

May 21, 2009

Ms. Elizabeth Ullrich
U.S. Nuclear Regulatory Commission
Region I, Nuclear Materials Section B
475 Allendale Road
King of Prussia, PA 19406-1415

Br2

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REGION I

Subject: Request to Amend NRC License Number 29-00117-06 to Remove License Conditions

Dear Ms. Ullrich:

Merck & Co., Inc has made a business decision to cease disposal of licensed material by incineration at our Rahway, NJ facility and requests that our license be amended to remove the associated license conditions, numbered 25 and 26 respectively.

Recently, Philotechnics Ltd. performed final status surveys of our incinerator building and their conclusions are listed below:

"Based upon the results of our survey, it is our professional opinion that Merck's waste incinerator building and associated fixtures meet the specified criteria for unrestricted release as defined in 10 CFR 20.1402".

A copy of Philotechnics' Final Status Survey Report is attached to this letter. Thank you for your assistance with this matter. If you have any questions related to this request please contact our Radiation Safety Officer, Vincent Williams at 732-594-1434 or vincent_williams@merck.com.

Sincerely,



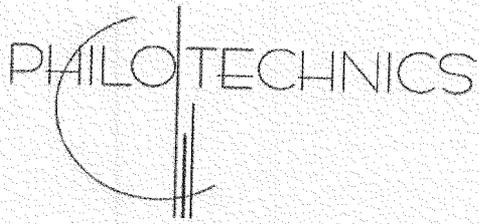
Gregory R. Reinhard, DVM

Cc: Mr. John J. Miller
Mr. Vincent P. Williams

WP44-204
RY80HP

File: NRC Correspondence

143753



Final Status Survey Report Merck Waste Incinerator

Prepared for:

**Merck & Company, Inc.
126 East Lincoln Ave.
Rahway, NJ 07065**

NRC Radioactive Materials License No. 29-00117-06

**Survey Dates: April 6, 2009 – April 9, 2009
Report Date: May 18, 2009**

Prepared by:

**Philotechnics, Ltd.
25 Mall Road, Suite 301
Burlington, MA 01803**

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Section 1.0 – Executive Summary

A radiological survey was completed utilizing the guidance provided in NUREG 1757, "Consolidated Nuclear Materials Safety and Safeguards (NMSS) Decommissioning Guidance" Volumes 1-3, NUREG 1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) and NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions." These reference materials were used in order to provide pertinent information for the decommissioning and unrestricted release of the Merck & Co., Inc. Rahway, NJ facility Radioactive Waste Incinerator Room, its associated effluent component parts and associated areas in Building 77 located at 126 East Lincoln Ave, Rahway, NJ. Associated areas include the restroom, control room, loading dock area, cold room area and mechanical room. The waste incinerator room was used to incinerate non-radioactive waste plus Tritium (^3H) and/or Carbon-14 (^{14}C) radioactive waste from various laboratories. During the incinerator's operational history, only ^3H and ^{14}C were incinerated.

Merck & Co., Inc. has selected conservative administrative limits for total beta, Carbon -14 (^{14}C), contamination (146,000 dpm/100cm²) and removable ^3H and ^{14}C contamination (14,600 dpm/100cm²) based on Merck's "Methodology for Performing Laboratory Decommissioning Surveys"; which is equivalent to a total effective dose equivalent of 1 mrem/year. These areas will be referenced as Building 77 unless otherwise noted. All associated effluent component parts will be referenced as Incinerator Fixtures.

The decontamination process and the utilization of these administrative limits comply with Merck's radioactive material license conditions. A review of all data collection and analysis supports our professional opinion that Building 77 Radioactive Waste Incinerator Room, its associated effluent component parts and associated areas included in the scope of this report meets the administrative limits and the criteria for unrestricted release according to 10 CFR 20.1402, "Radiological Criteria for Unrestricted Use," based upon the following:

- *All scanning measurements were substantially lower than the MDC_{scan} for ^{14}C .*
- *All static measurements in Building 77 were substantially lower than the administrative limit of 146,000 dpm/100cm² for ^{14}C .*
- *All removable contamination measurements in Building 77 were substantially lower than the administrative limit of 14,600 dpm/100cm² for ^{14}C .*
- *The total effective dose equivalent (TEDE) from any potential radioactive materials in the specified areas in Building 77 is calculated to be 0.04 mrem/year based upon maximum detectable concentrations of beta radionuclides uniformly dispersed in a localized area.*

Section 2.0 – Project Scope and Summary

This scope of work was for the characterization and unrestricted release of the radioactive waste incinerator its fixtures and surrounding building. Our efforts were focused on providing a comprehensive evaluation of the radiological conditions of Building 77.

In accordance with our agreement with Merck & Co., Inc., Philotechnics, Ltd. performed radiological decommissioning surveys of the impacted areas. The surveys and report provide pertinent information for the radiological decommissioning. The Final Status Survey design, selected instrumentation and field counting techniques and subsequent analysis of the data follow the guidance of MARSSIM (NUREG-1575), NUREG 1757, and NUREG-1507. The Incinerator Room was used both for non-radioactive waste and radioactive waste from various laboratories throughout the campus.

The following summarizes the independent conclusions representing Philotechnics, Ltd. best professional judgment based on information and data available to us during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the client, owner, or their representative has been assumed correct and complete based upon careful and diligent review of the safety program and past inspection records. Additionally, the conclusions presented are based on the conditions that existed at the time of the assessment. Note that on-site observation of the above referenced facility consisted of readily visible, accessible areas only.

Table 1: Assessment Review

Assessment Component	Acceptable	Unacceptable	Section
License Review & Historical Use	X		4.0
<i>Radiation Surveys</i>			
A) Static Measurements – Hand-held instruments	X		5.0
B) Static Measurements – Scintillation Counter	X		5.0
C) Scanning Measurements – Hand-held instruments	X		5.0

Conclusions and Recommendations

Based upon the results of our survey, it is our professional opinion that Merck's waste incinerator building and associated fixtures meet the specified criteria for unrestricted release as defined in 10 CFR 20.1402. After completion of the final status surveys, Philotechnics, Ltd. did verify that all labels, signs, or other similar markings indicating the presence of radioactive materials had been removed or obliterated. Additionally, no concerns requiring further investigation exist at this time.

Project Team

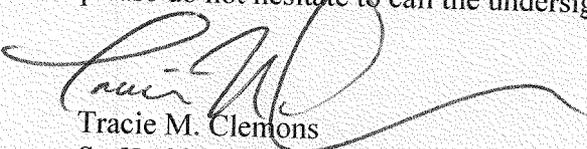
The project team consisted of the following individuals:

Researched by: Gary S. Nadeau and Matthew Norton
Surveyed by: Tracie M. Clemons, Evan Harpenau, and Frank Brown
Written by: Tracie M. Clemons

Project Manager and Contact: Tracie M. Clemons

Closing

We appreciate the opportunity to provide this radiological decommissioning and trust that the enclosed information is adequate for decision-making needs. Should you have any questions, please do not hesitate to call the undersigned.


Tracie M. Clemons
Sr. Health Physicist
Philotechnics, Ltd.

May 18, 2009

Section 3.0 – Assessment, Methodology and Report Limitations

The characterization and final status survey process evaluates a property's environmental status of impacted areas to allow unrestricted use by current or future users. The assessment part of the process involves the review of operations as they pertain to radioactive materials (RAM) use in order to identify potential radioactive contamination.

Assessment activities related to the characterization and final status surveys for the facility included the following tasks:

- A visual survey of both current and past RAM use areas in order to identify potential contamination and/or presence of radioactive materials
- Interviews with client personnel regarding current and historical use of RAM in the Incinerator Room and associated areas at Merck
- Review of existing documentation, as provided, regarding prior inspections, investigations, events or conditions in Building 77 at Merck related to RAM use
- Surveys of Building 77 with the use of portable hand-held radiation detection equipment to identify the presence of radioactive materials
- Indirect surveys to test for removable contamination with the use of a scintillation counter via wipes taken throughout Building 77
- Preparation of a report documenting our findings, recommendations and professional opinions regarding observed or suspected radiological concerns

Facility Point of Contact

Tracie M. Clemons met with Mr. Vincent Williams, who is the Radiation Safety Officer for Merck and Company, Inc at the Rahway campus. Mr. Williams was able to provide specific information regarding radioactive materials use in Building 77 based upon his historical knowledge of the facility and implemented practices at Merck.

Report Limitations

This report has been prepared solely for the use and benefit of the Licensee in compliance with MARSSIM, NUREG-1757 and NUREG 1507. Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with customary principles and practices in the field of environmental science. This warranty is in lieu of all other warranties either expressed or implied. Philotechnics is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration presented in this report.

It must be noted that no investigation, or survey, can absolutely rule out the existence of radioactive materials. This assessment was based upon prior history, observable conditions, direct surveys and indirect surveys. There are limitations based upon this approach where contaminants can escape detection using these methods. Minimum detectable concentrations have been specified for the instrumentation used to qualify the detection limits.

The work performed in conjunction with this assessment and the data developed are intended as a description of available information at the dates and location given. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated. In addition, this report is not intended as a regulatory agency compliance/safety audit or for the purpose of ensuring that all applicable permits and/or operating procedures are current and/or appropriate.

Section 4.0 License Review and Historical Use

Radioactive Materials (RAM) License

This decommissioning request affects specific areas of Building 77 at 126 East Lincoln Ave. Rahway, NJ operated under the Licensee's NRC Radioactive Materials License No. 29-00117-06

The Licensee operates under a Broad Scope Radioactive Materials license. The primary nuclides of concern for this decommissioning are Tritium (^3H) and Carbon-14 (^{14}C).

The Rahway, NJ facility currently operates under the Nuclear Regulatory Commission Radioactive Materials License No. 29-00117-06, Docket No. 030-14680, with an expiration date of May 31, 2011.

Authorized Use

In addition to other licensed materials, both Tritium (^3H) and Carbon-14 (^{14}C) were used for research and development as defined in 10 CFR 30.4; animal studies; and transfer of waste for incineration to persons who are authorized to possess.

Restricted and Impacted Area Summary

Areas in Building 77 where radioactive materials were historically used are summarized in Table 2 and are identified on the building and structure diagrams in Appendix A followed by the building mechanical systems (Incinerator Fixtures) diagrams in Appendix B.

Table 2: Restricted and Impacted Areas Summary

Restricted and Impacted Areas	Potential Contaminants	Classification	Last Use
MWI-1-001 (Conveyor System Area)	^3H , ^{14}C	1	7/2007
MWI-1-002 (Cold Room Area)	^3H , ^{14}C	2	7/2007
MWI-1-003 (Burn Chamber/Kiln Area)	^3H , ^{14}C	1	7/2007
MWI-1-004 (Loading Ram Area)	^3H , ^{14}C	1	7/2007
MWI-1-005 (Loading Dock Area)	^3H , ^{14}C	2	7/2007
MWI-1-006 (Fly Ash System/Bag House Area)	^3H , ^{14}C	1	7/2007
MWI-1-007 (Restroom)	^3H , ^{14}C	3	7/2007

Restricted and Impacted Areas	Potential Contaminants	Classification	Last Use
MWI-1-008 (Mechanical Room)	³ H, ¹⁴ C	3	7/2007
MWI-1-009 (Stairwell to Control Room)	³ H, ¹⁴ C	3	7/2007
MWI-2-001 (Control Room)	³ H, ¹⁴ C	3	7/2007

Historical Use

Operations utilizing radioactive materials have been conducted since 1994. The Incinerator Room is owned by the Licensee and consists of approximately 7800 sq. ft. of space, while the Control Room is approximately 595 sq. ft. of space. The Incinerator Room was used primarily by the Licensee's facility maintenance department.

The Licensee is a research and development company that uses radioactive materials for animal studies and radio-labeling pharmaceuticals. Merck and Company Inc. operates their radiation safety program under a Broad Scope License. The historical use of the Incinerator Room was limited to ³H and ¹⁴C. The survey model was developed and implemented to detect the radionuclides used in each specific area, realizing that any potential contamination due to the short lived radionuclides would have decayed by the time of the decommissioning survey.

Established Site DCGL's

The Derived Concentration Guideline Limit (DCGL) is used as a determining factor to the survey unit meeting the criteria for unrestricted release.

NRC radiological release criteria for decommissioning and license termination is based upon a 25 mrem/year for unrestricted use. Merck has selected a lower release criterion based on their license conditions and health physics procedures "Methodology for Performing Laboratory Decommissioning Surveys"; which is equivalent to a total effective dose equivalent of 1 mrem/year. The nuclides of concern site-specific screening levels for building surfaces and structures under a 25 mrem/year release criteria is derived from the NRC D and D Version 2.1. Merck's administrative limits are provided in Table 3.1 and Table 3.2.

Table 3.1 Site-Specific Default Screening Values based on 25 mrem/yr

Isotope	Half-life	Radiation Type	Total Activity (dpm/100cm ²) <small>Note 1</small>	Removable Activity (dpm/100cm ²)
H-3	12.3 years	Beta	1.20 x 10 ⁸	1.20 x 10 ⁷
C-14	5730 years	Beta	3.70 x 10 ⁶	3.70 x 10 ⁵

The screening values are determined from the NRC DandD Ver.2.1 model and the default parameters for removable fraction are set to 0.1.

Table 3.2 Merck's Administrative Limits based on 1 mrem/year

Isotope	Half-life	Radiation Type	Total Activity (dpm/100cm ²)*	Removable Activity (dpm/100cm ²)
H-3	12.3 years	Beta	5.0×10^5	5.0×10^4
C-14	5730 years	Beta	1.46×10^5	1.46×10^4

*The limiting DCGL_w for beta emitters is ¹⁴C at 1.46×10^5 dpm/100 cm²

Waste Disposal

There were no radioactive materials stored in Building 77 during this decommissioning.

Radioactive Materials Spills

Mr. Vincent Williams, the Radiation Safety Officer, indicated that four incidents occurred during incineration of radioactive material at Building 77. They are as follows:

1. July 11, 2007: A fire occurred in the baghouse. No contamination was found and the NRC was notified.
2. October 11, 2004: A leaking waste container was found in the storage area of Building 77. Minor levels of contamination (a few hundred cpm) were found on the floor near the waste container. The area was promptly decontaminated and no residual contamination persisted.
3. March 1, 2004: A smoke event occurred in the building due to the incinerator losing its draft. No contamination was found.
4. June 8, 2000: The loader door failed to close enabling smoke to fill the building. Afterwards, minor levels of contamination (a few hundred cpm) were found on the floor near the loader door. The area was promptly decontaminated and no residual contamination persisted.

Significant spills are defined as those spills that were not readily cleaned up by the Licensee and/or caused contamination to be found during follow-up or routine contamination surveys in excess of license limits. The licensees contamination surveys were included in the historical review of the license and there were no indications of contamination levels over the criteria for release affecting the areas included in this characterization survey.

A general historical overview of the areas within the facility where licensed material was given during personnel interviews. Individuals interviewed included:

Mr. Vincent Williams, RSO
Mr. Frank DiMatteo, Health Physicist

The purpose of the historical site assessment was to determine the current status of the Building 77 including potential, likely, or known sources of radioactive contamination. This data includes physical characteristics and location of the aforementioned area as well as information found in operating records, including radiological surveys.

Isotope Use History

Hydrogen-3: Hydrogen-3 (^3H) has seen consistent use throughout the life of the Incinerator Room. **^3H must be considered as a potential contaminant.**

Carbon-14: Carbon-14 (^{14}C) has seen consistent use throughout the life of the Incinerator Room. **^{14}C must be considered as a potential contaminant.**

Area Use History

The information in this section relied upon interviews with the site radiation safety officer to identify known and potential areas of use to ultimately classify areas as potentially impacted or non-impacted.

The majority of the Incinerator Room and operational spaces are considered potentially impacted. These drawings can be found in Appendix A.

Section 5.0 – Radiation Surveys and Findings

Description of Radiation Surveys

During the period of April 6 – 9, 2009, Philotechnics, Ltd. completed a comprehensive removable and total contamination survey in all accessible areas, which included floors, walls, building structures, incinerator fixtures and floor drain pits in the areas identified in Table 2 as well as non-impacted areas in the vicinity of Building 77. Survey maps depicting these areas are included as Appendix A and B.

It should be noted that the incinerator effluent fixtures (i.e., burn chambers, quench pit, bottom ash rake, drain pit trench, emergency stack, fly ash system/bag house, horizontal ventilation, quench tank, vertical exhaust stack) were surveyed separately as part of the building mechanical system. These survey maps are included in Appendix B.

Instrument Specifications

The instrumentation used for final status surveys is summarized in Table 4 and Table 4.1. Table 4 lists the standard features of each instrument such as probe size and efficiency. Table 4.1 lists typical operational parameters such as scan rate, count time, and the associated Minimum Detectable Concentrations (MDC).

Table 4 – Characterization Survey Instrumentation

Detector Model	Detector Type	Detector Area	Meter Model	Window Thickness	Typical Total Efficiency
NE IBP19DD	Beta Scintillation	100 cm ²	Ludlum 2350-1	0.9 mg/cm ²	5 % (C-14)
Packard	Liquid Scintillation	N/A	N/A	N/A	30% (H-3) 50% (C-14)

Table 4.1 – Typical Instrument Operating Parameters and Sensitivities

Measurement Type	Detector Model	Meter Model	Scan Rate	Count Time	Background (cpm)	MDC (dpm/100cm ²)
Surface Scans	NE IBP19DD	Ludlum 2350-1	2 in./sec.	N/A	350	3,843 (C-14)
Total Surface Activity	NE IBP19DD	Ludlum 2350-1	N/A	60 sec.	350	1,801 (C-14)
Removable Beta Activity	Packard 3200CA	N/A	N/A	30 sec.	12 (H-3) 19 (C-14)	64 (H-3) 47 (C-14)

The following instrumentation was used to quantify radiation levels:

- Ludlum 2350-1, with the following probe
 - ✓ IBP19DD (beta probe)
Serial # 192615 (Calibrated on 5/14/2008)
- Ludlum 2350-1, with the following probe
 - ✓ IBP19DD (beta probe)
Serial # 203462 (Calibrated on 5/14/2008)
- Merck's Packard 3200CA
 - ✓ Liquid Scintillation Counter (LSC)
Serial # 421793 (Calibrated on 12/9/2008)

The instrument calibrations were completed using National Institute of Standards and Technology (NIST) traceable ^{14}C source and the Certificates of Calibration are included as Appendix C.

Minimum Detectable Concentration (MDC) Calculations

Philotechnics, Ltd.'s analytical sheets are included as Appendix D, which show calculations for static MDC for the Scintillation Counter, Static MDC and Scanning MDC for instruments used. These calculations follow the guidance in MARSSIM, NUREG-1575 and NUREG-1507. This information was used to verify the effectiveness of the instrumentation used in units of dpm/100 cm^2 .

Area Classifications

Based on the results of the historical site assessment, the aforementioned areas were classified as impacted areas or non-impacted areas. Non-impacted areas are areas with no potential residual radioactivity from licensed activities. These include all property outside the building and areas inside the building where radioactive material was not handled (e.g. building telecommunications room). Impacted areas are those areas that may have some level of potential residual radioactivity from licensed activities.

Impacted areas are typically divided into Class 1, 2, or 3 areas. Class 1 areas have the greatest potential for contamination and therefore receive the highest degree of survey effort for the Final Status Survey, followed by Class 2 and then by Class 3. Initially, Upper walls (>2m) and ceilings in all areas were classified as non-impacted since there is little or no potential to exceed even a small fraction of the DCGLs on these surfaces.

Class 1 Areas – Areas with the highest potential for contamination, and meet the following criteria: (1) potentially impacted; (2) potential for delivering a dose above the release criteria; (3) potential for small areas of elevated activity; and (4) insufficient evidence to support classification as Class 2 or Class 3.

Class 2 Areas – Areas that meet the following criteria: (1) potentially impacted; (2) low potential for delivering a dose above the release criteria; and (3) little or no potential for small areas of elevated activity.

Class 3 Areas – Areas that meet the following criteria: (1) potentially impacted; (2) little or no potential for delivering a dose above the release criteria; and (3) little or no potential for small areas of elevated activity.

Non-impacted Areas: Building exterior, outside grounds, indoor areas other than those identified as restricted areas by the licensee, and surfaces above two meters in height in the areas specified below.

Impacted Class 1 Areas: Conveyor System, Burn Chamber-Kiln, Loading Ram, Fly Ash System/Bag House areas which include all floor, wall surfaces and structures < 2 meters in height

Impacted Class 2 Areas: Loading Dock and Cold Room areas which include all floor, wall surfaces and structures < 2 meters in height

Impacted Class 3 Areas: Mechanical, Restroom, Control Room, Stairwell areas which include all surfaces and structures < 2 meters in height

It should be noted that no contamination was ever found by the Liscensee in any of the support areas that are classified as Class 3 areas.

Establishing Survey Units

Survey Units were assigned for areas that were homogeneous in construction, contamination potential, and contamination distribution. Survey units were chosen to meet the size recommendations provided in MARSSIM or additional survey locations were plotted to compensate for the additional area.

Table 5 lists the recommended maximum survey unit sizes based on floor area. It should be noted that these limits are recommended and are not absolute.

Table 5: Recommended Maximum Survey Unit Size Limits

Type of Survey Unit	Class 1	Class 2	Class 3
Structures	Up to 100 m ²	100 m ² to 1,000 m ²	No limit

Survey Methodology

Our methodology for the Final Status Survey is based upon the classification. The number of measurements was determined by using MARISSM Table 5.5, "Values for N based upon Sign Test". MARSSIM recommendations were followed by calculating the required spacing between points, generating a random starting point and identifying the data grid point location.

A minimum number of samples are needed to obtain sufficient statistical confidence that the conclusions drawn from the samples are correct. The number of samples will depend on the Relative Shift (the ratio of the concentration to be measured relative to the statistical variability of the contaminant concentration). The minimum number of samples required is obtained from MARSSIM tables or calculated using equations in Section 5 of MARSSIM. The number of samples N needed in a survey may be determined from the following equation (MARSSIM Equation 5-2) and then increasing this result by 20%:

$$N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2}$$

where: N = number of samples needed in a survey unit
 $Z_{1-\alpha}$ = percentile represented by the decision error α
 $Z_{1-\beta}$ = percentile represented by the decision error β
 $\text{Sign } p$ = estimated probability that a random measurement for the survey unit will be less than the DCGL_w when the survey unit median concentration is the LBGR

Values of $Z_{1-\alpha}$, $Z_{1-\beta}$, and $\text{Sign } p$ are tabulated in Tables 5.2 and 5.4 of MARSSIM.

Background Determination

For total surface activity measurements, ambient background levels were generally determined for each survey unit by performing a one minute count with the probe at waist level and away from survey unit surfaces. Ambient background was subtracted from each total activity gross measurement.

Considering that Naturally Occurring Radioactive Material (NARM) may be present in the refractory brick or similar material, a background measurement on a representative refractory brick was taken inside the burn chamber to get an accurate geometrical representation measurement. This background measurement was applicable to the burn chamber and the horizontal ventilation and subtracted accordingly.

Surface Scans

The following table compares MARSSIM recommendations and actual area coverage for the scan survey completed in the Incinerator Room.

Table 6: Scan Survey Coverage Comparison

Classification	Percentage of Surface Area Requiring Scan Coverage (MARSSIM)	Incinerator Room Surface Area Scan Coverage
1	100%	100%
2	10 – 100% (Judgmental)	70 – 90%
3	Judgmental	50%

Class 1 survey areas received a 100% scan survey of all accessible areas and the Class 2 survey areas received a 70 - 90% scan survey of all accessible areas. Class 3 survey areas received a 50% scan survey of all accessible areas.

These scan survey percentages were chosen in order to provide a more comprehensive survey of the potentially impacted areas and a higher confidence that there was no detectable contamination present. In the event of any elevated activity noted from the survey, the location would have been marked and additional measurements would have been taken to quantify the activity.

All scanning measurements in Building 77 areas were substantially lower than the MDC_{scan} for ^{14}C .

Fixed or Static Measurements

Static measurements were completed at locations specified in the survey design. No additional areas were identified during the scanning survey that would warrant specific static measurements. The data calculations from this survey are included as Appendix E.

All static measurements in Building 77 areas were substantially lower than the $DCGL_W$ for ^{14}C .

Removable Measurements

For removable surface activity measurements, background levels were determined for the 3H and ^{14}C channels by counting a blank as the last sample for each batch of samples. The blank was a sample prepared using a new, unused smear. The background values were averaged to determine typical 3H and ^{14}C backgrounds. These values were used to determine counting error rates and minimum detectable concentrations. Channels 1 and 2 were setup for counting 3H and ^{14}C respectively. Channel 3 was left open over the remaining spectrum to detect other radioactive constituents if present. Channel 3 data were reviewed during the Data Quality Assessment to identify any anomalous results indicating the presence of other nuclides. No elevated results were obtained in Channel 3. All removable contamination results are reported as net dpm/100cm².

Channel 1 (3H)	:	0.0 - 12.0 keV
Channel 2 (^{14}C)	:	12.0 - 156 keV
Channel 3 (Others)	:	156 - 2000 keV

All final smear samples taken at the facility were counted on Merck's Packard 3200CA Liquid Scintillation Counter for 30 seconds. Smear results are manually transcribed from Merck's Rahway, NJ Site LSA printout results. Efficiencies are within a range, and vary as correlated by the quench indicating parameter and efficiency relationship. The data calculations from this survey are included as Appendix E.

All removable contamination measurements in Building 77 areas were substantially lower than the DCGL_w.

Surveys of Building Mechanical Systems

Surveys of various building system fixtures were performed. Surveys of the building mechanical system included removable and total contamination measurements of the following:

- Conveyor System
- Burn Chamber/Kiln
- Quench Pit
- Bottom Ash Rake
- Floor Drain Trench Pit
- Emergency Stack
- Fly Ash System/Bag House
- Top Elevation Horizontal Ventilation
- Quench Tank
- Vertical Exhaust Stack
- Loading Ram

Total activity and removable contamination measurement results for all incinerator fixtures are provided in Appendix F.

Section 6.0 Data Quality Assessment and Interpretation of Survey Results

The statistical guidance contained in Section 8 of MARSSIM was used to determine if areas are acceptable for unrestricted release, and whether additional surveys or sample measurements were needed.

The following table summarizes MARSSIM guidance for conclusions based upon data provided by the Final Status Survey.

Table 7: Guidance for Survey Conclusions

Survey Result	Conclusion
All measurements less than DCGL _w	Survey unit meets release criterion
Average greater than DCGL _w	Survey unit does not meet release criterion

All calculations of average, standard deviation, minimum and maximum values and all comparisons between survey data, DCGLs and administrative limits for each survey unit are presented in Tables 8 through 11. Complete survey data are included in Appendix E and F.

Table 8: Building 77 Surfaces and Structures Total Activity Summary

Survey Unit	Class	Number of Samples	Isotope	Average	Standard Deviation	Minimum	Maximum	Administrative Limit Note 1	Any Result Exceeding Administrative Limit? Note 2
MWI-1-001	1	32	¹⁴ C	476	208	-4,898	1,898	146,000	No
MWI-1-002	2	50	¹⁴ C	190	125	-1,237	2,017	146,000	No
MWI-1-003	1	29	¹⁴ C	1,666	221	0	5,712	146,000	No
MWI-1-004	1	21	¹⁴ C	279	175	-1,136	1,746	146,000	No
MWI-1-005	2	27	¹⁴ C	627	121	-644	1,915	146,000	No
MWI-1-006	1	43	¹⁴ C	818	168	-1,169	3,814	146,000	No
MWI-1-007	3	10	¹⁴ C	1,973	462	305	5,593	146,000	No
MWI-1-008	3	20	¹⁴ C	166	253	-1,678	1,712	146,000	No
MWI-1-009	3	20	¹⁴ C	-498	232	-2,102	1,559	146,000	No
MWI-2-001	3	20	¹⁴ C	272	121	-588	1,450	146,000	No

Note 1: The limiting DCGL_w for beta emitters is ¹⁴C at 1.46 x 10⁵ dpm/100 cm²
 Note 2: No measurement exceeded applicable DCGLs.

Table 9: Building 77 Building Surface and Structures Removable Contamination Summary

Survey Unit	Class	Number of Samples	Isotope	Average	Standard Deviation	Minimum	Maximum	Administrative Limit	Any Result Exceeding Administrative Limit? Note 1
MWI-1-001	1	32	³ H	10	3	0	57	14,600	No
			¹⁴ C	3	1	0	14	14,600	No
MWI-1-002	2	50	³ H	8	2	0	76	14,600	No
			¹⁴ C	1	1	0	13	14,600	No
MWI-1-003	1	29	³ H	25	17	0	68	14,600	No
			¹⁴ C	2	1	0	14	14,600	No
MWI-1-004	1	21	³ H	17	4	0	69	14,600	No
			¹⁴ C	4	1	0	16	14,600	No
MWI-1-005	2	27	³ H	0	0	0	27	14,600	No
			¹⁴ C	3	1	0	15	14,600	No
MWI-1-006	3	43	³ H	9	2	0	56	14,600	No
			¹⁴ C	2	1	0	13	14,600	No
MWI-1-007	3	10	³ H	3	2	0	20	14,600	No
			¹⁴ C	4	2	0	14	14,600	No
MWI-1-008	3	20	³ H	9	2	0	22	14,600	No
			¹⁴ C	3	1	0	17	14,600	No
MWI-1-009	3	20	³ H	1	1	0	10	14,600	No
			¹⁴ C	3	1	0	19	14,600	No
MWI-2-001	3	20	³ H	8	3	0	51	14,600	No
			¹⁴ C	3	1	0	21	14,600	No

Note 1: No measurement exceeded applicable DCGLs.

Table 10: Incinerator Fixtures Total Activity Summary

Building Mechanical Systems	Number of Samples	Isotope	Average	Standard Deviation	Minimum	Maximum	Administrative Limit Note 1	Any Result Exceeding Administrative Limit? Note 2
Incinerator Fixtures	124	¹⁴ C	2,837	499	-3,729	25,441	146,000	No

Note 1: The limiting DCGL_w for beta emitters is ¹⁴C at 1.46 x 10⁵ dpm/100 cm²

Note 2: No measurement exceeded applicable DCGLs.

Table 11: Incinerator Fixtures Removable Contamination Summary

Building Mechanical Systems	Number of Samples	Isotope	Average	Standard Deviation	Minimum	Maximum	Administrative Limit	Any Result Exceeding Administrative Limit? Note 1
Incinerator Fixtures	124	³ H	9	1	0	72	14,600	No
		¹⁴ C	3	0	0	25	14,600	No

Note 1: No measurement exceeded applicable DCGLs.

Determining Compliance for Building Surfaces and Structures

Removable contamination measurements were compared directly to the established DCGLs. Additionally, all removable contamination measurements were compared to the applicable administrative limits to determine if an area required further examination. All smears collected during the Final Status Survey were less than the applicable administrative limits and significantly less than the established DCGLs for removable activity. Therefore, compliance was determined based on total activity measurements.

All total beta surface activity measurements were compared directly to the established DCGLs. Additionally, all total beta surface activity measurements were compared to the applicable administrative limits to determine if an area required further examination. All total surface activity measurements collected during Final Status Surveys were less than the established DCGLs and the applicable administrative limits.

Therefore, the null hypothesis can be rejected and the survey units meet the release criteria and are suitable to release for unrestricted use. Total activity and removable contamination measurement results for all surface and structure survey units are provided in Appendix E.

Determining Compliance for Building Mechanical Systems (Incinerator Fixtures)

Removable contamination measurements were compared directly to the established DCGLs. Additionally, all removable contamination measurements were compared to the applicable administrative limits to determine if an area required further examination. All removable contamination measurements collected during the characterization surveys were less than the established DCGLs and the applicable administrative limits.

All total beta surface activity measurements were compared directly to the applicable DCGLs. Additionally, all total beta surface activity measurements were compared to the applicable administrative limits to determine if an area required further examination. All total beta surface activity measurements were less than the established DCGLs.

Total activity and removable activity measurement results for all building systems survey units are provided in Appendix F.

DandD Dose Calculations

To support the unrestricted release of the areas listed in Table 2 dose calculations were completed using DandD code Version2. The data sheets are included in Appendix E and doses were calculated using the maximum dpm static values of the surveys to give a maximum potential dose resulting from any radioactive material that may not have been detected by the survey. It is important to recognize that this dose calculation assumes this level of contamination uniformly exists in all areas affected by future decommissioning and that this calculation is very conservative. Appendix G includes the dose calculation for the maximum detectable concentration.

The total effective dose equivalent (TEDE) from any potential radioactive materials in the specified areas in Building 77 is calculated to be 0.04 mrem/year based upon maximum detectable concentrations of beta radionuclides uniformly dispersed in a localized area.

Decommissioning Review

Philotechnics has reviewed all of the applicable data pertaining to the history of radioactive materials use as well as the static and wipe surveys completed at Merck's Incinerator Building 77 located at 126 East Lincoln Ave. Rahway NJ. It is our professional opinion that the Incinerator and its fixtures meet the specified criteria for unrestricted release as defined in 10 CFR 20.1402.

Appendix A

Building 77 Facility Diagrams

Merck CODING SYSTEM

Example 1 (Building Structures and Surfaces): MWI-001-F1-T-001

MWI = Building Area (Merck Waste Incinerator)
001 = Survey Unit ID Code (001=Survey Unit 1)
F1 = Structural Surface Code (F=Floor, 1=corresponds to building floor, in this case 1=first floor)
T = Structural Material Code (i.e. Tile)
001 = Sample Number

Example 2 (Incinerator Component/Equipment): MWI-1-BC-F1-B-001

MWI = Building Area (Merck Waste Incinerator)
1 = Component Floor Location (1=First Floor)
BC = Incinerator Component/Equipment (BC=Burn Chamber)
F1 = Structural Surface Code (F=Floor, 1=corresponds to building floor)
B = Structural Material Code (i.e. Brick)
001 = Sample Number

STRUCTURAL/SURFACE MATERIAL

M (misc) – Metal, Wood, Steel, Drywall, Laminate, Cinder Block, Brick, Concrete, Rubber, Glass

STRUCTURAL SURFACE CODE

W1 – Wall

F1 – Floor

C1 – Ceiling

S1 – Structure (Columns, Beams)
--

BC – Burn Chamber

BH – Bag House

QP – Quench Pit

BR – Bottom Ash Rake

DP - Drain Pit

ES - Emergency Stack

HV – Horizontal Ventilation

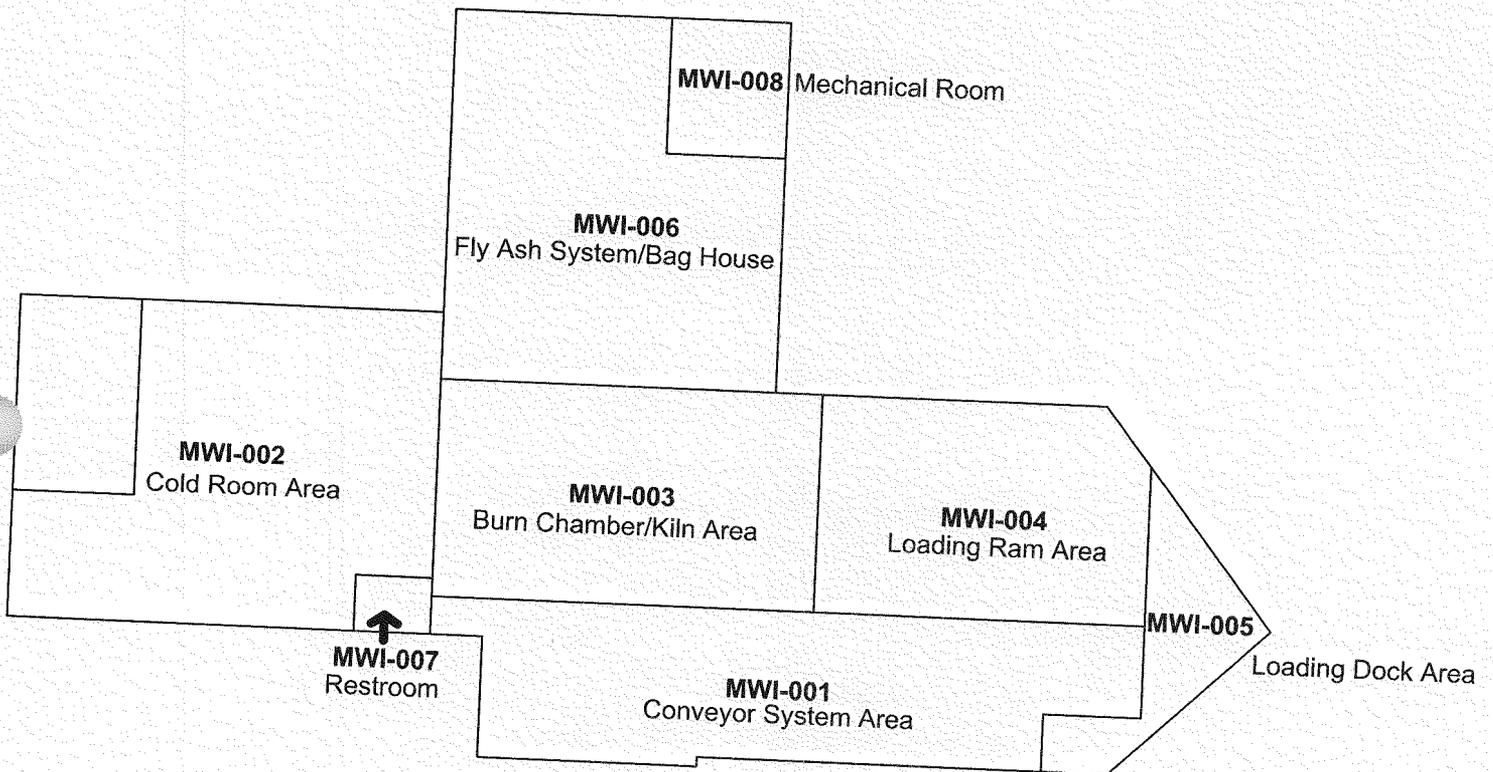
QT – Quench Tank

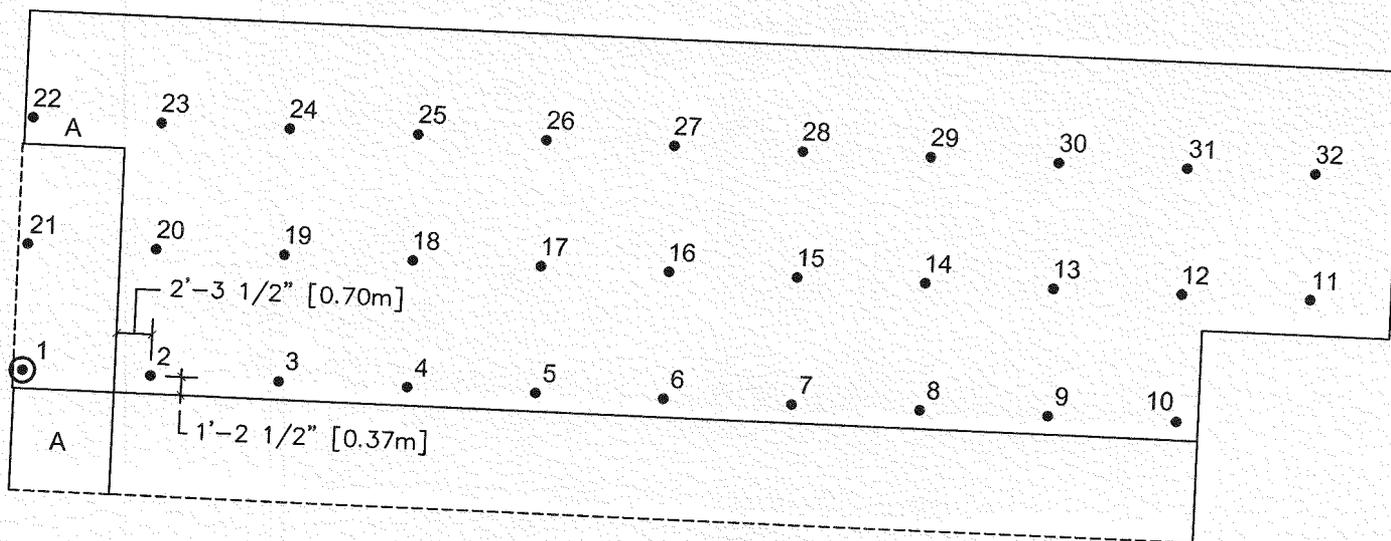
VS – Vertical Stack

CV – Conveyor System

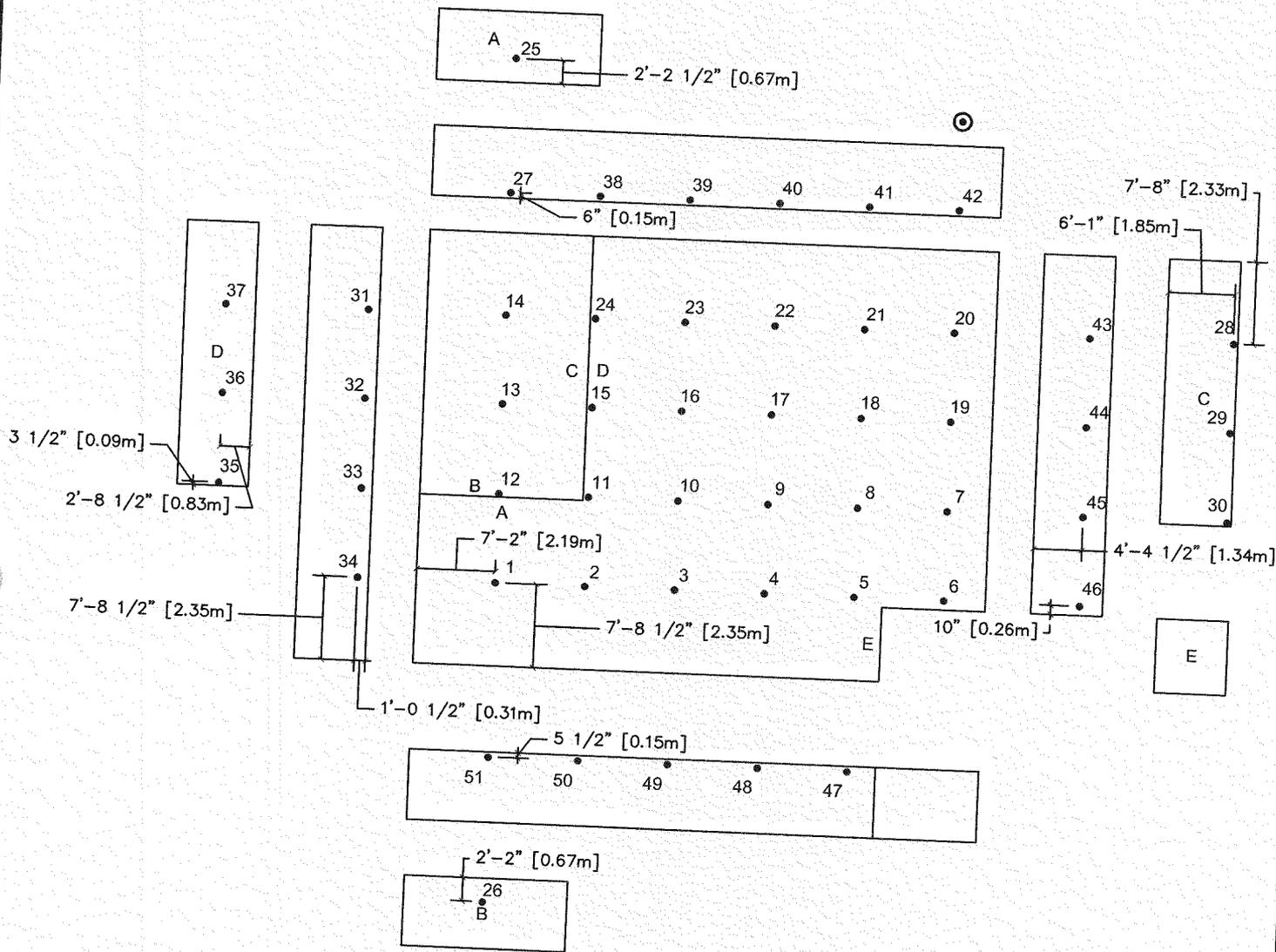
LR – Loading Ram

Survey Unit Overview



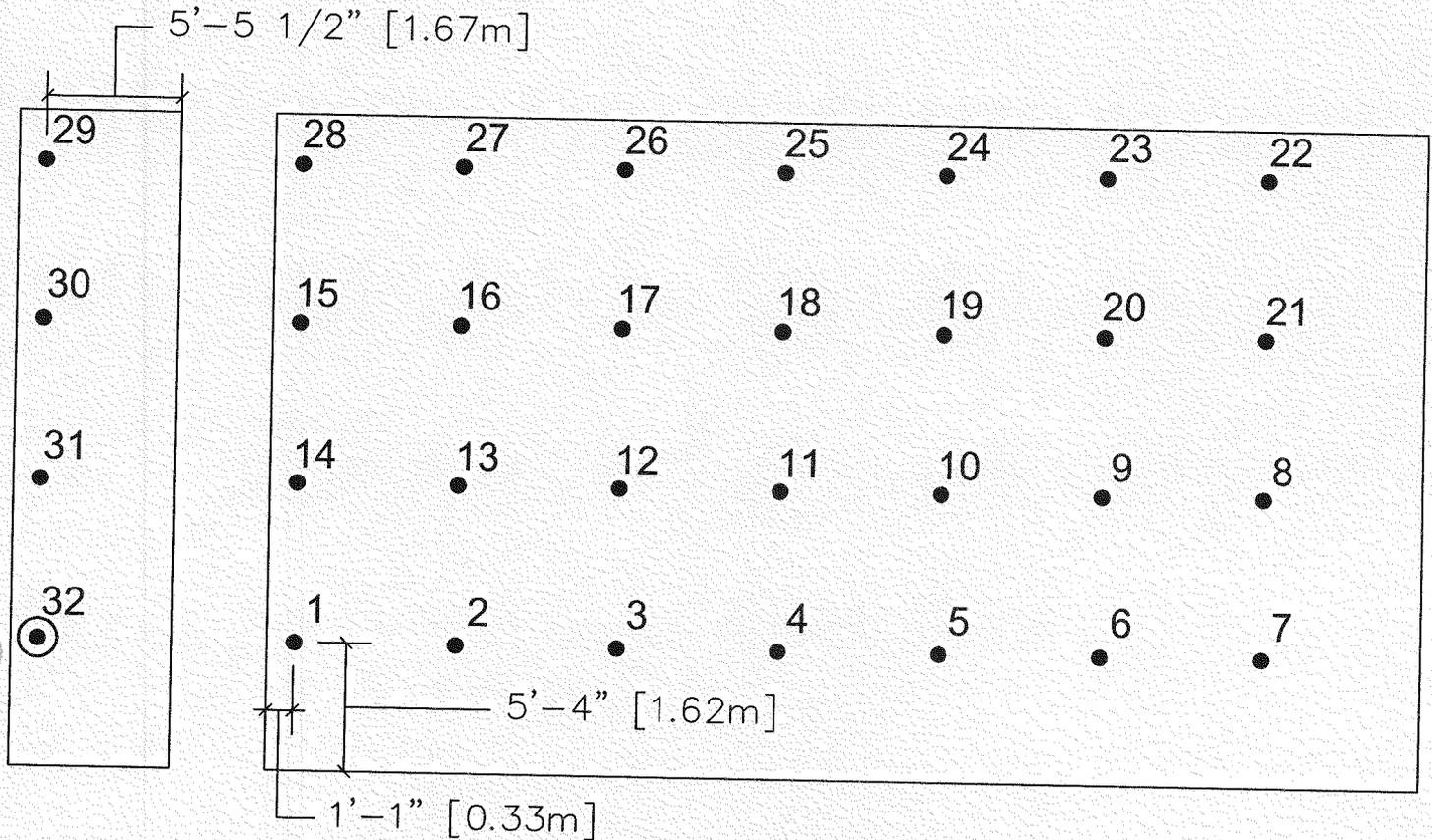


SURVEY MAP		
BUILDING: Merck MWI	SURVEY UNIT NUMBER: 1-001	PAGE OF
SURVEY TYPE (CHECK ONE): <input type="checkbox"/> Characterization Survey <input checked="" type="checkbox"/> Final Status Survey		
COMMENTS: Conveyor System Area In laying out the survey locations a random start for the square grid is selected by randomly choosing coordinates on an x-y system. Therefore, the random start point for the grid may or may not actually land on the survey unit surfaces..		
SURVEY COMPLETED BY: <i>[Signature]</i>		DATE COMPLETED: 4/9/09
RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: <i>[Signature]</i>		DATE: 5/17/09



- ⊙ Random Start Location
 - Sample Locations
- Typical Spacing – 8' 2.5" or 2.5m

SURVEY MAP		
BUILDING: Merck MWI	SURVEY UNIT NUMBER: 1-002	PAGE OF
SURVEY TYPE (CHECK ONE):		
<input type="checkbox"/> Characterization Survey	<input checked="" type="checkbox"/> Final Status Survey	
COMMENTS: Cold Room Area		
In laying out the survey locations a random start for the square grid is selected by randomly choosing coordinates on an x-y system. Therefore, the random start point for the grid may or may not actually land on the survey unit surfaces..		
SURVEY COMPLETED BY: <i>[Signature]</i>		DATE COMPLETED: 4/9/09
RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: <i>[Signature]</i>		DATE: 5/19/09



⊙ Random Start Location

● Sample Locations

Typical Spacing - 6' 6 .5" or 2.0m

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-003

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

COMMENTS: Burn Chamber/ Kiln Area

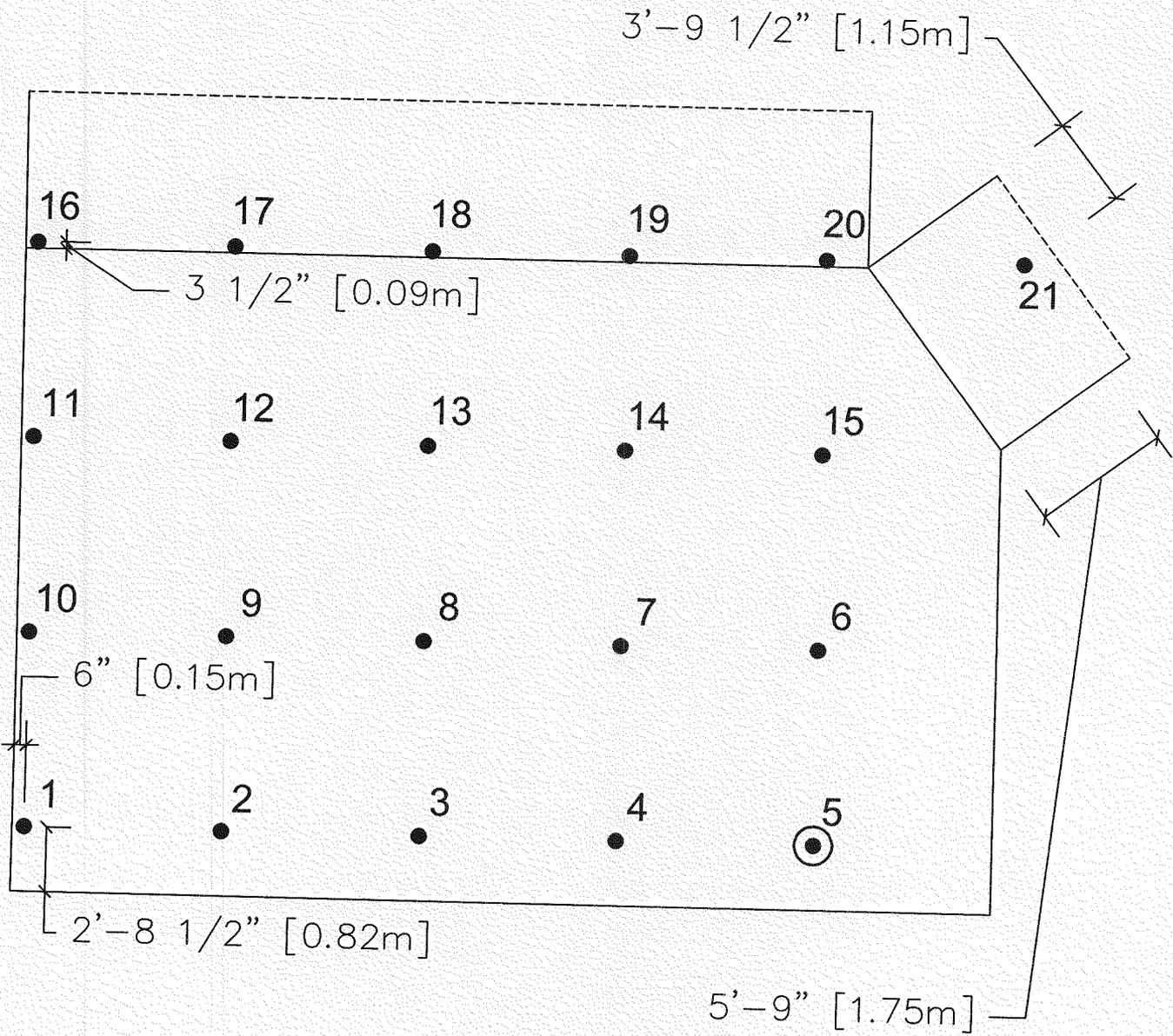
In laying out the survey locations a random start for the square grid is selected by randomly choosing coordinates on an x-y system. Therefore, the random start point for the grid may or may not actually land on the survey unit surfaces..

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/9/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



- ⊙ Random Start Location
 - Sample Locations
- Typical Spacing - 8' 2.5" or 2.5m

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-004

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

COMMENTS: Loading Ram Area

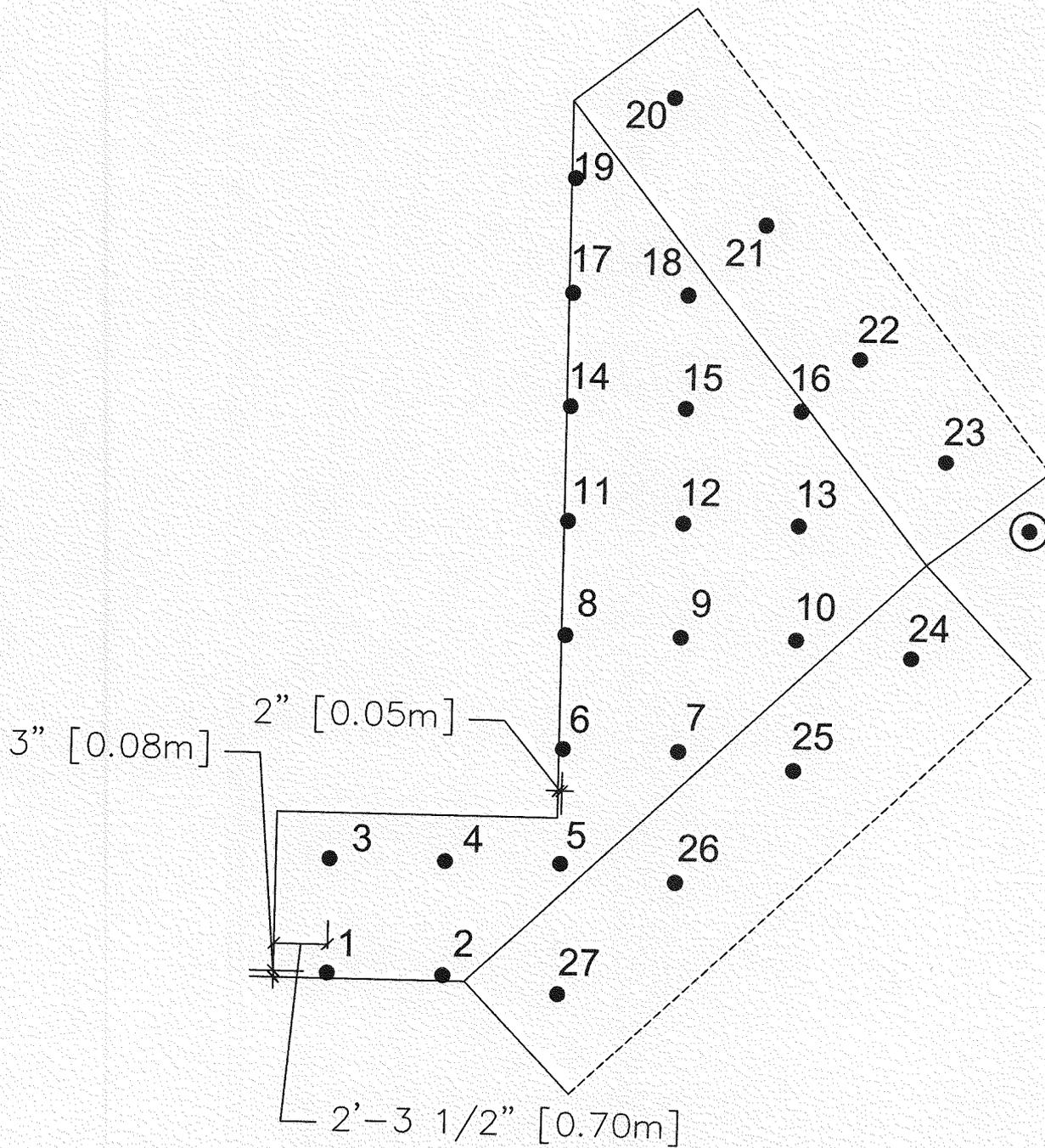
In laying out the survey locations a random start for the square grid is selected by randomly choosing coordinates on an x-y system. Therefore, the random start point for the grid may or may not actually land on the survey unit surfaces..

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/9/89

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/18/89



- ⊙ Random Start Location
 - Sample Locations
- Typical Spacing - 4' 11" or 1.5m

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-005

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

COMMENTS: Loading Dock Area

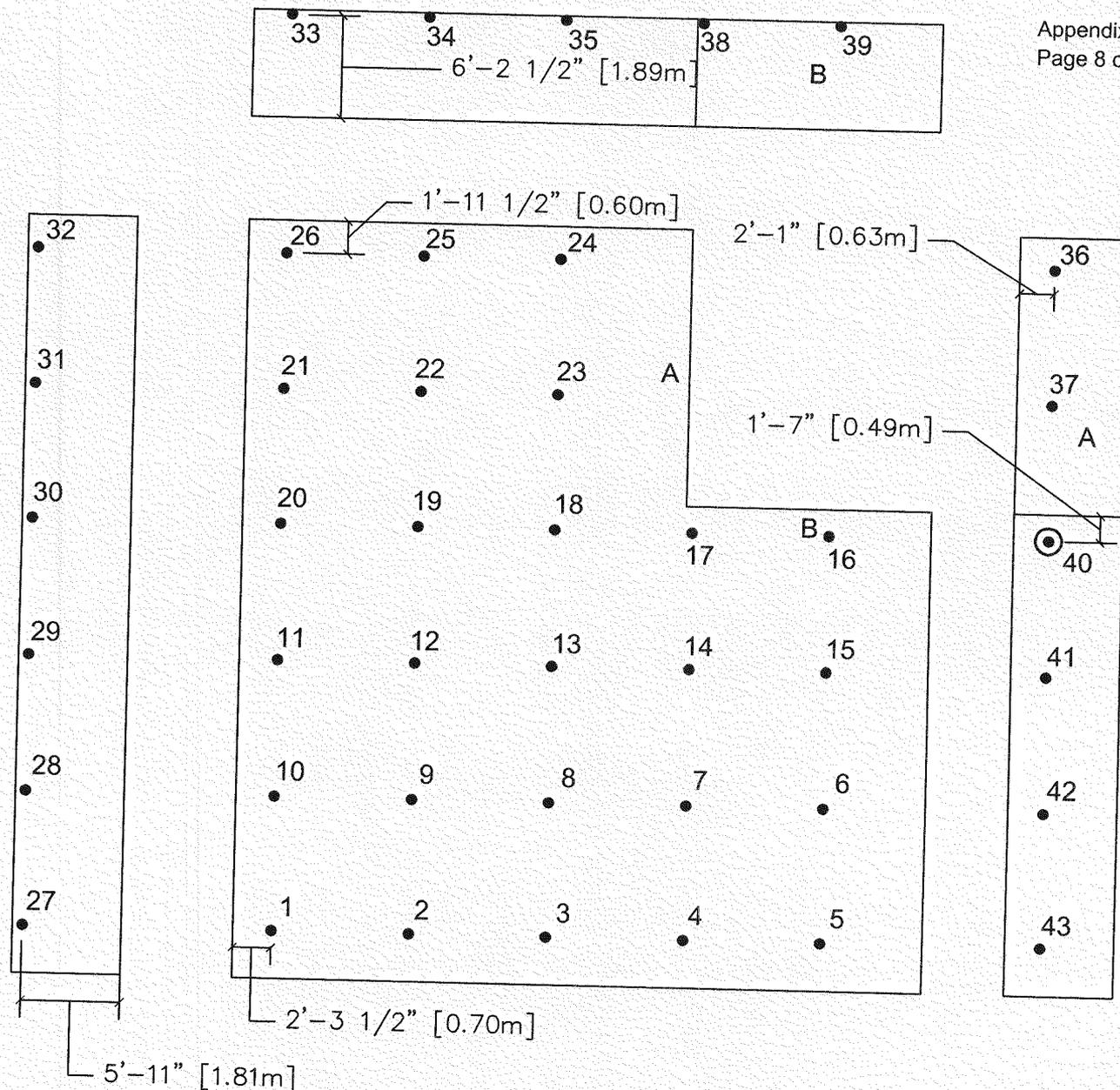
In laying out the survey locations a random start for the square grid is selected by randomly choosing coordinates on an x-y system. Therefore, the random start point for the grid may or may not actually land on the survey unit surfaces..

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/9/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/13/09



- Random Start Location
 - Sample Locations
- Typical Spacing - 8' 2.5" or 2.5m

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-006

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

COMMENTS: Fly Ash System/ Bag House Area

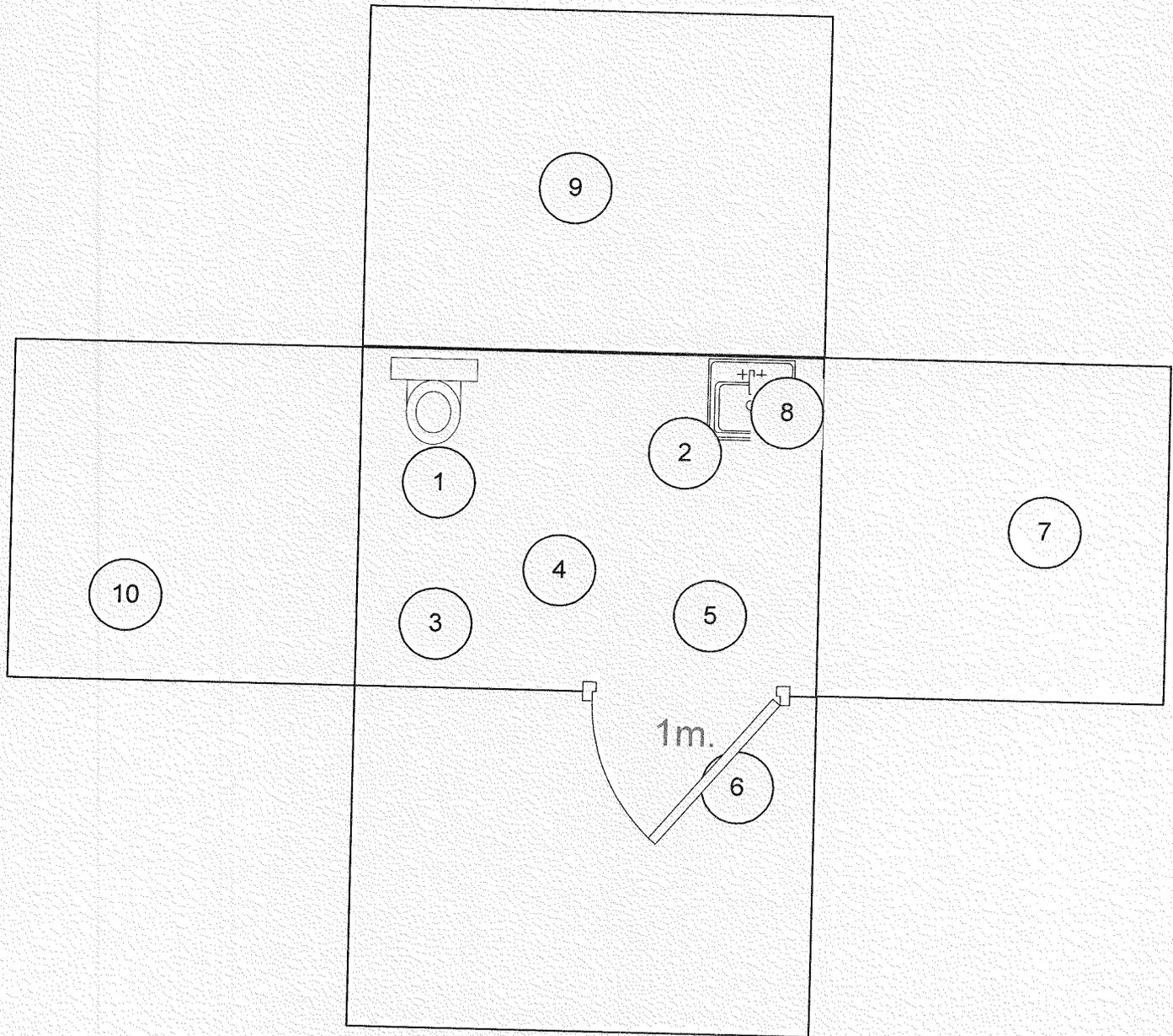
In laying out the survey locations a random start for the square grid is selected by randomly choosing coordinates on an x-y system. Therefore, the random start point for the grid may or may not actually land on the survey unit surfaces..

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/9/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



○ Sample Locations

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-007

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

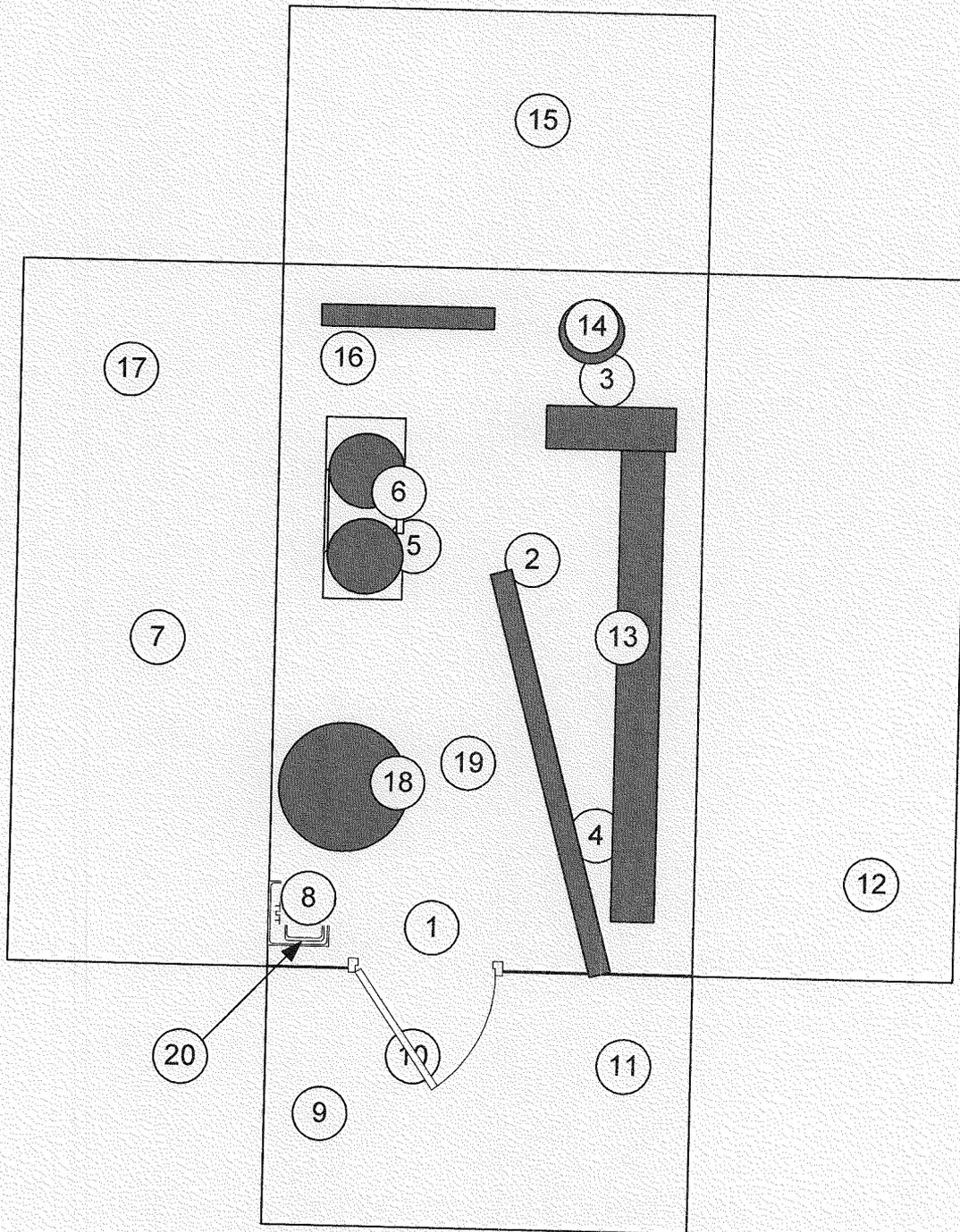
COMMENTS: Restroom

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/2/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



○ Sample Locations

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-008

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

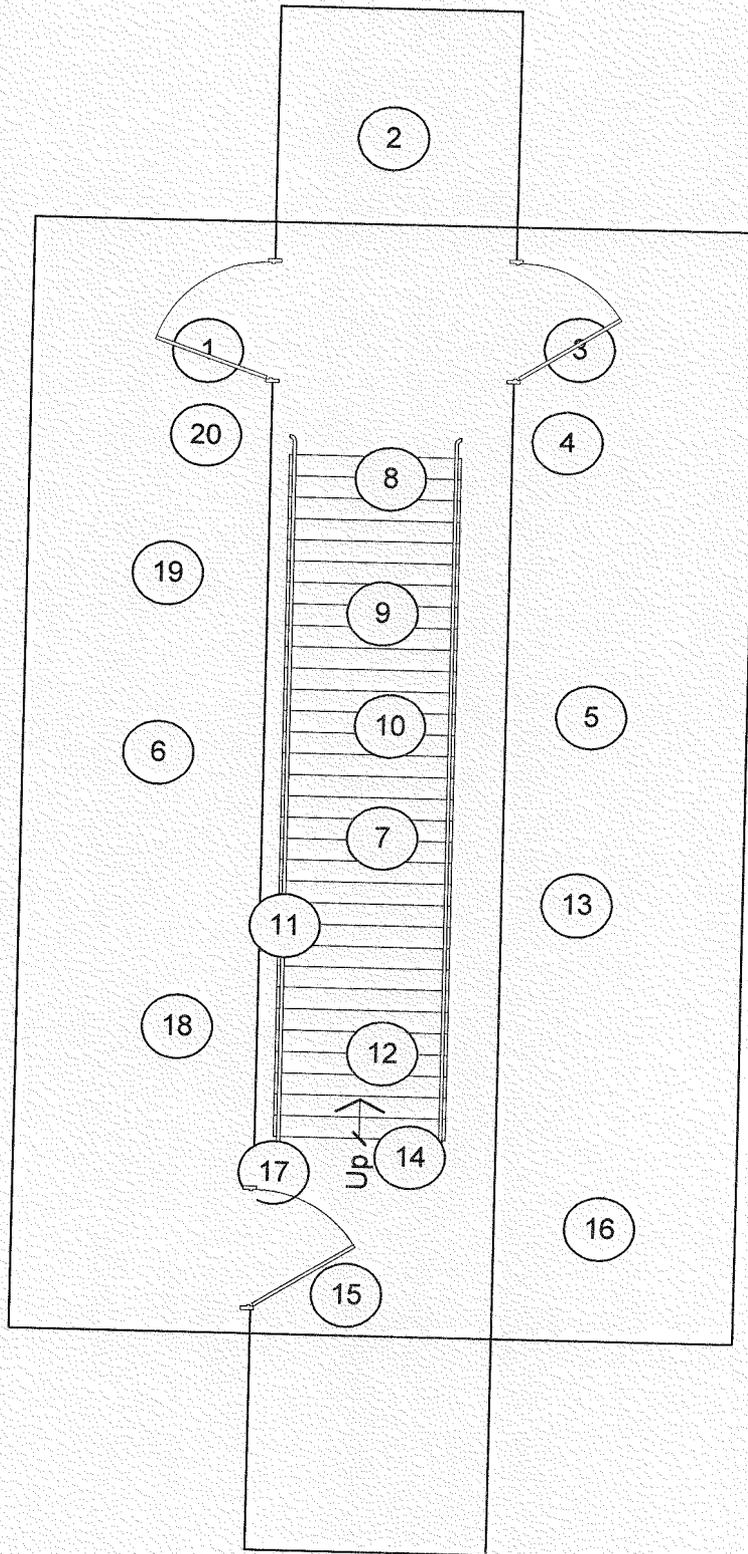
COMMENTS: Mechanical Room

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/4/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



○ Sample Locations

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 1-009

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

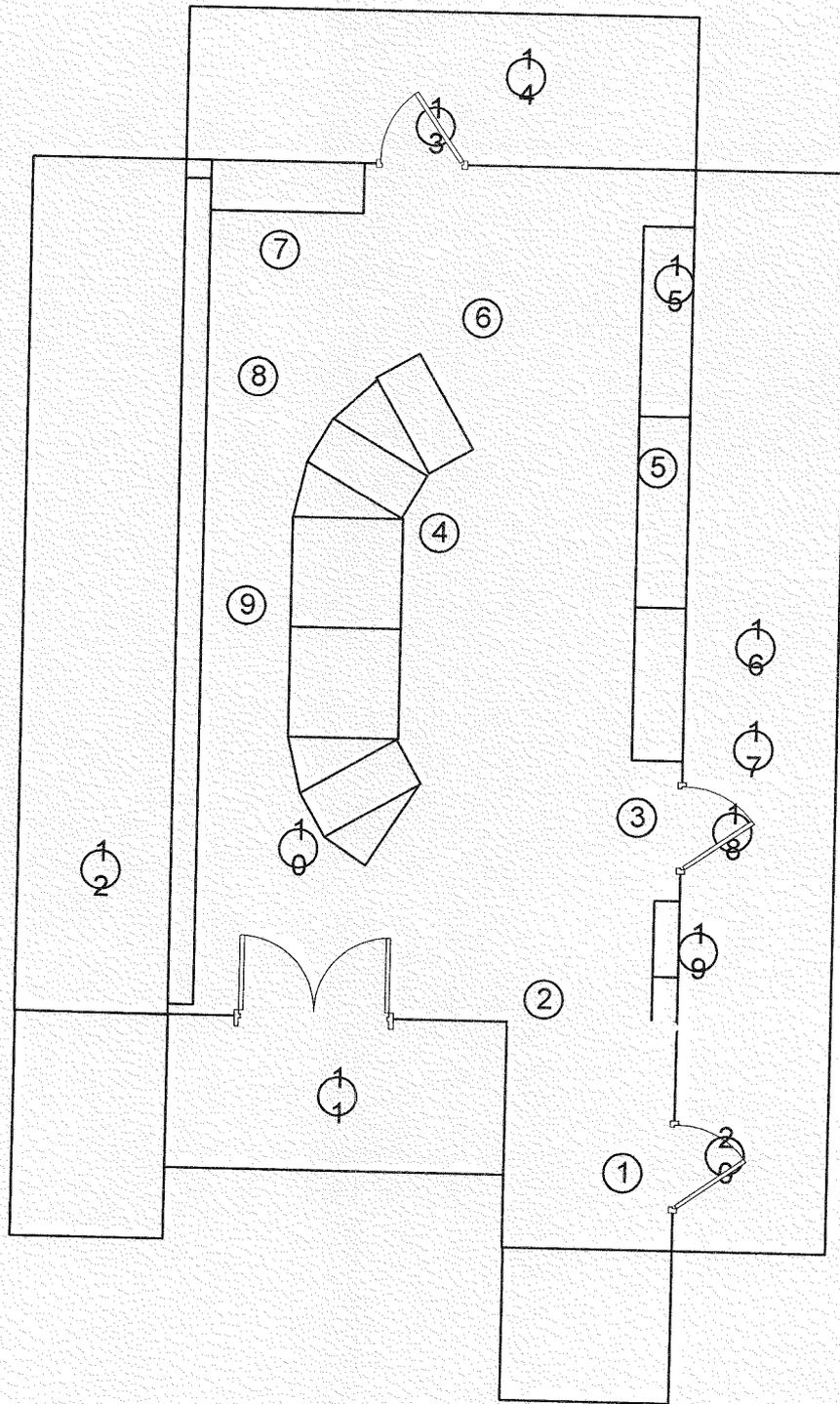
COMMENTS: Stairwell to Control Room

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/6/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



○ Sample Locations

SURVEY MAP

BUILDING: Merck MWI

SURVEY UNIT NUMBER: 2-001

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

COMMENTS: Control Room

SURVEY COMPLETED BY: *Lawrence*

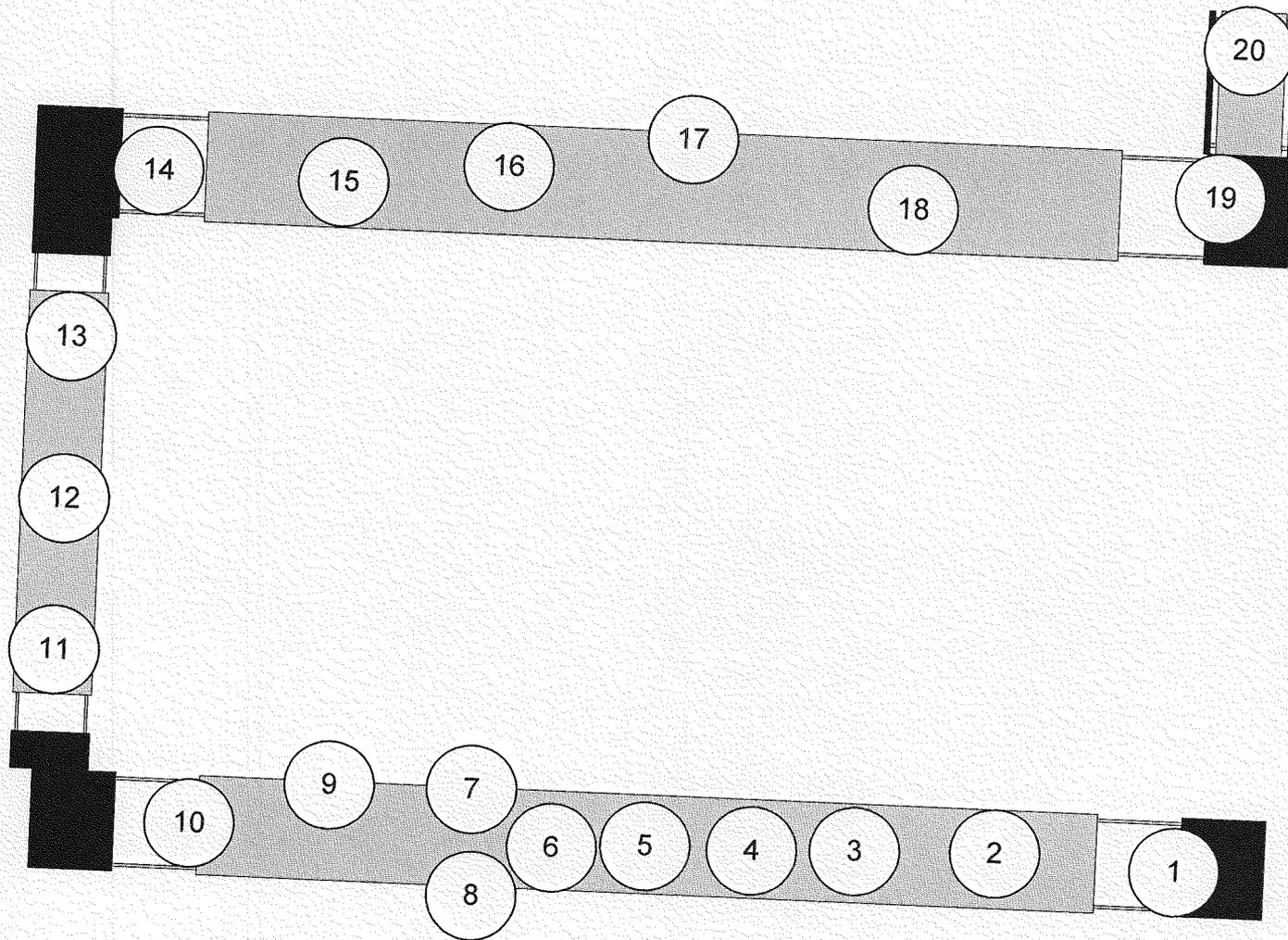
DATE COMPLETED: 4/9/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

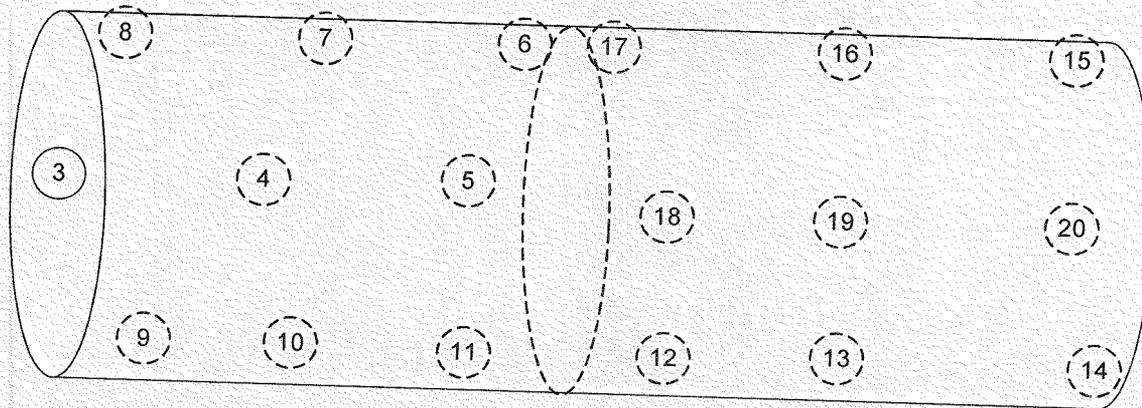
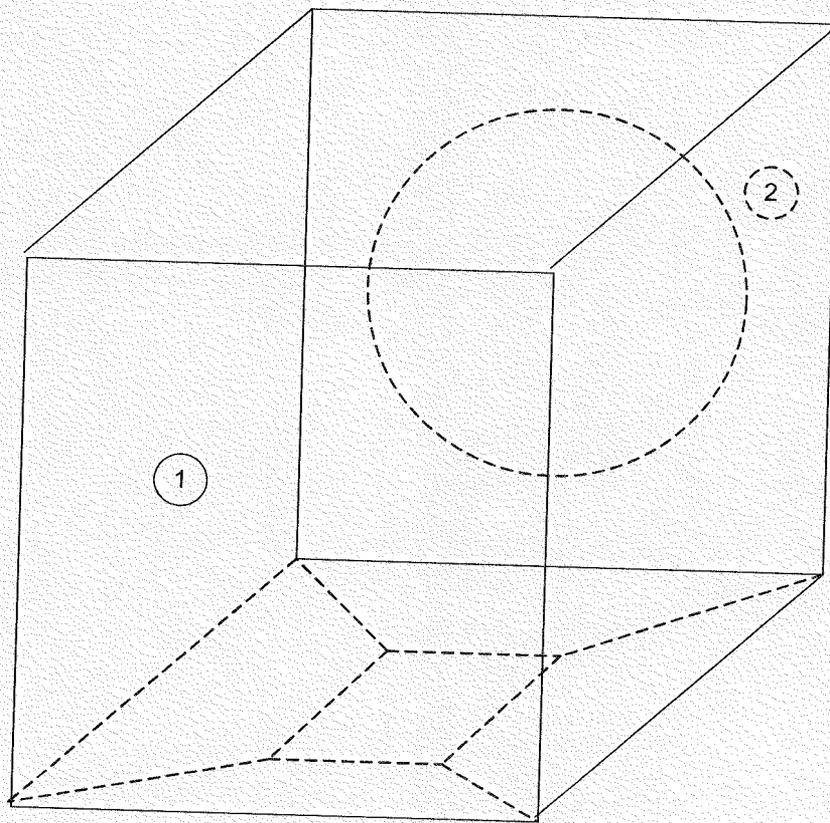
DATE: 5/13/09

Appendix B

Building 77 Incinerator Fixture Diagrams



SURVEY MAP		
BUILDING: MWI	SURVEY UNIT NUMBER: Conveyor System	PAGE OF
SURVEY TYPE (CHECK ONE):		
<input type="checkbox"/> Characterization Survey		<input checked="" type="checkbox"/> Final Status Survey
COMMENTS:		
SURVEY COMPLETED BY: <i>[Signature]</i>		DATE COMPLETED: 4/9/09
RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: <i>[Signature]</i>		DATE: 5/19/09



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Burn Chamber - Kiln

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

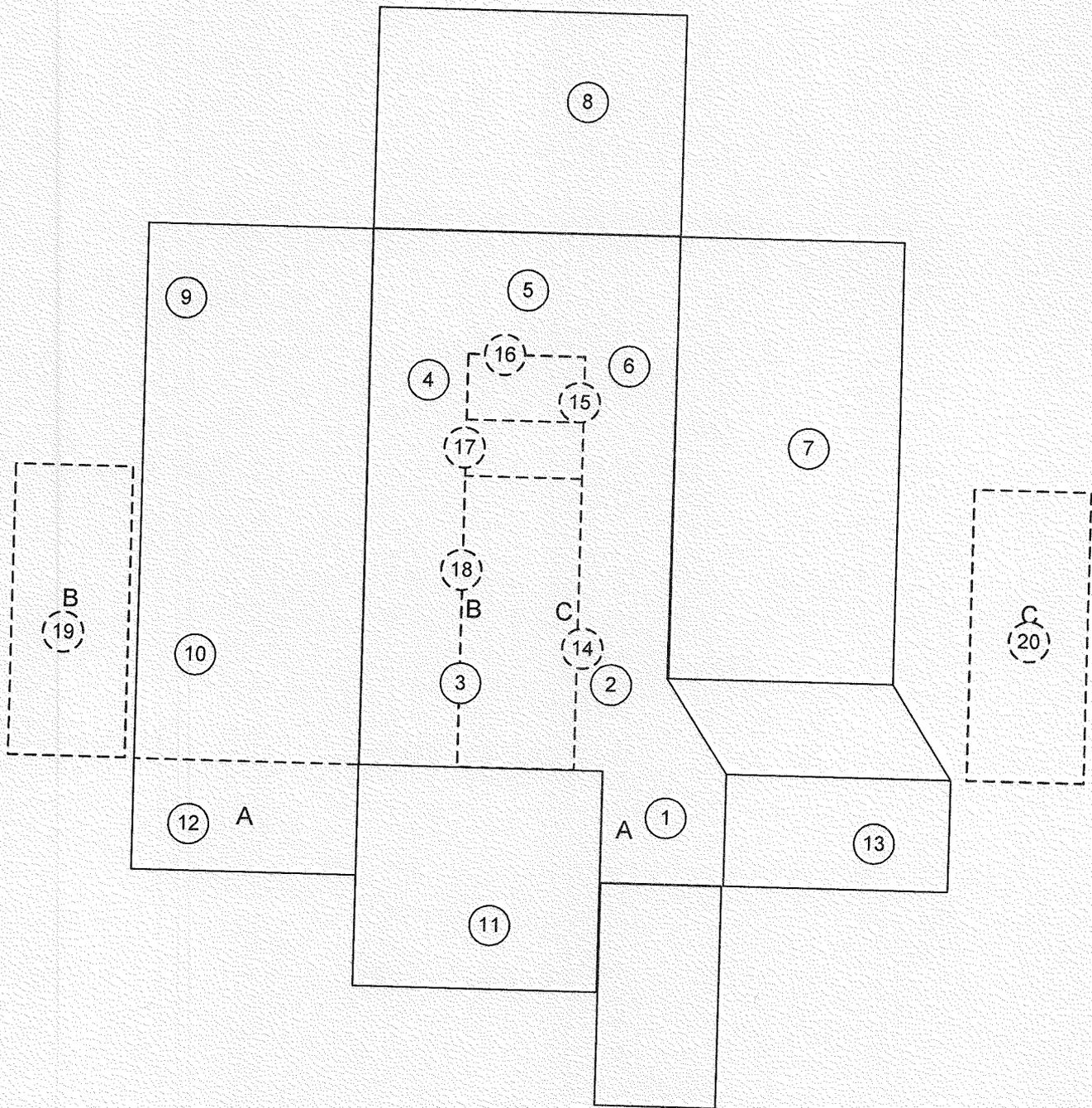
COMMENTS:

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: *4/9/09*

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: *5/19/09*



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Quench Pit

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

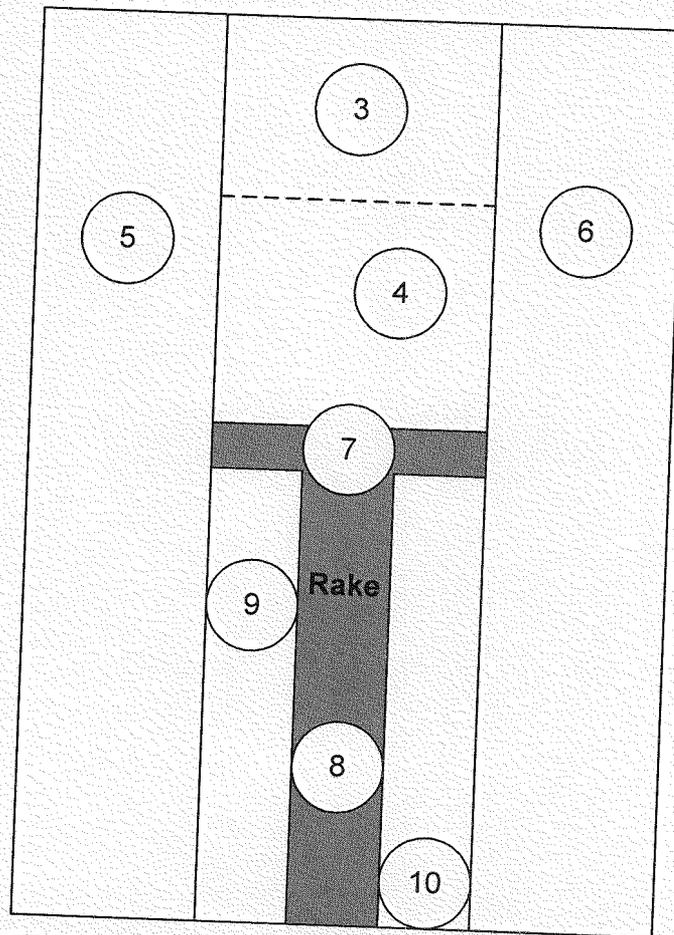
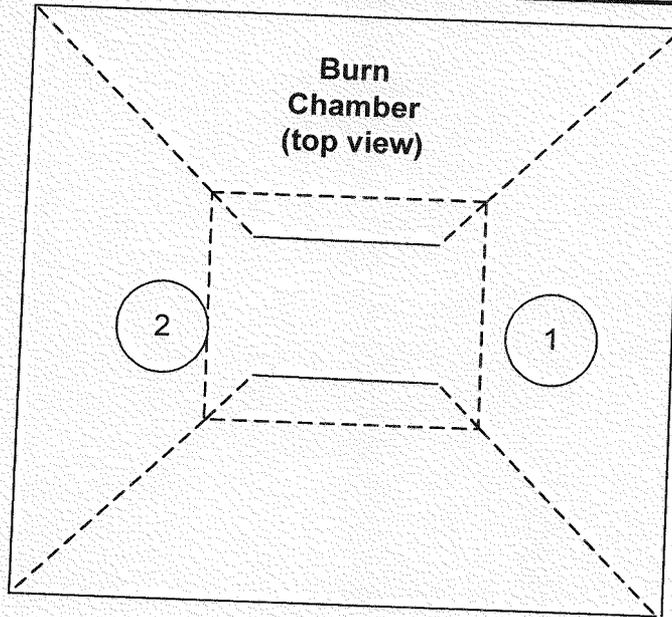
COMMENTS:

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/8/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Bottom Ash Rake

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

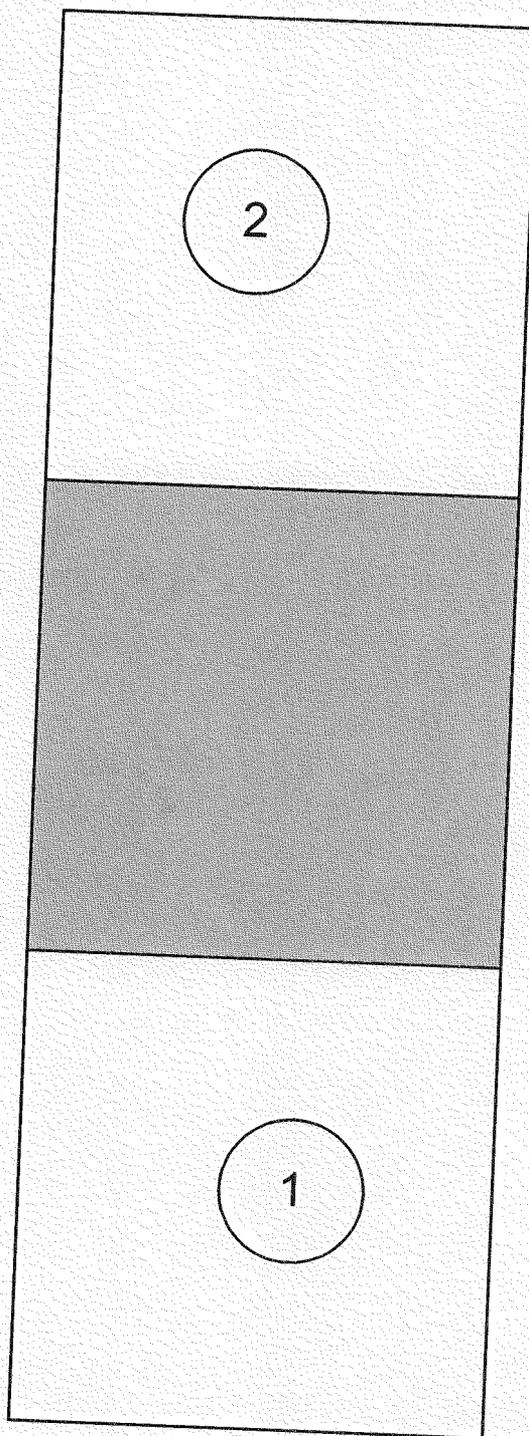
COMMENTS:

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/8/04

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/07



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Drain Pit Trench

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

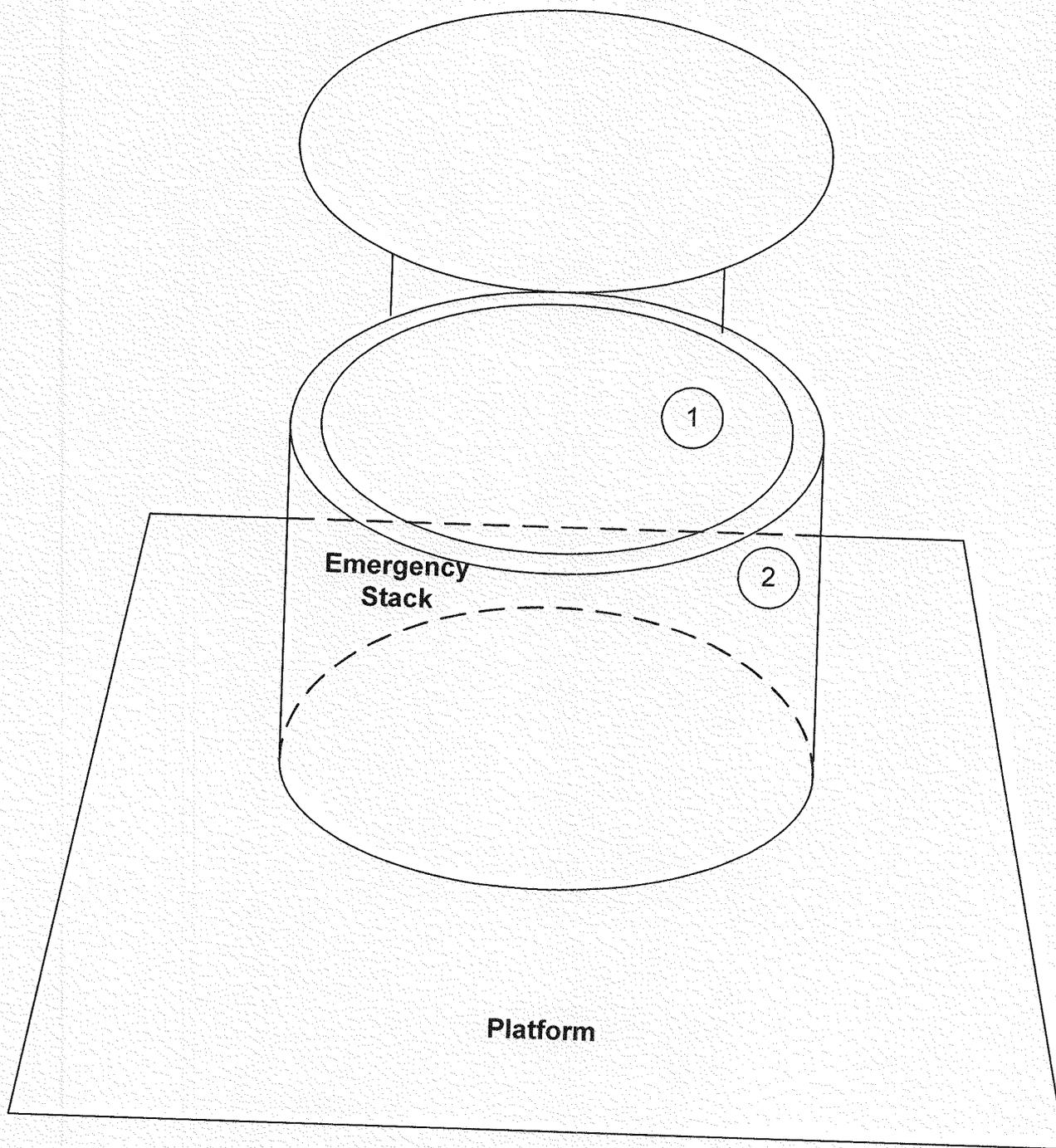
COMMENTS:

SURVEY COMPLETED BY: *[Signature]*

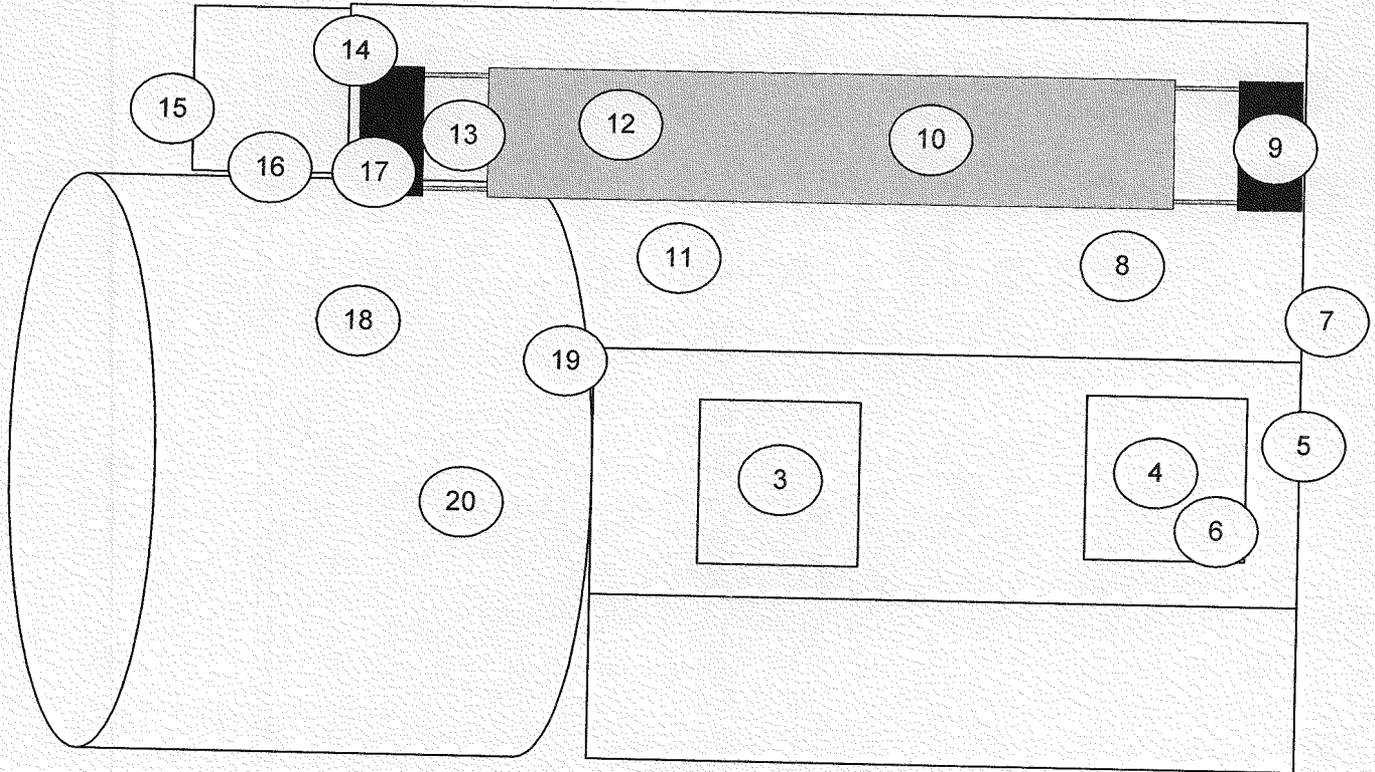
DATE COMPLETED: 4/8/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



SURVEY MAP		
BUILDING: MWI	SURVEY UNIT NUMBER: Emergency Stack	PAGE OF
SURVEY TYPE (CHECK ONE):	<input type="checkbox"/> Characterization Survey	<input checked="" type="checkbox"/> Final Status Survey
COMMENTS:		
SURVEY COMPLETED BY: <i>[Signature]</i>	DATE COMPLETED: 4/7/09	DATE: 5/19/09
RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: <i>[Signature]</i>		



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Loading Ram

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

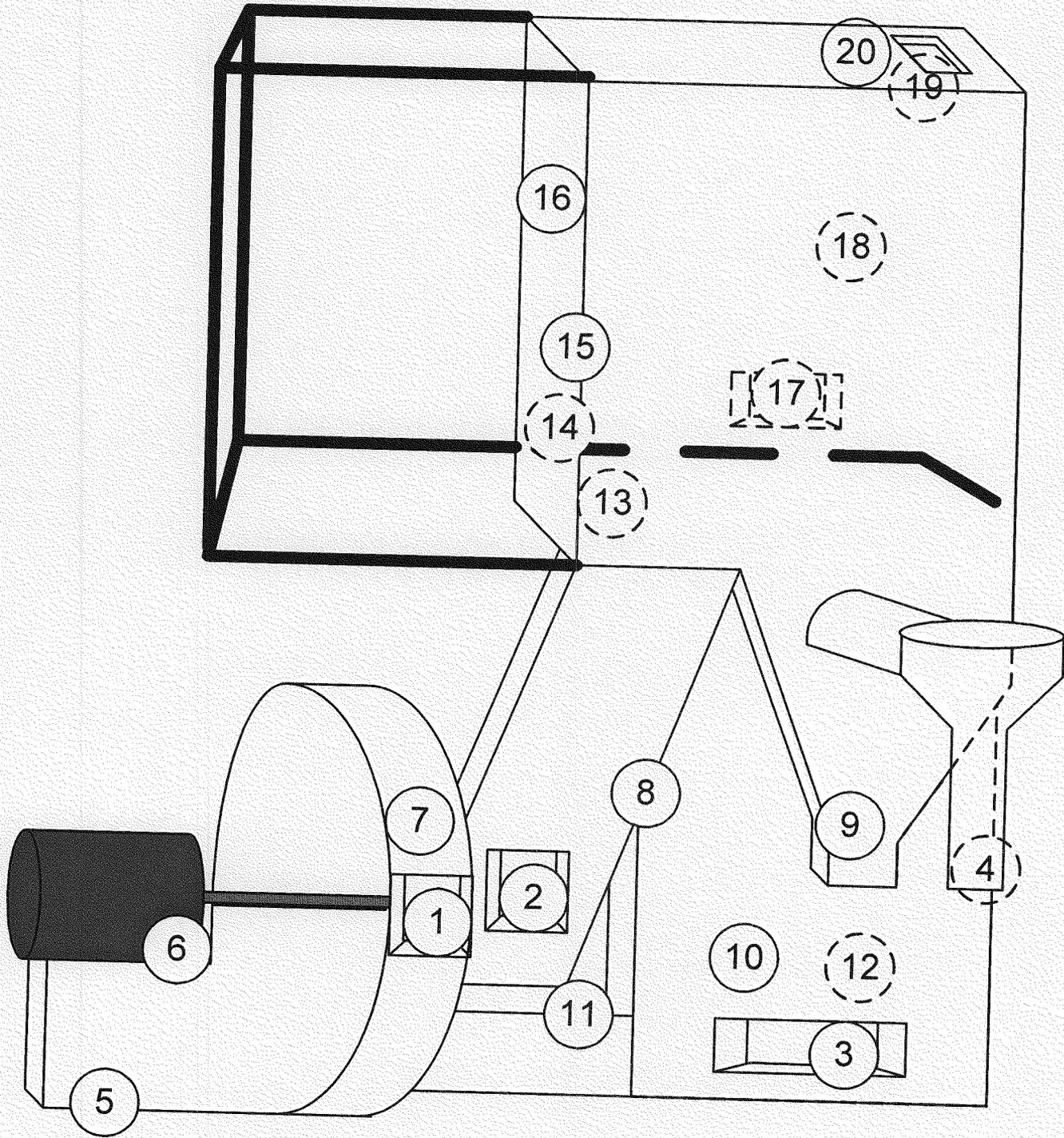
COMMENTS:

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/2/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/12/09



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Fly Ash System/ Baghouse

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

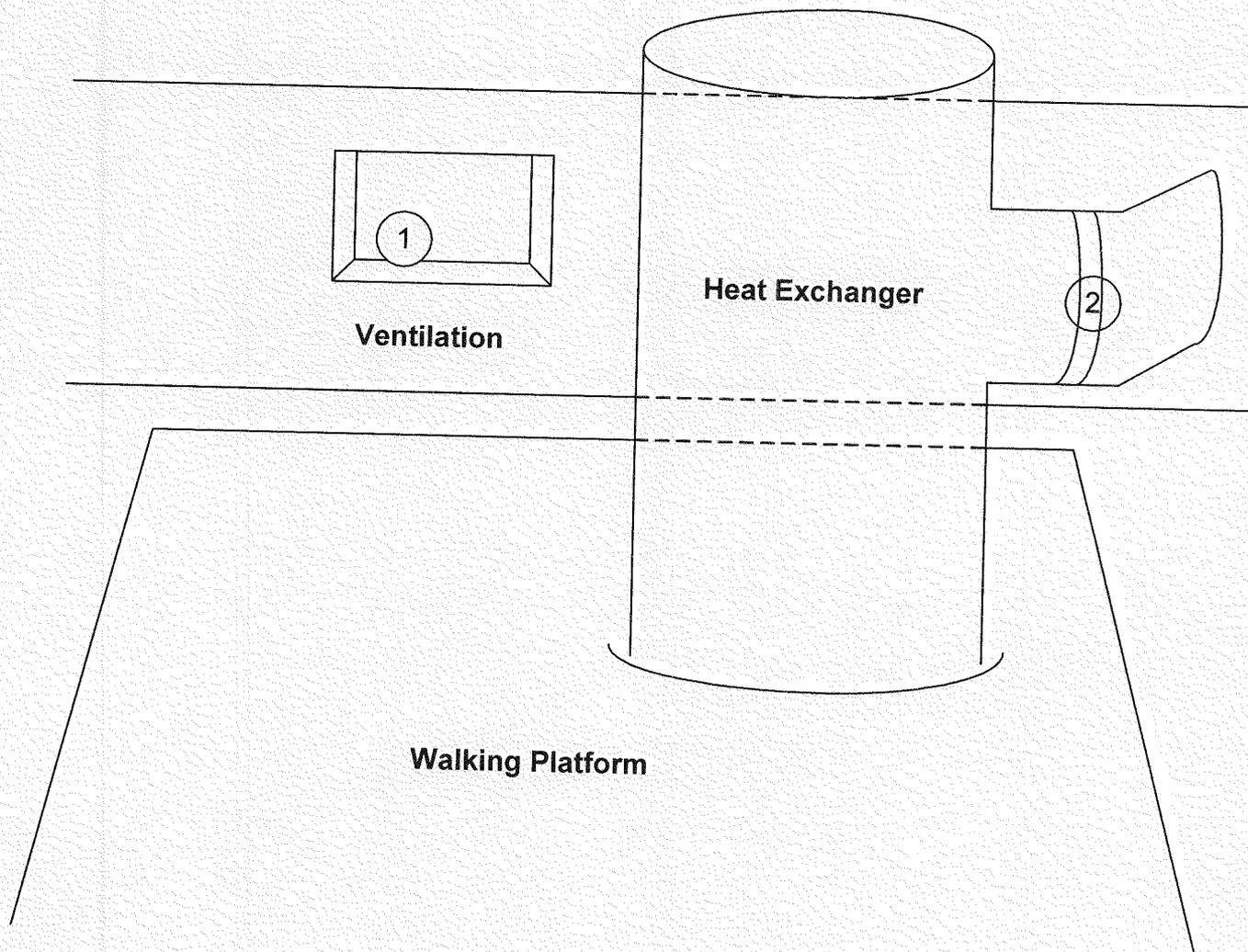
COMMENTS:

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/7/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/19/09



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Horizontal Ventilation

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

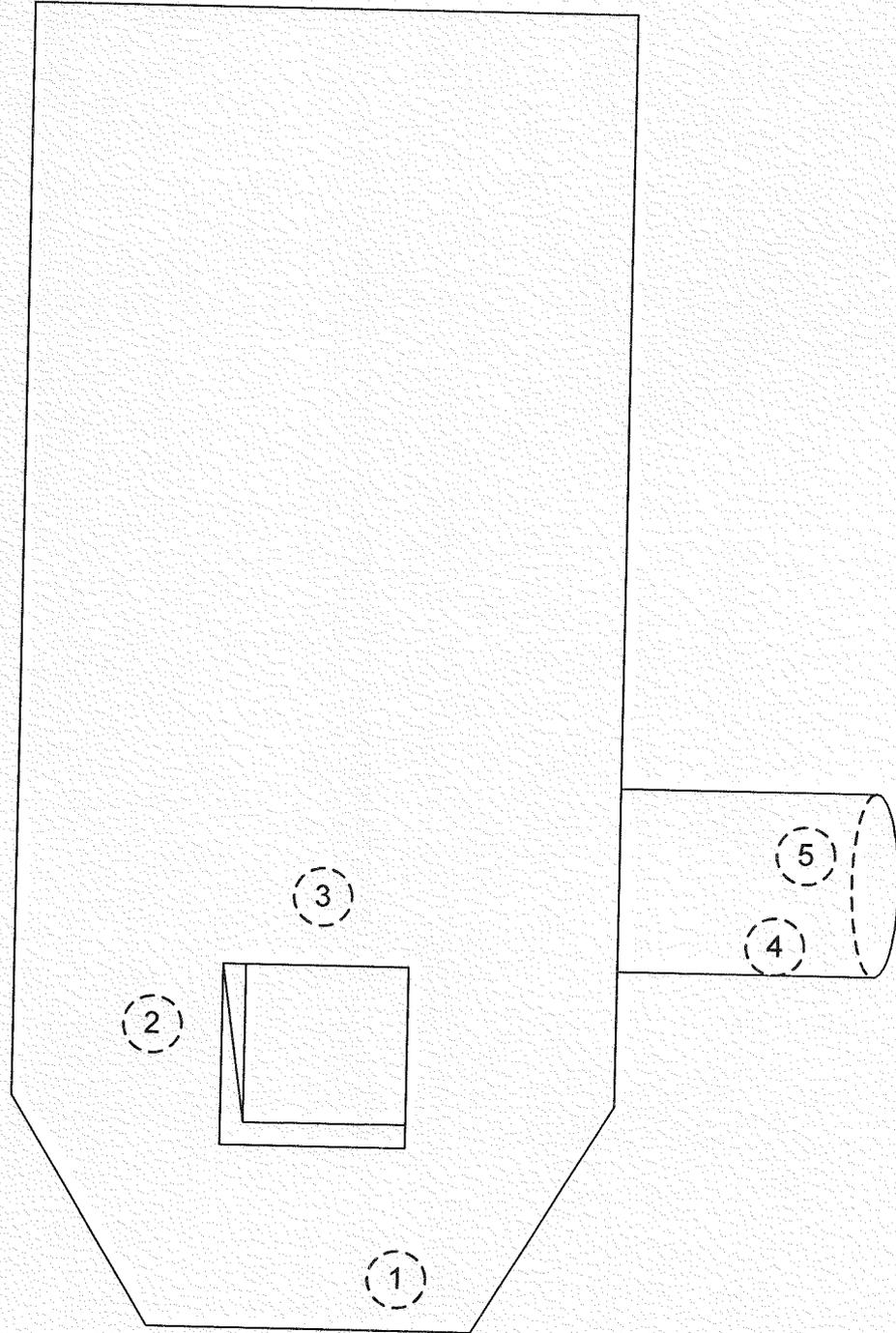
COMMENTS: Top Elevation

SURVEY COMPLETED BY: *[Signature]*

DATE COMPLETED: 4/7/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *[Signature]*

DATE: 5/17/09



SURVEY MAP

BUILDING: MWI

SURVEY UNIT NUMBER: Quench Tank

PAGE OF

SURVEY TYPE (CHECK ONE):

Characterization Survey

Final Status Survey

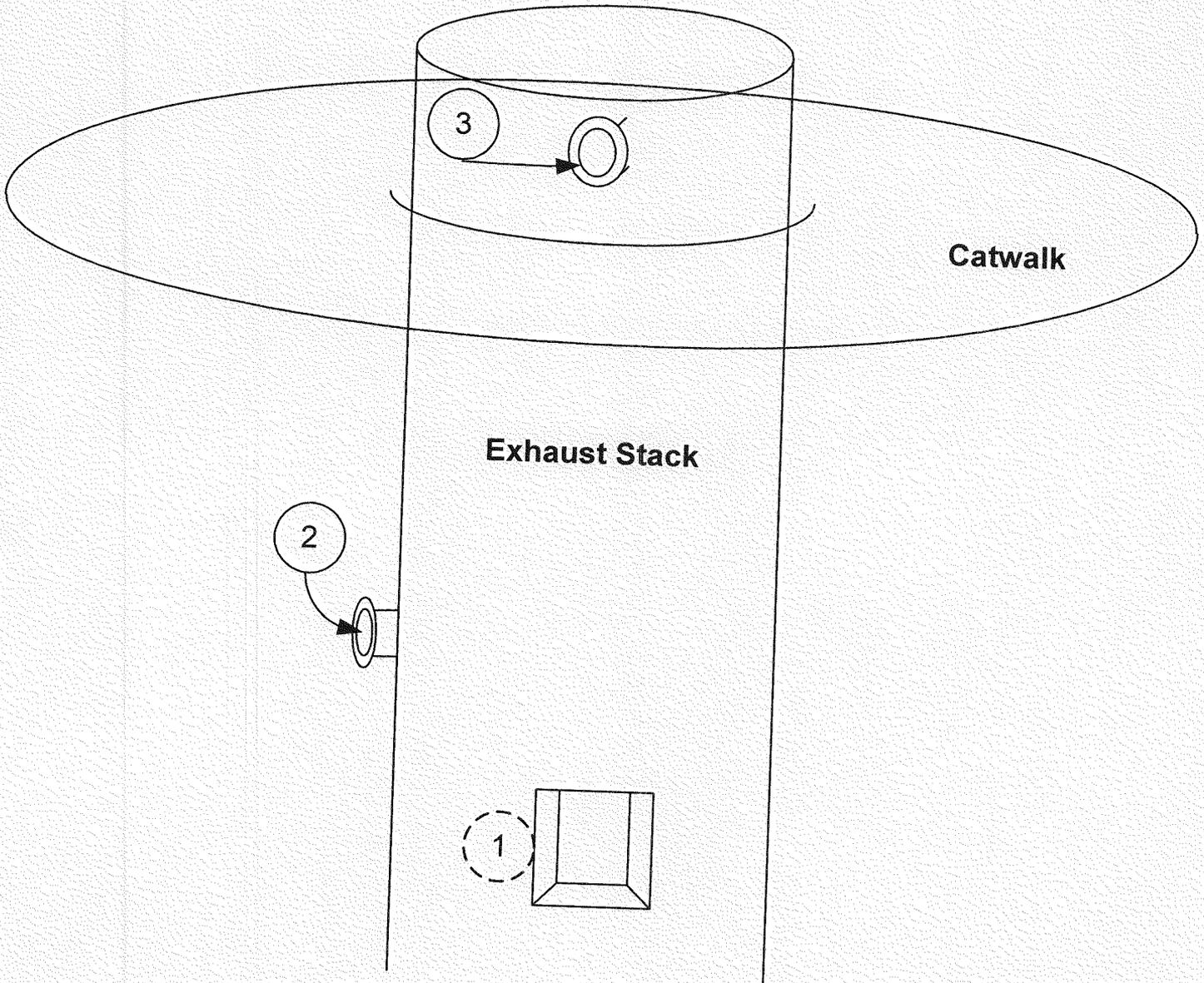
COMMENTS:

SURVEY COMPLETED BY: *hank*

DATE COMPLETED: 4/7/09

RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: *HR*

DATE: 5/19/09



SURVEY MAP		
BUILDING: MWI	SURVEY UNIT NUMBER: Vertical Exhaust Stack	PAGE OF
SURVEY TYPE (CHECK ONE):	<input type="checkbox"/> Characterization Survey	<input checked="" type="checkbox"/> Final Status Survey
COMMENTS:		
SURVEY COMPLETED BY: <i>[Signature]</i>	DATE COMPLETED: 4/8/09	DATE: 5/19/09
RADIOLOGICAL CONTROLS SUPERVISOR REVIEW: <i>[Signature]</i>		DATE: 5/19/09

Appendix C
Certificates of Calibration

Instrument #1

**Ludlum 2350-1, S# 192615
coupled with IBP19DD Beta Probe #K107**



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR

2350-1

SERIAL# 192615

Owner: PHILOTECHNICS

DATE: 05/14/08

LOCATION:

Griffin Inst

TECH: Joanne Glenn

DATE LAST CAL EXPIRES:

Reason For Calibration:

Due For Calibration

Repair (See Remarks)

Other (See Remarks)

Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500

SERIAL #: 114512

CAL. DUE: 12/20/08

MODEL:

SERIAL #:

CAL DUE:

Fast/Slow Switch working properly

Audio Response

Geotropism

CABLE LENGTH 5'

CONDITION: Sat

AF MECHANICAL ZERO: 0

AL MECHANICAL ZERO: 0

NEW BATTERIES: Yes No

BATTERY CHECK: 6.4 V

HV RANGE 400 - 1500 VOLTS

N/A Sat Unsat

HV

AS FOUND HV

AS LEFT HV

500 V:

500

A.F.

1250 V: 1000 V for 177s

1250

A.F.

2000 V: 1500 V for 177s

2000

A.F.

AF INPUT SENSITIVITY (mV):

40

AL INPUT SENSITIVITY (mV):

A.F.

RATE METER

SCALER

SCALE RATE CPM AS FOUND % ERROR AS LEFT % ERROR AS FOUND % ERROR AS LEFT % ERROR

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100					250	0.0%	A.F.	
	250	250	0.0%	A.F.					
	400								
x1 or x10	1000					2504	0.2%	A.F.	
	2500	2504	0.2%	A.F.					
	4000								
x10 or x100	10K					25.032	0.1%	A.F.	
	25K	25.032	0.1%	A.F.					
	40K								
x100 or x1000	100K					250.31	0.1%	A.F.	
	250K	250.31	0.1%	A.F.					
	400K								

Is the As Found Data Within 20% of the Set Point?:

Yes

No

REMARKS: Scaler instrument only. No previous cal data.

Does Instrument Meet Final Acceptance Criteria?:

Yes

No

Calibration Sticker Attached?:

Yes

No

Date Instrument is Due For Next Calibration:

05/14/09

Performed/Reviewed by:

Joanne Glenn

Date: 5/14/2008

Entered by: *JP* Initials



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR IBP19DD PROBE # K107

Owner: PHILOTECHNICS

DATE: 06/18/08

LOCATION: Griffin Inst

TECH: Joanne Glenn

DATE LAST CAL EXPIRES: 05/14/09

REASON FOR CALIBRATION:

- Due For Calibration, Repair (See Remarks), Other (See Remarks), Due and Repair

CABLE LENGTH: 5'

INPUT SENSITIVITY: 35 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2350-1 SERIAL #: 192615 CAL. DUE: 05/14/09
MODEL: SERIAL #: CAL. DUE:

NIST TRACEABLE SOURCES USED

SOURCE #: 2695-00 SOURCE #: PX-726
ISOTOPE: Tc99 Ni ISOTOPE: C14
ACTIVITY(dpm): 18400 ACTIVITY: 48,780 dpm
ASSAY DATE: 03/01/00 ASSAY DATE: 01/21/08

Condition: Sat Unsats Efficiency from last cal.: Pu: Tc Ni: 20.10%
Th: C-14: 4.23%

Setpoints from last cal.: HV Vernier
880 N/A
Source Alpha Response CPM Beta Response CPM

Background: Pu-239: A-B XTLK:
Tc-99 Ni: B-A XTLK:

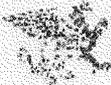
As Found Efficiencies Pu, Tc: Th-230 / C-14 /

Background: Pu-239: A-B XTLK:
Tc-99 Ni: B-A XTLK:

As Left Efficiencies Pu, Tc: (Used for repairs) Th-230 / C-14 /

Is as found efficiency within 20% of the efficiency from the last cal? Yes No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.



GRIFFIN INSTRUMENTS



PROBE #: K107

Date: 06/18/08

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
750		674	3.3%					67		
800		2697	13.9%					143		
850		4472	23.0%					239		
900		5532	28.2%					349		
950		6234	31.6%					418		
975		6503	32.6%					501		

Alpha / Beta Bkg (cpm)		429				
HV / Vernier	Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
950	CPM:		7669		4832	4462
	<i>4 pi AL Efficiencies:</i>		19.41%		9.03%	40.32%
	<i>2 pi AL Efficiencies:</i>		31.07%		23.60%	57.67%

Other NIST sources: Th-230 Source #99TH470-1815 4/11/06 30,000 dpm Pu-239 Source #2696-00 7/18/06 18,500dpm
Tc-99 on Stainless Steel Source #99TC470-1814 8/3/99 37,300 dpm, Sr90 Source #2697-00 3/1/00 12,200 dpm

REMARKS: As found data was off scale. Replaced mylar. Old effs were low. It seems other mylar was a 1.2 mg/cm2. Calibrated w/2350-1#192615. Cal due 5/14/09 to match box.

Does Instrument Meet Final Acceptance Criteria? Yes No

Calibration Sticker Attached? Yes No

Date Instrument is Due For Next Calibration: 05/14/09

Performed/Reviewed by: *Jeanne Glavin*

Date: 6/18/2008

Entered by: *JP* Initials

2 pi efficiencies denoted in italics.

Calibrations performed to ANSI N323A-1997 standards.

Instrument #2

**Ludlum 2350-1, S# 203462
coupled with IBP19DD Beta Probe #K104**



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR

2350-1

SERIAL#

203462

Owner: PHILOTECHNICS

DATE: 05/14/08

LOCATION:

Griffin Inst

TECH: Joanne Glenn

DATE LAST CAL EXPIRES:

Reason For Calibration:

- Due For Calibration
- Other (See Remarks)

- Repair (See Remarks)
- Due and Repair (See Remarks)

NIST TRACEABLE EQUIPMENT USED DURING CALIBRATION

MODEL: M-500

SERIAL #: 114512

CAL. DUE: 12/20/08

MODEL:

SERIAL #:

CAL DUE:

Fast/Slow Switch working properly

Audio Response

Geotropism

CABLE LENGTH 5'

CONDITION: Sat

AF MECHANICAL ZERO: 0

AL MECHANICAL ZERO: 0

NEW BATTERIES: Yes No

BATTERY CHECK: 6.3 V

HV RANGE 400 - 1500 VOLTS

N/A Sat Unsat

HV

AS FOUND HV

AS LEFT HV

500 V:

500

A.F.

1250 V: 1000 V for 177s

1250

A.F.

2000 V: 1500 V for 177s

2000

A.F.

AF INPUT SENSITIVITY (mV): 38

AL INPUT SENSITIVITY (mV): 40

RATE METER

SCALER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100					250	0.0%	A.F.	
	250	250	0.0%	A.F.					
	400								
x1 or x10	1000					2501	0.0%	A.F.	
	2500	2501	0.0%	A.F.					
	4000								
x10 or x100	10K					25.017	0.1%	A.F.	
	25K	25.017	0.1%	A.F.					
	40K								
x100 or x1000	100K					250.22	0.1%	A.F.	
	250K	250.22	0.1%	A.F.					
	400K								

Is the As Found Data Within 20% of the Set Point?:

- Yes
- No

REMARKS: Scaler instrument only. No previous cal data.

Does Instrument Meet Final Acceptance Criteria?: Yes No

Calibration Sticker Attached?: Yes No

Date Instrument is Due For Next Calibration: 05/14/09

Performed/Reviewed by: *Joanne Glenn*

Date: 5/14/2008

Entered by: *JG* Initials

Calibrations performed to ANSI N323A-1997 standards.



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR IBP19DD PROBE # K104

Owner: PHILOTECHNICS

DATE: 12/31/08

LOCATION: Griffin Inst

TECH: Joanne Glenn

DATE LAST CAL EXPIRES: 05/14/09

REASON FOR CALIBRATION:

- Due For Calibration
 Repair (See Remarks)
 Other (See Remarks)
 Due and Repair

CABLE LENGTH: 5'

INPUT SENSITIVITY: 35 mV

NIST TRACEABLE EQUIPMENT AND STANDARDS USED DURING CALIBRATION

MODEL: 2350-1 SERIAL #: 203462 CAL. DUE: 05/14/09

NIST TRACEABLE SOURCES USED

Source Number	Isotope	4 pi Activity	Assay Date	2 pi Activity
99TC470-1814	Tc99 SS	37,300 dpm	08/03/99	23,300 cpm
2697-00	Sr90	12,200 dpm	03/01/00	8,530 cpm
PX 726	C14	48,780 dpm	01/21/08	18,660 cpm

Efficiencies from last cal.:

Condition: Sat Unsat

Pu: Th: Sr: 39.82%

Tc ss: 19.18% C14: 7.92% Tc Ni:

As Found (AF) Efficiencies:

HV / Vernier:	Tc-99 Source Response Nickel (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Tc-99 Source Response Stainless Steel (CPM):		
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.	A ch.	B ch.	Net Eff.
875 / N/A								3625		23336	52.84%

Net A to B Xtalk: <10%	B to A Xtalk: <1%
	N/A

	Pu239	Tc99 Ni	Tc99 ss	Th-230	Sr90	C-14
AF CPM:	<input type="text"/>	<input type="text"/>	23336	<input type="text"/>	<input type="text"/>	<input type="text"/>
AF 4 pi eff:	<input type="text"/>	<input type="text"/>	52.84%	<input type="text"/>	<input type="text"/>	<input type="text"/>
AF 2 pi eff:	<input type="text"/>	<input type="text"/>	84.80%	<input type="text"/>	<input type="text"/>	<input type="text"/>

Is as found efficiency within 20% of the efficiency from the last cal?

- Yes
 No (See Remarks)

Note: If the as found data is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the plateau section and go directly to remarks.



GRIFFIN INSTRUMENTS



PROBE #: K104

Date: 12/31/08

PLATEAU AND SET POINT DATA

HV / Vernier:	Tc-99 Source Response SS (CPM):			Pu-239 Source Response (CPM):			Background (CPM):		Net A to B Xtalk: <10%	B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
750		3381	8.7%					134		
800		5877	14.9%					331		
825		7101	18.0%					400		
850								632		

Alpha / Beta Bkg (cpm)	400					
HV / Vernier	Pu-239	Tc-99 Ni	Tc-99 SS	Th-230	C-14	Sr-90
825 / N/A	CPM:		7101		3952	4849
	<i>4 pi AL Efficiencies:</i>		17.97%		7.28%	45.02%
	<i>2 pi AL Efficiencies:</i>		28.76%		19.04%	64.39%

REMARKS: As found bkg very high - reset PM Tube. Re-plateaued. Cal due 5/14/09 to match box.

Does Instrument Meet Final Acceptance Criteria? Yes No

Calibration Sticker Attached? Yes No

Date Instrument is Due For Next Calibration: 05/14/09

INSTRUMENT MARRIED WITH 2350-1 # 203462

Performed/Reviewed by: *Joanna Glensk*

Date: 12/31/2008

Entered by: *[Signature]* Initials

2 pi efficiencies denoted in Italics.

Calibrations performed to ANSI N323A-1997 standards.

#203462 2350-1 Detector Setup

Detector #	00
Serial #	K104
Model	IBP19DD
U=	7
M=	0
TB=	1
HV=	825
W	OFF
CT=	60
T=	350
CC=	1.00E+00
DT=	0.0 usec

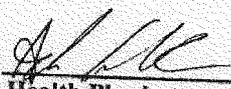
Instrument #3

Packard Tricarb Liquid Scintillation Counter S# 421793
(An excerpt from Merck's instrument calibration records)

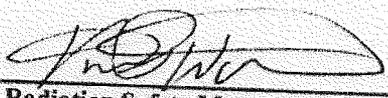
MERCK RESEARCH LABORATORIES
DEPARTMENT OF HEALTH PHYSICS

Instrument Calibration Summary

Instrument: Manufacturer	Packard
Model	Tricarb 3100TR
Serial Number	421793
Calibration Date	12/9/2008

Calibrated By: 
Health Physicist

1-6-2009
Date

Reviewed By: 
Radiation Safety Manager

2/4/2009
Date

Appendix D

MARSSIM Analytical Calculation Sheets

Philotechnics Analytical Worksheet

Minimum Detectable Concentration (MDC) Static Count

Calculations for Liquid Scintillation Counter

(95% confidence level via MARSSIM method)

Where:
$$MDC (dpm/100cm^2) = \frac{3 + 3.29\sqrt{(R_b)(T_{s+b})(1 + T_{s+b}/T_b)}}{(Eff.)(T_{s+b})}$$

Eff. = LSC total efficiency, Counter cpm/NIST Standard dpm

R_b = LSC background rate (cpm)

T_{s+b} = Sample count time (minutes)

T_b = Background count time (minutes)

Static Count MDC Calculations						
Isotope	Eff.	R _b	T _{s+b}	T _b	MDC (Static)	
H-3	20.00%	10.00	1	1	88.57 dpm/100 cm ²	Channel 1
C-14	40.00%	20.00	1	1	59.52 dpm/100 cm ²	Channel 2
Channel 3 - Other Nuclides	20.00%	10.00	1	1	88.57 dpm/100 cm ²	Channel 3

*All LSC efficiencies were provided by Merck & Co, Inc..

Minimum Detectable Concentration (MDC) Static Count

Calculations for Hand-Held Monitors

(95% confidence level via MARSSIM method)

Where:
$$MDC (dpm/100cm^2) = \frac{3 + 3.29\sqrt{(R_b)(T_{s+b})(1 + T_{s+b}/T_b)}}{(Eff.)(T_{s+b})(probearea cm^2/100cm^2)}$$

Eff. = instrument efficiency (2π geometry) for C-14

R_b = Average background rate (cpm)

T_{s+b} = Sample count time (minutes)

T_b = Background count time (minutes)

P = Probe area (cm²)

Static Count MDC Calculations						
Isotope	Eff.	R _b	T _{s+b}	T _b	P	MDC (Static)
<i>Probe: BP19DD</i>						
C-14	6%	480	1	1	100	1778.59 dpm/100 cm ²

Philotechnics Analytical Worksheet

Scan Minimum Detectable Concentration (MDC)

Calculations for Hand-Held Monitors

(Scan MDA per MARSSIM/NUREG-1575, NUREG-1507 methodology)

$$\text{Scan MDC} = \frac{MDCR}{\sqrt{p} (\epsilon_i)(\epsilon_s) \left(\frac{A}{100 \text{ cm}^2} \right)}$$

Where:

- p = surveyor efficiency, per MARSSIM (0.5)
 ϵ_i = instrument efficiency (2π geometry)
 ϵ_s = surface efficiency, 1 for gammas and high energy betas >1 Mev Emax (e.g. P-32, Cl-36, S/Y-90, etc.), 0.5 for low energy betas (e.g. C-14, P-33, S-35, Tc-99, Ca-45, etc.), 0.25
 A = probe active area (cm^2)

And,

$$MDCR = S_i (60 \text{ sec/min}) / i \text{ sec}$$

Where:

- $MDCR$ = Minimum detectable count rate (cpm)
 S_i = source counts in time interval, i

And,

$$S_i = d' \sqrt{B_i}$$

Where:

- d' = 1.38 for 95% true positive scan detection rate, per, MARSSIM, Table 6.5
 B_i = Background counts in interval, i

And,

$$B_i = (P_b)(i)(1 \text{ min} / 60 \text{ sec})$$

Where:

- P_b = probe background count rate (cpm)
 i = observation interval

Philotechnics Analytical Worksheet

Propagation of Error

The actual value of MDC (where t_s and t_b are both 1 minute), at the 95% confidence level, is:

$$MDC = \frac{3 + 4.65 \sqrt{B_r}}{E} \pm 1.96 \sigma_{MDC}$$

$$\sigma_{MDC} = MDC \sqrt{\left(\frac{\sigma_{R_b}}{R_b}\right)^2 + \left(\frac{\sigma_E}{E}\right)^2}$$

Because most (if not all) calibration labs do not report σ_E , we must compensate as shown below:

$$\sigma_{MDC} = MDC \sqrt{\left(\frac{\sigma_{R_b}}{R_b}\right)^2 + \left(\frac{\sigma_A}{A}\right)^2 + \left(\frac{\sigma_{R_c}}{R_c}\right)^2} = MDC \sqrt{\left(\frac{\sqrt{\frac{C_b}{t_b}}}{R_b}\right)^2 + \left(\frac{\sigma_A}{A}\right)^2 + \left(\frac{\sqrt{\frac{C_c}{t_c}}}{R_c}\right)^2}$$

where:

- σ_{MDC} = Standard deviation of Minimum Detectable Concentration, dpm/100cm²
- C_b = Background counts obtained
- t_b = Background count time interval, minutes
- R_b = Background count rate, minutes
- σ_A = Standard deviation of calibration source activity as reported on certificate of traceability
- A = Source activity, dpm, as reported on certificate of traceability
- C_c = Total net sample counts (minus background counts) obtained at the calibration facility when determining instrument efficiency
- t_c = Calibration facility count time interval, minutes
- R_c = Calibration facility net count rate (C_c/t_c)

Philotechnics Analytical Worksheet

Scan Minimum Detectable Concentration (MDC)

Calculations for Hand-Held Monitors

(Scan MDA per MARSSIM/NUREG-1575, NUREG-1507 methodology)

Specific Scan MDC calculation results:

	BP19DD for C-14	
	0	
$P_b =$	480	cpm
$i =$	1	sec
$B_i =$	8.00	counts
$d' =$	1.38	
$S_i =$	3.90	counts
MDCR =	234.19	cpm

Scan MDC Calculations					
Isotope	ϵ_i	ϵ_s	A	MDC (Scan)	Propagation of Error (dpm/100cm ²)
<i>Probe: BP19DD for C-14</i>					
C-14	24%	0.25	100	5613.56 dpm/100 cm ²	± 653

Appendix E

Building 77 Building & Structures Survey Data Results

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-001 Conveyor System Area

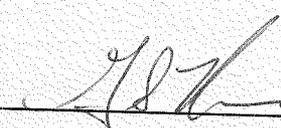
Page 1 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau Date: 4/9/2009
 Survey Completed By: _____ Date: _____

Ambient Background = 412 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-001-W1-M-001	367	-45	-763	14	0	-4
MWI-1-001-F1-M-002	476	64	1,085	0	0	-2
MWI-1-001-F1-M-003	443	31	525	34	2	-4
MWI-1-001-F1-M-004	407	-5	-85	0	10	0
MWI-1-001-F1-M-005	421	9	153	0	0	-2
MWI-1-001-F1-M-006	397	-15	-254	0	1	-4
MWI-1-001-F1-M-007	469	57	966	55	0	-4
MWI-1-001-F1-M-008	418	6	102	9	1	-4
MWI-1-001-F1-M-009	480	68	1,153	0	6	-4
MWI-1-001-F1-M-010	444	32	542	3	0	-4
MWI-1-001-F1-M-011	510	98	1,661	0	0	-4
MWI-1-001-F1-M-012	473	61	1,034	0	5	-4
MWI-1-001-F1-M-013	448	36	610	0	0	-4
MWI-1-001-F1-M-014	474	62	1,051	10	0	-4
MWI-1-001-F1-M-015	434	22	373	0	0	-4
MWI-1-001-F1-M-016	396	-16	-271	57	0	-4
MWI-1-001-F1-M-017	461	49	831	0	6	-4
MWI-1-001-F1-M-018	386	-26	-441	45	0	-4
MWI-1-001-F1-M-019	472	60	1,017	0	1	-4
MWI-1-001-F1-M-020	452	40	678	0	0	-4
MWI-1-001-W1-M-021	409	-3	-51	0	9	-4
MWI-1-001-F1-M-022	443	31	525	0	5	2
MWI-1-001-F1-M-023	489	77	1,305	41	0	-4
MWI-1-001-F1-M-024	450	38	644	0	9	-4
MWI-1-001-F1-M-025	499	87	1,475	0	14	-4
MWI-1-001-F1-M-026	413	1	17	0	0	-4
MWI-1-001-F1-M-027	123	-289	-4,898	35	0	-4
MWI-1-001-F1-M-028	472	60	1,017	0	0	-4
MWI-1-001-F1-M-029	524	112	1,898	0	6	-2
MWI-1-001-F1-M-030	477	65	1,102	0	0	-4

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-001 Conveyor System Area

Page 2 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 412 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM cpm/probe	Net CPM: cpm/probe	Net Activity dpm/100cm ²	DPM1 dpm/100cm ²	DPM2 dpm/100cm ²	CPM C CPM
MWI-1-001-F1-M-031	441	29	492	10	0	-4
MWI-1-001-F1-M-032	515	103	1,746	6	9	-4

Survey Reviewed By: _____

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	476.17
Standard Error	208.30
Median	627.12
Standard Deviation	1178.31
Sample Variance	1388410.07
Skewness	-3.14
Minimum	-4898.31
Maximum	1898.31
Count	32.00
Confidence Level(95.0%)	424.83

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	9.97
Standard Error	3.13
Median	0.00
Standard Deviation	17.69
Sample Variance	313.00
Skewness	1.73
Minimum	0.00
Maximum	57.00
Count	32.00
Confidence Level(95.0%)	6.38

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	2.63
Standard Error	0.70
Median	0.00
Standard Deviation	3.95
Sample Variance	15.60
Skewness	1.37
Minimum	0.00
Maximum	14.00
Count	32.00
Confidence Level(95.0%)	1.42

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-3.50
Standard Error	0.24
Median	-4.00
Standard Deviation	1.34
Sample Variance	1.81
Skewness	3.06
Minimum	-4.00
Maximum	2.00
Count	32.00
Confidence Level(95.0%)	0.48

Philotechnics, Ltd.
Building and Structures Survey Data

Building: 77

Survey Unit: MWI-1-002 Cold Room Area

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

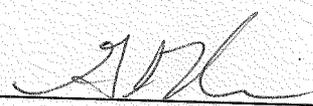
Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 399 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-002-F1-M-001	382	-17	-288	0	0	0
MWI-1-002-F1-M-002	487	88	1,492	0	2	-3
MWI-1-002-F1-M-003	469	70	1,186	4	0	-3
MWI-1-002-F1-M-004	467	68	1,153	31	0	-3
MWI-1-002-F1-M-005	424	25	424	56	0	-3
MWI-1-002-F1-M-006	493	94	1,593	68	0	2
MWI-1-002-F1-M-007	489	90	1,525	5	0	-2
MWI-1-002-F1-M-008	471	72	1,220	0	6	-2
MWI-1-002-F1-M-009	482	83	1,407	76	0	-3
MWI-1-002-F1-M-010	450	51	864	0	0	-2
MWI-1-002-F1-M-011	423	24	407	0	0	-2
MWI-1-002-F1-M-012	368	-31	-525	0	0	-3
MWI-1-002-F1-M-013	374	-25	-424	11	0	-3
MWI-1-002-F1-M-014	333	-66	-1,119	0	0	-3
MWI-1-002-F1-M-015	436	37	627	0	0	-3
MWI-1-002-F1-M-016	424	25	424	21	0	-3
MWI-1-002-F1-M-017	465	66	1,119	27	0	-3
MWI-1-002-F1-M-018	410	11	186	0	0	-2
MWI-1-002-F1-M-019	518	119	2,017	0	0	2
MWI-1-002-F1-M-020	465	66	1,119	0	0	-3
MWI-1-002-F1-M-021	421	22	373	0	0	-3
MWI-1-002-F1-M-022	501	102	1,729	0	0	-3
MWI-1-002-F1-M-023	423	24	407	7	0	-3
MWI-1-002-F1-M-024	455	56	949	0	2	-2
MWI-1-002-W1-M-025	367	-32	-542	0	0	0
MWI-1-002-W1-M-026	344	-55	-932	2	0	-3
MWI-1-002-W1-M-027	360	-39	-661	0	0	0
MWI-1-002-W1-M-028	370	-29	-492	0	9	0
MWI-1-002-W1-M-029	341	-58	-983	0	5	0
MWI-1-002-W1-M-030	354	-45	-763	0	0	-2

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-002 Cold Room Area

Page 5 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/9/2009

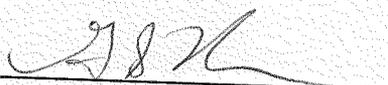
Survey Completed By: _____

Date: _____

Ambient Background = 399 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-002-W1-M-031	381	-18	-305	14	0	-3
MWI-1-002-W1-M-032	359	-40	-678	11	0	-4
MWI-1-002-W1-M-033	326	-73	-1,237	0	2	-4
MWI-1-002-W1-M-034	401	2	34	0	0	-1
MWI-1-002-W1-M-035	413	14	237	6	0	-4
MWI-1-002-W1-M-036	395	-4	-68	0	0	-1
MWI-1-002-W1-M-037	414	15	254	0	0	-4
MWI-1-002-W1-M-038	374	-25	-424	31	0	1
MWI-1-002-W1-M-039	344	-55	-932	17	6	-3
MWI-1-002-W1-M-040	387	-12	-203	0	0	-4
MWI-1-002-W1-M-041	328	-71	-1,203	23	0	-1
MWI-1-002-W1-M-042	339	-60	-1,017	0	13	-3
MWI-1-002-W1-M-044	394	-5	-85	0	0	-3
MWI-1-002-W1-M-045	446	47	797	0	0	-4
MWI-1-002-W1-M-046	483	84	1,424	0	0	-4
MWI-1-002-W1-M-047	413	14	237	0	0	-3
MWI-1-002-W1-M-048	411	12	203	0	2	1
MWI-1-002-W1-M-049	369	-30	-508	2	0	-4
MWI-1-002-W1-M-050	388	-11	-186	0	0	-4
MWI-1-002-W1-M-051	379	-20	-339	0	0	-4

Note: Survey location 43 was inaccessible due to open wall perimeter.

Survey Reviewed By: 

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	189.83
Standard Error	124.69
Median	194.92
Standard Deviation	881.72
Sample Variance	777433.18
Skewness	0.24
Minimum	-1237.29
Maximum	2016.95
Count	50.00
Confidence Level(95.0%)	250.58

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	8.24
Standard Error	2.44
Median	0.00
Standard Deviation	17.28
Sample Variance	298.43
Skewness	2.69
Minimum	0.00
Maximum	76.00
Count	50.00
Confidence Level(95.0%)	4.91

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	0.94
Standard Error	0.36
Median	0.00
Standard Deviation	2.55
Sample Variance	6.51
Skewness	3.30
Minimum	0.00
Maximum	13.00
Count	50.00
Confidence Level(95.0%)	0.72

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-2.28
Standard Error	0.23
Median	-3.00
Standard Deviation	1.63
Sample Variance	2.65
Skewness	1.15
Minimum	-4.00
Maximum	2.00
Count	50.00
Confidence Level(95.0%)	0.46

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-003 Burn Chamber/Kiln Area

Page 7 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/9/2009

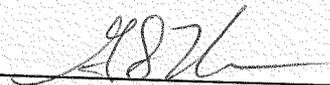
Survey Completed By: _____

Date: _____

Ambient Background = 390 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-003-F1-M-001	405	15	254	0	14	-2
MWI-1-003-F1-M-002	390	0	0	45	0	-3
MWI-1-003-F1-M-003	471	81	1,373	0	0	-3
MWI-1-003-F1-M-004	474	84	1,424	0	0	-2
MWI-1-003-F1-M-005	455	65	1,102	45	3	-2
MWI-1-003-F1-M-006	476	86	1,458	23	0	-2
MWI-1-003-F1-M-007	484	94	1,593	17	8	-2
MWI-1-003-F1-M-008	444	54	915	48	0	-2
MWI-1-003-F1-M-009	727	337	5,712	8	0	-3
MWI-1-003-F1-M-010	552	162	2,746	0	0	-3
MWI-1-003-F1-M-011	456	66	1,119	7	3	-3
MWI-1-003-F1-M-012	490	100	1,695	8	0	-3
MWI-1-003-F1-M-013	485	95	1,610	55	0	-3
MWI-1-003-F1-M-014	454	64	1,085	44	0	-3
MWI-1-003-F1-M-015	419	29	492	38	0	-3
MWI-1-003-F1-M-016	438	48	814	7	0	2
MWI-1-003-F1-M-017	502	112	1,898	15	9	-3
MWI-1-003-F1-M-018	548	158	2,678	60	0	-3
MWI-1-003-F1-M-020	633	243	4,119	0	4	-3
MWI-1-003-F1-M-021	551	161	2,729	58	0	-3
MWI-1-003-F1-M-022	473	83	1,407	68	0	-3
MWI-1-003-F1-M-023	484	94	1,593	34	0	-3
MWI-1-003-F1-M-024	544	154	2,610	17	4	-3
MWI-1-003-F1-M-025	523	133	2,254	0	3	-3
MWI-1-003-F1-M-026	527	137	2,322	24	0	-3
MWI-1-003-F1-M-027	473	83	1,407	36	0	-3
MWI-1-003-F1-M-028	450	60	1,017	0	12	4
MWI-1-003-W1-M-029	436	46	780	13	0	-3
MWI-1-003-W1-M-031	397	7	119	42	0	-2

Note: Survey locations 19 was physically inaccessible, while 30 and 31 were inaccessible due to open wall perimeter.

Survey Reviewed By: 

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	1666.28
Standard Error	221.28
Median	1423.73
Standard Deviation	1191.61
Sample Variance	1419934.82
Skewness	1.60
Minimum	0.00
Maximum	5711.86
Count	29.00
Confidence Level(95.0%)	453.26

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	24.55
Standard Error	4.06
Median	17.00
Standard Deviation	21.86
Sample Variance	478.04
Skewness	0.41
Minimum	0.00
Maximum	68.00
Count	29.00
Confidence Level(95.0%)	8.32

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	2.07
Standard Error	0.72
Median	0.00
Standard Deviation	3.87
Sample Variance	15.00
Skewness	2.02
Minimum	0.00
Maximum	14.00
Count	29.00
Confidence Level(95.0%)	1.47

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-2.34
Standard Error	0.29
Median	-3.00
Standard Deviation	1.56
Sample Variance	2.45
Skewness	3.33
Minimum	-3.00
Maximum	4.00
Count	29.00
Confidence Level(95.0%)	0.60

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-004 Loading Ram Area

Page 9 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 422 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-004-F1-M-001	525	103	1,746	42	0	-3
MWI-1-004-F1-M-002	458	36	610	0	4	-2
MWI-1-004-F1-M-003	413	-9	-153	15	0	4
MWI-1-004-F1-M-004	439	17	288	0	0	-3
MWI-1-004-F1-M-005	408	-14	-237	9	0	-3
MWI-1-004-F1-M-006	461	39	661	0	2	-3
MWI-1-004-F1-M-007	420	-2	-34	44	2	-2
MWI-1-004-F1-M-008	484	62	1,051	0	8	0
MWI-1-004-F1-M-009	497	75	1,271	0	9	-2
MWI-1-004-F1-M-010	459	37	627	69	0	-2
MWI-1-004-F1-M-011	509	87	1,475	3	4	0
MWI-1-004-F1-M-012	468	46	780	37	2	-3
MWI-1-004-F1-M-013	406	-16	-271	0	10	-3
MWI-1-004-F1-M-014	421	-1	-17	49	8	-3
MWI-1-004-F1-M-015	471	49	831	4	8	-3
MWI-1-004-W1-M-016	430	8	136	15	0	-3
MWI-1-004-W1-M-017	367	-55	-932	24	0	0
MWI-1-004-W1-M-018	355	-67	-1,136	0	2	-2
MWI-1-004-W1-M-019	371	-51	-864	0	2	2
MWI-1-004-W1-M-020	464	42	712	25	2	-3
MWI-1-004-W1-M-021	382	-40	-678	12	16	-3

Survey Reviewed By: 

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	279.26
Standard Error	175.48
Median	288.14
Standard Deviation	804.14
Sample Variance	646642.32
Skewness	-0.07
Minimum	-1135.59
Maximum	1745.76
Count	21.00
Confidence Level(95.0%)	366.04

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	16.57
Standard Error	4.46
Median	9.00
Standard Deviation	20.45
Sample Variance	418.26
Skewness	1.18
Minimum	0.00
Maximum	69.00
Count	21.00
Confidence Level(95.0%)	9.31

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.76
Standard Error	0.96
Median	2.00
Standard Deviation	4.40
Sample Variance	19.39
Skewness	1.32
Minimum	0.00
Maximum	16.00
Count	21.00
Confidence Level(95.0%)	2.00

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-1.76
Standard Error	0.42
Median	-3.00
Standard Deviation	1.92
Sample Variance	3.69
Skewness	1.87
Minimum	-3.00
Maximum	4.00
Count	21.00
Confidence Level(95.0%)	0.87

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-005 Loading Dock Area

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Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

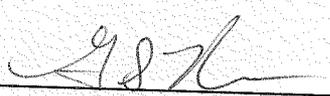
Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 383 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-005-F1-M-001	395	12	203	0	7	-2
MWI-1-005-F1-M-002	434	51	864	0	3	-2
MWI-1-005-F1-M-003	427	44	746	0	12	0
MWI-1-005-F1-M-004	419	36	610	0	0	-3
MWI-1-005-F1-M-005	400	17	288	0	0	-3
MWI-1-005-F1-M-006	421	38	644	0	0	-3
MWI-1-005-F1-M-007	478	95	1,610	0	0	-3
MWI-1-005-F1-M-008	453	70	1,186	0	0	-2
MWI-1-005-F1-M-009	496	113	1,915	0	0	-2
MWI-1-005-F1-M-010	448	65	1,102	0	0	-3
MWI-1-005-F1-M-011	488	105	1,780	0	4	-3
MWI-1-005-F1-M-012	443	60	1,017	0	0	-2
MWI-1-005-F1-M-013	412	29	492	0	9	2
MWI-1-005-F1-M-014	442	59	1,000	0	0	-3
MWI-1-005-F1-M-015	450	67	1,136	0	0	-3
MWI-1-005-F1-M-016	410	27	458	0	0	0
MWI-1-005-F1-M-017	397	14	237	0	7	-3
MWI-1-005-S1-M-018	385	2	34	0	0	-3
MWI-1-005-F1-M-019	457	74	1,254	0	8	2
MWI-1-005-W1-M-020	389	6	102	0	0	-2
MWI-1-005-W1-M-021	385	2	34	0	0	-2
MWI-1-005-W1-M-022	403	20	339	0	11	2
MWI-1-005-W1-M-023	345	-38	-644	0	7	-3
MWI-1-005-W1-M-024	368	-15	-254	0	7	0
MWI-1-005-W1-M-025	397	14	237	0	15	-2
MWI-1-005-W1-M-026	373	-10	-169	0	0	-2
MWI-1-005-W1-M-027	425	42	712	0	0	-3

Survey Reviewed By: 

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	627.12
Standard Error	120.83
Median	610.17
Standard Deviation	627.84
Sample Variance	394183.81
Skewness	0.22
Minimum	-644.07
Maximum	1915.25
Count	27.00
Confidence Level(95.0%)	248.37

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	0.00
Standard Error	0.00
Median	0.00
Standard Deviation	0.00
Sample Variance	0.00
Skewness	0.00
Minimum	0.00
Maximum	0.00
Count	27.00
Confidence Level(95.0%)	0.00

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.33
Standard Error	0.89
Median	0.00
Standard Deviation	4.62
Sample Variance	21.38
Skewness	1.08
Minimum	0.00
Maximum	15.00
Count	27.00
Confidence Level(95.0%)	1.83

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-1.78
Standard Error	0.32
Median	-2.00
Standard Deviation	1.65
Sample Variance	2.72
Skewness	1.45
Minimum	-3.00
Maximum	2.00
Count	27.00
Confidence Level(95.0%)	0.65

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-006 Fly Ash System/Bag House Area Page 13 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

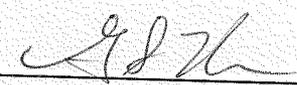
Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 399 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-006-F1-M-001	512	113	1,915	23	0	-3
MWI-1-006-F1-M-002	479	80	1,356	22	0	-3
MWI-1-006-F1-M-003	513	114	1,932	10	1	-3
MWI-1-006-F1-M-004	528	129	2,186	0	13	-3
MWI-1-006-F1-M-005	624	225	3,814	0	1	-1
MWI-1-006-F1-M-006	551	152	2,576	0	0	-3
MWI-1-006-F1-M-007	537	138	2,339	11	0	-3
MWI-1-006-F1-M-008	501	102	1,729	1	0	3
MWI-1-006-F1-M-009	495	96	1,627	0	13	-3
MWI-1-006-F1-M-010	449	50	847	0	1	-3
MWI-1-006-F1-M-011	426	27	458	0	0	-3
MWI-1-006-F1-M-012	433	34	576	21	0	-3
MWI-1-006-F1-M-013	335	-64	-1,085	0	0	1
MWI-1-006-F1-M-014	444	45	763	0	1	-1
MWI-1-006-F1-M-015	422	23	390	0	1	-3
MWI-1-006-F1-M-016	509	110	1,864	31	1	-3
MWI-1-006-F1-M-017	465	66	1,119	0	0	-1
MWI-1-006-F1-M-018	489	90	1,525	0	0	-3
MWI-1-006-F1-M-019	474	75	1,271	0	0	-3
MWI-1-006-F1-M-020	438	39	661	0	9	-3
MWI-1-006-F1-M-021	461	62	1,051	0	1	-3
MWI-1-006-F1-M-022	517	118	2,000	12	1	-3
MWI-1-006-F1-M-023	484	85	1,441	0	1	-3
MWI-1-006-F1-M-024	466	67	1,136	15	0	-1
MWI-1-006-F1-M-025	399	0	0	0	5	-3
MWI-1-006-F1-M-026	449	50	847	3	1	-3
MWI-1-006-W1-M-027	406	7	119	9	0	-3
MWI-1-006-W1-M-028	356	-43	-729	56	0	-3
MWI-1-006-W1-M-029	358	-41	-695	0	0	3
MWI-1-006-W1-M-030	373	-26	-441	0	0	-3

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-006 Fly Ash System/Bag House Area Page 14 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

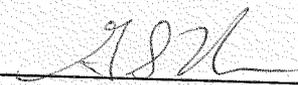
Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 399 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-006-W1-M-031	340	-59	-1,000	2	0	-4
MWI-1-006-W1-M-032	361	-38	-644	1	0	-4
MWI-1-006-W1-M-033	371	-28	-475	2	0	-4
MWI-1-006-W1-M-034	330	-69	-1,169	0	0	-4
MWI-1-006-W1-M-035	409	10	169	6	0	-4
MWI-1-006-W1-M-036	392	-7	-119	23	0	-4
MWI-1-006-W1-M-037	472	73	1,237	30	0	-4
MWI-1-006-W1-M-038	451	52	881	17	1	-4
MWI-1-006-W1-M-039	459	60	1,017	10	13	-4
MWI-1-006-W1-M-040	411	12	203	31	0	-2
MWI-1-006-W1-M-041	374	-25	-424	0	5	-2
MWI-1-006-W1-M-042	498	99	1,678	0	0	-4
MWI-1-006-W1-M-043	472	73	1,237	33	0	-4

Survey Reviewed By: 

Date: 5/13/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	818.29
Standard Error	168.31
Median	881.36
Standard Deviation	1103.70
Sample Variance	1218154.68
Skewness	0.14
Minimum	-1169.49
Maximum	3813.56
Count	43.00
Confidence Level(95.0%)	339.67

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	8.58
Standard Error	1.97
Median	1.00
Standard Deviation	12.89
Sample Variance	166.15
Skewness	1.75
Minimum	0.00
Maximum	56.00
Count	43.00
Confidence Level(95.0%)	3.97

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	1.60
Standard Error	0.55
Median	0.00
Standard Deviation	3.58
Sample Variance	12.82
Skewness	2.62
Minimum	0.00
Maximum	13.00
Count	43.00
Confidence Level(95.0%)	1.10

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-2.65
Standard Error	0.25
Median	-3.00
Standard Deviation	1.63
Sample Variance	2.66
Skewness	2.30
Minimum	-4.00
Maximum	3.00
Count	43.00
Confidence Level(95.0%)	0.50

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-007 Restroom

Page 16 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

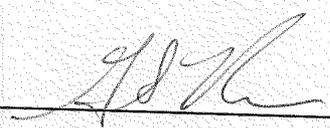
Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 373 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-007-F1-M-001	503	130	2,203	0	14	-2
MWI-1-007-F1-M-002	467	94	1,593	0	2	0
MWI-1-007-F1-M-003	463	90	1,525	0	6	0
MWI-1-007-F1-M-004	466	93	1,576	0	0	-2
MWI-1-007-F1-M-005	440	67	1,136	20	0	-3
MWI-1-007-W1-M-006	438	65	1,102	0	2	-3
MWI-1-007-W1-M-007	553	180	3,051	0	0	-3
MWI-1-007-S1-M-008	703	330	5,593	0	0	-2
MWI-1-007-W1-M-009	391	18	305	0	14	-3
MWI-1-007-W1-M-010	470	97	1,644	15	0	-2

Survey Reviewed By: 

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	1972.88
Standard Error	461.56
Median	1584.75
Standard Deviation	1459.58
Sample Variance	2130371.22
Skewness	1.90
Minimum	305.08
Maximum	5593.22
Count	10.00
Confidence Level(95.0%)	1044.12

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.50
Standard Error	2.36
Median	0.00
Standard Deviation	7.47
Sample Variance	55.83
Skewness	1.89
Minimum	0.00
Maximum	20.00
Count	10.00
Confidence Level(95.0%)	5.35

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.80
Standard Error	1.80
Median	1.00
Standard Deviation	5.69
Sample Variance	32.40
Skewness	1.39
Minimum	0.00
Maximum	14.00
Count	10.00
Confidence Level(95.0%)	4.07

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-2.00
Standard Error	0.37
Median	-2.00
Standard Deviation	1.15
Sample Variance	1.33
Skewness	1.08
Minimum	-3.00
Maximum	0.00
Count	10.00
Confidence Level(95.0%)	0.83

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-008 Mechanical Room

Page 18 of 23

Survey Type: Final Status Survey

Survey Completed By: Evan Harpenau

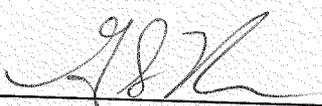
Date: 4/7/2009

Survey Completed By: _____

Date: _____

Ambient Background = 433 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-008-F1-M-001	534	101	1,712	0	2	-2
MWI-1-008-F1-M-002	497	64	1,085	17	0	-2
MWI-1-008-F1-M-003	479	46	780	0	2	-4
MWI-1-008-F1-M-004	499	66	1,119	11	5	-4
MWI-1-008-F1-M-005	494	61	1,034	0	5	-4
MWI-1-008-S1-M-006	334	-99	-1,678	0	17	-4
MWI-1-008-W1-M-007	444	11	186	16	2	-4
MWI-1-008-S1-M-008	425	-8	-136	0	0	0
MWI-1-008-W1-M-009	527	94	1,593	0	0	-4
MWI-1-008-W1-M-010	402	-31	-525	22	2	8
MWI-1-008-W1-M-011	448	15	254	20	9	-4
MWI-1-008-S1-M-013	367	-66	-1,119	10	0	-4
MWI-1-008-S1-M-014	366	-67	-1,136	0	0	-4
MWI-1-008-W1-M-015	388	-45	-763	20	0	-2
MWI-1-008-W1-M-015	344	-89	-1,508	0	2	2
MWI-1-008-F1-M-016	519	86	1,458	10	0	-4
MWI-1-008-W1-M-017	450	17	288	0	13	-2
MWI-1-008-S1-M-018	352	-81	-1,373	17	0	-4
MWI-1-008-F1-M-019	464	31	525	21	1	-4
MWI-1-008-F1-M-020	523	90	1,525	15	2	2

Survey Reviewed By: 

Date: 5/12/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	166.10
Standard Error	253.01
Median	271.19
Standard Deviation	1131.49
Sample Variance	1280261.27
Skewness	-0.25
Minimum	-1677.97
Maximum	1711.86
Count	20.00
Confidence Level(95.0%)	529.55

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	8.95
Standard Error	1.99
Median	10.00
Standard Deviation	8.89
Sample Variance	79.10
Skewness	0.15
Minimum	0.00
Maximum	22.00
Count	20.00
Confidence Level(95.0%)	4.16

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.10
Standard Error	1.05
Median	2.00
Standard Deviation	4.71
Sample Variance	22.20
Skewness	2.02
Minimum	0.00
Maximum	17.00
Count	20.00
Confidence Level(95.0%)	2.21

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-2.20
Standard Error	0.69
Median	-4.00
Standard Deviation	3.11
Sample Variance	9.64
Skewness	2.25
Minimum	-4.00
Maximum	8.00
Count	20.00
Confidence Level(95.0%)	1.45

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix E

Building: 77

Survey Unit: MWI-1-009 Stairwell to Control Room

Page 20 of 23

Survey Type: Final Status Survey

Survey Completed By: Tracie Clemons

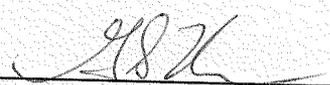
Date: 4/6/2009

Survey Completed By: _____

Date: _____

Ambient Background = 472 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-009-W1-M-001	406	-66	-1,119	0	0	-5
MWI-1-009-W1-M-002	398	-74	-1,254	0	7	-5
MWI-1-009-W1-M-003	422	-50	-847	0	3	-2
MWI-1-009-W1-M-004	348	-124	-2,102	0	0	-5
MWI-1-009-W1-M-005	401	-71	-1,203	0	3	-4
MWI-1-009-W1-M-006	396	-76	-1,288	9	0	-5
MWI-1-009-F1-M-007	437	-35	-593	10	0	-5
MWI-1-009-F1-M-008	511	39	661	0	7	-5
MWI-1-009-F1-M-009	493	21	356	0	7	0
MWI-1-009-F1-M-010	468	-4	-68	0	0	-5
MWI-1-009-F1-M-011	537	65	1,102	0	0	-5
MWI-1-009-F1-M-012	500	28	475	0	0	-5
MWI-1-009-W1-M-013	458	-14	-237	5	0	-5
MWI-1-009-F1-M-014	564	92	1,559	0	0	-5
MWI-1-009-F1-M-015	506	34	576	0	19	-5
MWI-1-009-W1-M-016	380	-92	-1,559	0	0	0
MWI-1-009-F1-M-017	348	-124	-2,102	0	0	-5
MWI-1-009-F1-M-018	391	-81	-1,373	0	0	-2
MWI-1-009-F1-M-019	435	-37	-627	0	7	-5
MWI-1-009-S1-M-020	453	-19	-322	0	7	-5

Survey Reviewed By: 

Date: 5/19/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	-498.31
Standard Error	232.32
Median	-610.17
Standard Deviation	1038.99
Sample Variance	1079496.21
Skewness	0.29
Minimum	-2101.69
Maximum	1559.32
Count	20.00
Confidence Level(95.0%)	486.26

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	1.20
Standard Error	0.68
Median	0.00
Standard Deviation	3.05
Sample Variance	9.33
Skewness	2.43
Minimum	0.00
Maximum	10.00
Count	20.00
Confidence Level(95.0%)	1.43

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.00
Standard Error	1.08
Median	0.00
Standard Deviation	4.83
Sample Variance	23.37
Skewness	2.12
Minimum	0.00
Maximum	19.00
Count	20.00
Confidence Level(95.0%)	2.26

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-4.15
Standard Error	0.38
Median	-5.00
Standard Deviation	1.69
Sample Variance	2.87
Skewness	1.85
Minimum	-5.00
Maximum	0.00
Count	20.00
Confidence Level(95.0%)	0.79

Philotechnics, Ltd.
Building and Structures Survey Data

Building: 77

Survey Unit: MWI-2-001 Control Room

Survey Type: Final Status Survey

Survey Completed By: Tracie Clemons

Date: 4/6/2009

Survey Completed By: _____

Date: _____

Ambient Background = 292 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-2-001-F2-M-001	306	14	294	0	0	-4
MWI-2-001-F2-M-002	287	-5	-105	0	9	1
MWI-2-001-F2-M-003	292	0	0	0	0	-1
MWI-2-001-F2-M-004	341	49	1,029	0	5	-4
MWI-2-001-F2-M-005	313	21	441	0	21	-1
MWI-2-001-F2-M-006	296	4	84	51	0	-1
MWI-2-001-F2-M-007	276	-16	-336	26	0	-4
MWI-2-001-F2-M-008	303	11	231	0	5	1
MWI-2-001-F2-M-009	316	24	504	0	0	-3
MWI-2-001-F2-M-010	286	-6	-126	10	0	-1
MWI-2-001-W2-M-011	361	69	1,450	0	11	-4
MWI-2-001-W2-M-012	284	-8	-168	3	0	-3
MWI-2-001-W2-M-013	291	-1	-21	30	0	-3
MWI-2-001-W2-M-014	300	8	168	5	0	-3
MWI-2-001-S2-M-015	288	-4	-84	0	8	-3
MWI-2-001-W2-M-016	293	1	21	8	0	5
MWI-2-001-W2-M-017	319	27	567	0	1	-1
MWI-2-001-W2-M-018	357	65	1,366	4	0	-3
MWI-2-001-W2-M-019	264	-28	-588	23	0	-1
MWI-2-001-W2-M-020	326	34	714	2	0	1

Survey Reviewed By: 

Date: 5/12/09

MWI - C-14 Static Measurements Statistics - Final Activity (dpm/100cm²)	
Average	272.06
Standard Error	120.56
Median	126.05
Standard Deviation	539.18
Sample Variance	290711.10
Skewness	0.87
Minimum	-588.24
Maximum	1449.58
Count	20.00
Confidence Level(95.0%)	252.34

MWI - H-3 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	8.10
Standard Error	3.08
Median	1.00
Standard Deviation	13.79
Sample Variance	190.09
Skewness	2.07
Minimum	0.00
Maximum	51.00
Count	20.00
Confidence Level(95.0%)	6.45

MWI - C-14 Removable Measurements Statistics - Net (dpm/100cm²)	
Average	3.00
Standard Error	1.23
Median	0.00
Standard Deviation	5.52
Sample Variance	30.42
Skewness	2.21
Minimum	0.00
Maximum	21.00
Count	20.00
Confidence Level(95.0%)	2.58

MWI - Other Nuclides - Removable Measurements Statistics - Net (dpm/100cm²)	
Average	-1.60
Standard Error	0.52
Median	-2.00
Standard Deviation	2.30
Sample Variance	5.31
Skewness	1.29
Minimum	-4.00
Maximum	5.00
Count	20.00
Confidence Level(95.0%)	1.08

Appendix F

Building 77 Incinerator Fixture Survey Data Results

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-001 Conveyor System

Page 1 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Tracie Clemons

Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 326 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-CS-S1-M-001	340	14	237	4	0	-3
MWI-1-CS-S1-M-002	289	-37	-627	0	3	-3
MWI-1-CS-S1-M-003	401	75	1,271	0	11	-3
MWI-1-CS-S1-M-004	321	-5	-85	0	0	-3
MWI-1-CS-S1-M-005	346	20	339	2	0	-2
MWI-1-CS-S1-M-006	319	-7	-119	0	4	-3
MWI-1-CS-S1-M-007	423	97	1,644	1	0	-2
MWI-1-CS-S1-M-008	399	73	1,237	0	4	-3
MWI-1-CS-S1-M-009	277	-49	-831	0	0	0
MWI-1-CS-S1-M-010	383	57	966	0	4	-3
MWI-1-CS-S1-M-011	361	35	593	0	0	-3
MWI-1-CS-S1-M-012	354	28	475	0	0	-3
MWI-1-CS-S1-M-013	375	49	831	0	0	-3
MWI-1-CS-S1-M-014	406	80	1,356	0	9	-3
MWI-1-CS-S1-M-015	387	61	1,034	0	0	-3
MWI-1-CS-S1-M-016	298	-28	-475	0	0	-3
MWI-1-CS-S1-M-017	363	37	627	0	0	-3
MWI-1-CS-S1-M-018	401	75	1,271	0	17	-3
MWI-1-CS-S1-M-019	296	-30	-508	0	0	0
MWI-1-CS-S1-M-020	384	58	983	0	0	-3

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-003 **Burn Chamber-Kiln Internal Components**

Page 2 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

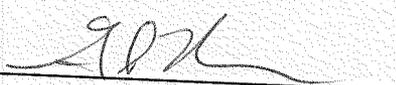
Date: 4/9/2009

Survey Completed By: _____

Date: _____

Ambient Background = 2114 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-BC-W1-B-001	2,840	726	12,305	0	0	-3
MWI-1-BC-W1-B-002	2,627	513	8,695	25	0	-3
MWI-1-BC-W1-B-003	2,657	543	9,203	62	0	-2
MWI-1-BC-W1-B-004	2,778	664	11,254	0	0	-3
MWI-1-BC-W1-B-005	2,903	789	13,373	0	0	0
MWI-1-BC-C1-B-006	3,615	1,501	25,441	0	0	2
MWI-1-BC-C1-B-007	2,527	413	7,000	0	4	-3
MWI-1-BC-C1-B-008	2,588	474	8,034	0	0	-2
MWI-1-BC-F1-B-009	2,517	403	6,831	28	0	-3
MWI-1-BC-F1-B-010	2,808	694	11,763	15	0	-2
MWI-1-BC-F1-B-011	2,970	856	14,508	7	7	-3
MWI-1-BC-F1-B-012	2,601	487	8,254	0	0	-2
MWI-1-BC-F1-B-013	2,409	295	5,000	12	0	-3
MWI-1-BC-F1-B-014	3,087	973	16,492	42	0	-3
MWI-1-BC-C1-B-015	2,935	821	13,915	22	0	0
MWI-1-BC-C1-B-016	2,496	382	6,475	0	0	0
MWI-1-BC-C1-B-017	3,094	980	16,610	0	0	0
MWI-1-BC-W1-B-018	3,424	1,310	22,203	0	0	-3
MWI-1-BC-W1-B-019	2,438	324	5,492	11	4	-3
MWI-1-BC-W1-B-020	3,319	1,205	20,424	50	0	-2

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-003 Quench Pit

Page 3 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

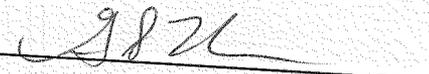
Date: 4/8/2009

Survey Completed By: _____

Date: _____

Ambient Background = 455 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-QP-F1-M-001	1,023	568	9,627	22	0	-3
MWI-1-QP-F1-M-002	1,115	660	11,186	2	8	0
MWI-1-QP-F1-M-003	1,050	595	10,085	0	5	-2
MWI-1-QP-F1-M-004	820	365	6,186	0	0	-2
MWI-1-QP-F1-M-005	1,205	750	12,712	13	0	-3
MWI-1-QP-F1-M-006	762	307	5,203	8	8	0
MWI-1-QP-W1-M-007	444	-11	-186	7	0	-2
MWI-1-QP-W1-M-008	448	-7	-119	21	8	6
MWI-1-QP-W1-M-009	476	21	356	0	8	-3
MWI-1-QP-W1-M-010	403	-52	-881	0	8	-3
MWI-1-QP-W1-M-011	476	21	356	1	0	-3
MWI-1-QP-W1-M-012	414	-41	-695	0	0	-2
MWI-1-QP-W1-M-013	498	43	729	0	5	-3
MWI-1-QP-S1-M-014	416	-39	-661	11	12	-2
MWI-1-QP-S1-M-015	503	48	814	37	5	-3
MWI-1-QP-S1-M-016	468	13	220	4	0	-3
MWI-1-QP-S1-M-017	440	-15	-254	6	0	-3
MWI-1-QP-S1-M-018	414	-41	-695	0	12	-3
MWI-1-QP-S1-M-019	837	382	6,475	13	0	-2
MWI-1-QP-S1-M-020	628	173	2,932	22	1	2

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-003 Bottom Ash Rake

Page 4 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

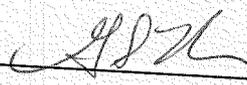
Date: 4/8/2009

Survey Completed By: _____

Date: _____

Ambient Background = 702 cpm

Total Beta Activity Results						
Location:	Gross CPM	Net CPM:	Net Activity	Smear Results		
	cpm/probe	cpm/probe	dpm/100cm ²	DPM1	DPM2	CPM C
				dpm/100cm ²		CPM
MWI-1-BR-W1-M-001	747	45	763	0	5	-3
MWI-1-BR-W1-M-002	780	78	1,322	0	0	0
MWI-1-BR-F1-M-003	1,194	492	8,339	0	2	-2
MWI-1-BR-F1-M-004	482	-220	-3,729	6	0	-2
MWI-1-BR-W1-M-005	773	71	1,203	0	0	-3
MWI-1-BR-W1-M-006	575	-127	-2,153	0	2	0
MWI-1-BR-S1-M-007	711	9	153	0	2	-2
MWI-1-BR-S1-M-008	525	-177	-3,000	0	0	6
MWI-1-BR-F1-M-009	1,007	305	5,169	0	2	-3
MWI-1-BR-F1-M-010	502	-200	-3,390	0	0	-3

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-003 Drain Pit Trench

Page 5 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

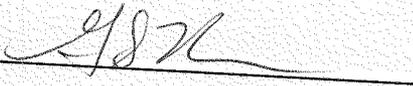
Date: 4/8/2009

Survey Completed By: _____

Date: _____

Ambient Background = 403 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM cpm/probe	Net CPM: cpm/probe	Net Activity dpm/100cm ²	DPM1 dpm/100cm ²	DPM2 dpm/100cm ²	CPM C CPM
MWI-1-DP-F1-M-001	511	108	1,831	41	0	-3
MWI-1-DP-F1-M-002	480	77	1,305	60	2	-2

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-003 Emergency Stack

Page 6 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/7/2009

Survey Completed By: _____

Date: _____

Ambient Background = 455 cpm

Total Beta Activity Results

Location:	Gross CPM	Net CPM:	Net Activity	Smear Results		
	cpm/probe	cpm/probe	dpm/100cm ²	DPM1	DPM2	CPM C
MWI-1-ES-S1-M-001	1,252	797	13,508	dpm/100cm ²		
MWI-1-ES-S1-M-002	511	56	949	12	3	0
				27	0	-4

Survey Reviewed By: *[Signature]*

Date: 5/19/08

Philotechnics, Ltd.
Building and Structures Survey Data

Building: 77

Survey Unit: MWI-1-004 Loading Ram

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/8/2009

Survey Completed By: _____

Date: _____

Ambient Background = 433 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-LR-S1-M-001	404	-29	-492	0	7	0
MWI-1-LR-S1-M-002	316	-117	-1,983	0	10	-2
MWI-1-LR-S1-M-003	497	64	1,085	0	0	-3
MWI-1-LR-S1-M-004	320	-113	-1,915	0	0	-2
MWI-1-LR-S1-M-005	352	-81	-1,373	0	2	2
MWI-1-LR-S1-M-006	391	-42	-712	0	12	-3
MWI-1-LR-S1-M-007	338	-95	-1,610	60	0	0
MWI-1-LR-S1-M-008	269	-164	-2,780	27	0	0
MWI-1-LR-S1-M-009	403	-30	-508	0	0	-3
MWI-1-LR-S1-M-010	388	-45	-763	0	20	-2
MWI-1-LR-S1-M-011	393	-40	-678	0	0	-2
MWI-1-LR-S1-M-012	400	-33	-559	43	0	0
MWI-1-LR-S1-M-013	423	-10	-169	0	0	-2
MWI-1-LR-S1-M-014	289	-144	-2,441	8	0	-2
MWI-1-LR-S1-M-015	319	-114	-1,932	0	0	-3
MWI-1-LR-S1-M-016	420	-13	-220	0	7	-3
MWI-1-LR-S1-M-017	422	-11	-186	30	2	-2
MWI-1-LR-S1-M-018	467	34	576	0	2	-3
MWI-1-LR-S1-M-019	557	124	2,102	0	25	-2
MWI-1-LR-S1-M-020	431	-2	-34	0	13	-2

Survey Reviewed By: *AJH*

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-006 Fly Ash System/Bag House

Page 8 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

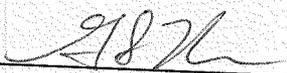
Date: 4/7/2009

Survey Completed By: _____

Date: _____

Ambient Background = 426 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM cpm/probe	Net CPM: cpm/probe	Net Activity dpm/100cm ²	DPM1 dpm/100cm ²	DPM2 dpm/100cm ²	CPM C CPM
MWI-1-BH-S1-M-001	380	-46	-780	0	0	0
MWI-1-BH-S1-M-002	356	-70	-1,186	0	6	-3
MWI-1-BH-S1-M-003	653	227	3,847	0	2	-3
MWI-1-BH-S1-M-004	591	165	2,797	27	0	-3
MWI-1-BH-S1-M-005	382	-44	-746	15	2	-3
MWI-1-BH-S1-M-006	409	-17	-288	1	2	-3
MWI-1-BH-S1-M-007	405	-21	-356	0	7	0
MWI-1-BH-S1-M-008	386	-40	-678	0	0	-2
MWI-1-BH-S1-M-009	410	-16	-271	0	0	-2
MWI-1-BH-S1-M-010	378	-48	-814	4	0	-2
MWI-1-BH-S1-M-011	427	1	17	0	6	0
MWI-1-BH-S1-M-012	381	-45	-763	72	0	-2
MWI-1-BH-S1-M-013	563	137	2,322	12	0	-2
MWI-1-BH-S1-M-014	508	82	1,390	54	0	-3
MWI-1-BH-S1-M-015	398	-28	-475	0	10	-3
MWI-1-BH-S1-M-016	384	-42	-712	0	6	-2
MWI-1-BH-S1-M-017	541	115	1,949	11	0	-3
MWI-1-BH-S1-M-018	379	-47	-797	22	0	0
MWI-1-BH-S1-M-019	459	33	559	0	6	-2
MWI-1-BH-S1-M-020	733	307	5,203	0	0	-2

Survey Reviewed By: 

Date: 5/10/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-006 Horizontal Ventilation

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Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/7/2009

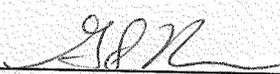
Survey Completed By: _____

Date: _____

Ambient Background = 2114 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM	Net CPM:	Net Activity	DPM1	DPM2	CPM C
	cpm/probe	cpm/probe	dpm/100cm ²	dpm/100cm ²		CPM
MWI-1-HV-S1-M-001	2,350	236	4,000	35	0	-2
MWI-1-HV-S1-M-002	N/A	N/A	0	0	1	-2

Note: Location 2 surface area not accessible to perform gross static measurement.

Survey Reviewed By: 

Date: 5/12/09

Philotechnics, Ltd.
Building and Structures Survey Data

Appendix F

Building: 77

Survey Unit: MWI-1-006 Quench Tank

Page 10 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/7/2009

Survey Completed By: _____

Date: _____

Ambient Background = 1104 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM cpm/probe	Net CPM: cpm/probe	Net Activity dpm/100cm ²	DPM1 dpm/100cm ²	DPM2 dpm/100cm ²	CPM C CPM
MWI-1-QT-S1-M-001	887	-217	-3,678	15	0	-1
MWI-1-QT-S1-M-002	1,576	472	8,000	0	9	-4
MWI-1-QT-S1-M-003	1,474	370	6,271	9	1	1
MWI-1-QT-S1-M-004	503	-188	-3,186	0	0	-1
MWI-1-QT-S1-M-005	813	122	2,068	0	0	-4

Survey Reviewed By: 

Date: 5/19/09

Philotechnics, Ltd.
Building and Structures Survey Data

Building: 77

Survey Unit: MWI-1-006 Vertical Exhaust Stack

Page 11 of 12

Survey Type: Incinerator Fixture Final Status Survey

Survey Completed By: Evan Harpenau

Date: 4/8/2009

Survey Completed By: _____

Date: _____

Ambient Background = 340 cpm

Location:	Total Beta Activity Results			Smear Results		
	Gross CPM cpm/probe	Net CPM: cpm/probe	Net Activity dpm/100cm ²	DPM1 dpm/100cm ²	DPM2 dpm/100cm ²	CPM C CPM
MWI-1-HV-S1-M-001	312	-28	-475	8	0	-3
MWI-1-HV-S1-M-002	417	77	1,305	43	0	2
MWI-1-HV-S1-M-003	498	158	2,678	11	0	-2

Survey Reviewed By: *[Signature]*

Date: 5/19/09



DandD Building Occupancy Scenario

DandD Version: 2.1.0
Run Date/Time: 5/7/2009 2:39:52 AM
Site Name: Merck Waste Incinerator - Building 77
Description: 1 mRem TEDE for Building 77.
FileName: C:\Documents and Settings\TMClemons.PHILOTECHNICS\Desktop\Merck.mcd

Options:

Implicit progeny doses NOT included with explicit parent doses
Nuclide concentrations are distributed among all progeny
Number of simulations: 100
Seed for Random Generation: 8718721
Averages used for behavioral type parameters

External Pathway is ON
Inhalation Pathway is ON
Secondary Ingestion Pathway is ON

Initial Activities:

Nuclide	Area of Contamination (m ²)	Distribution
14C	UNLIMITED	CONSTANT(dpm/100 cm**2)
Justification for concentration: Maximum Net Activity for Building 77.		Value 5.71E+03

Site Specific Parameters:

General Parameters:

None

Correlation Coefficients:

None

Summary Results:

90.00% of the 100 calculated TEDE values are < 3.88E-02 mrem/year .
The 95 % Confidence Interval for the 0.9 quantile value of TEDE is 3.61E-02 to 4.23E-02 mrem/year

This is to acknowledge the receipt of your letter/application dated

5/21/2009, and to inform you that the initial processing which includes an administrative review has been performed.

ENVIRONMENTAL ASSESSMENT 29-00117-06
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 143753.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader