

GENERAL DYNAMICS

Land Systems

Boyd H. Rose, CIH

Sr. Environmental, Health and Safety Specialist

October 9, 2017

Materials Licensing Branch
U.S. Nuclear Regulatory Commission
Region III
2443 Warrenville Road, Suite 210
Lisle, IL 60532-4352

Subject: Notification of Permanent Cessation of Licensed Activities at, Group 1 Decommissioning of, Final Status Survey Report (FSSR) for, and Certification of Acceptability for Unrestricted Use of the Former General Dynamics Land Systems Shelby Operations Facility

- Reference:
- (a) U.S. Nuclear Regulatory Commission Byproduct Materials License 21-21068-01, Docket No. 030-19731, Amendment 26, General Dynamics Land Systems
 - (b) U.S. Nuclear Regulatory Commission. Standards for protection against radiation. Washington, DC: U.S. Government Printing Office; 10 CFR Part 20; 2017
 - (c) U.S. Nuclear Regulatory Commission. Standards for protection against radiation. Washington, DC: U.S. Government Printing Office; 10 CFR Part 30; 2017
 - (d) U.S. Nuclear Regulatory Commission. Consolidated decommissioning guidance: Decommissioning process for materials licensees: Final report; NUREG-1757, vol. 1, rev. 2; 2006 [Online]
<https://www.ornl.gov/ptp/PTP%20Library/library/NRC/NUREG/1757v1.pdf> (Accessed October 9, 2017)
 - (e) Headquarters Department of the Army. Department of the Army pamphlet 385-24: Safety: The Army radiation safety program; 2015 [Online]
http://www.apd.army.mil/epubs/DR_pubs/DR_a/pdf/web/p385_24.pdf (Accessed October 9, 2017)
 - (f) RAM Services, Inc. Wipe test analysis report, isotope Ni-63, report date 02 October 2017, GDLS Project SHEL092717Ni63
 - (g) RAM Services, Inc. Sealed source leak test certificates, isotope Ni-63, RAM accession numbers 141815 – 141839, report date 08 September 2016, General Dynamics – Land Systems, GDLS Project CO090616H3Ni63
 - (h) RAM Services, Inc. Wipe test analysis report, isotope Ni-63, report date 16 March 2009, GDLS Project CO022409Ni63
 - (i) U.S. Nuclear Regulatory Commission. Memorandum to John Hickey, Chief Materials Safety and Inspection Branch, DIMNS, NMSS, From Kathy Dolce Modes /RA Senior Health Physicist by Pamela Henderson Acting For/ John McGrath /RA/ Senior Health Physicist, subject: Leak-Testing of nickel-63 sealed sources; August 1, 2001 [Online]
<https://www.nrc.gov/docs/ML0121/ML012140304.pdf> (Accessed October 9, 2017)

Enclosure(s): reference (f)

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Materials Licensing Branch:

This letter is to notify the U.S. Nuclear Commission (NRC) that General Dynamics Land Systems (GDLS) has permanently ceased its licensed activities (ref. c, §30.36(d)(2)) at:

General Dynamics
Land Systems
Shelby Operations
14920 23 Mile Road
Shelby Township, MI 48315-3008 (ref. a, item 10.A.)

All GDLS licensed activities were permanently discontinued at the Shelby Operations on September 28, 2017, 5:30 PM EDT.

GDLS has decommissioned the Shelby Operations under Group 1 decommissioning (ref. d, sec. 8). All 15 M88 ACADA units and their designated storage cabinet, which were and continue to be in NRC license possession of the U.S. Army (co-occupant), that were in storage at the Shelby Operations proximate to GDLS' permanent discontinuation of licensed activities at the Shelby Operations were transferred to the following GDLS facility:

General Dynamics
Land Systems
Logistics & Engineering Facility
6000 E. 17 Mile Road
Sterling Heights, MI 48313-4500

GDLS has determined as the final status of the Shelby Operations that the Shelby Operations:

1. is free of any residual surface or volumetric byproduct material contamination above natural background levels, Ni-63 in particular, as result of GDLS (facility lessee / principal occupant) and U.S. Army (facility co-occupant) handling, possession, receipt, storage, transfer and use of NRC licensed byproduct material commodities at the facility; and,
2. meets all U.S. Army (ref. e) and NRC (refs. d and b) surface contamination screening levels for unrestricted release for use by the public

The bases of GDLS' final status determination for the Shelby Operations are:

1. GDLS' possession and use (primarily occasional / infrequent receipt as discreet consignments or installed on military vehicles and transfer to the U.S. Army, and long-term storage) of M88 ACADA units that did not leak while in GDLS and U.S. Army possession;
2. the final wipe survey of the facility (ref. f; tables 1 – 3 and figures 1 – 4, pp. 4 – 11 of this letter) which finds the absence of residual beta particle surface contamination on facility surfaces (floors and carpet) and inside the relocated M88 ACADA storage locker exceeding either natural background levels (per counting system), the sealed source leak limit (ref. a, item 15.D.), or the U.S.

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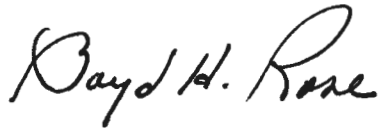
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Department of the Army (DA) (ref. e, table 5-3) or NRC (ref. d, table B.1) screening levels for unrestricted release (ref. b, § 20.1402);

3. the most current leak tests / wipe survey data (ref. g) for M88 ACADA units that are similarly possessed and used by GDLS at the General Dynamics Land Systems Central Office (ref. a, item 10.A.) which demonstrate that M88 ACADA units in GDLS possession and use at GDLS operations are not likely to leak at levels that exceed natural background levels or at levels at or above the sealed source leak limit (ref. a, item 15.D.), or the U.S. Department of the Army (DA) (ref. e, table 5-3) or NRC (ref. d, table B.1) screening levels for unrestricted release;
4. historical leak test / wipe survey data (ref. h) for an M88 ACADA unit found in a severely battle damaged (fire damaged) combat vehicle, which demonstrates that that M88 ACADA units in GDLS possession and use at GDLS operations are not likely to leak at levels that exceed natural background levels, at levels at or above the sealed source leak limit (ref. a, item 15.D.), or the U.S. Department of the Army (DA) (ref. e, table 5-3) or NRC (ref. d, table B.1) screening levels for unrestricted release; and,
5. the NRC's internal health physics opinion (ref. i) that nickel-63 sources do not leak readily and pose negligible consequences from contamination when found leaking.

Please contact me at (586) 825-4503 (tel) or roseb@gdls.com if additional information is required regarding this matter.

Respectfully,



| Sample | | | | |
|--|--------------|------------------------------|-----------|--|
| No. | Type | Wipe Area (cm ²) | Wipe Date | Description |
| SHEL01 | Field Blank | NA | 28-Sep-17 | Sterling Heights Complex EHS Office and in-field |
| SHEL02 | Field Blank | NA | 28-Sep-17 | Sterling Heights Complex EHS Office and in-field |
| SHEL03 | Surface Wipe | 100 | 28-Sep-17 | USG Crib, former M88 storage location floor |
| SHEL04 | Surface Wipe | 100 | 28-Sep-17 | USG Crib, general area floor |
| SHEL05 | Surface Wipe | 100 | 28-Sep-17 | USG Crib, former M88 storage location floor |
| SHEL06 | Surface Wipe | 100 | 28-Sep-17 | USG Crib, general area floor |
| SHEL07 | Surface Wipe | 100 | 28-Sep-17 | Val/Ver Bay, general area |
| SHEL08 | Surface Wipe | 100 | 28-Sep-17 | Val/Ver Bay, general area |
| SHEL09 | Surface Wipe | 100 | 28-Sep-17 | Val/Ver Bay, general area |
| SHEL10 | Surface Wipe | 100 | 28-Sep-17 | Val/Ver Bay, general area |
| SHEL11 | Surface Wipe | 100 | 28-Sep-17 | USG Crib, found unit Y14-M/Y14-D-19658 temp storage area |
| SHEL12 | Surface Wipe | 100 | 28-Sep-17 | USG Crib, found unit Y14-M/Y14-D-19658 temp storage area |
| SHEL13 | Surface Wipe | 100 | 28-Sep-17 | Warehouse, found unit Y14-M/Y14-D-19658 temp staging area |
| SHEL14 | Surface Wipe | 100 | 28-Sep-17 | Warehouse, found unit Y14-M/Y14-D-19658 general storage area |
| SHEL15 | Surface Wipe | 100 | 28-Sep-17 | Kitchen / Dining / Break area, general area floor |
| SHEL16 | Surface Wipe | 100 | 28-Sep-17 | Kitchen / Dining / Break area, counter / sink area floor |
| SHEL17 | Surface Wipe | 100 | 28-Sep-17 | USG Office Area main aisleway floor (carpeted) |
| SHEL18 | Surface Wipe | 100 | 28-Sep-17 | USG Office Area main aisleway floor (carpeted) |
| SHEL19 | Surface Wipe | 100 | 28-Sep-17 | *USG M88 ACADA storage locker inside, bottom shelf/floor |
| SHEL20 | Surface Wipe | 300 | 28-Sep-17 | *USG M88 ACADA storage locker inside, 2nd shelf & ACADA tops |
| *New storage location, Stryker Val/Ver, 6000 E 17 Mile Road, Sterling Heights, MI 48313; storage locker wipes SHEL19 and SHEL20 taken to indicate if leakage from the 15 stored M88 ACADA units has occurred | | | | |

Table 1. SHEL092817Ni63 wipe sample identification; samples SHEL03 through SHEL18 collected at GDLS Shelby Operations, 14920 23 Mile Road, Shelby Township, MI

| Sample ID | Sample Gross Activity | | | | | | Sample and Surface Specific Activity | | | | | |
|-----------|----------------------------|----------------|----------------|--------------------------|--------------------------|--------------------------|--------------------------------------|-------------------------|---------------------------------------|--------------------------------------|-------------------------------|----------------------------------|
| | Counting System Background | Wipe, Reported | Wipe, Reported | Sealed Source Leak Limit | Sealed Source Leak Limit | Sealed Source Leak Limit | Wipe Area | Wipe, Reported | Sampled surface, 1.00 removal assumed | Sampled surface, 0.1 removal assumed | DA PAM 385-24 Screening Level | NUREG 1757 V1 R2 Screening Level |
| | cpm | cpm | dpm | Bq | dpm | μCi | cm ² | dpm/100 cm ² | dpm/100 cm ² | dpm/100 cm ² | dpm/100 cm ² | dpm/100 cm ² |
| SHEL01 | 19 | 6 | 6 | 185 | 11,100 | 0.005 | NA | NA | NA | NA | NA | NA |
| SHEL02 | | 8 | 9 | | | | NA | NA | NA | NA | NA | NA |
| SHEL03 | | 12 | 14 | | | | 100 | 14 | 14 | 140 | 600,000 | 1,800,000 |
| SHEL04 | | 10 | 12 | | | | 100 | 12 | 12 | 120 | | |
| SHEL05 | | 6 | 6 | | | | 100 | 6 | 6 | 60 | | |
| SHEL06 | | 11 | 13 | | | | 100 | 13 | 13 | 130 | | |
| SHEL07 | | 11 | 12 | | | | 100 | 12 | 12 | 120 | | |
| SHEL08 | | 9 | 9 | | | | 100 | 9 | 9 | 90 | | |
| SHEL09 | | 12 | 14 | | | | 100 | 14 | 14 | 140 | | |
| SHEL10 | | 12 | 9 | | | | 100 | 9 | 9 | 90 | | |
| SHEL11 | | 7 | 7 | | | | 100 | 7 | 7 | 70 | | |
| SHEL12 | | 12 | 14 | | | | 100 | 14 | 14 | 140 | | |
| SHEL13 | | 7 | 7 | | | | 100 | 7 | 7 | 70 | | |
| SHEL14 | | 7 | 8 | | | | 100 | 8 | 8 | 80 | | |
| SHEL15 | | 6 | 6 | | | | 100 | 6 | 6 | 60 | | |
| SHEL16 | | 6 | 6 | | | | 100 | 6 | 6 | 60 | | |
| SHEL17 | | 8 | 9 | | | | 100 | 9 | 9 | 90 | | |
| SHEL18 | | 14 | 16 | | | | 100 | 16 | 16 | 160 | | |
| SHEL19 | | 15 | 17 | | | | 100 | 17 | 17 | 170 | | |
| SHEL20 | | 6 | 6 | | | | 300 | 6 | 6 | 60 | | |

Table 2. SHEL092817Ni63 wipe sample analysis data; sealed source leak limit, and U.S. Department of the Army and U.S. Nuclear Regulatory Commission surface contamination screening levels for clearance for unrestricted use are listed for reference

| Project No. | Sample | | Area Wiped cm ² | Description | Number of Samples at or above | | |
|----------------|--------|--------------------|-------------------------------|---|-------------------------------|----------------------------------|-------------------------------------|
| | ID | Type | | | Sealed Source Leak Limit | DA PAM 385-24 Screening Level | NUREG 1757 V1 R2 Screening Level |
| CO022409Ni63 | CO01 | Field Blank | NA | Field blank, leak test swab | 0 | 0 | 0 |
| CO022409Ni63 | CO02 | Field Blank | NA | Field blank, surface wipe | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL01 | Field Blank | NA | Sterling Heights Complex EHS Office and in-field | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL02 | Field Blank | NA | Sterling Heights Complex EHS Office and in-field | 0 | 0 | 0 |
| CO022409Ni63 | CO04 | Leak Wipe | NA | ICV-0270-03 M88 ACADA S/N Y14-D-21298, Y14-M-21298 Inlet Port | 0 | 0 | 0 |
| CO022409Ni63 | CO05 | Leak Wipe | NA | ICV-0270-03 M88 ACADA S/N Y14-D-21298, Y14-M-21298 Exhaust Port | 0 | 0 | 0 |
| CO090616H3Ni63 | 141816 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-19396 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141817 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-17540 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141818 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-19141 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141819 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-17261 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141820 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-20668 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141834 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-07832 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141835 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-30669 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141836 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-31236 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141837 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-30908 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141838 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-20571 | 0 | 0 | 0 |
| CO090616H3Ni63 | 141839 | Leak /Surface Wipe | 100 | Detector, Chemical Agent, Y14-D-21298 | 0 | 0 | 0 |
| CO022409Ni63 | CO12 | Surface Wipe | 100 | ICV-0270-03 Commander's Station Roof | 0 | 0 | 0 |
| CO022409Ni63 | CO13 | Surface Wipe | 100 | ICV-0270-03 Commander's Station Bulkhead | 0 | 0 | 0 |
| CO022409Ni63 | CO03 | Surface Wipe | 100 | ICV-0270-03 M88 ACADA S/N Y14-D-21298, Y14-M-21298 Top Surface | 0 | 0 | 0 |
| CO022409Ni63 | CO06 | Surface Wipe | 100 | ICV-0270-03 Tunnel Roof | 0 | 0 | 0 |
| CO022409Ni63 | CO07 | Surface Wipe | 100 | ICV-0270-03 Tunnel Bulkhead | 0 | 0 | 0 |
| CO022409Ni63 | CO08 | Surface Wipe | 100 | ICV-0270-03 Tunnel Floor | 0 | 0 | 0 |
| CO022409Ni63 | CO09 | Surface Wipe | 100 | ICV-0270-03 Driver's Station Roof | 0 | 0 | 0 |
| CO022409Ni63 | CO10 | Surface Wipe | 100 | ICV-0270-03 Driver's Station Bulkhead | 0 | 0 | 0 |
| CO022409Ni63 | CO11 | Surface Wipe | 100 | ICV-0270-03 Driver's Station Floor | 0 | 0 | 0 |
| CO022409Ni63 | CO14 | Surface Wipe | 100 | ICV-0270-03 Commander's Station Floor | 0 | 0 | 0 |
| CO022409Ni63 | CO15 | Surface Wipe | 100 | ICV-0270-03 Troop Compartment Roof | 0 | 0 | 0 |
| CO022409Ni63 | CO16 | Surface Wipe | 100 | ICV-0270-03 Troop Compartment Bulkhead | 0 | 0 | 0 |
| CO022409Ni63 | CO17 | Surface Wipe | 100 | ICV-0270-03 Troop Compartment Floor | 0 | 0 | 0 |
| CO022409Ni63 | CO18 | Surface Wipe | 100 | ICV-0270-03 Engine Compartment, adjacent to tunnel Bulkhead | 0 | 0 | 0 |
| CO022409Ni63 | CO19 | Surface Wipe | 100 | ICV-0270-03 Exterior, adjacent to ICV-0270-03 Driver's Hatch, Hull Roof | 0 | 0 | 0 |
| CO022409Ni63 | CO20 | Surface Wipe | 100 | ICV-0270-03 Exterior, adjacent to port (left) side hatch, Hull Side | 0 | 0 | 0 |

Table 3. Compiled summary of current and historical leak tests and surface contamination wipe survey data for Ni-63 associated with GDLS possession of M88

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| Project No. | Sample | | Area Wiped cm ² | Description | Number of Samples at or above | | |
|----------------|--------|--------------|-------------------------------|--|-------------------------------|----------------------------------|-------------------------------------|
| | ID | Type | | | Sealed Source Leak Limit | DA PAM 385-24 Screening Level | NUREG 1757 V1 R2 Screening Level |
| CO090616H3Ni63 | 141815 | Surface Wipe | 100 | Floor in front of Source Vault | 0 | 0 | 0 |
| CO090616H3Ni63 | 141821 | Surface Wipe | 100 | Source Vault Door Interior Side | 0 | 0 | 0 |
| CO090616H3Ni63 | 141822 | Surface Wipe | 100 | Source Vault Shelf G | 0 | 0 | 0 |
| CO090616H3Ni63 | 141823 | Surface Wipe | 100 | Source Vault Shelf E | 0 | 0 | 0 |
| CO090616H3Ni63 | 141824 | Surface Wipe | 100 | Source Vault Shelf D | 0 | 0 | 0 |
| CO090616H3Ni63 | 141825 | Surface Wipe | 100 | Source Vault Shelf B | 0 | 0 | 0 |
| CO090616H3Ni63 | 141826 | Surface Wipe | 100 | Source Vault Shelf C | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL03 | Surface Wipe | 100 | USG Crib, former M88 storage location floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL04 | Surface Wipe | 100 | USG Crib, general area floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL05 | Surface Wipe | 100 | USG Crib, former M88 storage location floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL06 | Surface Wipe | 100 | USG Crib, general area floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL07 | Surface Wipe | 100 | Val/Ver Bay, general area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL08 | Surface Wipe | 100 | Val/Ver Bay, general area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL09 | Surface Wipe | 100 | Val/Ver Bay, general area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL10 | Surface Wipe | 100 | Val/Ver Bay, general area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL11 | Surface Wipe | 100 | USG Crib, found unit Y14-M/Y14-D-19658 temp storage area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL12 | Surface Wipe | 100 | USG Crib, found unit Y14-M/Y14-D-19658 temp storage area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL13 | Surface Wipe | 100 | Warehouse, found unit Y14-M/Y14-D-19658 temp staging area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL14 | Surface Wipe | 100 | Warehouse, found unit Y14-M/Y14-D-19658 general storage area | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL15 | Surface Wipe | 100 | Kitchen / Dining / Break area, general area floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL16 | Surface Wipe | 100 | Kitchen / Dining / Break area, counter / sink area floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL17 | Surface Wipe | 100 | USG Office Area main aisleway floor (carpeted) | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL18 | Surface Wipe | 100 | USG Office Area main aisleway floor (carpeted) | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL19 | Surface Wipe | 100 | *USG M88 ACADA storage locker inside, bottom shelf/floor | 0 | 0 | 0 |
| SHEL092817Ni63 | SHEL20 | Surface Wipe | 300 | *USG M88 ACADA storage locker inside, 2nd shelf & ACADA tops | 0 | 0 | 0 |

Table 3. Compiled summary of current and historical leak tests and surface contamination wipe survey data for Ni-63 associated with GDLS possession of M88

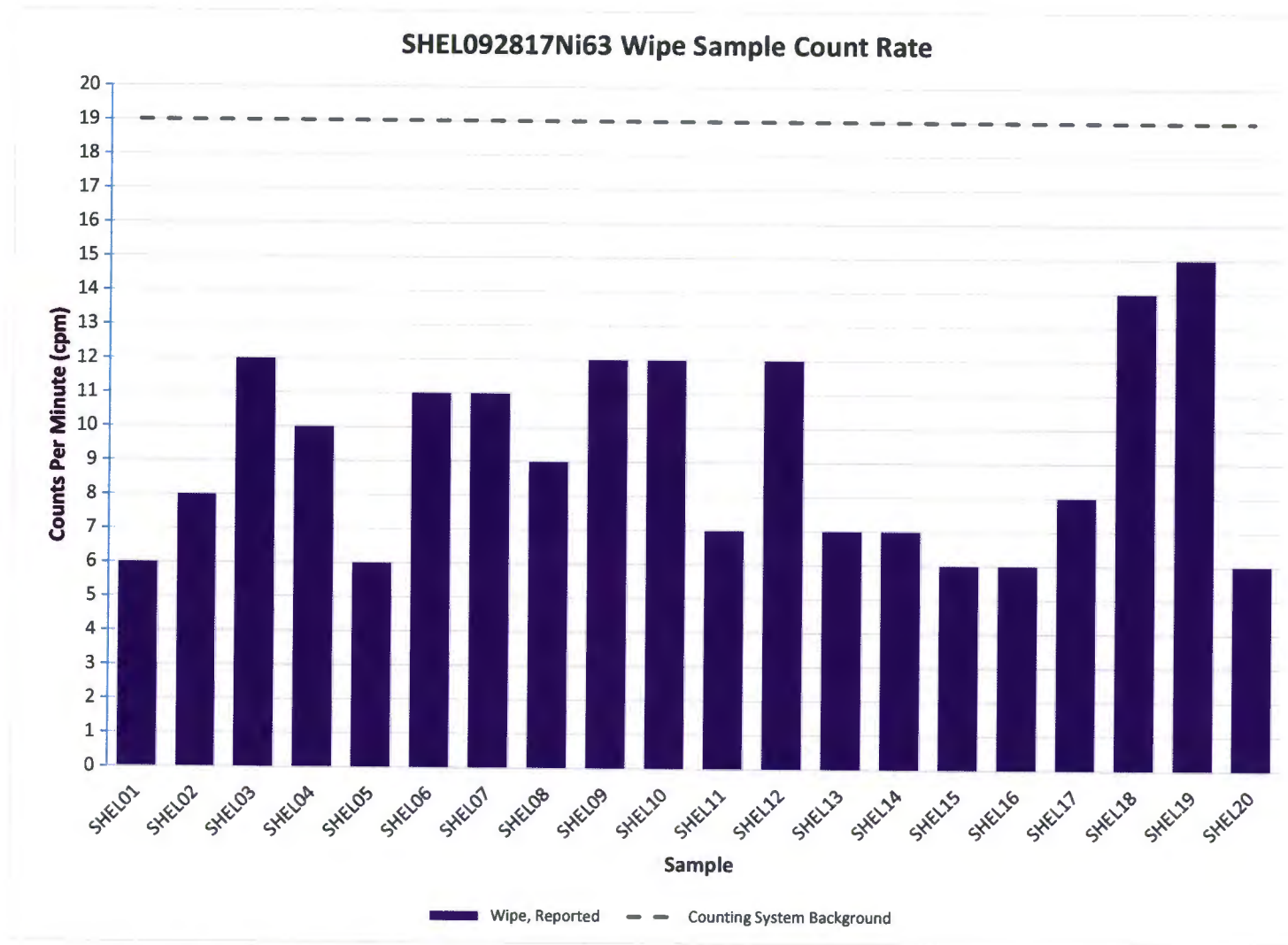


Figure 1. SHEL092817Ni63 wipe sample analysis data, sample count rate data

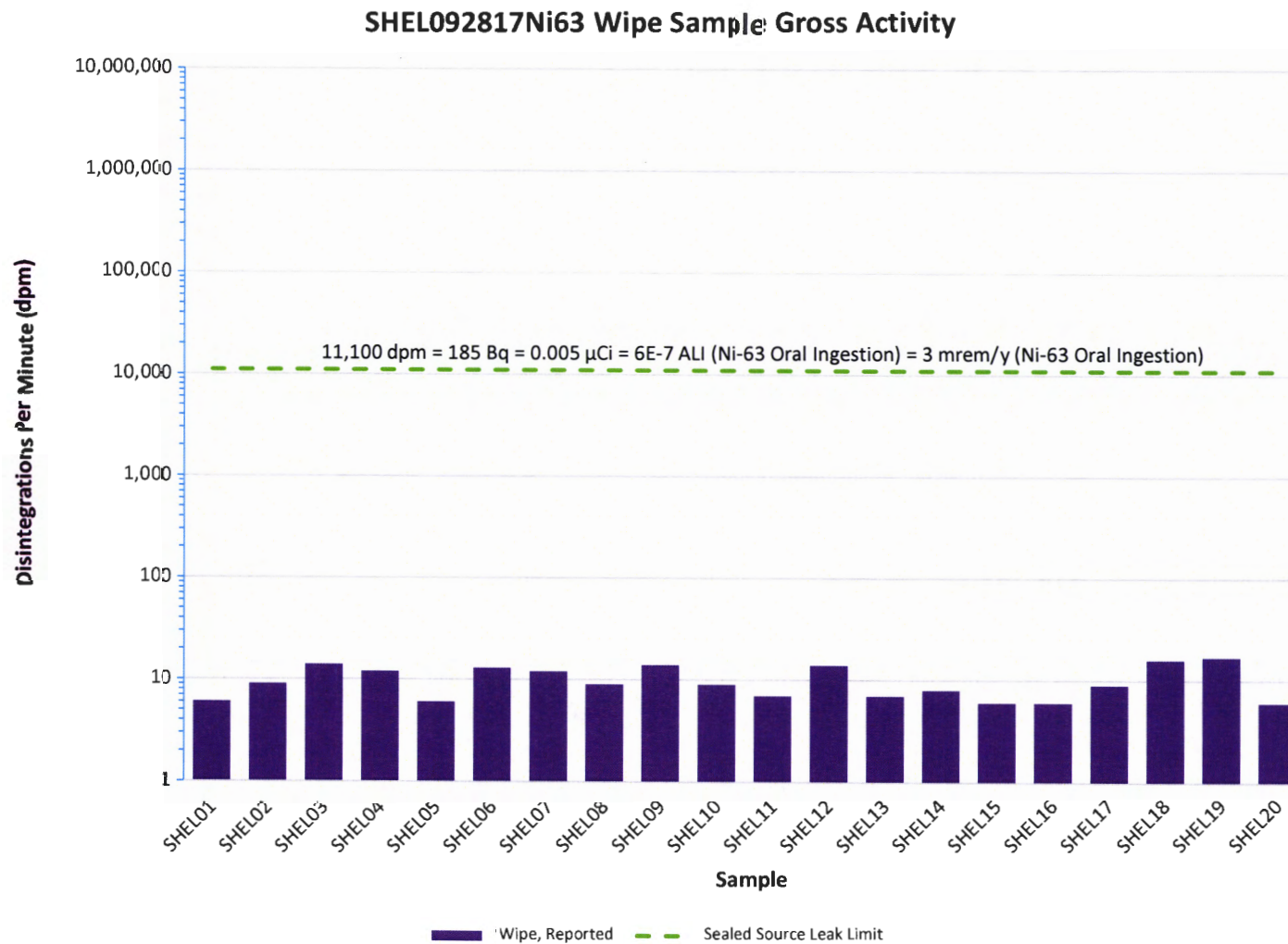


Figure 2. SHEL092817Ni63 wipe sample analysis data, sample gross activity data

SHEL092817Ni63 Wipe Sample and Sampled Surface Specific Activity

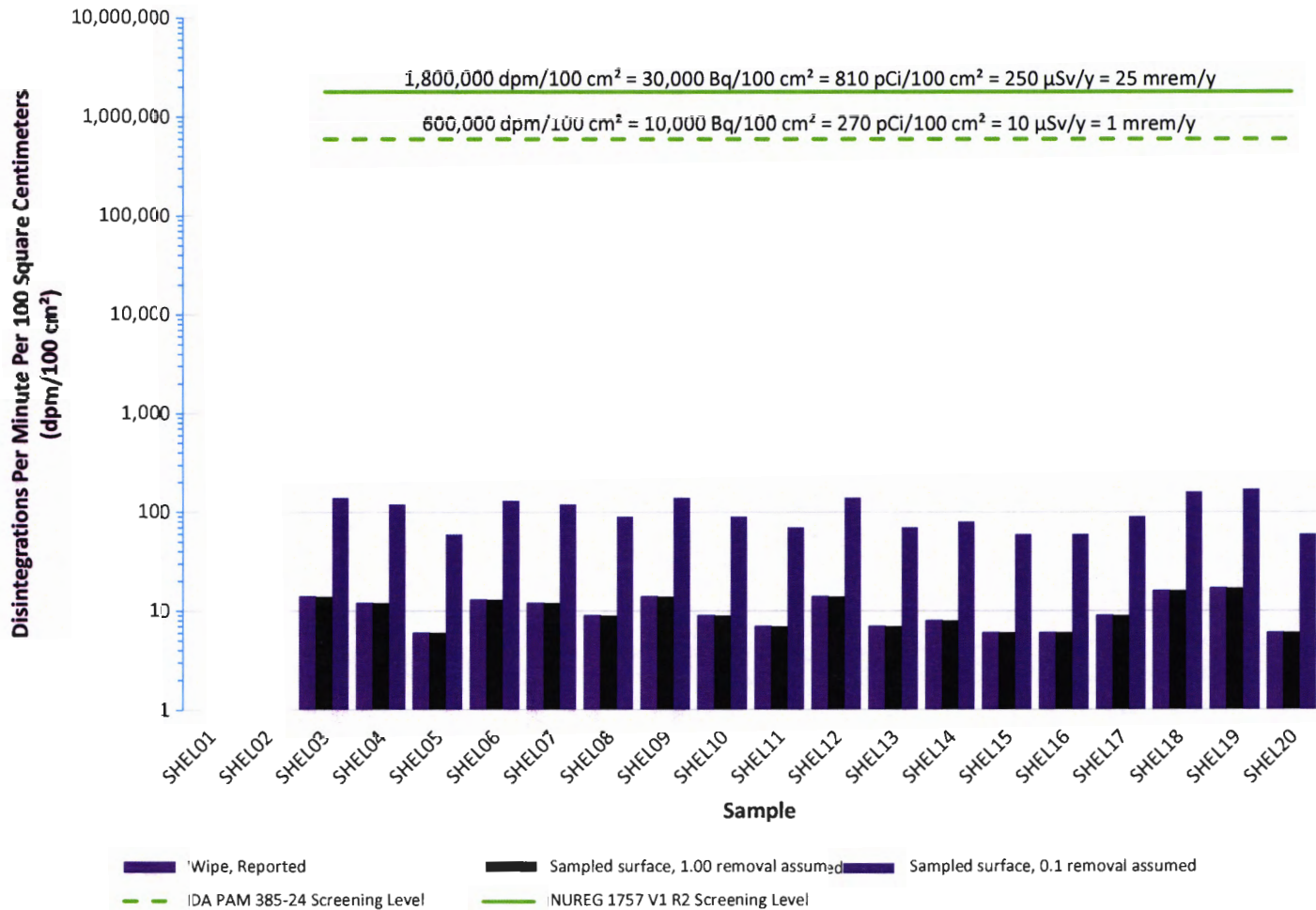


Figure 3. SHEL092817Ni63 wipe sample analysis data, sample specific activity data

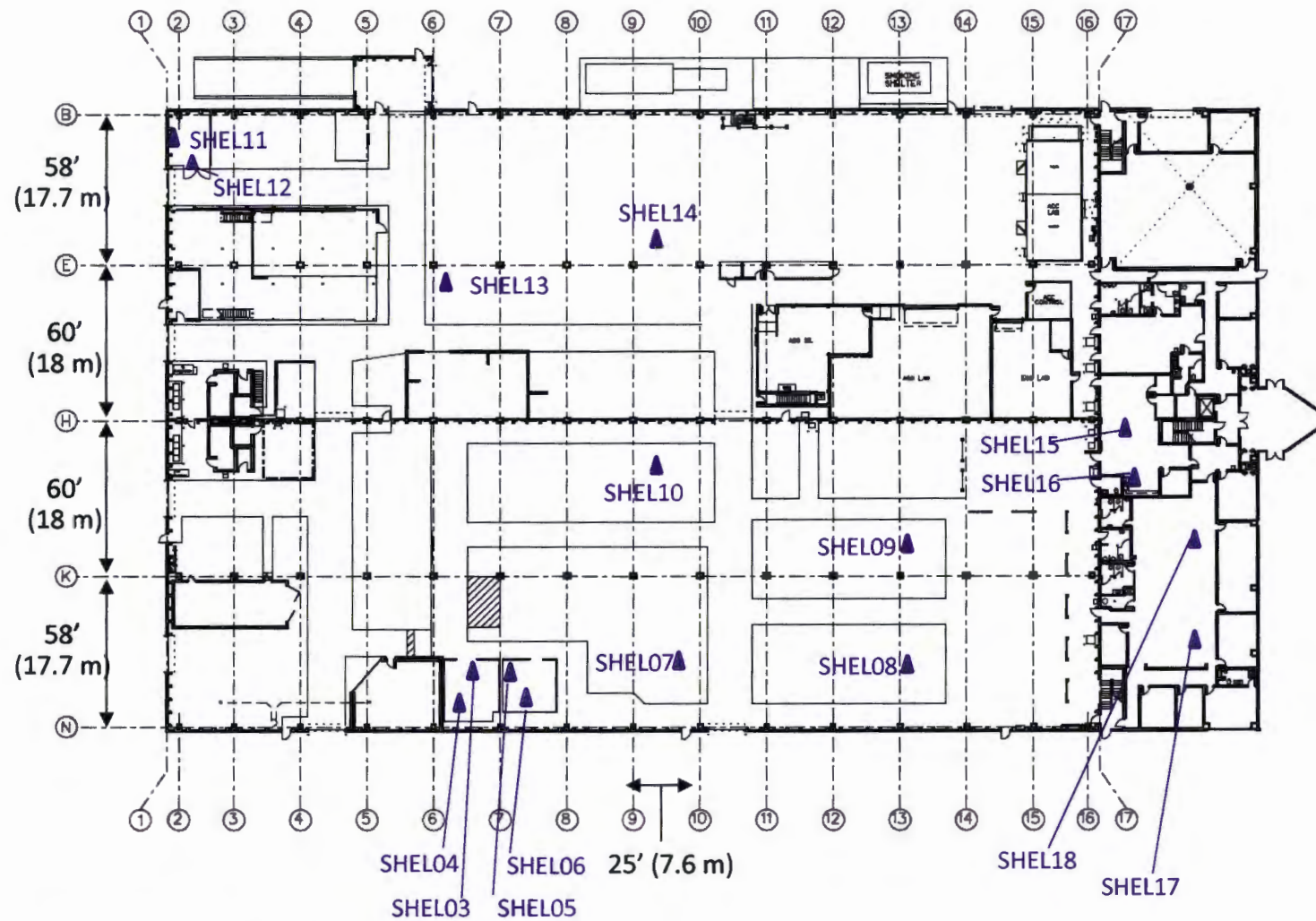


Figure 4. SHEL092817Ni63 building interior wipe sample locations (indicated in magenta)



Removable Contamination Report Dual Channel analysis

Analysis Performed 30-Sep-17
Sample Received 30-Sep-17
Report date 2-Oct-17
Analyst J Wiza
Project SHEL092817Ni63
Sample location As noted by serial
Reported Wipe area 100 cm2

Results highlighted (yellow) for H-3 DPM

Analysis Method: Liquid Scintillation Counting

| ASSAY # | wipe # | location | Count Time | Low energy (H-3 CPM) | upper energy counts (NON H-3 CPM) | H-3 DPM | upper energy DPM | H-3 efficiency (%) | Efficiency upper energy (%) |
|---------|--------|--|------------|----------------------|-----------------------------------|---------|------------------|--------------------|-----------------------------|
| BLANK | | (background) | 10 | 16 | 19 | NA | NA | NA | NA |
| | 1 | SHEL001 EHS office and in-field | 1 | 9 | 6 | 19 | 6 | 50% | 94% |
| | 2 | SHEL002 EHS office and in-field | 1 | 5 | 8 | 9 | 9 | 61% | 94% |
| | 3 | SHEL003 USG CRIB former m88 storage | 1 | 6 | 12 | 11 | 14 | 61% | 92% |
| | 4 | SHEL004 USG CRIB general floor area | 1 | 7 | 10 | 15 | 12 | 50% | 90% |
| | 5 | SHEL005 USG CRIB former m88 storage | 1 | 8 | 6 | 16 | 6 | 50% | 90% |
| | 6 | SHEL006 USG CRIB general floor area | 1 | 10 | 11 | 20 | 13 | 50% | 90% |
| | 7 | SHEL007 VAL/VER BAY, general area | 1 | 10 | 11 | 24 | 12 | 43% | 90% |
| | 8 | SHEL008 VAL/VER BAY, general area | 1 | 13 | 9 | 35 | 9 | 39% | 96% |
| | 9 | SHEL009 VAL/VER BAY, general area | 1 | 10 | 12 | 23 | 14 | 43% | 89% |
| | 10 | SHEL010 VAL/VER BAY, general area | 1 | 5 | 12 | 9 | 14 | 55% | 89% |
| | 11 | SHEL011 USG Crib, found unit Y14-M/Y14-D-19658 temp storage area | 1 | 9 | 7 | 24 | 7 | 40% | 94% |
| | 12 | SHEL012 USG Crib, found unit Y14-M/Y14-D-19658 temp storage area | 1 | 7 | 12 | 16 | 14 | 45% | 87% |
| | 13 | SHEL013 WAREHOUSE, found unit Y14-M/Y14-D-19658 temp staging area | 1 | 10 | 7 | 27 | 7 | 39% | 95% |
| | 14 | SHEL014 WAREHOUSE, found unit Y14-M/Y14-D-19658 general storage area | 1 | 8 | 7 | 19 | 8 | 43% | 93% |
| | 15 | SHEL015 Kitchen, dining, break area, general area floor | 1 | 13 | 6 | 34 | 6 | 39% | 93% |
| | 16 | SHEL016 Kitchen, dining, break area, counter/sink area floor | 1 | 12 | 6 | 30 | 6 | 40% | 93% |
| | 17 | SHEL017 USG office area main aisleway floor (carpeted) | 1 | 7 | 8 | 15 | 9 | 46% | 93% |
| | 18 | SHEL018 USG office area main aisleway floor (carpeted) | 1 | 8 | 14 | 18 | 16 | 44% | 90% |
| | 19 | SHEL019 USG M88 ACADA storage locker inside, bottom shelf/floor | 1 | 15 | 15 | 36 | 17 | 42% | 90% |
| | 20 | SHEL020 USG M88 ACADA storage locker inside, 2nd shelf & ACADA tops | 1 | 7 | 6 | 23 | 6 | 32% | 94% |

Questions: Please contact Rick Parlato 920-686-3889 or rick.parlato@ramservicesinc.com

SNC Protocol

Calibration Information

Software Version IC: 3.04

Software Version EC: 4.00

Instrument Model: Tri-Carb 3110TR

Instrument Serial Number: 130414

3H Chi Square: 14.38 Date Processed: 9/30/2017 8:56:36 AM

14C Chi Square: 23.47 Date Processed: 9/30/2017 8:56:36 AM

3H E²/B (1-18.6 keV): 226.39 Date Processed: 9/30/2017 8:56:36 AM14C E²/B (4-156 keV): 469.88 Date Processed: 9/30/2017 8:56:36 AM

3H Efficiency (1-18.6 keV): 61.03 Date Processed: 9/30/2017 8:56:36 AM

14C Efficiency (4-156 keV): 93.70 Date Processed: 9/30/2017 8:56:36 AM

IPA Background Date Processed: 9/30/2017 8:56:36 AM

3H Background CPM (1-18.6 keV): 16.45 Date Processed: 9/30/2017 8:56:36 AM

14C Background CPM (4-156 keV): 18.68 Date Processed: 9/30/2017 8:56:36 AM

3H Calibration DPM: 260100

3H Reference Date: 4/12/2013

14C Calibration DPM: 124800

Assay Definition

Assay Description:

Basic dual DPM assay

Assay Type: DPM (Dual)

Report Name: Report1

Output Data Path: c:\packard\tricarb\Results\Default\3h_14c_dpm\20170930_1311

Raw Results Path: c:\packard\tricarb\Results\Default\3h_14c_dpm\20170930_1311\20170930_1311.results

Assay File Name: c:\packard\tricarb\Assays\3h_14c_dpm.lsa

Count Conditions

Nuclide: 3H-14C

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s

Pre-Count Delay (min): 0.00

Quench Sets:

Low Energy: 3H

Mid Energy: 14C

Count Time (min): 1.00

Count Mode: Normal

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Count Corrections

Static Controller: On

Luminescence Correction: Off

Colored Samples: Off

Heterogeneity Monitor: n/a

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

IPA Block Data

IPA Background Date Processed: 9/30/2017 8:56:36 AM

3H Background CPM (1-18.6 keV): 16.45 Date Processed: 9/30/2017 8:56:36 AM

14C Background CPM (4-156 keV): 18.68 Date Processed: 9/30/2017 8:56:36 AM

3H Calibration DPM: 260100

3H Reference Date: 4/12/2013

14C Calibration DPM: 124800

Cycle 1 Results

| S# | Count | Time | CPMA | CPMB | DPM1 | DPM2 | SIS | tSIE | MESSAGES |
|----|-------|------|------|------|------|------|--------|--------|----------|
| 1 | 1.00 | | 9 | 6 | 19 | 6 | 420.51 | 446.44 | |
| 2 | 1.00 | | 5 | 8 | 9 | 9 | 515.25 | 429.87 | |
| 3 | 1.00 | | 6 | 12 | 11 | 14 | 264.24 | 408.87 | |
| 4 | 1.00 | | 7 | 10 | 15 | 12 | 314.29 | 358.00 | |
| 5 | 1.00 | | 8 | 6 | 16 | 6 | 957.92 | 469.71 | |
| 6 | 1.00 | | 10 | 11 | 20 | 13 | 277.05 | 417.41 | |
| 7 | 1.00 | | 10 | 11 | 24 | 12 | 380.88 | 339.36 | |
| 8 | 1.00 | | 13 | 9 | 35 | 9 | 802.64 | 322.89 | |
| 9 | 1.00 | | 10 | 12 | 23 | 14 | 704.86 | 360.19 | |
| 10 | 1.00 | | 5 | 12 | 9 | 14 | 450.86 | 350.40 | |
| 11 | 1.00 | | 9 | 7 | 24 | 7 | 336.60 | 332.52 | |
| 12 | 1.00 | | 7 | 12 | 16 | 14 | 319.66 | 314.04 | |
| 13 | 1.00 | | 10 | 7 | 27 | 7 | 415.66 | 311.60 | |
| 14 | 1.00 | | 8 | 7 | 19 | 8 | 246.37 | 357.81 | |
| 15 | 1.00 | | 13 | 6 | 34 | 6 | 993.50 | 338.28 | |
| 16 | 1.00 | | 12 | 6 | 30 | 6 | 554.42 | 346.15 | |

Protocol# 15 - 3h_14c_dpm.lsa

User: Default

| | | | | | | | |
|----|------|----|----|----|----|--------|--------|
| 17 | 1.00 | 7 | 8 | 15 | 9 | 897.06 | 385.71 |
| 18 | 1.00 | 8 | 14 | 18 | 16 | 619.76 | 315.49 |
| 19 | 1.00 | 15 | 15 | 36 | 17 | 93.07 | 340.74 |
| 20 | 1.00 | 7 | 6 | 23 | 6 | 153.68 | 240.89 |

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Land Systems

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REGION III
MATERIALS LICENSING BRANCH
2443 WARRENVILLE ROAD
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