LOS ALAMOS NATIONAL LABORATORY

RADIOLOGICAL FACILITY LIST

PS-OAB-403, Revision 1

Prepared by: George F. Nolan	Signature: Peter Hills for George Nolan	Date: 1/13/03
Approved by: David G.Satterwhite, Office Leader	Signature: David G. Satterwhite	Date: 1/13/03

HISTORY OF REVISIONS

Revision Record		
Revision	**Date**	**Summary**
0	09/18/01	Original Issue
1	11/14/02	Annual update based upon input from facility managers

Los Alamos
NATIONAL LABORATORY

James L. Holt
Associate Director for Operations
Los Alamos National Laboratory
Mail Stop A104
Los Alamos, New Mexico 87545
505-667-0079/Fax 505-665-1812

Date: September 26, 2002
Refer to: AD-Ops:02-120

Christopher M. Steele
National Nuclear Security Administration
Office of Los Alamos Support Operations
P.O. Box 1663, Mail Stop A316
Los Alamos, NM 87545

Dear Mr. Steele:

Subject: Radiological Facilities Inventory of Radioactive Material

Attached for your information are the results of LANL's annual radioactive material inventory, conducted in accordance with the requirement of LIR 300-00-05, *Facility Hazard Categorization*. Attachment 1 is the radioactive material inventory report for radiological facilities. The methodology used in developing this report is detailed in Attachment 2. Attachment 3 is the updated listing of radiological facilities. Attachment 4 is a summary of the changes to the radiological facilities list over the past year

If you have questions please contact George Nolan, 7-3477.

Sincerely,

James L. Holt
Associate Director for Operations

JLH:DGS:mv

Attachments:
1. RAM Inventory
2. RAM Inventory Methodology
3. LANL Radiological Facility List
4. Summary of Radiological Facility List Changes.

Action to Jim Loud and Dave Sattenwhite Due to Scott COB Nov. 7th. BJB 11/1

United States Government **Department of Energy**

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

memorandum

DATE: October 25, 2002
REPLY TO ATTN OF: SABT/RCJ.02.012: SABM Steele

SUBJECT: Radiological Facilities Inventory of Radioactive Material

TO: James L. Holt, Associate Director for Operations, MS-A104

The Los Alamos National Laboratory (LANL) submitted, via a letter from J. Holt to C. Steele, dated September 26, 2002, the "Radiological Facilities Inventory of Radioactive Material" to National Nuclear Security Administration (NNSA) for information (Attachment 1). NNSA has reviewed the subject document and has identified issues in a number of the hazard categorization tables included in the document. These tables provide the calculations of the Hazard Category (HC3) Ratio used to determine that the radioactive material inventory in the facility is less than HC3 in accordance with the standard and Laboratory Implementing Requirements (LIR 300-00-05, Facility Hazard Categorization).

The calculations provided in these tables are used by LANL to finalize the current list of Radiological Facilities (RF) at LANL. NNSA performed independent verification of a small number of the hazard categorization results using the Mass Inventory values provided with the correct threshold values obtained from DOE-STD-1027-92 CN1. The results of the NNSA review indicates that the inventory / HC3 ratios for the NIS facilities could be greater than one (Attachment 2).

NNSA comments on the above referenced submittal are included as Attachment 2. NNSA requires LANL to review all of the Radioactive Material Inventory tables submitted in the referenced document and revise those tables as appropriate.

If you have any questions regarding this matter please contact Randy Janke of my staff at 665-4205 or myself at 667-3418.

Christopher M. Steele
Senior Authorization Basis Manager

5 of 7

Los Alamos
NATIONAL LABORATORY

James L. Holt
Associate Director for Operations
Los Alamos National Laboratory
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505-667-0079/Fax 505-665-1812

Date: November 14, 2002
Refer to: AD-Ops:02-152

Christopher M. Steele
National Nuclear Security Administration
Office of Los Alamos Support Operations
P.O. Box 1663, Mail Stop A316
Los Alamos, NM 87545

Dear Chris ~~Mr. Steele~~:

Subject: Radiological Facilities Inventory of Radioactive Material

Reference: SABT/RCJ.02.012:SABM Steele (October 25, 2002)

The subject document has been revised and attached (Attachment 1) according to your comments/ observations transmitted in the Reference stated above. Response/resolution to each comment has been also documented and attached (Attachment 2).

If you have questions, please contact David Satterwhite 5-8034 or Kyo Kim 5-8902 of my staff.

Sincerely,

James L. Holt
Associate Director for Operations

JLH:DGS:mv

Attachments:

1. List of LANL Radiological Facilities
2. NNSA Comment Resolution

Based upon input from facility managers (FM), the facilities listed in the table below are identified as radiological facilities. The definition for radiological facility per in the DOE-approved LIR 300-00-05, *Facility Hazard Categorization,* is:

> *A radioactive material using area/activity that contains less than category 3 inventories as listed in Table A.1 DOE-STD-1027-92, but where the amount of radioactive material present is sufficient to create a "radiological area" as defined in 10 CFR 835. Radioactive material that is either in a DOT Type B shipping container or is a sealed source may be excluded from consideration per the conditions defined by DOE-STD-1027-92.*

Based on the LIR definition, the following instructions were provided to the facility mangers to identify radiological facilities:

a. Contains less than hazard category 3 (<HC3) amounts of RAM (see DOE-STD-1027-92, Change 1).
b. Contains area posted as a radiological area (per 10 CFR 835)
c. Exclude RAM in sealed radioactive sources meeting requirements of ANSI N43.6.
d. Exclude RAM in U.S. Department of Transportation (DOT) Type B container.
e. Exclude structures included in the safety bases of HC2 and HC3 nuclear facility (see *DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities*, FWO-OAB 401, Rev. 1), and
f. Exclude structures whose only source of radiation is machine produced X rays.
g. RAM used in exempted, commercially available products, should not be considered part of a facility's inventory.

Radiological facilities (<HC3) are nuclear facilities but are not required to comply with 10 CFR 830, Subpart B. The attached table provides a list of these radiological facilities identified in September 2002. Several facilities are listed as potentially radiological facilities. These facilities normally have no RAM, but could receive RAM on an interim basis. Per DOE-STD-1027-92, a facility is involved with an inventory of radioactive materials that varies with time must be categorized on the basis of its maximum inventory of radioactive materials.

LANL RADIOLOGICAL FACILITY SUMMARY TABLE

TA-BLDG	Descriptor	FM/FMU	Disposition Note
TA-2-1	Omega Reactor	D. McLain/64	D&D residual radiation
TA-3-16	Ion Exchange	D. McLain/64	D&D, tritium
TA-3-34	Cryogenics Bldg B	L. Woodrow/73	Multiple isotope samples
TA-3-35	Σ Press Building	L. Woodrow/73	DU plus residual in ducts
TA-3-40	Physics Bldg (HP)	S. Archuleta/77	To relocate TA-36-1/214
TA-3-66	Sigma Building	L. Woodrow/73	DU
TA-3-102	Tech Shop Add	B. Grace/70	DU
TA-3-159	Σ Thorium Storage	L. Woodrow/73	Th-232
TA-3-169	Warehouse	L. Woodrow/73	DU
TA-3-1698	Material Science Lab	L. Woodrow/73	Multiple isotope samples
TA-3-1819	Experiment Mat'l Lab	L. Woodrow/73	Multiple isotope samples
TA-8-22	X ray Facility	B. Grace/70	Potential DU
TA-8-70	Non Destructive Testing	B. Grace/70	DU/Th-232
TA-8-120	Radiography	B. Grace/70	Potential DU
TA-11-30	Vibration Test	B. Grace/70	Potential DU
TA-15-R183	Vault	T. Alexander/67	DU
TA-16-88	RAM Machine Shop	B. Grace/70	DU/Th-232
TA-16-202	Laboratory	B. Grace/70	DU/tritium
TA-16-207	Component Testing	B. Grace/70	Potential DU/Th-232, Rm 113
TA-16-300	Component Storage	B. Grace/70	DU/Th-232
TA-16-301	Component Storage	B. Grace/70	DU
TA-16-302	Component Storage Training	B. Grace/70	DU/Th-232
TA-16-332	Component Storage	B. Grace/70	DU/Th-232
TA-16-410	Assembly Building	B. Grace/70	DU/Th-232
TA-16-411	Assembly Building	B. Grace/70	DU/Th-232
TA-21-5	Lab Bldg	D. McLain/64	D&D
TA-33-86	High pressure tritium	D. McLain/64	D&D
TA-35-2	Nuclear Safeguards Research	P. Bussolini/75	NIS-5 sources
TA-35-27	Nuclear Safeguards Lab	P. Bussolini/75	NIS-5 sources
TA-36-1	Laboratory and offices	S. Helmick/71	Sources
TA-36-214	Central HP Calibration Facility	S. Helmick/71	Sources
TA-37-10	Storage Magazine	B. Grace/70	DU
TA-37-14	Storage Magazine	B. Grace/70	DU
TA-37-16	Storage Magazine	B. Grace/70	DU
TA-37-24	Storage Magazine	B. Grace/70	DU
TA-37-25	Storage Magazine	B. Grace/70	DU
TA-41-1	Underground Vault	B. Grace/70	DU/Th-232
TA-43-1	Bio Lab	R. Crook/72	Sources
TA-53-945	RLW Treatment Facility	D. Seely/61	Waste products
TA-53-954	RLW Basins	D. Seely/61	Waste products
TA-54-412	DVRS	D. McLain/64	Waste products

LIST OF LANL RADIOLOGICAL FACILITIES

Table	TA-BLDG	Descriptor	FM/FMU	Disposition/Note
1.	TA-2-1	Omega Reactor	D. McLain/64	D&D residual radiation
2.	TA-3-16	Ion exchange	D. McLain/64	D&D tritium
3.	TA-3-34	Condensed Matter & Thermal Physics	L. Woodrow/73	Multiple isotope samples
4.	TA-3-35	Sigma Press Building	L. Woodrow/73	DU
5.	TA-3-40	Physics Bldg (Health Physics)	S. Archuleta/77	Multiple isotope samples
6.	TA-3-66	Sigma Building	L. Woodrow/73	DU
7.	TA-3-102	RAM Machine Shop	B. Grace/70	DU
8.	TA-3-159	Sigma Thorium Building	L. Woodrow/73	Th-232
9.	TA-3-169	Sigma Thorium Building	L. Woodrow/73	DU
10.	TA-3-1698	Material Science Lab	L. Woodrow/73	Multiple isotope samples
11.	TA-3-1819	Material Science Lab	L. Woodrow/73	Multiple isotope samples
12.	TA-8-22	Radiography	B. Grace/70	DU
13.	TA-8-70	NDT&E	B. Grace/70	DU/Th-232
14.	TA-8-120	Radiography	B. Grace/70	Potential DU
15.	TA-11-30	Vibration Testing	B. Grace/70	Potential DU
16.	TA-15-R183	Vault	T. Alexander/67	DU
17.	TA-16-88	Component Storage	B. Grace/70	DU/Th-232
18.	TA-16-202	Laboratory	B. Grace/70	DU/tritium
19.	TA-16-207	Component Testing	B. Grace/70	DU/Th-232, Rm 113
20.	TA-16-300	Component Storage	B. Grace/70	DU/Th-232
21.	TA-16-301	Component Storage	B. Grace/70	DU
22.	TA-16-302	Component Storage/Training	B. Grace/70	DU/Th-232
23.	TA-16-332	Component Storage	B. Grace/70	DU/Th-232
24.	TA-16-410	Assembly Building	B. Grace/70	DU/Th-232
25.	TA-16-411	Assembly Building	B. Grace/70	DU/Th-232
26.	TA-21-5	Lab Bldg	D. McLain/64	D&D
27.	TA-33-86	High pressure tritium facility	D. McLain/64	D&D, tritium
28.	TA-35-2	Nuclear Safeguards Research	P. Bussolini/75	Sources
29.	TA-35-27	Nuclear Safeguards Research	P. Bussolini/75	Sources
30.	TA-36-1	Calibration Lab and offices	S. Helmick/71	Sources
31.	TA-36-214	Calibration Lab and offices	S. Helmick/71	Sources
32.	TA-37-10	Storage Magazine	B. Grace/70	DU
33.	TA-37-14	Storage Magazine	B. Grace/70	DU
34.	TA-37-16	Storage Magazine	B. Grace/70	DU
35.	TA-37-24	Storage Magazine	B. Grace/70	DU
36.	TA-37-25	Storage Magazine	B. Grace/70	DU
37.	TA-41-1	Underground Vault	B. Grace/70	DU/Th-232
38.	TA-43-1	Bio/Chem Laboratory	Crook/72	Lab sources
39.	TA-53-945	RLW Treatment	D. Seely/61	RLW products
40.	TA-53-954	RLW Basins	D. Seely/61	RLW products
41.	TA-54-412	Radioactive waste compactor (DVRS)	D. McLain/64	Residual

Table 1 Isotopic Inventory for BLDG TA-2-1

Descriptor: Omega Reactor

Division: FWO

Responsible FM/FMU: D. McLain/64

RAM Accountability Procedure: SO-WFM-001, *Inventory Control for Radiological Facilities*

Disposition D&D

Date of Inventory: Not applicable

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Fixed low level residual radiation. No new RAM allowed.			
		HC3 Ratio Sum	**NA**

Table 2 Isotopic Inventory for BLDG TA-3-16

Descriptor: Ion exchange

Division: FWO

Responsible FM/FMU: D. McLain/64

RAM Accountability Procedure: FM Standing Order

Disposition D&D

Date of Inventory: Not applicable

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Entrained tritium. No new RAM allowed.			
		HC3 Ratio Sum	**NA**

Table 3 Isotopic Inventory for TA-3-34

Descriptor: Condensed Matter and Thermal Physics

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FSP-PAC-5304, *Facility Safety Plan for the Material Science Complex*

Date of Inventory: August 8, 15, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Pu-239	0.15	8.4	0.020
		HC3 Ratio Sum	**0.020**

Table 4 Isotopic Inventory for TA-3-35

Descriptor: Sigma Press Building

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FOM-AP-0310, *MST Field Operations Manual for Radionuclide Inventory Management*

Date of Inventory: August 15, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Empty			
		HC3 Ratio Sum	**0.000**

Table 5 Isotopic Inventory for TA-3-40

Descriptor: Physics Building (Health Physics)

Division: P

Responsible FM/FMU: D. Riker/77

RAM Accountability Procedure: FSP-FMU77-2002-02

Date of Inventory: September 12, 2002

Isotope	Activity(Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
Cl-36	4.7E-7	3.4E+2	0.000
Co-60	2.00E-6	2.8E+2	0.000
Sr-90	1.70E-5	1.6E+1	0.000
I-129	1.03E-6	6.0E-2	0.000
Cs-137	5.50E-3	6.0E+1	0.000
Pu-238	7.41E-8	6.2E-1	0.000
Pu-239	4.00E-8	5.2E-1	0.000
H-3	1.00E+1	1.6E+4	0.001
		HC3 Ratio Sum	**0.001**

Table 6 Isotopic Inventory for TA-3-66

Descriptor: Sigma Building

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FOM-AP-0310, *MST Field Operations Manual for Radionuclide Inventory Management*

Date of Inventory: August 15, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	9.55E+3	1.3E+4	0.735
		HC3 Ratio Sum	**0.735**

Table 7 Isotopic Inventory for TA-3-102

Descriptor: RAM machine shop

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	3E+3	1.3E+4	0.231
		HC3 Ratio Sum	**0.231**

Table 8 Isotopic Inventory for TA-3-159

Descriptor: Sigma Thorium Building

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FOM-AP-0310, *MST Field Operations Manual for Radionuclide Inventory Management*

Date of Inventory: August 15, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Th-232	2.43E+5	9.1E+5	0.267
		HC3 Ratio Sum	**0.267**

Table 9 Isotopic Inventory for TA-3-169

Descriptor: Sigma Thorium Building

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FOM-AP-0310, *MST Field Operations Manual for Radionuclide Inventory Management*

Date of Inventory: August 15, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	1.18E+3	1.3E+4	0.091
		HC3 Ratio Sum	**0.091**

Table 10 Isotopic Inventory for TA-3-1698

Descriptor: Material Science Lab

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FSP-PAC-5304, *Facility Safety Plan for the Material Science Complex*

Date of Inventory: August 15, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Empty			0.000
		HC3 Ratio Sum	**0.000**

Table 11. Isotopic Inventory for TA-3-1819

Descriptor: Material Science Lab

Division: MST

Responsible FM/FMU: L. Woodrow/73

RAM Accountability Procedure: MST-FSP-PAC-5304, *Facility Safety Plan for the Material Science Complex*

Date of Inventory: August 15, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Empty			0.00
		HC3 Ratio Sum	**0.00**

Table 12. Isotopic Inventory for TA-8-22

Descriptor: Radiography

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	4.8E+1	1.3E+4	0.004
		HC3 Ratio Sum	**0.004**

Table 13. Isotopic Inventory for TA-8-70

Descriptor: NDT&E

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	4.70E+1	1.3E+4	0.004
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.004**

Table 14. Isotopic Inventory for TA-8-120

Descriptor: Radiography

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
Empty			
		HC3 Ratio Sum	**0.000**

Table 15. Isotopic Inventory for TA-11-30

Descriptor: Vibration testing

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Empty			
		HC3 Ratio Sum	**0.000**

Table 16. Isotopic Inventory for TA-15-R183

Descriptor: Vault

Division: DX

Responsible FM/FMU: T. Alexander/67

RAM Accountability Procedure: PRO-DX-001 and PRO-DX-009

Date of Inventory: August 26, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
U-238 (DU)	7.38E+5	1.3E+7	0.057
		HC3 Ratio Sum	**0.057**

Table 17. Isotopic Inventory for TA-16-88

Descriptor: Component storage

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	6.26E+2	1.3E+4	0.048
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.048**

Table 18. Isotopic Inventory for TA-16-202

Descriptor: Laboratory

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
U-238 (DU)	0.0E+0	1.3E+7	0.000
H-3	0.0E+0	1.6E+0	0.000
		HC3 Ratio Sum	**0.000**

Table 19. Isotopic Inventory for TA-16-207

Descriptor: Component testing

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	5.4E+1	1.3E+4	0.004
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.004**

Table 20. Isotopic Inventory for TA-16-300

Descriptor: Component storage

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	0	1.3E+4	0.000
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.000**

Table 21. Isotopic Inventory for TA-16-301

Descriptor: Component storage

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	2.3E+1	1.3E+4	0.002
		HC3 Ratio Sum	**0.002**

Table 22. Isotopic Inventory for TA-16-302

Descriptor: Component storage/training

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	3.91E+2	1.3E+4	0.030
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.030**

Table 23. Isotopic Inventory for TA-16-332

Descriptor: Component storage

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	5.113E+3	1.3E+4	0.393
Th-232	1.50E+2	9.1E+2	0.165
		HC3 Ratio Sum	**0.558**

Table 24. Isotopic Inventory for TA-16-410

Descriptor: Assembly building

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	1.94E+2	1.3E+4	0.015
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.015**

Table 25. Isotopic Inventory for TA-16-411

Descriptor: Assembly building

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Materials*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	4.0E+0	1.3E+4	0.000
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.000**

Table 26. Isotopic Inventory for TA-21-5

Descriptor: Laboratory building

Division: FWO

Responsible FM/FMU: D. McLain/64

RAM Accountability Procedure: FM Standing Order

Disposition: D&D

Date of Inventory: Not applicable

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Fixed low level residual radiation. No new RAM allowed per FM standing order.			
		HC3 Ratio Sum	**NA**

Table 27. Isotopic Inventory for TA-33-86

Descriptor: High-pressure tritium facility

Division: FWO

Responsible FM/FMU: D. McLain/64

RAM Accountability Procedure: FM Standing Order

Disposition: D&D

Date of Inventory: Not applicable

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
Entrained tritium in confinement system piping that is open to the atmosphere. No new RAM allowed per FM standing order.			
		HC3 Ratio Sum	**NA**

Table 28. Isotopic Inventory for TA-35-2

Descriptor: Nuclear safeguards research

Division: NIS

Responsible FM/FMU: P. Bussolini/75

RAM Accountability Procedure: NIS-5-99-01, *Radioactive Sealed Source Control and Accountability*

Date of Inventory: August 8, 2002

Isotope	Inventory (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
Am-241	1.32E-1	5.20E-1	0.254
Ba-133	3.42E-3	1.10E+3	0.000
Cd-109	1.65E-4	1.80E+2	0.000
Cm-244	3.80E-5	1.04E+0	0.000
Cs-137	5.24E-4	6.00E+1	0.000
Np-237	4.00E-6	4.20E-1	0.000
Pu-238*	5.55E-3	3.60E-2	0.154
Pu-239*	1.49E+0	8.40E+0	0.177
Pu-240*	2.83E-1	2.28E+0	0.124
Pu-241*	1.97E-2	3.10E-1	0.064
Pu-242*	2.20E-2	1.58E+2	0.000
Sr-90	2.28E-2	1.60E+1	0.001
Tc-99	8.50E-2	1.70E+3	0.000
Th-228	6.31E-6	1.00E+0	0.000
Th-232	5.62E-4	1.00E-1	0.006
U-235*	1.81E+3	1.90E+6	0.001
U-238*	2.42E+4	1.30E+7	0.002
		HC3 Ratio Sum	**0.783**

Note *: U and Pu isotopes are in gram unit

Table 29. Isotopic Inventory for TA-35-27

Descriptor: Nuclear safeguards research

Division: NIS

Responsible FM/FMU: P. Bussolini/75

RAM Accountability Procedure: NIS-5-99-01, *Radioactive Sealed Source Control and Accountability*

Date of Inventory: August 8, 2002

Isotope	Inventory (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
H-3	2.91E+0	1.60E+4	0.000
Cf-252	2.09E-2	3.20E+0	0.007
Am-241	3.88E-2	5.20E-1	0.074
Cs-137	2.84E-3	6.00E+1	0.000
Pu-238*	5.18E-4	3.60E-2	0.014
Pu-239*	4.58E-1	8.40E+0	0.054
Pu-240*	5.27E-2	2.28E+0	0.023
Pu-241*	3.31E-3	3.10E-1	0.010
Pu-242*	1.50E-2	1.58E+2	0.000
Ra-226	4.43E+0	1.20E+1	0.369
U-235*	9.96E+3	1.90E+6	0.005
U-238*	1.39E+6	1.30E+7	0.106
		HC3 Ratio Sum	**0.662**

Note *: Pu and U isotopes are in gram units

Table 30. Isotopic Inventory for TA-36-1

Descriptor: Calibration lab and offices

Division: Responsible FM/FMU: S. Helmick/71

RAM Accountability Procedure: HSR-4-SOP-07, *Safe Operating Procedure for the Central Health Physics Calibration Facility*

Date of Inventory: September 3, 2002

Isotope	Activity (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
Am-241	1.13E-5	5.2E-1	0.000
Gd-148	4.2E-8	8.2E-2	0.000
Ba-133	2.08E-6	1.1E+3	0.000
C-14	1.6E-7	4.2E+2	0.000
Cl-36	4.79E-7	3.4E+2	0.000
Cs-137	7.76E-5	6.0E+1	0.000
I-129	1.03E-7	6.0E-2	0.000
Na-22	1.36E-6	2.4E+2	0.000
Pm-147	1.14E-7	1.00E+3	0.000

Isotope	Activity (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
Pu-238	7.00E-8	6.2E-1	0.000
Pu-239	3.97E-6	5.2E-1	0.000
Ra-226	9.00E-10	1.20E+1	0.000
Sr-90	4.54E-5	1.6E+1	0.000
Tc-99	2.92E-7	1.7E+3	0.000
Tl-204	4.00E-8	1.20E+3	0.000
H-3	2.00E+1	1.6E+4	0.001
U-235	6.00E-9	4.2E+0	0.000
		HC3 Ratio Sum	**0.001**

Table 31. Isotopic Inventory for TA-36-214

Descriptor: Calibration lab and offices

Division: Responsible FM/FMU: S. Helmick/71

RAM Accountability Procedure: HSR-4-RIC-SOP-06, *Central Health Physics Calibration Facility Safe Operating Procedure, (Sec. 8)*

Date of Inventory: September 3, 2002

Isotope	Activity (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
Pm-147	1.58E-3	1.00E+3	0.000
Tl-204	1.20E-4	1.20E+3	0.000
Sr-90	4.65E-3	1.6E+1	0.000
Cs-137	1.28E-4	6.0E+1	0.000
		HC3 Ratio Sum	**0.000**

Table 32. Isotopic Inventory for TA-37-10

Descriptor: Storage magazine

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Material*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	8.60E+3	1.3E+4	0.662
		HC3 Ratio Sum	**0.662**

Table 33. Isotopic Inventory for TA-37-14

Descriptor: Storage magazine

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Material*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	8.79E+3	1.3E+4	0.676
		HC3 Ratio Sum	**0.676**

Table 34. Isotopic Inventory for TA-37-16

Descriptor: Storage magazine

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Material*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	8.28E+3	1.3E+4	0.637
		HC3 Ratio Sum	**0.637**

Table 35. Isotopic Inventory for TA-37-24

Descriptor: Storage magazine

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Material*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	8.80E+3	1.3E+4	0.677
		HC3 Ratio Sum	**0.677**

Table 36. Isotopic Inventory for TA-37-25

Descriptor: Storage magazine

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Material*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	8.77E+3	1.3E+4	0.675
		HC3 Ratio Sum	**0.675**

Table 37. Isotopic Inventory for TA-41-1

Descriptor: Underground vault

Division: ESA

Responsible FM/FMU: B. Grace/70

RAM Accountability Procedure: ESA-WMM-AP-04, *Material Control and Physical Inventory of Nuclear Material*

Date of Inventory: September 24, 2002

Isotope	Mass (kg)	1027 HC3 TQ (kg)	HC3 Ratio
U-238 (DU)	0	1.3E+4	0.000
Th-232	0	9.1E+2	0.000
		HC3 Ratio Sum	**0.000**

Table 38. Isotopic Inventory for TA-43-1

Descriptor: Bio/Chem Lab

Division: B

Responsible FM/FMU: R. Crook/72

RAM Accountability Procedure: B-PRO-001, *Procedure for Receipt of Radioactive Material at HRL*

Date of Inventory: September 16, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
C-14	2.24E-3	9.40E+1	0.000
		HC3 Ratio Sum	**0.000**

Table 39. Isotopic Inventory for TA-53-945

Descriptor: RLW treatment

Division: LANSCE

Responsible FM/FMU: D. Seely/61

RAM Accountability Procedure: SOP-RLW-002, Rev. 3, *Procedures for TA-53 Radioactive Liquid Waste System: Emergency, Operations, Maintenance, and Sampling*

Date of Inventory: September 24, 2002

Isotope	Activity(Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
H-3	5.8E-2	1.6E+4	0.000
P-32	9.9E-4	1.2E+1	0.000
Co-58	4.5E-8	9.0E+2	0.000
Gd-148	1.2E-4	8.2E-2	0.001
Yb-166	1.4E-2	8.4E+2	0.000
Lu-170	3.1E-2	5.0E+2	0.000
Lu-171	2.3E-3	1.4E+3	0.000
Hf-172	2.2E-2	9.4E+1	0.000
Lu-172	4.8E-3	4.8E+2	0.000
Hf-175	1.4E-2	2.0E+3	0.000
W-181	1.5E-1	1.3E+4	0.000
Ta-182	4.9E-2	6.2E+2	0.000
W-185	9.0E-2	1.4E+3	0.000
U-234	8.3E-6	4.2E+0	0.000
U-235	1.9E-7	4.2E+0	0.000
U-238	1.6E-7	4.2E+0	0.000
Pu-238	4.6E-6	6.2E-1	0.000
Pu-239	2.2E-6	5.2E-1	0.000
Am-241	8.0E-6	5.2E-1	0.000
		HC3 Ratio Sum	**0.001**

Table 40. Isotopic Inventory for TA-53-954

Descriptor: Radioactive liquid waste basins

Division: LANSCE

Responsible FM/FMU: D. Seely/61

RAM Accountability Procedure: SOP-RLW-002, Rev. 3, *Procedures for TA-53 Radioactive Liquid Waste System: Emergency, Operations, Maintenance, and Sampling*

Date of Inventory: September 24, 2002

Isotope	Activity (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
H-3	5.8E-2	1.6E+4	0.000
Co-58	4.5E-8	9.0E+2	0.000
Lu-170	3.1E-2	5.0E+2	0.000
Hf-172	2.2E-2	9.4E+1	0.000

Isotope	Activity (Ci)	1027 HC3 TQ (Ci)	HC3 Ratio
Hf-175	1.4E-2	2.0E+3	0.000
W-181	1.5E-2	1.3E+4	0.000
		HC3 Ratio Sum	**0.000**

Table 41. Isotopic Inventory for TA-54-412

Descriptor: Radioactive waste compactor (DVRS)

Division: FWO

Responsible FM/FMU: D. McLain/64

RAM Accountability Procedure: DOP-WFM-001, *DVRS Process Operation*

Date of Inventory: September 24, 2002

Isotope	Mass (g)	1027 HC3 TQ (g)	HC3 Ratio
None			
		HC3 Ratio Sum	**NA**

Attachment 2

Response/Resolution of NNSAComments on LANL's Radiological Facilities Inventory of Radioactive Material

No.	Page	Section/Para/Line	Reviewer Comment	Response/Resolution
1	1	List of LANL RF's	Observation: The table descriptors are inconsistent with the descriptor provided by the Facility Manager (FM). Example; table 3 states 'Cryogenics Bldg. B' and the FM's ' Condensed matter and Thermal Physics'. This inconsistency can be found for table 3,7,9,11,12,17,and 41. Action; use consistent terminology.	Revised descriptors to be consistent with each other.
2	1	List of LANL RF's	Observation: the tables' Disposition/Note are not consistent with that provided by the FM. Example; table 9 states 'Multiple isotope samples' and the FM's is 'Empty' This inconsistency can be found for table 3,4,10,11,14,and 15. Action; correct the difference.	The subject buildings will be used for the purpose Noted when needed. No RAM was stored at the time of inventory.
3	1	List of LANL RF's	Observation: the observation items No.1 and No. 2, listed above, have been incorporated into the LANL List of Radiological Facility (RF) attached to LOS ALAMOS NATIONAL LABORATORY RADIOLOGICAL FACILITY LIST, PS-OAB-403, Rev. 1 Action: correct the RF's list using the information obtained from the completion of observation items No. 1 and 2.	See 1 & 2 above
4	8	Table 20	Observation: the header states 1027 HC3 TQ (g) while the threshold values listed are in (kg). No impact on the HC3 ratio Action; list the required 1027 TQ values in (g)	Corrected, changed "g" to read "kg".
5	9	Table 23	Observation; the header states 1027 HC3 TQ (g) while the threshold values for U-238 and Th-232 listed are in (kg). Using the inventory mass values listed (g) and the correct 1027 values in (g) shown in Bold then;	All numbers are in Kg units. Table heading has been corrected. HC3 ratios as reported is still correct.

Attachment 2

Response/Resolution of NNSAComments on LANL's Radiological Facilities Inventory of Radioactive Material

No.	Page	Section/Para/Line	Reviewer Comment	Response/Resolution
			Isotope, Inventory Mass(g), 1027 HC3 TQ (g), HC3 Ratio U-238, 5.113E+3, **1.3 E+7**, **0.000393** Th-232, 1.5E+2 , **9.1E+5** **0.000165** HC# RATIO **SUM** **0.000558** Because of the obvious errors with the TQ values from 1027 there is no confidence that the Mass values listed under Inventory column are correct, therefore revise the whole table.	
6	11	Table 28	Observation; the header states 1027 HC3 TQ (Ci) while the TQ values listed are not correct for Pu-238, 239,240,241, Pu-242, U-235 and U-238, they appear to be stated in grams. Using the inventory mass values listed (Ci) and the correct 1027 values in (Ci) shown in Bold below then;	All Pu and U isotopes are reported in grams and a footnote has been added to note this fact at the bottom of the table. HC3 Ratio as reported is correct and no "unidentified HC3 facility" exists.

Isotope	Inventory (Ci)	1027 HC3TQ(Ci)	HC3 Ratio
Am –241	1.32E-1	5.2E-1	0.254
Ba-133	3.42E-3	1.1E+3	0.000
Cd-109	1.65E-4	1.8E+2	0.000
Cm-244	3.8E-5	1.04E+1	0.000
Cs-137	5.24E-4	6.00E+1	0.000
Np-237	4.00E-6	4.2E-1	0.000
Pu-238	5.55E-3	**6.2E-1**	**0.0089**
Pu-239	1.49E+0	**5.2E-1**	**2.865**
Pu-240	2.83E-1	**5.2E-1**	**0.5442**
Pu-241	1.97E-2	**3.2E+1**	**0.0006**
Pu-242	2.20E-2	**6.2E-2**	**0.0354**
Sr-90	2.28E-2	1.6E+1	0.000
Tc-99	8.5E-2	1.7E+3	0.000
Th-228	6.31E-6	**1.0E+00**	0.000
U-235	1.81E+3	**4.2E+00**	**4.30E+2**
U-238	2.42E+4	**4.2E+00**	**5.762E+3**
		HC3 Ratio Sum	**6.2E+3**

Attachment 2

Response/Resolution of NNSAComments on LANL's Radiological Facilities Inventory of Radioactive Material

No.	Page	Section/Para/Line	Reviewer Comment	Response/Resolution
			The errors in the Table raise a concern that TA-35-2 may be an **unidentified HC3** facility. Because of the obvious errors with the TQ values from 1027 there is no confidence that the Mass values listed under Inventory column are correct, therefore revise the whole table.	
7	12	Table 29	Observation; the header states the 1027 HC3 TQ (Ci), while the TQ values listed are not correct for Pu-238, 239, 240, 241, Pu-242, U-235 and U-238, they are in (g). Using the inventory mass values listed (Ci) and the correct 1027 values in (Ci) shown in Bold below then; Isotope , Inventory (Ci), 1027 HC3 TQ (Ci), HC3 Ration H-3 2.91E+0 **1.6E+4** **0.000** Cf-252 2.09E-2 3.2E+0 0.007 Am-241 3.88E-2 5.2E-1 0.074 Cs-137 2.84E-3 6.00E+1 0.000 Pu-238 5.18E-4 **6.2E-1** **0.000** Pu-239 4.58E-1 **5.2E-1** **0.881** Pu-240 5.27E-2 **5.2E-1** **0.101** Pu-241 3.31E-3 **3.2E+1** **0.000** Pu-242 1.5E-2 **6.2E-1** **0.024** Ra-226 4.43E+0 1.20E+1 0.369 U-235 9.96E+3 **4.2E+00** **2.37E+3** U-238 1.39E+6 **4.2E+00** **3.31E+5** HC3 Ratio Sum **3.312E+5** The errors in the Table raise a concern that TA-35-27 may be an **unidentified HC3** facility. Because of the obvious errors with the TQ values from 1027	The H-3 TQ has been corrected. All Pu and U isotopes are reported in grams. The HC3 ratio has been changed from 0.665 to 0.662 due to H-3 isotope. A footnote has been added at the bottom of the table.

Attachment 2

Response/Resolution of NNSAComments on LANL's Radiological Facilities Inventory of Radioactive Material

No.	Page	Section/Para/Line	Reviewer Comment	Response/Resolution
			there is no confidence that the Mass values listed under Inventory column are correct, therefore revise the whole table.	
8	14-15	Table 35 and 36	The Inventory/Hazard Category 3 (HC3) ratios for separate facilities within close proximity approach unity. The proximity of storage magazines within TA-37, with radioactive material inventories approaching unity, may be as close as a few hundred feet. For example, storage magazines 24 and 25 are within approximately 200 feet of one another and have HC3 ratios of 0.677 and 0.675, respectively. DOE-STD-1027-92 states: "...the standard permits the concept of facility segmentation provided the hazardous material in one segment could not interact with hazardous materials in other segments..." Common cause evaluation basis accidents need to be carefully evaluated to ensure that the hazard categorization was appropriately applied for this facility as well as others. The use of segmentation per DOE-STD-1027-92 should be evaluated carefully to ensure that the hazard categorization can be supported.	In accordance with ESA practices, bulk DU and bulk HE are not stored together in these magazines. Hence, segmentation for these facilities is believed to be defensible under the worst case situation due to facility design and form of DU (solid non-dispersible). However, the segmentation issue will be re-visited as a part of resolving non-nuclear hazard categorization issues raised in the NNSA memorandum, SABT:3DN-008 (April 25, 2002)."

S = Suggested comment.
R = Required comment (comment must be addressed).