Department of Energy
National Nuclear Security Administration
Washington, DC 20585

January 30, 2008

The Honorable A. J. Eggenberger
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W., Suite 700
Washington, D.C. 20004-2901

Dear Mr. Chairman:

This letter transmits the National Nuclear Security Administration's (NNSA) deliverables required to fulfill commitments 5.1.2 and 5.1.4 of the Department's Implementation Plan responding to Board Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*. Specifically the two commitments are listed below.

> **Commitment 5.1.2: Identify NNSA defense nuclear facilities for which a criticality safety program is required (per DOE O 420.1B) and relies upon *in situ* NDA.**
>
> **Commitment 5.1.4: Prioritize NNSA defense nuclear facilities based upon criticality accident risk for those facilities identified in Commitment 5.1.2.**

NNSA received responses from all its sites that have, or are in the process of having, approved Criticality Safety Programs as required by DOE Order 420.1B. Of these, only the Criticality Safety Program at the Y-12 Plant has any reliance upon *in situ* nondestructive assay (NDA) for criticality control. This satisfies Commitment 5.1.2 to identify NNSA sites for which a criticality safety program is required and that also relies upon *in situ* NDA.

The Y-12 Site Office (YSO) prioritized Y-12 facilities in terms of criticality accident risk. YSO described the basis for establishing criticality accident risk in their submittal (enclosed). The Y-12 facility criticality risk ranking from highest risk to lowest risk is: Building 9212 and Building 9215 followed by Buildings 9206, 9204-2E, 9720-5, 9204-4, and 9995. Buildings 9212 and 9215 have approximately 2,100 of the total of about 2300 NDA measurement locations at Y-12, and are the two highest risk facilities that have a dependence upon *in situ* NDA for criticality control. A single *in situ* NDA program, the Uranium Holdup Survey Program (UHSP), covers all Y-12 facilities. This satisfies Commitment 5.1.4 to prioritize NNSA defense nuclear facilities based upon criticality accident risk for those facilities identified in Commitment 5.1.2.

The response memos from the individual NNSA sites are enclosed for your information. If you have any questions or need further assistance, please contact me, or Jerry McKamy at (301) 903-8031.

Sincerely,

Robert L. Smolen
Deputy Administrator
for Defense Programs

Enclosures

cc: M. Thompson, NA-17
M. Schoenbauer, NA-10
R. Smolen, NA-10
W. Ostendorff, NA-2
J. McConnell, NA-2.1
R. Lagdon, US

DOE F 1325.8
(10/90)

United States Government **Department of Energy**
National Nuclear Security Administration

memorandum

DATE: December 12, 2007

REPLY TO
ATTN OF:

SUBJECT: **2007-1 DATA CALL FOR Y-12 NSC**

TO: Dr. Jerry N. McKamy, Nuclear Criticality Safety Program Manager, NNSA Office of Facility and Infrastructure Acquisition and Operation, NA-17, GTN

Attachment to this memorandum is the information, as previously coordinated, to answer the 2007-1 data call for Y-12. This attachment provides information relative to the number of total active points (note: will include NMCA as well as NCS), and then the NCS points and active processes reliant upon uranium holdup survey program (UHSP) measurements for NCS. The data was culled a bit further to differentiate (i.e., if there is any - a minor detail) relative to NCS controlled documents (i.e., criticality safety evaluations and analyses documents) vs. operations controlled procedures. These operations procedures may still be NCS related but not as directly tied to NCS program and hence the CSP description document. This later was accomplished given your expressed interest in the flow down from the criticality safety program (CSP) description document itself.

The Y-12 CSP description document as required under DOE order 420.1B, is chapter 6 of Y-12 National Security Complex Safety Analysis Report (Y/FSD-17, Rev.4, November 2007). The CSP designates the UHSP and the inadvertent accumulation prevention program (IAPP) as programs relied upon by NCS under section 6.7. An active data base of UHSP points is maintained per the UHSP procedure that is referenced in the CSP. The attached response is based upon a printout of this dynamic data base on 11/29/07. While the nature of this data base, especially given the IAPP baseline walk downs currently in progress, changes day to day the general risk ranking, determining overall dependence of facilities upon UHSP, etc. as requested for this 2007-1 data call should not affect the overall risk conclusions drawn.

If there are any questions related to this response please feel free to contact me as needed at (865)574-8647.

Ed Kendall
Senior NCS Engineer
Y-12 Site Office

Attachment:
As Stated

cc:
C. Worley, JCC, MS8010, B&W Y-12
C. Robertson, JCC MS8010, B&W Y12
G. Pfennigwerth, 9212, MS8194, B&W Y-12
J. Goss, Y12-50, YSO
K. Rhyne, Y12-50, YSO
P. Jones, Y12-50, YSO

Attachment

FACILITY	Total Active Points	NCS use of UHSP for monitoring requirements:	Risk ranking/ Notes on general nature of facility fissile operations.
Note: data based upon 11/29/07 data base printout. While actual numbers of points, etc. are expected to fluctuate, it should not impact the overall facility risk ranking presented here in.			
9212	1355	35 active processes using UHSP monitoring for NCS. 1355 total active points with 1037 listed as NCS - 1032 of which are tied to 41 NCS controlled analysis documents: CSR-AEC-013, -021, -024, -026, BL-050, C1 R&S-048, CE/W-016, CP-044, DAG-004, DEC-022, DNT-079, DV1-047, DV3-028, DVS-005, HGF-052, HHSH-002, IE-073, MF-003, NR&HNO3-019, OXD-071, PHV-068, PRCP-038, PX-069, REC-039, RHFB-072, RED-070, S110-015, S27-036, S28-035, S33-011, S38-032, S43-023, S48-033, SOP-027, SORT-045, SPBL-106, STF-030, TD-040, TOP-046, WC-049, Y/DD-806.	Y-12 risk rank 1 – active solutions and oxides processing w/ large # active processes reliant upon NDA for NCS. Active chemical recovery and process operations (include high equity solutions) metal casting, pack/ship/receive, legacy fissile material holdup, and storage (including solution) operations. Examples of equipment being monitored include: exhaust components from various processes, ductwork, HEPA filters, roughing filters, process equipment (tanks, vents, scrubber filters, hood & glove-box exhaust, mist eliminators, ovens, etc.), filter houses, vacuum systems incl. those associated with casting, hoods, floor, and other misc. filters/filter housings.

FACILITY	Total Active Points	NCS use of UHSP for monitoring requirements:	Risk ranking/ Notes on general nature of facility fissile operations.
Note: data based upon 11/29/07 data base printout. While actual numbers of points, etc. are expected to fluctuate, it should not impact the overall facility risk ranking presented here in.			
9215	698	8 active processes using UHSP monitoring for NCS. 698 total active points with 631 listed as NCS - which are all tied to 8 NCS controlled analysis documents: CSR-AVS-055, CPK-057, CVS-058, MCS-056, MWS-054, S3-062, SOW-064, SWG-100.	Y-12 risk rank 2 – active metals processing (limited solutions) w/ large # active processes reliant upon NDA for NCS. Large scale metal machining operations with related quality, storage, legacy fissile material holdup, and support solution process (i.e., machine coolant) activities. Examples of equipment being monitored include: Vacuum systems, HEPA filters, ductwork, tanks, filter housings, exhaust systems.
9206	62	3 active processes using UHSP monitoring for NCS. 62 total active points, which are all tied to 5 NCS controlled analysis documents: CSA-9206- 24-2, 24-2, 25-2, 30-1, WTH-078.	Y-12 risk rank 3 – inactive solutions and oxides processing facility w/ some active processes. Holdups from legacy solutions activities increase risk ranking for this facility reliant upon NDA for NCS. Limited storage, glove box for limited can blend & sample operations, and ventilation units. No other active fissile processing, however legacy chemical operations (fissile solutions) and legacy fissile material holdup will rely heavily upon NDA for D&D activity. Examples of equipment being monitored include: HEPA filters, roughing filters, cyclone separators, exhaust fans, ductwork.

FACILITY	Total Active Points	NCS use of UHSP for monitoring requirements:	Risk ranking/ Notes on general nature of facility fissile operations.
Note: data based upon 11/29/07 data base printout. While actual numbers of points, etc. are expected to fluctuate, it should not impact the overall facility risk ranking presented here in.			
9204-2E	149	6 active processes using UHSP monitoring for NCS. 149 total active points listed as NCS, 61 of which are tied to 3 NCS controlled analysis documents: CSA-B2E-30-1, 30.4, 500.	Y-12 risk rank 4 – active metals processing w/ moderate # of active processes reliant upon NDA for NCS. Active assembly, disassembly, related quality activities, and storage operations. Examples of equipment being monitored include: HEPA filters, roughing filters, bubbler systems, drains, misc. filters, ductwork.
9720-5	8	1 active process using UHSP monitoring for NCS. 8 total active points listed as NCS, tied to 1 NCS controlled analysis document: CSE-NMSSS-11.2	Y-12 risk rank 5 – active storage operations with one active process (glove-box) reliant upon NDA for NCS. Active fissile storage operations, glove-box (associated with NDA points), and limited work involving open access to packaged materials. Examples of equipment being monitored include: Glove-box ducts and HEPA filters.
9204-4	22	1 active process using UHSP monitoring for NCS. 22 total active points listed as NCS, none of which is tied to a controlled NCS analysis document.	Y12 risk rank 6 – generally low equity storage only, fissile material operations removed and analyses being cancelled. Legacy quality evaluation work, drum storage. Examples of equipment being monitored include: ductwork, exhaust components, filter/filer box.

FACILITY	Total Active Points	NCS use of UHSP for monitoring requirements:	Risk ranking/ Notes on general nature of facility fissile operations.
Note: data based upon 11/29/07 data base printout. While actual numbers of points, etc. are expected to fluctuate, it should not impact the overall facility risk ranking presented here in.			
9995	14	No active process using UHSP monitoring for NCS. 14 total active points listed as NCS, none of which is tied to a controlled NCS analysis document.	Y12 risk rank 7 – analytical plant lab generally handling only small samples (well below min. critical mass). Examples of equipment being monitored include: hoods and exhaust hoods.

UNITED STATES GOVERNMENT | DEPARTMENT OF ENERGY

memorandum

National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

DATE: DEC 1 3 2007
REPLY TO ATTN OF: SET:5PM-004
SUBJECT: 2007-1 Response

TO: Jerry McKamy, Office of Facilities Operations, NA-171, HQ/GTN

In response to your data call on Recommendation 2007-01, Safety-Related In Situ Nondestructive Assay of Radioactive Materials, relative to Criticality Safety reliance on Non-Destructive Assay (NDA) measurements of holdup the Los Alamos Site Office and Los Alamos National Laboratory (LANL) have reviewed the criticality safety controls for all facilities at the laboratory.

LANL does not currently rely on NDA measurements of holdup for Nuclear Criticality Safety limit compliance in any operation. No NDA measurement controls exist within current criticality safety evaluations or criticality safety limit approvals.

Joseph C. Vozella
Assistant Manager
Office of Safety Operations

NNSA/DOE
Los Alamos Site Office
528 35th Street
Los Alamos, NM 87544-2201

NNSA/DOE
Headquarters
1000 Independence Avenue, SW
Washington, DC 20585-1290

JCR-SO-12/13/2007-1597

U. S. Department of Energy
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PO Box 808, L-293
7000 East Avenue
Livermore, California 94551-0808

5481.1.4
DEC 19 2007 COR-NNSA-12/19/2007-5804

MEMORANDUM FOR DR. JERRY McKAMY
NUCLEAR CRITICALITY SAFETY PROGRAM MANAGER
OFFICE OF FACILITIES OPERATIONS

FROM: PHILIP HILL
TECHNICAL DEPUTY

SUBJECT: Lawrence Livermore National Laboratory Input for Recommendation 2007-1 Data Call

REFERENCE: Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*, dated October 24, 2007

The Livermore Site Office has evaluated the Lawrence Livermore National Laboratory (LLNL) facilities for applicability to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2007-1. LLNL has no facilities or operations that require in-situ non-destructive assay measurement as part of its criticality safety program or the implementation of criticality safety controls.

Should you have any questions, please call Mark Lee at (925) 422-4567.

cc:
K. Carroll, LLNL/L-198
D. Heinrichs, LLNL/L-198

Department of Energy
National Nuclear Security Administration
Pantex Site Office
P. O. Box 30030
Amarillo, TX 79120

DEC 17 2007

National Nuclear Security Administration

MEMORANDUM FOR: Dr. Jerry N. McKamy, Nuclear Criticality Safety Program Manager, National Nuclear Security Administration, Service Center

FROM: Karl E. Waltzer, Assistant Manager for Nuclear Engineering, PXSO

SUBJECT: Validation of In-Situ Nondestructive Assay Status for Pantex Nuclear Facilities

REFERENCE(S): 1) Defense Nuclear Safety Board Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials,* dated April 25, 2007
2) Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2007-1, *Safety-Related In Situ Nondestructive Assay of Radioactive Materials*, dated October 24, 2007

Pantex has evaluated its operations for applicability of the Defense Nuclear Facility Safety Board (DNFSB) Recommendation 2007-1. Pantex has no operations that require in-situ non-destructive assay measurement to ensure maintenance of nuclear criticality safety. All operations at Pantex have been evaluated in accordance with DOE O 420.1B and an inadvertent nuclear criticality excursion, at Pantex, has been determined to be beyond extremely unlikely. All Special Nuclear Material (SNM) at Pantex is in known, fixed quantities and configurations. These quantities and configurations do not change. Therefore, no in-situ measurements are required.

If you have any questions, please contact David Nester of my staff at (806) 477-6462.

cc:
K. Waltzer, PXSO, 12-36
M. Blackburn, PXSO, 12-36
D. Nester, PXSO, 12-36
R. Hedtke, PXSO, 12-36

National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

DEC 19 2007

Dr. Jerry McKamy
National Nuclear Security Administration
Department of Energy/GTN, NA-17
19901 Germantown Rd
Germantown, MD 20874

Subject: Sandia Site Office (SSO) Response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2007-1

Dear Dr. McKamy:

The DNFSB issued Recommendation 2007-1 on April 25, 2007, related to the use of *in situ* non-destructive assay (NDA) for nuclear safety. The fundamental concern relates to the measuring of radioactive material holdup at defense nuclear facilities in the Department of Energy (DOE) Complex. The DNFSB concern is where the quantity and composition of radioactive material must be determined and access to the material is impossible or undesirable, when weighing, laboratory analysis, and calorimetry are not viable options. In these cases *in situ* NDA, based on the measurement of signature emissions from a specific isotope of interest is used to provide an estimate of the type and quantity of radioactive material present. However, large uncertainties and inaccuracies have occurred in estimating the type and quantity of radioactive material using *in situ* NDA. This could lead to a potential criticality accident condition, unexpected radiation exposure to workers, and an underestimation of radioactive material available for release in accident scenarios.

DOE has issue an Implementation Plan (IP) to determine the status of this condition in the DOE Complex focusing on fissionable material. The first milestone laid out in the IP, Commitment 5.1.1, concerns the identification of defense nuclear facilities for which a criticality safety program is required and relies upon *in situ* NDA. A discussion was held with the Sandia National Laboratories (SNL) Criticality Safety Officer (CSO) to specifically identify facilities in which *in situ* NDA results are used to:

- ensure compliance with nuclear safety limits;
- support a facility, or facility segment, hazard categorization;
- estimate the material at risk for release in an accident scenario; or
- support designation of safety related structures, systems, or components or specific administrative controls

All facilities where fissionable material is present were discussed. At the Hot Cell Facility which worked with significant quantities of nuclear material was de-conned between 1995 and 1997 and no significant accumulation of fissile materials were identified in the ductwork with only contamination quantities remaining. At the Radiological Mixed Waste Management Facility (RMWMF), the last check of the pre-filters indicated the contamination level to be 0.3 g U-235 on the filter. SNL does not believe that they have any U-235 in the ductwork and no NDA requirements are necessary at the RMWMF.

Based on the discussion with the SNL CSO, there are no facilities at SNL that meet these conditions. If you have any questions, you may contact me at (505) 845-5456.

Sincerely,

Jeffrey Petraglia

Jeffrey Petraglia
SSO Criticality Safety Point-of-Contact

cc:
J. Lee, SNL/NM, MS-1169
P. Raglin, SNL/NM, MS-1145
J. Dahl, SNL/NM, MS-1141
N. Schwers, SNL/NM, MS-1143
S. Pierpoint, HQ/GTN, NA-171
L. Berg, HQ/GTN, EM-60 CNS/270CC
D. Nichols, HQ/FORS, NA-1
P. Wagner, SSO
K. Davis, SSO
D. Brunell, SSO
M. McFadden, SSO
J. Todd, SSO
M. Hamilton, SSO
07-184-AMFO

Department of Energy
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DEC 2 0 2007

Dr. Jerry N. McKamy, Nuclear Criticality Safety Program Manager, NNSA/HQ (NA-17)
FORS

NATIONAL NUCLEAR SECURITY ADMINISTRATION NEVADA SITE OFFICE (NNSA/NSO) RESPONSE TO DOE HEADQUARTERS REQUEST FOR INFORMATION ON IN-SITU NONDESTRUCTIVE ASSAY (NDA) MEASUREMENTS AT THE NEVADA TEST SITE (NTS)

NNSA/NSO has evaluated the current NTS fissionable material activities to determine if any of the activities requiring coverage by a criticality safety program also require NDA holdup measurements for the purposes of detecting or controlling the accumulation of fissionable materials. Based on NNSA/NSO evaluation, it was determined the current fissionable material activities at the NTS do not require In-Situ NDA measurements to be performed. This conclusion was reached because the fissionable material associated with the NTS activities are in a form or configuration that would not result in significant amounts of removable material that could collect in process equipment and result in a criticality concern.

Please find attached a listing of the facilities and associated activities at the NTS which handle sufficient quantities of fissionable material to require a criticality safety program.

If you require further assistance, please contact Jimmy S. Dyke at (702) 295-1050.

R. T. Brock
Senior Nuclear Safety Advisor

OMGR:JSD-825
SHM 5-5

Attachment:
As stated

cc w/atch:
Jerry Hicks, DOE/AL, Albuquerque, NM
J. S. Dyke, OMGR, NNSA/NSO,
Las Vegas, NV
E. J. Amarescu. OMGR, NNSA/NSO,
Las Vegas, NV
D. D. Monette, A/DMGR, NNSA/NSO,
Las Vegas, NV
B. G. Golden, A/DAMNS, NNSA/NSO,
Las Vegas, NV

Attachment

Listing of Current NTS Facilities and Activities
Requiring Application of a Criticality Safety Program

Facility	Activity	Main Fissionable Materials	Material Form/Configuration
DAF	Glove Box	Plutonium	Metal/Encapsulated
DAF	Down Draft Table	Plutonium	Metal/Various
DAF	Fissionable Material Staging	Uranium Plutonium Neptunium	Metal/Containerized
DAF	Nuclear Material Handling and Measurement	Uranium Plutonium	Metal/Various
DAF	Subcritical Experiment Assembly	Plutonium	Metal/Encapsulated
U1a	Subcritical Experiment	Plutonium	Metal and Oxide Encapsulated
Jasper	Fissionable Material Staging to Support Experimental Activities	Plutonium	Metal and Oxide Containerized
Area 5	TRU Waste Staging	Plutonium	Containerized Waste
Area 5	LLW Disposal	Uranium	Containerized Waste