> as measured using a pre-prepared template.**

5.13.2.1 Perform a stationary measurement in that location.

5.13.2.2 Remove the paint (or other surface covering) before performing a second stationary measurement and smear collection in that location.



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- 5.13.2.3 Document the location on the applicable survey map and describe the nature of the covering.
- 5.13.2.4 Document the approximate dimensions of the painted surface.
- 5.13.2.5 Photograph the location.

#### 5.13.3 Large area evaluations:

**Note: A large area is one that is greater than 100 cm<sup>2</sup> as measured with a pre-prepared template.**

- 5.13.3.1 Scan the painted area to identify the 100 cm<sup>2</sup> area that exhibits the highest alpha activity.
- 5.13.3.2 Perform a stationary measurement in that location.
- 5.13.3.3 Remove the paint (or other covering) using sandpaper, ensuring all of the removed material, including the sandpaper, is placed into a sample collection container.
- 5.13.3.4 Wipe the cleaned area using a sample filter, placing the filter into the sample collection container.
- 5.13.3.5 Label the collection container, log the sample into a chain-of-custody form, and forward the sample for analysis if so directed by the Project Manager (see RSP-026).
- 5.13.3.6 Perform a second stationary measurement over the cleaned location.
- 5.13.3.7 Perform a contamination survey over the entirety of the cleaned area.
- 5.13.3.8 Document the location on the applicable survey map, describe the nature of the covering, and record the survey results and sample number.
- 5.13.3.9 Document the approximate dimensions of the painted surface.
- 5.13.3.10 Photograph the location.

#### 5.14 Performing Ambient Exposure Rates within Buildings

- 5.14.1 Ambient exposure rates shall be measured as instructed in RSP-018.
- 5.14.2 Measurements shall be performed at each stationary count location (see Section 5.11).
- 5.14.3 Raw data should be captured on a "Raw Data Capture Sheet" (see Attachment 8.4) or a blank spreadsheet extracted from a FSS Workbook (see Attachment 8.5).
- 5.14.4 Duplicate measurements shall be performed at the following minimum frequency:
  - 5.14.4.1 Once per survey unit; or
  - 5.14.4.2 Once every 18 measurements.

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5.14.5 After exposure rates measurements are complete, data shall be entered into the FSS Workbook for the survey unit in question (see Attachment 8.5).

5.14.6 If the detection levels calculated in the FSS Workbook are greater than the measurement criteria shown in 5.3.2, above, that location shall be re-surveyed with either a longer data acquisition time or multiple measurements.

**Note: Contact the Project CHP for assistance in optimizing measurement procedures to ensure the detection level requirement in Section 5.3.2 is achieved.**

#### 5.15 Evaluating Refractory Brick

5.15.1 Furnace 8 contains refractory brick that contains uranium and thorium as an intrinsic part of the entire refractory brick. In order to demonstrate that Furnace 8 does not contain levels of depleted uranium in excess of the criteria described in Section 5.2, an evaluation must be completed.

5.15.2 Collect at least five (5) wipe samples inside Furnace 8. Evaluate the wipe samples as described in Section 5.11. Confirm that the DCGL for removable activity is satisfied, as described in Section 5.3.

**Caution: Do not enter a confined space. Collect the samples near the accessible opening and in an area within arm's reach. Confirm with representative from Fenton Glass that the furnace is de-energized and at ambient temperature.**

5.15.3 Evaluate the presence of total uranium on the surface of the refractory brick and compare the results to equivalent measurements on refractory in furnaces that did not process depleted uranium.

5.15.3.1 Collect stationary measurements inside Furnace 8 in accessible areas. Summarize the data as described in Section 5.10.

5.15.3.2 Collect stationary measurements inside two (2) other furnaces (Reference Area). Verify with representatives of Fenton Glass that the furnaces did not process depleted uranium.

5.15.3.3 Compare the results using the Wilcoxon Rank Sum (WRS) and confirm that the radiation measurements are statistically equivalent( Ref 3.9.

#### 5.16 Photographs

5.16.1 Photographs shall be made to assist in documenting on-site activities and for future reference.

5.16.2 The following photographs shall be taken, at a minimum:

5.16.2.1 One photograph of the general area that holds the survey unit; and

5.16.2.2 One photograph of each survey unit.

5.16.3 The Field Site Manager, or designee, shall maintain a photo log that includes the photograph number, the date of the photo, and a short descriptive phrase that includes the survey unit numbers depicted in the photo, as applicable.

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5.17 End of Day Activities

5.17.1 All Mylar windows on survey instruments shall be checked for light leaks, with windows replaced as required.

**Note: Window changes can cause elevated phototube response that may take a few hours to clear. Therefore, to ensure instruments are available for use when needed, light leaks should be tested at the end of each work day.**

5.17.2 Project team members shall deliver all hard-copy notes, records and log entries made during the day to the Field Site Manager for safe keeping.

**Note: The Project Manager will advise the Field Site Manager as to when records should be transferred to the Plexus server for safe keeping.**

6 EXEMPTION PROVISIONS

6.1 Changes to this RSP that do not reduce the inherent compliance with the Decommissioning Plan shall be permitted pursuant to the written authorization of the Project Manager and the Project CHP.

7 DOCUMENTATION

7.1.1 Field Logs

7.1.1.1 Project data shall be recorded in a field log (bound and with numbered pages), a Field Activity Daily Log form, or equivalent method of data and information recording.

**Note: The contents of the logs maintained by all field personnel shall be subsequently transferred to an electronic format for inclusion in the project records.**

7.1.1.2 Field logs shall be reviewed by the Project Manager at least weekly and after any significant event.

7.1.1.3 Each entry into a log shall be legible, factual, detailed, complete and shall be signed and dated by the individual making the entry.

7.1.1.4 If a mistake is made, the error shall have a single line drawn through it, with the initials of the person making the correction written next to the line.

**Note: No erasures or "white out" use is permitted.**

7.1.1.5 Electronic copies of all field notes and log entries shall be forwarded to the Project Manager as soon as possible after demobilizing from the site.

7.1.2 Survey Packages

7.1.2.1 A survey package shall be prepared for each survey unit.

7.1.2.2 Each survey package should contain or be associated with the following:

7.1.2.2.1 A cover sheet.

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- 7.1.2.2.2 A copy of the applicable calibration certificate for each instrument used to acquire data.
- 7.1.2.2.3 A copy of the applicable "Daily Instrument Response Check" sheet.
- 7.1.2.2.4 A copy of the applicable "Survey Unit Scan Results" sheet.
- 7.1.2.2.5 A copy of the applicable "Survey Unit Stationary Count Results" sheet.
- 7.1.2.2.6 A copy of the applicable "Removable Contamination Survey Results" sheet.
- 7.1.2.2.7 A map showing the location of all measurements and issues of interest (i.e., surface coverings).
- 7.1.2.2.8 Photo documentation showing the location of all measurements and issues of interest, and an indication of where the survey unit sits with respect to the rest of the floor.

7.1.2.3 Each page of the survey package shall be reviewed for completeness and accuracy, and initialed/dated in the bottom right corner by the Project Manager, the Project CHP and the Quality Assurance Officer.

#### 7.1.3 Electronic Records

7.1.3.1 To avoid damage or loss, all electronic data shall be protected.

7.1.3.2 All electronic information acquired for the project shall be downloaded from its collection device (e.g., laptop computers, data loggers, etc.), or scanned if hard copy, on a daily basis and forwarded to the Plexus server.

**Note: There are multiple levels of redundant and recoverable storage/backup on the Plexus SharePoint.**

## 8 ATTACHMENTS

- 8.1 Daily Instrument Response Check
- 8.2 Survey Unit Log
- 8.3 Survey Unit Design
- 8.4 Raw Data Capture Sheet
- 8.5 Final Status Survey (FSS) Workbook

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ATTACHMENT 8.1  
DAILY INSTRUMENT RESPONSE CHECK SPREADSHEET

RSP-008, ATTACHMENT 8.17  
CONTAMINATION SURVEY INSTRUMENT DATA SHEET

GENERAL INFORMATION	
Project No.:	
Meter Model No.:	
Probe Model No.:	
Detector Area (cm <sup>2</sup> ):	
Background Location:	
Count time (min):	
Alpha Check Source No.:	
Radionuclide:	
Activity (dpm):	
Beta Check Source No.:	
Radionuclide:	
Activity (dpm):	
Analysis Performed By:	

\*\*Area for smear counter is 100

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Date	Units	Start of Shift Background (alpha)				Start of Shift Background (beta)				End of Shift Background (alpha)				End of Shift Background (beta)				Source Check (alpha)		Source Check (beta)		MDA (dpm)		
		1	2	3	Average (cpm)	1	2	3	Average (cpm)	1	2	3	Average (cpm)	1	2	3	Average (cpm)	Source counts	EFF.	Source counts	EFF.	Alpha	Beta	
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**ATTACHMENT 8.3  
 SURVEY UNIT DESIGN**

Room Name	Survey Class	Floor Dimensions (m2)	Wall Dimensions (m2)	No. Survey Units	Additional Issues to be Addressed
Color Mixing room	1	38	67	1	Storage Containers
Walkway to Furnace 8	1	55	12	1	Interior of Furnace
Laboratory	3	61	67	1	
Floor Area Surrounding Furnace 8	3	Subject to Surveyor Discretion	0	1	Includes the sidewalk leading to the Feldspar Silo
Room under the Feldspar Silo	1	17	27	1	
Batch Mixing Room	3	76	140	1	





RADIATION SAFETY PROCEDURE

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Minor Change  
Number:  
By:  
Date: / /

FINAL STATUS SURVEY OF THE FENTON GLASS FACILITY

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**ATTACHMENT 8.5**  
FSS Workbook  
*(Spreadsheet version located on SharePoint)*