February 29, 1996

MN No. 96-020

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

NOTICE OF LICENSEE MEETING

Name of Licensee: Department of the Army
U. S. Army Communications-Electronics Command

Name of Facility: U. S. Army Communications-Electronics Command
Fort Monmouth, New Jersey

Docket No.: 030-29741

License No.: 29-01022-14

Time and Date of Meeting: March 13, 1996 at 10:00 a.m.

Location of Meeting: U.S. Nuclear Regulatory Commission
DNMS Conference Room
475 Allendale Road
King of Prussia, PA 19406

Purpose of Meeting: Licensing meeting to discuss procedures for release for unrestricted use of Army bases where commodities were used or stored pursuant to License No. 29-01022-14.

NRC Attendees: John D. Kinneman, Chief, Nuclear Materials Safety Branch 2: Research and Development (NMSB-2)
Francis M. Costello, Chief, Nuclear Materials Safety Branch 3: Industrial Applications (NMSB-3)
Betsy Ullrich, Senior Health Physicist, NMSB-2
Sheri Arredondo, Health Physicist, NMSB-3
Monte Phillips
~~Dave Fauver, Division of Waste Management~~

Licensee Attendees: John Manfre, Headquarters, Army Materiel Command
Michael Borisky, Headquarters, Army Research Laboratory
Lt. Col. Charles Kelsey, Headquarters, Army Materiel Command
Bob Schroeder, Headquarters, Army Environmental Program
Robin Mills
Col. Robert Cherry, Director, Army Safety
Steven Horne, Chief, Safety Office, U. S. Army Communications-Electronics Command
Col. Johnson - Carl Hyggren
Bill

A/13

This Enforcement Conference is open to the public. Handicapped persons requiring assistance to attend or participate in the meeting should make their requests known to Betsy Ullrich, Branch 2, DNMS, U.S. Nuclear Regulatory Commission, Region I, 475 Allendale Road, King of Prussia, PA 19406, at (610) 337-5040, no later than five business days prior to the meeting. Attendance by other NRC personnel at this meeting should be made known by March 11, 1996.

Prepared by: Betsy Ullrich
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RADIOLOGICAL SURVEYS AT RADIOACTIVE COMMODITY BRAC SITES

Presented By: US Army

Presented To: Nuclear Regulatory Commission
Regions I, III & HQ
King of Prussia, PA
13 March 1996

The Problem

- Radioactive commodity items have been present at most DA installations, indoors and outdoors - small potential for contamination
- Most radioactive commodity items are subject to NRC licenses and regulations - may be subject to regulatory requirements for historical review/survey before release
- Source design, form, isotope, activity, use, management - what is appropriate level of survey?

Approach For This Briefing

- Describe commodity design, use, license conditions
- Describe our interpretation of NRC requirements/ guidance
- Describe our revised protocol
- Review key interpretations
- Questions

Commodity Items

- Fire Control Devices, H-3 (sealed in glass ampule), Pm-147 (now license exempt)
- DU Munitions (Staballoy)
- DU Armor (encapsulated in welded steel)
- Chemical Agent Detector, Am-241 (foil disk)
- Calibration Sources, Sr-90, Pu-239, Kr-85 (sealed, electroplated or gas)
- Night Vision Devices, Th-232, solid thorium fluoride on optical systems (NRC license exempt)
- Aircraft Engine Components, Th-232, magthor alloy, (license exempt)
- Compasses and Watches, H-3 or Ra-226 (sealed)

Commodity Items (Continued)

- Moisture Density Gauge, Cs-137 and Am-241 (both sealed)
- Older Radioluminescent Dials and Gauges, Ra-226 (enclosed in gauge)
- In General - Radioactive Material Sealed, Contained or in a Non-Dispersible Form

Safety Engineering

- Largest calibration sources "special form" (impact test, drop test, percussion test, bending test, heat test)
- Many other sources "sealed", ANSI, 10CFR32.210
- Limited Activity - none individually or on a worldwide total require financial assurance for decommissioning
- Th Coated Optics - humidity, salt spray, adhesion/ adherence, abrasion test

Choice of Nuclides
Comparison of Unrestricted Area Cleanup Limits (dpm/100cm^2)

	Current NRC	Draft NRC (3 mREM/Yr)
Total H-3	5,000	5,290,000
Total Ni-63	5,000	512,000
Total Pm-147	5,000	249,000
Total Am-241	100	37

Note: Total can include up to 20% removable

License Conditions

- Opening or removing sources generally forbidden
- Some licenses require surveys of "potentially contaminated" surfaces
- Periodic Inventories
- Loss of item requires reporting to licensee
- Leak testing
- Leak testing QA program (found leaking CADs)
  - After 10 years in field, 4% leaking, 0.00047 uCi Max, if spread over 10 cm^2, will meet the current unrestricted area limit

License Conditions (Continued)

- For calibration sources, NRC waiver obtained for certain commodities in storage because no history of leakage, "no health and safety concern"
- Regular area surveys and wipe tests required for some commodities
- Air monitoring at H-3 depot repair facilities and H-3 bulk storage areas
- Periodic program evaluations/inspections at user sites by CHPPM and licensee
- No financial assurance for decommissioning was required

NRC Requirements/Guidance For Site Release

- 10CFR30.36, 40.42, 70.38, "Termination of Licenses and Decommissioning of Sites"
  - Commodity licenses not being terminated with base closure
  - Within 60 days of the following, NRC must be notified, and decommissioning of area/site "that contains residual radioactivity" must begin, or a decommissioning plan must be submitted (if required) within 12 months, if:
    - License has expired
    - Permanently cease principal activities in areas/sites "that contain residual radioactivity"
    - Licensed activities have not been conducted for 24 months

NRC Requirements/Guidance For Site Release

- "Guidelines for Decontamination of Facilities and Equipment Prior to the Release for Unrestricted Use, or Termination of License..." August 1987
  - Specifies the limits which should be used in decontamination and survey of surfaces or premises prior to abandonment or release for unrestricted use
  - Prior to release for unrestricted use, licensee shall conduct comprehensive survey which establishes contamination is within limits (can then release site)
  - Provide copy to NRC - Prior approval not required - NRC may choose to verify

Revised Protocol
Generic Survey Plan (GSP)

- Guiding Principles
  - Commensurate with source design, use, management and past survey results
  - Apply good health physics practice
  - Ensure quality assurance, documented, defendable (NUREG 5849)
  - Unrestricted release
  - Offer survey results to NRC
  - Consistent with Air Force and Navy
- Major Changes
  - Reduction in areas classified as "affected"
  - Reduction in surveying of furniture and fixtures
  - Elimination of gridding in "unaffected areas"
  - Use of survey units and random sampling in "unaffected areas"
  - Exemption of certain commodity areas from any survey requirement

Historical Review and Area Classifications

- Review Records
- Conduct Interviews
- Affected Area - areas that have potential radioactive contamination based upon operating history, or known contamination based upon past or preliminary radiological surveillance
  - Commodity repair, maintenance, waste operations where historical information indicates release may have occurred
  - Past accidental releases not cleaned to present standards
  - Cannibalization/demil areas where it is known commodities/dials were broken

Historical Review and Area Classifications (Continued)

- Unaffected Areas - areas not expected to contain residual radioactivity, based upon a knowledge of site history and previous survey information
  - Past accidental releases cleaned to present standards
  - All other areas not classified as affected, except
- No Survey Required for
  - Areas where commodities were present and individual activities did not require posting per 10CFR20.1902
  - Areas where license exempt commodities were present
  - Areas where commodities were present and specific license condition relieves posting requirement (1000 compasses)
  - Areas used for the storage and use of armored vehicles with intact DU shielding

Final Survey

- NUREG 5849
- Affected Indoor Areas
  - 2 meter x 2 meter grids if MDA less than or equal to 25% release limit
  - 1 meter x 1 meter grids if MDA greater than 25% release limit
  - Walls gridded to 2 meters above floor
  - 5 static alpha and beta readings per grid
  - 1 gamma reading at 1 meter above middle of grid, unless only pure alpha or beta emitters were present
  - Wipe testing at highest alpha or beta reading if alpha or beta reading exceeds background interval
  - Scanning only in areas known to be contaminated
- Affected Grounds
  - 10 meter x 10 meter grids
  - 5 sampling/measurement locations per grid

Verification Surveys

- Required only in areas where cleanup was required
- Should be performed by different agency than final surveys
- 1-10% resampling
- Bias sampling

Key Interpretations

- In the absence of contamination beyond unrestricted area limits:
  - Commodity site surveys are not "decommissioning surveys"
  - NUREG 5849 and NUREGS 1505-7 not requirements
  - Appropriate to apply "Guidelines for Decontamination of Facilities and Equipment Prior to the Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material", August 1987
- H-3 commodities "Sealed in Glass Ampoules", issued registration as sealed sources IAW 10 CFR 30.32(g), 10 CFR 32.210, considered sealed sources
- Area classifications

Questions

- For contamination beyond unrestricted area levels, apply NUREG 5849 or NUREG 1505-07?
- Is proposed survey approach a violation of CECOM's license conditions?
- How obtain a formal policy from NRC?

Shari
John
Frank
- For the Wed. meet w/ Army

U.S. ARMY RESEARCH LABORATORY
RISK MANAGEMENT DIVISION
FAX COVER SHEET

DATE: 5 Mar 96

FROM: Michael Boristy

TO: Betsy Ulrich

ORGANIZATION: NRC Region I

FAX: (610) 337-5269 PHONE: ( )

Number of Pages, Including Cover: 20

REMARKS: Betsy,
We thought this "read ahead" would be helpful to you in preparing for our 13 Mar meeting. Should provide you with insight into our thinking on this issue. Please call me as you wish @ (301) 394-2218

Michael

Telephone: (301) 394-4511/2218, [DSN]: 290-4511/2218 [FAX]: (301) 394-2660

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MAR - 7 1996

EXCERPTS FROM THE GENERIC SURVEY PLAN, PROPOSED TO REVISE THE SURVEY PROTOCOL FOR COMMODITY SITES.

EXECUTIVE SUMMARY
GENERIC RADIOACTIVE COMMODITY SITE
RADIATION SURVEY PROTOCOL
NOVEMBER 1995

1. This generic survey plan (GSP) specifies the survey protocol that will be applied at closing or realigning sites where radioactive commodities were used, stored, repaired, and potentially involved in cannibalization/demilitarization/burial operations. This GSP has been based upon good health physics practices, discussions with the Nuclear Regulatory Commission (NRC) Headquarters and NRC licensing Regions, and the results at commodity sites surveyed to date. Following this GSP will satisfy regulatory requirements and support unrestricted release of these sites and areas, while ensuring that federal survey dollar expenditures are commensurate with the design and past use of the commodities.

2. **In the event that contamination is found that requires extensive clean-up, that portion of the effort may be classified as a "decommissioning" effort. In this case, in addition to immediately reporting the contamination to the NRC, a formal decommissioning plan must be prepared and submitted through HQ AMC to the NRC for review and approval before clean-up begins. This GSP must not be used as a decommissioning plan. For more information on the definition and requirements of a decommissioning action, reference 10 CFR 30.36, 40.42, and 70.38.**

4. The radiological surveys, as well as any radiological clean-up required, must be coordinated in advance with the Army agency responsible for conducting the overall environmental remediation process at the site of concern. This is necessary to ensure that any state environmental requirements that may have jurisdiction over radiological surveys and contamination are met. The state may have jurisdiction that will effect survey design and clean-up. State release criteria may be more restrictive than NRC release criteria, requiring more sensitive survey measurements, and more intensive clean-up.

5. In most cases, radioactive commodities were designed and developed specifically for military use and specific missions. As such, most commodities were subjected to use and environmental test factors during their development to establish and prove the military usefulness and safety of the items. For instance, drop,

shock, vibration, temperature extreme, altitude, and accelerated weathering tests such as those established in 10 CFR Part 32.101, were included as part of the testing protocol. It is for this reason the commodities are generally designed with the radionuclide in a non-dispersible form, are rugged, and are not expected to have contaminated areas where they were used or stored.

6. Quality assurance (QA) procedures are described in this GSP. The QA procedures will be followed throughout the survey process to ensure that the work is performed in compliance with this GSP. This GSP generally follows the guidelines in NUREG/CR-5849. Although NUREG/CR-5849 is generally not applicable to surveys/clean-up of commodity sites (since the commodities are generally designed with the radioisotope in a non-dispersible form), portions of the NUREG have been used to help design the survey effort. In addition, the survey program will comply with the applicable federal, state, DA and other regulatory directives (e.g., the NRC, states health and environmental departments, and the Environmental Protection Agency (EPA)). It will follow applicable health physics standards set forth by recognized institutions or technical societies (e.g., the National Council on Radiation Protection and Measurements (NCRP), and the American National Standards Institute (ANSI)).

7. In the event that contamination is found, Occupational and Radiation Protection Programs will be applied, consisting of a set of policies, procedures, and instructions to protect workers, the general public, and the environment. Any Occupational and Radiation Protection Programs applied will provide occupational health, health physics, industrial, and safety elements. If contamination is found that requires extensive clean-up, that portion of the effort may be classified as a "decommissioning" effort. In this case, in addition to immediately reporting the contamination to the NRC, a formal decommissioning plan will be prepared and submitted through HQ AMC to the NRC for review and approval before clean-up begins. For more information on the definition and requirements of a decommissioning action, reference 10 CFR 30.36, 40.42, and 70.38.

SECTION 1

BACKGROUND

1.1 This GSP covers facilities/installations that had operations involving radioactive commodities. These commodities were generally designed with the radioisotope sealed, contained, or in a non-dispersible form, and were authorized under either an NRC license issued to an AMC MSC, or by a DARA issued by AMC. Some older commodities may have contained naturally occurring radioactive material that was not covered by a license or a DARA (example, Radium). In most cases, radioactive commodities were

designed and developed specifically for military use and to accomplish specific assigned missions. It is for this reason the commodities were generally designed with the radioisotope sealed, contained, or in a non-dispersible form, rugged, and not expected to have contaminated areas where they were used or stored. For the most part, areas inside of buildings where these commodities were used, stored, and repaired are of primary interest. Also of interest ARE outdoor areas such as cannibalization and demilitarization yards, where dials and gauges containing radioactive materials might have been broken. Also of concern, but very unlikely, is outdoor areas where radioactive commodities may have been disposed of by on-site burial. ?

1.2 Radioactive contamination is not expected. This is because the commodities were generally designed to be rugged with the radioisotope sealed, contained, or in a non-dispersible form, to prevent release of the radioactive material inside. Furthermore, the most significant of these devices were subjected to periodic leak tests, design quality assurance programs, and periodic area surveys. Site surveys conducted to date have demonstrated that commodity designs and management efforts have generally been successful in preventing serious contamination, and quickly identifying and remediating the few cases of contamination incidents that have occurred in the past.

1.3 This GSP generally follows the guidelines specified in the NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination. Quality assurance (QA) procedures are also described in this GSP. Although NUREG/CR-5849 is generally not applicable to surveys/clean-up of commodity sites (since the commodities are generally designed with the radioisotope sealed, contained, or in a non-dispersible form), portions of the NUREG have been used to design the survey effort.

1.5 Examples of radioactive commodities used and stored at Army installations are listed below. Army Technical Bulletin 43-0116 contains a complete listing of radioactive items that may have been used and stored at Army installations.

NOMENCLATURE	ISOTOPE	NRC LICENSEE
Front Sight Post Assembly	H-3	ACALA
Radioluminous Fire Control Devices	H-3	ACALA
Compasses	H-3	ATCOM
Infinity Collimator	H-3	ACALA
M1A1 Collimator	H-3	ACALA
M1A1 Quadrant Fire Control Device	H-3	ACALA
M58 and M59 Aiming Light Post	H-3	ACALA
Wrist watches	H-3	ATCOM
Chemical Agent Monitor	Ni-63	ACALA
→ MX-7338 Radiac Check Source	Kr-85	CECOM

UDM/2 Radiac Calibration Set	Sr-90	CECOM
M72 Light Antitank Weapon (LAW)	Pm-147	IOC
Front Sight Post Assembly	Pm-147	ACALA
Radium Dial/Compass/Check Source	Ra-226	DARA
T-53 Aircraft Engine Components	Th-232	ATCOM
Night Vision Devices	Th-232	CECOM
UDM/6 Radiac Calibration Set	Pu-239	CECOM
MC-1 Moisture Density Tester	Am-241	TACOM
M8A1 Chemical Agent Alarm	Am-241	ACALA
M1A1 Tank Armor	U-238	TACOM
MC-1 Moisture Density Gauge	Cs-137 Am-241	TACOM
M1A1 Tank Armor	DU	TACOM

AIG?

SECTION 2

HISTORICAL REVIEW AND AREA CLASSIFICATIONS

2.1 A historical review will be conducted to identify structures and/or land areas where radioactive commodities may have been stored, repaired, maintained, etc. A review of the type of operation, as well as any accident/incident/leak test reports that indicate an accidental release will be used to classify the areas. NUREG 5849 defines "unaffected areas" as areas not expected to contain residual radioactivity, based upon a knowledge of site history and previous survey information. NUREG 5849 defines "affected areas" as areas that have potential radioactive contamination based upon operating history, or known contamination (based upon past or preliminary radiological surveillance).

2.2 As part of the historical data review, all available NRC licenses, DA authorizations, area surveys, leak test records, incident/accident records, inventories, disposal records, and shipment records will be reviewed. Interviews will be conducted with all available personnel that can offer a historical perspective on the past storage, use, and disposal of radioactive commodities on the site. This could include the installation RPO, past/present commodity workers, environmental personnel, and property disposal personnel (that may have been involved in cannibalization, demilitarization, or burial operations).

2.3 Areas will generally be classified as follows:

2.3.1 AFFECTED AREAS - areas where historical information indicates commodity repair, maintenance, or waste operations may have compromised the non-dispersible design of the commodities; areas where tritium repair/maintenance/waste operations occurred; areas where an accidental release occurred in the past that has not been remediated to the present unrestricted area limits; and outdoor and/or indoor cannibalization, demilitarization, or disposal areas where it is known that radioactive commodities or dials have been broken or buried.

2.3.3 UNAFFECTED AREAS - All other indoor and outdoor areas where commodities were repaired, maintained, or stored, unless; **(1) the individual item activity did not require posting per 10CFR20.1902, or (2) the items were license exempt, or (3) a specifically issued NRC license relieves the posting requirement for bulk storage (example, 1000 compasses).** Areas used for the storage and use of armored vehicles with intact DU shielding will also be exempt from any survey requirements. Areas where historical information indicates an accidental release occurred and has already been remediated to the present standards for unrestricted release, will also be classified as unaffected.

How will these be considered?

2.4 Surveys are required inside drainage pipes, vents, and ducts only in those indoor areas classified as affected. For tritium areas classified as affected due only to the presence of tritium, surveys are not required in drainage pipes due to the gaseous nature of tritium.

2.5 Some buildings contain other assets, such as furniture and fixtures, that will be transferred with the property to the acquiring entities. Furniture and fixtures left behind in affected areas will be surveyed to screen for potential contamination before they are released. Surveying furniture and fixtures is not necessary in unaffected areas, unless an area is reclassified as affected based upon survey results.

2.6 If commodities are known to have been stored, repaired, maintained, etc., in a building classified as unaffected, but the specific room or rooms are not known, then the entire building can be considered an unaffected survey unit, subject to random sampling and measurement as specified in NUREG 5849. Further guidance is provided later in this GSP.

2.7 For areas where historical information indicates commodity repair, maintenance, or waste operations compromised the non-dispersible design of the commodities, the historical review and/or walk through should be able to pinpoint the location of such operations. Only those specific rooms within a building where such operations were known to have occurred will be classified as affected. All other rooms will be classified as unaffected, subject to random sampling and measurement. If contamination exceeding the release limit is then found, the area will be reclassified as affected.

SECTION 6

FINAL STATUS SURVEY

6.1 The Final Status Survey is used to determine the final condition of the site, to include areas where clean-up may have been required. It also provides data to demonstrate that all radiological parameters satisfy the established guideline values and conditions for unrestricted release. The Final Status Survey is also known as the Termination Survey, or simply the Final Survey. For this GSP, the term "final survey" will be favored. Data from characterization surveys performed using the final survey protocol in affected areas where no contamination was found will be included in the final survey report. The final report will include sampling and measurements made in both affected and unaffected areas.

6.2 The sampling plan described below, is a systematic method of measurements and sampling as generally described in NUREG/CR-5849. In addition, in areas classified as affected, random and/or bias sampling will include inside drainage pipes, vents, and ducts.

6.4.2 In **affected areas** only, preparation of a grid system. The grid system will be a network of evenly spaced horizontal and vertical lines, that can be utilized to assist in locating and reproducing sampling locations. Affected structures will be gridded in 2 meter by 2 meter grids. This requires an instrument/method minimum detectable activity (MDA) of 25% of the unrestricted area limit. Affected grounds will be gridded using 10 meter by 10 meter grids. The survey teams will document the specific locations for each location surveyed.

6.4.3 **Unaffected structures and grounds** will be surveyed without the use of grids. Given that the sources were generally designed with the radioisotope sealed, contained, or in a non-dispersible form, and no contamination is expected, this method is commensurate with the design and management of the sources, and will save survey time, labor, and dollars. As discussed in NUREG 5849 for building surfaces, 30 randomly selected measurement locations or an average of 1 location per 50 square meters of building surface area, whichever is greater, will be made per survey unit. Survey units are areas with common history or characteristics, or are naturally distinguishable from other portions of a site. Rooms of the same contamination potential can be combined into a single survey unit. This means that a building area as large as 1500 square meters can be surveyed using 30 random locations. This method will alleviate the need to move furniture in unaffected areas, because gridding will not be necessary. For unaffected grounds, random sampling is not subject to the "1 location per 50 square meter" limitation. 30 randomly selected locations per outdoor survey unit is sufficient. **As with affected areas where grids were established, the exact location of randomly selected sampling and measurement locations must be marked and recorded for inclusion in the final report.**

6.4.7 **AREA SCANNING.** For the purposes of this GSP, only static survey measurements are considered necessary, ie, no area scanning, unless it is known commodities were broken and/or contamination is present. This again is because site surveys conducted to date have demonstrated that the generally sealed, contained, or non-dispersible form of the devices have been successful in preventing contamination, and management efforts have quickly identified and remediated the few cases of contamination that have occurred in the past.

6.5 SAMPLING PLAN.

6.5.1 AFFECTED BUILDINGS

6.5.1.1 For alpha emitters in affected buildings, there will be five static survey meter readings per grid which will be taken in a "z" pattern. One reading will be taken in the middle of the grid, and the other four data points will be equidistant from the middle data point and each corner of the grid.

6.5.1.2 For beta emitters in affected buildings, the process is the same as for alpha emitters. For low energy beta emitters, especially tritium, these readings may be possible only if special instrumentation is available that can detect a low energy beta emitted from a surface.

6.5.1.3 For gamma emitters in affected buildings, there shall be one survey point in the middle of each grid, taken at 1 meter above the surface of the grid. A gamma reading is not required if historical review indicates that only pure alpha and/or pure beta emitters were present in the survey area.

6.5.1.4 For affected buildings, a "Nucon" wipe and a "LSI' wipe will be collected at the point of the highest alpha and beta meter readings, if the readings exceed the normal range for background. If a flag value (see definition below) is exceeded at one or more points in that grid, the grid will be further evaluated (such as additional samples or survey measurements) to determine the extent of contamination or whether samples of construction material should be analyzed for increased levels of naturally occurring radioactivity.

"Nucon" wipe: Hard Wipe collected on a filter paper type media, later analyzed in a laboratory setting for alpha and beta-gamma emitters. Samples removable contamination at location of wipe.

"LSI' wipe: Liquid Scintillation wipe collected on a metrical membrane filter, or thin styrofoam LSC wipe, that is dissolved in scintillation cocktail, and analyzed in a laboratory setting. Can be used to indicate the presence of removable low-energy beta contamination.

Flag value: A survey measurement that is equivalent to some fraction of the free release criteria for unrestricted use for the isotope of interest. Normally set at 25% of the release limit for buildings, 75% for grounds.

6.5.2 **UNAFFECTED BUILDINGS.** For unaffected buildings, the static measurements and sampling described for affected buildings will be conducted at each of the randomly selected locations.

Again, no scanning is necessary. Identification of activity levels in excess of 25% of the limit may require reclassification of the area as affected. HQ AMC will be notified before the area is re-surveyed as affected.

6.5.6 **AFFECTED GROUNDS.** For affected grounds, survey and sampling locations will be located within grids as described for affected buildings, except that the grids will be 10 meter by 10 meters. On soil or vegetation, fixed measurements, wipe tests, and alpha-beta scanning are not considered meaningful, and therefore will not be performed. Instead, soil samples will be collected in the locations were fixed measurements are normally made, within 15 cm of the surface. On paved surfaces, fixed measurements (not to include wipes), and alpha-beta scanning are meaningful, and will be conducted as indicated by the isotopes known to have been present. For both paved surfaces and ground surfaces where it is known that commodities were broken or buried, a 100% gamma scan of the affected surface will be conducted.

6.5.7 **UNAFFECTED GROUNDS.** For unaffected grounds, the measurements and test will be conducted as described above for affected grounds, but only at the 30 random locations. Identification of hot-spots or individual locations with activity levels in excess of 75% of the guidelines requires reclassification of the area as "affected".

6.6 If elevated levels are detected, ensure the elevated levels detected are not due to naturally occurring radioactivity in building materials, or an elevated terrestrial background. If it is confirmed to be contamination greater than the release limit for unrestricted use, the area will be cleaned and resurveyed until levels are below the release limits. **In the event that contamination is found that requires extensive clean-up, that portion of the effort may be classified as a "decommissioning" effort. In this case, in addition to immediately reporting the contamination to the NRC, a formal decommissioning plan will be prepared and submitted through HQ AMC to the NRC for review and approval before clean-up begins. This GSP must not be used as a decommissioning plan. For more information on the definition and requirements of a decommissioning action, reference 10 CFR 30.36, 40.42, and 70.38.**

6.6.1 Once final survey methods and measurements (following any reclassification of areas, resurvey, and clean-up required) show contamination less than the release limits, the room or outdoor area will be declared suitable for unrestricted use.

POLICY STATEMENT THAT WOULD SUMMARIZE THE CHANGES IMBEDDED IN THE GENERIC SURVEY PLAN

1. **GENERAL.** This policy establishes how radiological surveys at closing or realigning sites where radioactive commodities were stored, repaired, or potentially involved in cannibalization/demilitarization/burial operations will be conducted. This policy is based upon; good health physics practice, discussions with the Nuclear Regulatory Commission and states, the design and management of the radioactive commodities, and survey results to date. Army radioactive commodities are generally designed rugged, with a limited amount of the radionuclide in a non-dispersible form. They are not expected to have contaminated areas where they were merely present. This policy is necessary to ensure that federal survey dollar expenditures are commensurate with the design, use, and potential risk of the commodities.

2. **AREA CLASSIFICATION.** A historical review will be conducted to identify structures and/or land areas where radioactive commodities were stored, repaired, cannibalized, or buried. A review of the type of operation, as well as any accident/incident/leak test reports that indicate an accidental release will be used to classify areas. "Unaffected areas" will be considered areas not expected to contain residual radioactivity, based upon a knowledge of site history and previous survey information. "Affected areas" will be considered areas that have potential radioactive contamination based upon operating history, or known contamination (based upon past or preliminary radiological surveillance). Using these definitions, commodity areas will be classified as follows:

a. **AFFECTED AREAS** - only those areas where historical information indicates: commodity repair, maintenance, or waste operations compromised the non-dispersible design of the commodities; tritium repair/maintenance/waste operations; an accidental release in the past that has not been adequately remediated; outdoor and/or indoor cannibalization, demilitarization, or disposal operations known to have broken or buried radioactive commodities or dials.

b. **UNAFFECTED AREAS** - Most other indoor and outdoor areas where commodities were repaired, maintained, or stored. Areas where historical information indicates an accidental release occurred but has already been adequately remediated for unrestricted release, will also be classified as unaffected.

c. **"NO SURVEY" STORAGE AREAS** - The following storage areas will not require any surveys: (1) where individual item activity did not require posting per 10CFR20.1902, (2) where the items were license exempt, (3) when an NRC license condition relieved the posting requirement for bulk storage (example, 1000

compasses), and (4) where armored vehicles with intact DU shielding were present.

3. **FINAL SURVEYS**

a. **AREA SCANNING.** Area scanning involves slowly moving the detector of a radiation detection instrument along a surface to detect the presence of contamination. Because of the design of the commodities, the limited quantity of radioisotopes within, and the low radiotoxicity of most commodity isotopes, area scanning is only required in areas known to be contaminated, or where commodities were known to be broken.

b. **DRAINS/VENTS/DUCTS.** Surveys are required inside drainage pipes, vents, and ducts only in those areas classified as affected.

c. **FURNITURE/FIXTURES.** For affected areas containing assets such as furniture and fixtures that will be transferred with the property, these assets will be surveyed to screen for potential contamination before they are released. Surveying furniture and fixtures is not necessary in unaffected areas, unless an unaffected area is reclassified as affected based upon building surface survey results.

d. **RANDOM SAMPLING.** For surveying unaffected areas, random sampling will be used to eliminate the need for moving furniture and gridding. "Survey units" will be used to minimize the number of random samples required. If commodities are known to have been stored in a building classified as unaffected, but the specific room or rooms are not known, then the entire building can be considered an unaffected area survey unit, subject to random sampling. For areas where historical information indicates commodity repair, maintenance, waste, or cannibalization operations compromised the non-dispersible design of the commodities (affected areas), the historical review and/or walk through should be able to pinpoint the location of such operations. Only those specific areas where such operations were known to have occurred will be classified as affected. All other areas will be classified as an unaffected area survey unit, subject to random sampling.

4. **CHARACTERIZATION SURVEYS.** Characterization surveys will be performed only on those areas known to have been contaminated by commodities operations. For all other areas, the survey team will proceed directly to the final survey.

5. **VERIFICATION SURVEYS.** Verification surveys will only be conducted in those areas that required clean-up.

6. **INSTRUMENTATION.** Instruments and methods chosen will be capable of detecting 25% of the guidelines for release of

buildings, and 75% of the guidelines for release of grounds. Surveys will also be conducted with instruments that offer and apply technology that will minimize the overall survey, recording, and reporting cost (to include consideration of labor, per diem, transportation, etc.)

ANSWERS TO QUESTIONS POSED BY ARMY PERSONNEL REVIEWING THE PROPOSED GENERIC SURVEY PROTOCOL. A RESPONSE TO COMMENTS RECEIVED ON THE PROPOSED PROTOCOL IS ALSO PROVIDED IN SOME CASES.

a. Do the procedures satisfy state and Federal requirements for unrestricted use of past sites where radioactive commodities were used or stored? For federal, yes. For state, probably, as the states usually follow the lead of the NRC on radiological matters. But to be sure, state requirements will be determined through state review and negotiation on a case by case basis, as required by the revised plan. See explanation below.

Are the procedures in accordance with standards of good health physics practice for this type of activity? Yes. See explanation below.

The revised protocol is the product of an in-process review. One of the first questions it was necessary to answer was what federal requirements actually apply to the commodity site closing situation? Army has been strictly applying the NRC requirements for decommissioning, even though many believe the commodity site situation does not represent a decommissioning action, and that treating it as a decommissioning action results in expensive overkill, especially given the commodity design, use, management, and the survey results to date.

A meeting was therefore arranged with the termination survey policy-makers at the NRC headquarters (July 95), in hopes of determining what level of survey is appropriate for the commodity situation. The NRC policy-makers were briefed on Army commodity design, management, license conditions, and survey procedures being applied. The NRC Regional offices were attending the conference via teleconference. The NRC indicated that the surveys are in fact overkill, and that application of NUREG 5849 (decommissioning survey protocol) was not a requirement for the commodity situation. One of the regional offices was surprised that any surveys were being conducted at all, as surveys are not normally required at sites where sealed sources were used, and leak test have been conducted if required.

Realizing that NRC review of a special plan for commodities could take year(s) and limit our flexibility to make changes along the way, Army opted to revise the plan following "good practice". To obtain some degree of NRC review/concurrence, survey results can be provided to the licensing region after the survey. Although this process is not as rigorous as that which would be required at a decommissioning site, it is consistent with the process outlined in HQ NRC guidance entitled "Guideline for Decontamination of Facilities and Equipment Prior to the Release

Do we want this?

for Unrestricted Use, or Termination of Licenses...", August 1987. Given the design and use of the commodities, this is considered the appropriate process. The surveys are therefore considered "release surveys", not "decommissioning surveys". **After all, not every release survey and decontamination conducted at an Army site qualifies as a decommissioning action.** In fact, a careful reading of 10CFR suggests that decommissioning requirements are meant to apply to when "buildings or outdoor areas contain residual radioactivity such that the building or outdoor area is unsuitable for release". This of course makes sense, as it would be unnecessarily expensive to strictly apply decommissioning requirements to sites not expected to contain residual radioactivity beyond unrestricted area levels.

To perform the release survey, we opted to follow NUREG 5849, but to (1) bring the interpretation of area classifications definitions more in line with the design and use of the commodities and past commodity site survey results, and (2) take advantage of the relief that NUREG 5849 provides to further reduce the number of measurements necessary, the need to move furniture, the need to grid areas, etc. By doing this, we believe the revised protocol is commensurate with commodity design and use, while still applying and obtaining the credibility of NUREG 5849. And as a byproduct, the cost savings will be very large. One significant deviation was made from NUREG 5849. Scanning is now only required in those areas known to be contaminated. This was felt to be justified, given the commodity design, management, and past survey results.

Before settling on this approach, the Navy and Air Force were contacted to determine whether they are strictly applying decommissioning rules to their commodity sites, or whether they are applying less rigorous "release surveys". They are applying less rigorous release surveys, and the revised protocol is consistent with the approach they are using. Some still feel the revised protocol is overkill, and perhaps it is.

In reference to others' concerns about risk-based requirements: It is recognized in the revised plan that state radiological and environmental departments may have more stringent desires or requirements that are risk-based. That is the reason why the plan requires the protocol be coordinated with the state in advance, and that any disagreements be negotiated. This is not uncommon. But conversions from contamination levels to dose to risk can serve as the basis to demonstrate compliance with risk based criteria, if necessary. And the survey instrument detection levels can be adjusted if necessary, to measure those levels corresponding to acceptable risk. Notice that contamination levels are not specified in the plan for this very reason. (For most all the commodity isotopes, the contamination level associated with acceptable risk is relatively high anyway, because of the low-radiotoxicity, so risk criteria will easily be

met). What the Army cannot afford to do is sign-up to state risk-based requirements that are unreasonable and expensive, and conduct expensive surveys just to demonstrate compliance with an unreasonable requirement.

In reference to the use of NUREGS 1505, 1506, and 1507: They are currently "under consideration" by the NRC. In the Forwards of 1505 and 1506, it is stated that the approaches and methods are provided "for information only". Paragraph 1.2 of 1505 states that at present, NRC staff uses NUREG 5849. It would seem unwise to develop a survey protocol around methods not yet widely adopted and applied, and certainly not required. Furthermore, when the 3 mrem/yr criteria is adopted, the corresponding contamination levels of the low-radiotoxicity nuclides used in commodities will be so high above background, that any benefit of using the new methods may vanish.

b. **Were the correct changes made to streamline and reduce the cost of decommissioning surveys?** Yes. Although these surveys are not considered "decommissioning surveys" nor these actions "decommissioning actions", the revised protocol is still consistent with NUREG 5849, with the exception of area scanning, as described earlier.

Identify the requirements eliminated or the changes made and discuss the health and regulatory impact of these changes. First, it is important to recognize that the revised protocol is essentially the same protocol used by Army at Fort Ord and Fort Devens, with the changes indicated below. Major changes are as follows:

1. AREA CLASSIFICATION. NUREG 5849 defines "Unaffected areas" as areas not expected to contain residual radioactivity, based upon a knowledge of site history and previous survey information, and "Affected areas" as areas that have potential radioactive contamination based upon operating history, or known contamination (based upon past or preliminary radiological surveillance). In the revised plan, for Army commodity operations, these definitions are interpreted as follows:

(a) AFFECTED AREAS - only those areas where historical information indicates: commodity repair, maintenance, or waste operations compromised the non-dispersible design of the commodities; tritium repair/maintenance/waste operations; an accidental release in the past that has not been adequately remediated; outdoor and/or indoor cannibalization, demilitarization, or disposal operations known to have broken or buried radioactive commodities or dials.

(b). UNAFFECTED AREAS - Most other indoor and outdoor areas where commodities were repaired, maintained, or stored. Also, areas where historical information indicates an accidental

release occurred but has already been adequately remediated for unrestricted release.

(c) A third category of areas, termed "NO SURVEY" STORAGE AREAS has been added, based upon the insignificant amount and form of the activity present: The following storage areas will not require any surveys: (1) where individual item activity did not require posting per 10CFR20.1902, (2) where the items were license exempt, (3) when an NRC license condition relieved the posting requirement for bulk storage (example, 1000 compasses), and (4) where armored vehicles with intact DU shielding were present.

Area classification is perhaps the most major change, because in the past, the mere presence or storage of even a single radioactive commodity may have resulted in the area being classified as affected, requiring extensive surveys, gridding, furniture removal and surveying, etc. A large number of areas were therefore classified as affected in the past, greatly increasing the survey, gridding, and furniture moving requirements. In the past, Army chose to focus on the term "potential" in the area classification definitions. Given the design and management of the commodities, and past survey information, the revised plan focuses on the terms "not expected", "site history", "previous survey information", and "known contamination" when classifying areas. If "potential" was simply the criteria, we would also have to survey all the grounds where the commodities were present during use, as well as all the civilian trucks and transportation warehouses and depots where they were present during transport. This of course is not reasonable, nor should the mere presence of a commodity necessarily require a survey, much less a "decommissioning survey".

2. FINAL SURVEYS

(a) AREA SCANNING. As discussed earlier, because of the design of the commodities, the limited quantity of radioisotopes within, and the low radiotoxicity of most commodity isotopes, the revised plan requires area scanning only in areas known to be contaminated, or where commodities were known to be broken. Presently, scanning is conducted in both affected and unaffected areas.

(b) DRAINS/VENTS/DUCTS. The revised plan requires surveys only inside drainage pipes, vents, and ducts in those areas classified as affected. Presently, such surveys are also conducted in unaffected areas.

3. FURNITURE/FIXTURES. The revised plan requires surveying of furniture and fixtures only in affected areas. Presently, they are also conducted in unaffected areas.

4. RANDOM SAMPLING. The revised plan allows the use of random sampling and survey units for unaffected areas, greatly reducing the number of measurements required, as well as the need to move furniture for gridding. Presently, unaffected areas are gridded for surveying, and furniture is removed to allow such gridding.

5. CHARACTERIZATION SURVEYS. The revised plan requires a characterization survey only on those areas known to have been contaminated by commodities operations. For all other areas, the survey team can proceed directly to the final survey. Presently, characterization surveys may be conducted in areas that are not known to be contaminated, to then be followed by a final survey.

6. VERIFICATION SURVEYS. The revised plan requires verification surveys only be conducted in those areas that required clean-up. Presently, verification surveys may be conducted in areas that did not require clean-up.

7. INSTRUMENTATION. The revised plan requires that instruments and methods be chosen capable of detecting 25% of the guidelines for release of buildings, and 75% of the guidelines for release of grounds, to allow reduction of the grid size and number of measurements. The revised plan also requires that instruments that offer and apply technology that will minimize the overall survey, recording, and reporting cost (to include consideration of labor, per diem, transportation, etc.) be used.

There is no regulatory impact to the above changes, as previously discussed, recognizing that the NRC will be provided survey results, states will have the opportunity to comment/negotiate on the surveys in advance, and the plan implements NUREG 5849 (minus area scanning).

There is no significant health impact to the changes. Given the design and management of the commodities, the survey protocol is considered commensurate with the commodities and any potential hazard presented.

As for others' comments on area scanning and numbers of measurements: as with any sampling method, the Army will never be able to survey every square inch of potentially affected and unaffected areas. There will always be some level of uncertainty, and it is extremely expensive to attempt to eliminate all uncertainty. Instead, applying the revised plan will provide for the correct level of certainty. And NRC review of survey results, and state concurrence and negotiation, will also help provide for the appropriate level of certainty.

As for others' comments on cost versus risk analysis: the proposed protocol has been based upon a risk versus cost judgement by experienced Health Physicists. Furthermore,

inherent to the use of NUREG 5849 is the application of cost versus risk considerations.

c. **How adequate are the procedures in ensuring that these operations protect the personnel performing the surveys and the subsequent users of the facility?** Survey personnel will be in no greater danger than those personnel that have been moving around in these areas over the years. If an area is considered affected due to the mere storage or presence of commodities, what about the areas in the field, or the civilian trucks and warehouses where these items were present in the past? Given the design, management, quantities, and radioisotopes chosen, the NRC allowed wide-distribution with a minimum of controls. Subjecting areas to surveys, or considering areas as potentially dangerous based upon the mere presence of radioactive commodities, is not warranted.

As discussed earlier, the revised plan satisfies NUREG 5849, with the exception of scanning. The revised protocol will therefore support release for unrestricted use. The states will verify upon review and the NRC will verify upon review of the survey results that the areas are safe for subsequent users.

but period 1991 - not significant

As for others' comment that these surveys are "decommissioning surveys": Again, this process is not as rigorous as that which would be required at a decommissioning site. The revised process is, however, consistent with the process outlined in "Guideline for Decontamination of Facilities and Equipment Prior to the Release for Unrestricted Use, or Termination of Licenses...", August 1987. Given the design and use of the commodities, this is considered the appropriate process. The surveys are therefore considered "release surveys", not "decommissioning surveys". **After all, not every release survey and decontamination conducted at an Army site qualifies as a decommissioning action.** In fact, a careful reading of 10CFR suggests that decommissioning requirements are meant to apply to "buildings or outdoor areas that contain residual radioactivity such that the building or outdoor area is unsuitable for release". This of course makes sense, as it would be unnecessarily expensive to strictly apply decommissioning requirements to sites not expected to contain residual radioactivity beyond unrestricted area levels. ?

As for others' comment about eventual termination of the license: Since the revised plan implements NUREG 5849, the surveys could serve as termination surveys if ever called upon at the time of license termination.

d. **How accurate is the technical guidance provided?** It is accurate.

As for others' comment reference contamination potentials: the design and management of the commodities is believed to be

sufficient to prevent serious contamination. Given the large number of measurements made at Ft Ord and Ft Devens, a statistically powerful database now exists to assess this belief.

As for others' comment that the plan has not been approved by regulatory bodies: The plan requires approval coordination/negotiation with the state, and survey results would be provided to the NRC region. JDK/RA

As for others' comment on a Radiation Protection Program: Again, the surveyor will not be exposed to any greater hazard then the personnel that have been in these areas over the years. It is only in the unusual case of serious contamination that a Radiation Protection Program will be required to protect personnel, and when that occurs, NRC regulations will not allow work to begin or proceed until they have reviewed and approved a comprehensive Radiation Protection Program under the decommissioning process.

As for others' comments reference classification of areas: As discussed earlier, NUREGs 1505, 1506, and 1507 are not "current guidance". The NRC is merely providing them for "information only", and the currently applied guidance, except for maybe NRC test cases of 1505-7, is still NUREG 5849. Even so, for the commodity sites, these are not requirements, since the actions are not decommissioning actions. Use of the documents, in either case, is therefore voluntary, unless serious contamination is found. In that case, and as stated in the plan, the immediate area might be subject decommissioning requirements (but not the remainder of the site).

As for others' comment reference contamination potential: although serious contamination is not expected, the plan is written to consider the possibility, and address it if it is found (as the exception, not the rule).

As for others' recommendation to forward the draft protocol to the states for review and consideration: the revised plan provides for coordination with the states on a case by case basis. It is imperative that any negotiations/discussion with the states be conducted only by those who are committed in ensuring the survey protocol is commensurate with the design, use and risk of the commodities, otherwise the Army could become committed to unreasonable and unnecessarily expensive desires or preferences of a state.

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