Radiological Clearance of Scrap and Personal Property at NNSA Sites

Evaluation of Current Practices and Recommendations for Improvement

National Nuclear Security Administration

Office of Infrastructure and Environment

May 2010

Report on Radiological Clearance of Scrap and Personal Property at NNSA Sites

Submitted by:

Richard W. Meehan, NA-58

6/24/10
Date

Approved by:

6/24/10
Date

Xavier Ascanio, Director
Office of Nuclear Materials Integration, NA-58

Executive Summary

On July 13, 2000, the Secretary of Energy suspended the release of scrap metal managed in radiological areas for the purpose of recycling until improvements in release criteria and related information management were implemented. Department of Energy sites immediately complied with this policy by encumbering scrap, and in many cases all metal items from release into general commerce until the suspension was lifted. The suspension was originally forecast to expire on December 31, 2000.

The changes to the Department's clearance process directed by the former Secretary were proposed in the Federal Register and distributed for DOE-wide review, but in January of 2001 the Secretary decided not to issue the revised order. Instead on January 19, 2001, the former Secretary extended the prohibition until 1) NRC made a decision whether to issue a national standard, 2) DOE studied the issue further and 3) certain improvements in the radiological clearance process could be implemented at DOE/NNSA field sites. Although NRC decided not to issue a national standard several years ago, until recently no concerted effort has been undertaken to define the specific process improvements mandated by the former Secretary and to assess site compliance with such improvements.

On January 19, 2001, the Secretary extended the suspension until sites could demonstrate improvements of radiological clearance programs in four broad performance areas:

1. Clearly define areas and activities that could potentially contaminate property.
2. Clearly define release criteria, including measurement and survey protocols, for property released from areas or activities that have the potential to contaminate.
3. Ensure that released property meets DOE requirements.
4. Better inform and involve the public and improve DOE reporting on releases.

Inventories of suspension policy encumbered scrap have continued to accumulate at DOE/NNSA sites and represent a significant financial burden associated with continued storage or disposal needs.

In September 2008, the NNSA Office of Infrastructure and Environment (NA-50) embarked on an initiative with support from the Office of Health Safety and Security, Office of Nuclear Safety, Quality Assurance, and Environment to assess NNSA site compliance with the Secretarial direction to improve radiological clearance program performance. This initiative was joined by the Office of Science in August 2009 with the inclusion of the SLAC National Accelerator Laboratory and the Thomas Jefferson National Accelerator Facility in the site review process. The objectives of the site reviews were to: 1) determine the status of implementing and institutionalizing the directed improvements; and 2) develop an inter-site consensus on principles of operation and management of radiological clearance programs that aligns with the Secretarial direction. The joint NNSA-HSS-SC team has attained both of these objectives and offers the following recommendations to the Under Secretary for Nuclear Security:

1. The Undersecretary for Nuclear Security should promulgate the Principles for Management and Operation of Radiological Clearance Programs identified in this report as guidance to field sites. Site acceptance of these principles should be required as a condition for restart of radiological clearance operations for all personal property.
2. A headquarters organization should be assigned the responsibility to:
    a. Provide an appropriate level of oversight and assistance to field elements to ensure continued conformance to the aforementioned principles;
    b. Offer guidance and support as requested;
    c. Coordinate other NNSA offices and other relevant headquarters organizations as necessary and appropriate;
    d. Monitor the Occurrence Reporting System (ORPS) for issues related to release of items from radiological control;
    e. Report on performance trends.
3. In consideration for implementing Recommendations 1 and 2, request the Secretary to delegate the Under Secretary authority to resume clearance of scrap metal from radiological areas for those Sites that demonstrate compliance with the Principles for management and operation of radiological clearance programs.

Introduction

Since 2000, the Department of Energy (DOE) as well as the National Nuclear Security Administration (NNSA) has been precluded from releasing scrap metal from radiological areas (as defined by 10 CFR 835, "Occupational Radiation Protection") regardless of whether the material is contaminated with residual radioactive materials. Initially, the prohibition established by the former Secretary was to be in place for six months while DOE/NNSA procedures governing the clearance of personal property from radiological control were revised to include enhanced management processes and oversight as well as public involvement and participation.

The changes to the Department's clearance process directed by the former Secretary where proposed in the Federal Register and distributed for DOE-wide review, but in January of 2001 the Secretary decided not to issue the revised order. Instead on January 19, 2001, the former Secretary extended the prohibition until 1) NRC made a decision whether to issue a national standard, 2) DOE studied the issue further and 3) certain improvements in the radiological clearance process could be implemented at DOE/NNSA field sites. Although NRC decided not to issue a national standard several years ago, until recently no concerted effort has been undertaken to define the specific process improvements mandated by the former Secretary and to assess site compliance with such improvements.

The lack of progress in resolving the performance issues that resulted in the suspension as well as a conservative interpretation of the policy at field sites has led to large accumulations of policy encumbered materials and equipment of all types at DOE/NNSA sites. To date the only policy compliant option for disposition has been disposal of these materials as waste – the cost of which is a significant unbudgeted expense for the sites and is contradictory to Departmental waste minimization and pollution prevention efforts.

To address this increasing management problem, in September 2008, NNSA embarked on an effort with the support of the Office of Health, Safety and Security (HSS), Office of Nuclear Safety, Quality Assurance and Environment (HS-20) to: (1) define the specific performance elements of the process improvements mandated by the former Secretary; and (2) assess the status of site radiological clearance and other relevant programs with regard to compliance with the mandated improvements. The goal of this effort was to establish a sound technical and administrative basis to support a delegation of authority from the Secretary to the NNSA Administrator (e.g., Undersecretary for Nuclear Security) to manage the radiological clearance process at NNSA sites. This authority would include the discretion to restart scrap clearance operations at sites that have been determined to have institutionalized the performance improvements mandated by the former Secretary and identified by the joint NNSA-HSS team.

Concurrent with the NNSA effort, the Office of Science was receiving requests for direction from national laboratory directors regarding disposition of encumbered scrap metal. During a meeting with the Secretary in July 2009, the directors were made aware of the NNSA initiative to address the management challenges contained in the current

suspension policy. In August 2009 the Office of Science (SC) formally joined the NNSA initiative and nominated two facilities to be included in the effort. These facilities were subsequently evaluated and have been included in this initiative.

Lastly, the team addressed the issues associated with determining the extent of the operational impact on metals in a linear accelerator facility. Since accelerators can induce radioactivity in metals (depending on their power and type), approved and recognized practices to delineate the reasonable extent of the potential to activate metals as well as a means of verifying this determination is needed. Promulgation of these practices will significantly reduce the amount of non-impacted (e.g., no potential for radiological contamination) metal from these facilities that currently requires disposal as industrial waste.

Background

In September 1998, the Department of Energy Oak Ridge Operations Office entered into a contract with British Nuclear Fuels, Limited (BNFL) to decontaminate and decommission (D&D) three large process buildings located at the Oak Ridge Gaseous Diffusion or K-25 Plant. These buildings contained vast amounts (e.g., > 1M tons) of metal process and electrical support equipment made from steel, aluminum, copper and nickel. The contract allowed for BNFL to underwrite a significant portion of the total project cost with proceeds garnered from the decontamination and sale of scrap metal for recycle.

The large amount of metal to be recovered through this project resulted in public concern regarding the efficacy and reliability of DOE radiological clearance processes to stop radioactively contaminated materials from reaching the general public. The initial concern was associated with the potential for the release of volumetrically contaminated nickel and eventually grew to incorporate similar concerns regarding all scrap metal generated from this project as well as other DOE operations.

On February 14, 2000,[1] the Secretary of Energy issued a moratorium on the release of metal contaminated in volume with radioactive materials. The moratorium was to be "...in effect at least until the Nuclear Regulatory Commission (NRC) makes a decision regarding whether to proceed [with setting] a national standard for the release of solid materials." This action was followed on July 13, 2000[2] with a suspension on the release of scrap metal for the purpose of recycling that was managed in a radiological area as defined by 10 CFR 835, "Occupational Radiation Safety. The suspension was to remain in effect until December 31, 2000 while the Department revised its procedures to limit the release of personal property from its sites to items that were indistinguishable from background levels of radioactivity.

---

[1] Memorandum for Heads of All Departmental Elements, "Release of Materials for Re-use and Recycle," Bill Richardson, Secretary of Energy. February 14, 2000. See Appendix I

[2] Memorandum for Heads of All Departmental Elements, "Release of Surplus and Scrap Materials," Bill Richardson, Secretary of Energy. July 13, 2000. See Appendix I

By early January 2001, the procedural changes forecast by the July 13, 2000 memorandum had not been implemented nor fully developed due to their potential impact to departmental operations. On January 19, 2001, the Secretary stated in a memorandum to all department elements:[3]

> "The Department has, over the last several months, been developing procedures which, when implemented, would allow for the unrestricted releases for recycling of metals without detectable radioactive contamination. Internal and public comments on these proposed changes raised *significant and substantive* [emphasis added] issues. Consequently, additional deliberation is necessary, and the new requirements are not complete."

The significant and substantive issues included an estimated $3B impact on department budgets necessary to manage a standard that departed from the pre-approved authorized limits found in DOE Order 5400.5, "Radiation Protection of the Public and Environment." This was in addition to the primary environmental costs associated with development and management of additional land disposal facilities to accommodate the large amount of previously recyclable scrap that would now be designated as waste. Secondary impacts associated with replacement of these resources (e.g., mining, ore processing, primary metal production, greenhouse gas emissions, etc) were not included in this estimate.

The memorandum also extended the suspension beyond the original six month time frame noted in the July 13, 2000 memorandum and provided direction to implement four specific items of guidance to "help our sites improve their monitoring and release practices." The mandates are:

1. Clearly define areas and activities that could potentially contaminate property.
2. Clearly define release criteria, including measurement and survey protocols, for property released from areas or activities that have the potential to contaminate.
3. Ensure that released property meets DOE requirements.
4. Better inform and involve the public and improve DOE reporting on releases.

The memorandum directed that the guidance be incorporated into existing site release programs. Since 2002, the Department has issued guidance for the preparation of the Annual Site Environmental reports that recommended the inclusion of data on radiological clearance of property in the annual reports to address the recommendation to better inform the public regarding criteria and protocols and property releases. In May 2002, the Department issued guidance (distributed for use and comment) for the release and control of property potentially containing residual radioactive material. The guidance addressed the Secretary's four improvements.

---

[3] Memorandum for Heads of All Departmental Elements, "Managing the Release of Surplus and Scrap Materials," Bill Richardson, Secretary of Energy. January 19, 2001. See Appendix I.

However, since the imposition of both the moratorium and suspension policies in 2000, there has been little documented progress at resolving certain aspects of the issues underlying either of these policies. The NRC has ceased efforts to promulgate a standard for residual radioactive materials entrained in bulk materials and the no concerted attempt has been made to evaluate site radiological clearance programs for compliance with guidance contained in the Secretarial memorandum of January 19, 2000. To address these shortcomings NNSA, SC and HSS embarked on an effort to evaluate site clearance programs and to develop a methodology to identify, minimize and isolate metals with a reasonable potential to be contaminated in volume.

Lastly, The former Secretary determined that the Department should prepare an environmental impact statement (EIS) to, "allow for an open healthy discussion of the broadest range of concerns associated with the unrestricted release of materials from our sites." The Office of Environmental Management (EM) was assigned this task and was to coordinate with other Departmental elements. EM published a Notice of Intent (NOI) to prepare an EIS in the Federal Register on July 12, 2001. While an attempt was made by EM to prepare the EIS, the document was never completed and finalized.

Impacts and Current Status

Prior to the efforts documented in this report, there has been no concerted effort to articulate and address the technical and administrative challenges issued in the aforementioned Secretarial memoranda. As a result, inventories of radiologically clean, but policy encumbered materials have continued to accumulate at NNSA and DOE sites. Management of these inventories as waste has strained operations and research budgets at plants and national laboratories. For example:

1. At Lawrence Livermore National Laboratory (LLNL), clean, recyclable scrap metal was disposed as industrial waste in conflict with local ordinances promoting recycle. This metal was high grade stainless steel that currently sells for > $0.50 per pound.
2. The Los Alamos Neutron Science Center (LANSCE), over $700K was spent in 2003 to dispose of clean scrap metal due to space considerations. Over $400K of potential value through sale was also lost.
3. At the Y-12 National Security Complex, clean, but policy encumbered precious metal was disposed at a loss of over $2M of value.

Losses similar to these are expected to continue as inventories become large and costlier to manage than dispose. The prevailing management position at the sites is that headquarters direction is required to enable cost effective and beneficial disposition of this material. The management restrictions imposed by the suspension must be lifted as soon as possible to avoid the expenditure of funds to dispose of clean metals as well as the loss of revenue from its sale and loss of valuable national resources. The NNSA-SC-HSS team has developed a set of management and operating principles described in this report that will meet this challenge. If adopted and institutionalized, they will support

delegation of the authority to manage the radiological clearance process (including restart of clearance operations) to the responsible program secretarial officer (PSO).

In addition to the budgetary burden, the policy has also resulted in an extra layer of complexity to the clearance of materials and equipment process which introduces additional risk. Health physicists and technicians responsible for the clearance of property are typically trained to make property disposition determinations from a sound technical basis. The suspension on the release of scrap metal from a radiological area represents a significant departure from industry standards that lacks a technical basis. DOE Order 5400.5, Radiation Protection of the Public and the Environment, provides a property clearance process that was developed based on appropriate technical standards and relevant national and international recommendations. By adding a non-technical level of complexity to the clearance process, the risk of releasing material that should not be cleared is increased due to the confusion surrounding implementation of the policy. Lifting the suspension would reduce confusion related to property clearance and therefore be more protective of the public and the environment, as technicians and health physicists would still be responsible for meeting the requirements of DOE Order 5400.5.

With regard to accelerator facilities, sites require a headquarters approved procedure and process to identify and segregate equipment with a reasonable potential to be contaminated with radioactive material as a result of accelerator operations. The NNSA-SC-HSS Team established the accelerator materials working group to address these issues. This effort is not directed at lifting the February 14, 2000 moratorium on the release of metals contaminated in volume, rather it is concerned exclusively with; (1) establishing a technically defensible of certainty regarding the extent of metal activation in the accelerator field; (2) specification of non-destructive means of confirming this extent; and (3) defining criteria to support the release of such materials determined to be non-impacted from radiological control.

Methodology

A three phased approach was used to develop a path forward to resolving these policy challenges. First, each site clearing materials from radiological control for clearance into general commerce was evaluated for program proficiency as well as meeting the challenges to improve performance as directed by the former Secretary. Second, these evaluations were consolidated to identify best practices as well as gaps in performance. Third, an inter-site workshop to develop a consistent set of management and operating principles was held to establish approaches to achieving the directed performance improvements. Program Office and site acceptance of these principles will form the basis from which authority to resume radiological clearance will be requested from the Secretary of Energy.

To assess and document site management responses to both the moratorium and suspension, NNSA, HSS, and SC established a team of subject matter experts (SMEs) to conduct a series of assistance visits to NNSA and selected SC field operations. This team

was to determine the rigor of the following operational practices which align with the performance improvements directed by the former Secretary:

1. Collection and management of data necessary to support the radiological clearance process and limit the number and aerial extent of radiological operations (process knowledge);
2. Management and availability of radiological characterization data associated with items offered for release into general commerce (survey protocols, instrument control, documentation, audit trail);
3. Rigor and effectiveness of federal site office staff in providing oversight to the radiological clearance program to ensure its integrity (independent verification);
4. Comprehensiveness of the public outreach program to report releases as well as encourage public engagement in issues associated with radiological clearance of property (public information and involvement).

SME interactions with site personnel regarding these practices were guided by lines of inquiry incorporated in a review team charter that was shared with sites prior to each visit. The charter was standardized for use at all sites to ensure all relevant topics were covered as well as consistency of approach. Staffing of the review team was also fixed with the same individuals participating in each site visit. The review team charter and team roster are included in Appendices II and III respectively.

Based on lessons learned from site visits, the team began to develop self-assessment and technical assistance tools for the purpose of maintaining consistency, predictability, and sustainability for the overall effort.

On site, team activities were focused on field observations. To validate the integrity and proficiency of site radiological clearance management systems, the team engaged in the following practices at all sites:

- Site contractors were randomly challenged to produce comprehensive, auditable documentation supporting clearance of property items staged for public sale;
- Radiological control technician proficiency (e.g., technique, technical knowledge) were observed and challenged in the field;
- Calibration status of field instruments was challenged to determine the risk that an instrument that was out of calibration could be available for use;
- Site contractor personnel were randomly challenged to describe their technical knowledge of radiological control procedures/practices relative to their activities.

Each site visit was concluded with an out brief that indicated the team's immediate impression of site radiological clearance practices and procedures with regard to meeting the performance improvement expectations contained in the Secretarial memorandum of January 19, 2001. The team also offered clarifications to the moratorium and suspension

policies where sites were determined to have been too conservative in their approach to compliance. Proficiencies, observations and recommendations were documented in a letter report to each site after each site visit.

Results of Site Visits

Table 1 summarizes the current status at NNSA sites of the performance improvements directed by the January 19, 2001 Secretarial memorandum. With the exception of Los Alamos National Laboratory (LANL) in the area of independent verification, all sites have made progress in meeting these challenges to improve the performance of radiological clearance programs. Of the directed improvements, the requirement for independent verification of the integrity of site clearance programs was the most misunderstood. Most sites did not perceive that independent verification was a uniquely federal function related closely to contractor oversight and performance assurance. Sites also were not aware of the need to grade the approach to independent verification in line with the scope and type of the radiological clearance task(s) underway at their location. Additionally, many sites were performing independent verification activities, but had not identified them as such. In some cases, sites deemed to be wholly or partially compliant with the independent verification requirement had not formalized or documented their efforts.

Table 1: Results of Property Clearance Assistance Visits (NNSA Sites Only)
Current Status of Directed Improvements to Radiological Clearance Processes

Site	Process Knowledge Management	Radiological Characterization Data Management	Independent Verification	Public Outreach
Pantex	****	**1/2	*	***
Y-12	**	*	***	****
LLNL	**	**	*	***
SNL	***1/2	***1/2	*	***1/2
LANL	**	***1/2	-	*
NTS	***	**1/2	***	***1/2

Legend *= minimally; **= partially; *= mostly; ****= fully responsive**

Conversely, most sites were credited with having very good to excellent public reporting and involvement opportunities. Most sites have regularly scheduled public meetings that have open agendas to encourage public participation. These forums enable the public to engage in dialogue regarding radiological clearance as well as other site activities. The requirement to report releases of personal property through the Annual Site

Environmental Report (required by DOE Order 231.1-2) has provided a consistent template used across DOE/NNSA to communicate the type and amount of materials removed from the site for beneficial reuse in general commerce, although it was recommended that most sites consider providing more detail in that report specific to clearance of property.

Practices associated with the collection, management and preservation of process knowledge information and radiological survey data vary widely across NNSA facilities. Pantex was identified as having the most complete and reliable system of process knowledge management. During the site visit, the team requested and was provided comprehensive documentation of releases of personal property (including scrap) metal from the site dating back to 2000. From these records the team could identify and request radiological survey data that supported each release.

Sandia National Laboratories (SNL) has invested in a commercial off-the-shelf (COTS) radiological survey data management and archival system that can support similar data management objectives as well as *ad hoc* queries. While not fully developed at this time, the SNL system is extremely robust having the capability and flexibility to support paperless process knowledge and radiological survey data management. SNL is also credited with selecting a COTS solution that limits the need for routine maintenance and improvement of the software (these functions are economically provided through software license fees).

Other sites collect process knowledge and radiological survey data in free form in field notebooks which are then transcribed onto automated word processor forms at a computer workstation. The forms are the printed with the paper copy serving as the survey record. These paper records are then manually indexed and filed. These systems, while marginally functional to support the objective of after-the-fact validation of radiological clearance determinations and decisions, are labor intensive and subject to multiple opportunities for data transcription errors and loss of information. These sites indicated that the cost to fully automate the data management was prohibitive. However, this claim does not comport with the observation that the data is already digitized during its input to word processor forms which are then printed and managed as paper records. Further, Pantex advised the team that automating process knowledge management eliminated up to two full time equivalents necessary to index and manage paper files[4].

The team was encouraged to find that the Nevada Test Site (NTS) intends to pilot the use of digital data capture devices to automate the collection of radiological survey data in the field as it is acquired. If successful, use of these devices will promote consistency of data collection, enable automated error checks, limit transcription errors, and reduce technician fatigue – increasing the reliability and integrity of the survey and the survey record.

[4] Assuming a fully loaded rate of $130/hr and 2050 hours/work year, one full time equivalent is valued at $266,500 annually.

Inter-Site Workshop on Property Clearance

An inter-site workshop was held March 29- April 1, 2010 to present and discuss best practices identified during the site assistance visits and to develop a common, consistent approach to addressing the challenges to improve radiological clearance program performance as identified in the January 19, 2001 Secretarial memorandum. The workshop was attended by all NNSA and the two SC sites involved in this initiative. Observers from the Offices of Environmental Management and Nuclear Energy were also in attendance.

Workshop attendees were assigned to six individual working groups to produce consensus answers to the following questions as deliverables:

Working Group	Deliverable
1.	Describe a consistent management strategy to encourage minimization and reduction of radiological areas to the maximum extent practical.
2.	Define a system of data acquisition and management that supports after the fact validation, tracking, and accountability for radiological clearance decisions. Specify what constitutes a reasonable time to retrieve all relevant information to support a clearance decision. (Note: "system" is not intended to imply "automated")
3.	Define the specific performance objectives of an Independent Verification system considering the Secretarial mandate that it be separate from site operating contractor performance management systems and accountable to the federal site manager.
4.	Define what constitutes an adequate and responsive public involvement and outreach program related to site radiological clearance programs in consideration of the Secretarial mandate of January 19, 2001.
5.	Define a process whereby accelerator materials may be segregated into items reasonably expected to be activated by facility operations AND be subject to the DOE Order 5400.5 authorized limit process for unrestricted release. Items not captured by this segregation would be eligible for clearance from radiological control. Define analytical method(s) to monitor and validate the segregation process to ensure its effectiveness to comply with the requirements of DOE Order 5400.5.

6. Develop a draft policy that supports the use of the MARSAME[5] interagency framework for radiological characterization as the foundation of radiological clearance practices.

Working groups 1-4 were assigned deliverables directly associated with meeting the performance objectives as directed in the January 19, 2001 Secretarial memorandum. Working Group 5 was assigned to address issues relevant to clearing metals from accelerator facilities. Working Group 6 developed a consensus position on applying the MARSAME approach to radiological clearance processes at DOE/NNSA facilities which relates to the second Secretarial recommendation (performance objective from the January 19, 2001, memorandum) to clearly define measurement and survey protocols.

The descriptions and definitions developed by the Workgroups constitute a set of "Principles of Management and Operations," applicable to the clearance of property from radiological control. Program office institutionalization of these principles constitutes a commitment to implementing and maintaining the improvements to clearance program performance directed in the January 19, 2001 Secretarial memorandum. The Principles of Management and Operations are summarized as follows:

1. Program offices and sites commit to an active and continuous process of validating radiological postings and will continuously endeavor to minimize the number and aerial extent of areas requiring such postings. Deliberate care will be exercised to ensure non-contaminated materials are not introduced to posted areas unless necessary to support mission requirements.
2. Sufficient information should be gathered, managed and preserved as process knowledge to support validation of the clearance decision by a third, independent party. Process knowledge including radiological survey data, should be retrievable in less than one week for clearance events less than one year old, in about a week for events less than three years old and one month for events more than three years old.
3. Site office personnel are responsible for independent verification and oversight of the integrity of radiological clearance programs. Site offices should develop a risk based approach to establish an independent verification program commensurate with the scope and type of clearance activities underway at the site. Sites acknowledge the need to separate this oversight function from the site contractors engaged in property sales or other disposition functions.
4. Sites will use the Annual Site Environmental Report as the primary conduit to report the amount and type of personal property cleared. Sites will use a combination of public reading rooms, regular public meetings and other forums to permit the public to engage in a dialogue regarding radiological

[5] MARSAME is the Multi Agency Survey and Assessment manual for Materials and Equipment. The MARSAME approach has been approved for use by the Departments of Defense and Energy as well as the Nuclear Regulatory Commission and the Environmental Protection Agency.

clearance practices. Site public affairs offices will be the primary contact with members of the public to ensure accurate and consistent information is provided in response to inquiries.

5. For accelerator facilities, items determined to be indistinguishable from background radiation levels are not impacted by accelerator operations. Material meeting this criterion may be cleared from radiological controls and offered for any type of beneficial reuse. Clearance of materials from areas potentially impacted by operations will be based on the following objective criteria:

    a. Evaluation of the potential radioactivity of components is based on process knowledge. The evaluation may include identifying areas and/or activities that can potentially activate or contaminate materials. The evaluation can be used to set the needs, requirements and graded approach for the measurement protocols.
    b. Measurement protocols.
    c. Technical basis documents supporting the release protocols and measurement protocols.
    d. Administrative controls for release of materials with activity above background – these can include; a) recipient notification concepts, b) quality control and verification processes, and 3) documentation on release processes.

6. To the extent possible, sites will model their radiological clearance programs according to the processes defined in the MARSAME manual. Integration of the MARSAME approach into existing clearance programs promotes consistency between federal agencies as well as DOE/NNSA sites. MARSAME has been reviewed by the USEPA Science Advisory Board and has been subjected to extensive public comment through the Federal Register process. Use of it in support of radiological decisions will increase public confidence in the integrity of DOE/NNSA clearance programs.

The complete text of Working Group deliberations and deliverables is presented in Appendix IV.

Conclusions

The Property Clearance Initiative revealed that NNSA sites have implemented and institutionalized many of the improvements to radiological clearance programs directed by the January 19, 2001 Secretarial memorandum regarding management and release of surplus and scrap materials. Consideration to resume clearance of clean scrap metal from radiological areas was conditioned on site implementation of these improvements.

To ensure a clear and consistent path forward to certify that sites have met these performance improvement benchmarks, the NNSA-HSS-SC Team in cooperation with individual sites, developed a consistent set of management and operating principles to

guide site radiological clearance programs. Acknowledgement and adherence to these principles will ensure that the process improvements are institutionalized and maintained.

Recommendations

The NNSA-HSS-SC Team offers the following recommendations regarding management and clearance of personal property from radiological controls:

1. The Undersecretary for Nuclear Security should promulgate the Principles for Management and Operation of Radiological Clearance Programs identified in this report as guidance to field sites. Site acceptance of these principles should be required as a condition for restart of radiological clearance operations for all personal property.
2. A headquarters organization should be assigned the responsibility to:
    a. Provide an appropriate level of oversight and assistance to field elements to ensure continued conformance to the aforementioned principles;
    b. Offer guidance and support as requested;
    c. Coordinate other NNSA offices and other relevant headquarters organizations as necessary and appropriate;
    d. Monitor the Occurrence Reporting System (ORPS) for issues related to release of items from radiological control;
    e. Report on performance trends.
3. In consideration for implementing Recommendations 1 and 2, request the Secretary to delegate the Under Secretary authority to resume clearance of scrap metal from radiological areas for those Sites that demonstrate compliance with the Principles for management and operation of radiological clearance programs.

Appendix I

Secretarial Memoranda Regarding Radiological Clearance and Reuse of Personal Property

The Secretary of Energy
Washington, DC 20585

February 14, 2000

2000-002369

MEMORANDUM FOR HEADS OF ALL DEPARTMENTAL ELEMENTS

FROM: BILL RICHARDSON

SUBJECT: Release of Materials for Re-use and Recycle

I am hereby directing actions to improve the management of materials which might be released from Department facilities for re-use or recycling. These actions are intended to better ensure protection of public health and the environment, openness and public trust, and fiscal responsibility.

First, pursuant to my decision on January 12, 2000, the Department will continue its moratorium on the release of volumetrically contaminated metals. Volumetrically contaminated metals are those which have radioactive contaminants distributed throughout their mass. This moratorium will remain in effect at least until the Nuclear Regulatory Commission (NRC) makes a decision regarding whether to proceed with a rulemaking which would set national standards for the release of solid materials (see 64 FR 35090). If the NRC determines to proceed with its rulemaking process, the moratorium will continue throughout that process, and the Department will support the NRC's efforts. I will encourage the NRC to move expeditiously to establish national standards because such standards are in the best interest of the Department and the Nation.

Second, I have established a Re-use and Recycling Task Force, co-chaired by Brian Costner, my Senior Policy Advisor for Environment, Safety and Health (6-8567), and Steve Cary, Senior Technical Advisor for the Office of Environment, Safety and Health (6-0264), which will conduct a review of Department policies regarding the release of all materials for re-use and recycling. This task force will recommend to me this summer ways the Department can better meet the objectives I have outlined above. The task force will operate in an open manner so that concerned citizens and government and industry officials can follow its work and provide input directly to the task force.

Each affected Program Secretarial Officer (see attached list) and the General Counsel should designate one, permanent member to the Re-use and Recycling Task Force. The scope of the task force does not include nuclear materials being managed by the Office of Fissile Materials Disposition, radioisotopes sold for commercial or research purposes, or waste disposal.

Thank you in advance for actively supporting the work of this important task force.

Attachment

The Secretary of Energy
Washington, DC 20585
July 13, 2000

MEMORANDUM FOR HEADS OF DEPARTMENTAL ELEMENTS

FROM: BILL RICHARDSON

SUBJECT: Release of Surplus and Scrap Materials

The Department of Energy's (DOE) management of surplus and scrap materials has evolved over many years. Effective management of these materials has become more complicated over the past decade because the Department has begun generating them in larger quantities as it closes many facilities and expands its environmental management activities. Moreover, since much of this material was once used in nuclear operations, our management of it must continue to take into account safety and security issues, but we also want to address recently voiced public concerns that are not faced by most other Federal Agencies or by private industry.

For several months, we have been actively reviewing ways to improve our management of materials which might be released from departmental control. My goal has been to identify ways to better ensure protection of public health and the environment, openness and public trust, and fiscal responsibility.

I thank the Reuse and Recycling Task Force I established last winter for their contribution to the Department's review. While the work of the task force is now complete, many of its members will be involved over the coming months further developing and implementing changes to our policies and procedures.

On January 12, 2000, I placed a moratorium on the Department's release of volumetrically contaminated metals pending a decision by the Nuclear Regulatory Commission (NRC) whether to establish national standards. The NRC continues to review the issue, and the moratorium remains in effect.

Today, I am hereby directing further action in four areas: improvement of the Department's release criteria and monitoring practices; expansion of efforts to promote reuse and recycling within the complex of DOE facilities; improvement of the Department's management of information about material inventories and releases; and the accelerated recovery of sealed sources. Also, I am suspending the unrestricted release for recycling of scrap metals from radiation areas within DOE facilities. This suspension will remain in effect until improvements in our release criteria and information management have been developed and implemented as described below.

Our existing release criteria, described in DOE Order 5400.5, limit the potential for radiation exposure to the public to levels well below applicable requirements. Our experience using these criteria, however, demonstrates that even this very low potential exposure is not fully acceptable to the public. Our experience with existing criteria also shows that most scrap metal released is either not contaminated at all or has residual levels of surface contamination well below the current DOE standard.

Henceforth, the Department will not allow the release of scrap metals for recycling if contamination from DOE operations is detected using appropriate, commercially available monitoring equipment and approved procedures. To implement this decision, I am directing the Assistant Secretary for Environment, Safety and Health, with appropriate resource support, to revise DOE directives and associated guidance documents applicable to scrap metal releases through a public process, as described below, by December 31, 2000.

The Department will publish proposed changes to DOE directives and guidance for at least sixty days of public review and comment. The changes will describe conditions whereby the Department uses appropriate, commercially available technology and the most appropriate monitoring and decontamination procedures to ensure that no detectable contamination from DOE operations remains on any scrap metal released into commerce for recycling from any portion of our facilities. The revised DOE directive will establish a review cycle to develop future updates to guidance consistent with lessons learned, advances in monitoring or decontamination technology and procedures, and new information such as any future rulemaking activity by the NRC.

Changes will also be made to DOE's requirements and guidance to improve the collection, maintenance, and reporting of information associated with releases of surplus equipment, scrap metals, and other excess personal property. We need better records on inventories of these materials; contamination, security, and other concerns associated with them; and the basis for decisions authorizing their release. This information needs to be maintained in a way that makes it easily accessible to the public (consistent with classification and other security requirements) and readily available to meet the needs of project and program managers.

Once the revised directives and guidance are in place, the Department will require each DOE site to have local public participation before the site may resume the unrestricted release for recycling of scrap metals from radiation areas. These public participation requirements must address each of the above mentioned elements associated with release criteria and information management. In addition, the Department will require individual sites to certify, through the responsible Program Secretarial Officer (PSO), that they have met all requirements of the revised order before the release of scrap metal from radiation areas for recycling can resume. In addition, each affected PSO will implement an

independent verification program to ensure that site activities continue to comply with the new requirements.

While updated release criteria and record keeping procedures are being developed and implemented, the Department will undertake several activities to promote internal reuse and recycling. All DOE programs and sites should expand their efforts to reuse and recycle materials within the Department. I direct the Assistant Secretary for Energy Efficiency and Renewable Energy to lead completion of a feasibility study on the potential use of a dedicated mill to recycle steel for reuse within the DOE complex. The study is to be completed within ninety days, after which I will receive the study's recommendations and determine if the Department will pursue the project further. Also, I direct the Chief Financial Officer to develop a set of proposed actions that will institutionalize incentives for internal reuse and recycling when such activities are cost-effective and protective of workers, the public, and the environment. The Chief Financial Officer will forward these recommended actions to me within 120 days for approval.

Finally, I direct the Assistant Secretary for Environmental Management to accelerate the Department's program to recover radioactive sources. The goal should be to recover over the next four years the backlog of commercial sources for which the Department has authority.

The Secretary of Energy
Washington, DC 20585

January 19,200 1

MEMORANDUM FOR HEADS OF DEPARTMENT ELEMENTS

FROM: BILL RICHARDSON

SUBJECT: Managing the Release of Surplus and Scrap Materials

Over the last year, the Department has grappled with how to improve its management and release of surplus and scrap material. Our reviews have not identified any evidence that the public might be harmed by releases from our sites, but we have determined that there is a need to improve radiation monitoring, independent verification, and record keeping and reporting. We must also better engage the public in our decision making and help them better understand our release practices.

There is clearly expressed public concern and interest regarding the procedures and requirements under which materials leave our sites for recycling, reuse, or other disposition. I have taken steps to address these concerns while we improve our release policies and procedures. Last January, I placed a moratorium on the unrestricted release of volumetrically contaminated metals pending a decision by the Nuclear Regulatory Commissjon whether to establish national standards. In July, I suspended the unrestricted release for recycling of all metals from radiation areas within Department of Energy (DOE) facilities until improvements in release criteria and related information management have been implemented. Both these prohibitions remain in effect.

The Department has, over the last several months, been developing procedures which, when implemented, would allow unrestricted releases for recycling of metals without detectable radioactive contamination. Internal and public comments on these proposed changes raised significant and substantive issues. Consequently, additional deliberation is necessary, and the new requirements are not complete.

Moreover, in light of these comments, I have determined that the Department should prepare an environmental impact statement (EIS). This will allow an open, healthy discussion of the broadest range of concerns associated with the unrestricted release of materials from our sites. The Office of Environmental Management, in coordination with other Departmental elements, should prepare a Notice of Intent to begin this EIS, to be published within 60 days.

Finally, I am forwarding the guidance below to help our sites improve their monitoring and release practices. These steps are consistent with existing provisions of DOE Order 5400.5 and should be incorporated into your existing release programs.

1) Clearly define areas and activities that can potentially contaminate property: I want to emphasize the importance of evaluating activities and areas for potential radiological contaminationbefore property is released from them. DOE has both the authority and responsibility for regulating the radiological release of property under our radiological control. It is necessary that we establish and document clear process-knowledge-based procedures for those releases that have no potential to violate our radiological protection requirements. In addition, there should be opportunity for public participation in establishing and implementing these procedures.

2) Clearly define release criteria, including measurement and survey protocols, for property released from areas or activities that have potential to contaminate: Property that cannot be certified for release through process knowledge procedures must be reviewed using our authorized limit-based release procedures consistent with existing DOE Order 5400.5 requirements and associated guidance, as well as the prohibitions mentioned above. All such property must be appropriately surveyed, and its compliance with DOE-approve authorized limits confirmed.

Authorized limits you approve must be well documented. The documentation should address the rationale for selecting them (including as low as reasonably achievable, ALARA, considerations), the scope of their applicability, and measurement procedures and protocols for demonstrating compliance. Such documentation is necessary even if the surface activity guidelines from DOE Order 5400.5 or the Office of Environment, Safety and Health's (EH) November 17, 1995 guidance is being used. A complete understanding of the limits is needed to ensure that contractors understand the requirements and for DOE to fulfill its regulatory responsibility when evaluating contractor performance. It will also help in ensuring that our process to clear materials for release is open to public scrutiny. The approval process for authorized limits should be implemented consistent with the requirements of DOE Order 5400.5 and the EH guidance.

3) Ensuring that released property meets DOE requirements: As I have stated, DOE has both the authority and responsibility for regulating the radiological release of property under our radiological control. Line management, in particular the Field Offices, have the responsibility to ensure that contractors and DOE personnel comply with DOE requirements. As such, I encourage line management to internally review their property release and control systems to ensure they are compliant with DOE directives. It should be clear that DOE contractors or DOE elements are responsible for conducting final surveys and the preparation of documentation to demonstrate that property releases meet DOE requirements. In addition, DOE field offices, working with their lead program office should establish independent verification programs to further confirm that survey and evaluation processes are in place, being appropriately implemented and that property released from DOE radiological control meets authorized limits. The level and scope of the verification effort should be commensurate with the potential for contamination, as well as the complexity and hazard, and it should appropriately address real and personal property releases. If DOE personnel responsible for independent verification use contractors, the contractors must be independent of the operating contractor managing the property or responsible for the release survey or decontamination of the property.

4) Better inform and involve the public and improve DOE reporting on releases: All DOE sites are already responsible for having and implementing public involvement and communications programs. Field Office Managers should incorporate information on property control and release programs including information on authorized limits, certification and verification survey programs, and process knowledge decisions into site public involvement and communications programs. Site release policies and protocols shall be coordinated with the public, and public input considered in DOE's development and approval of site release programs. Responsible field offices must make the documentation on releases available to the public and those receiving the property.

In addition, field offices should report annually on their release programs. The Office of Management and Administration should work with EH and the program offices to develop a system that will allow headquarters to track releases by category. DOE Order 5400.5 and DOE M 43 1.1 already require annual site environmental reports to contain information on DOE releases of radioactive material and potential doses to the public. Therefore, I am directing Field Office Managers to ensure that they include information on the authorized limits being used at their facilities, and surveys and independent verification program results, in the site's annual environmental reports.

Appendix II

NNSA-HSS
Property Clearance Assistance Team Charter

Team Charter
Review of Radiation Control and Materials Release Procedures and Practices at the [insert site]

BACKGROUND

On July 13, 2000, the Secretary of Energy issued a memorandum directing that all DOE operational and field elements immediately suspend the release of metal from radiological areas for the distinct purpose of recycling. The suspension was to remain in effect until the Department reviewed all procedures and protocols for monitoring and release of materials from radiological areas and issued new guidance to enhance these processes to include rigorous procedures to document the rationale for the release of all such materials. Specifically, the memorandum indicated, *"the need to improve radiation monitoring, independent verification, and record keeping....and to better engage the public in our decision making and help them better understand our [DOE] release practices."* For the purposes of complying with the suspension, recycling was defined as sale of metal scrap, materials or equipment for re-melt and re-fabrication into new products available in general commerce for unrestricted (e.g., non-nuclear applications) use.

To assist Departmental elements to comply with this directive, the Office of Environmental Policy and Guidance, Air, Water, and Radiation Division (EH-412) issued the scenario based guidance entitled "Frequently Asked Questions on the Suspension on Release for Recycling of Metal from Radiological Areas." Sites were to apply this guidance to day to day decisions regarding dispositioning of metals managed in radiological areas. The guidance also provided contact information to support expert review and offer a source of advice for situations not specifically covered.

To date, efforts to comply with the requirements to improve the Department's release processes and procedures have been ineffective in lifting the suspension. The result has been a build up of inventories of scrap metal at DOE and NNSA sites that does not qualify for disposal as low level radioactive waste but cannot be dispositioned for recycle due to the Secretarial suspension. Managing this ever increasing inventory is a management challenge for these sites. The NNSA Office of Infrastructure and Environment (NA-50) has been charged with the task of developing a path toward resolution of this problem for the DOE complex of facilities. To accomplish this assignment, NA-50 is cooperating with the Office of Health, Safety and Security (HS) to evaluate site responses to the management challenges associated with the July 13, 2000 suspension subsequently reaffirmed in a January 19, 2001 Secretarial memorandum to improve performance of radiological clearance and safety programs.

Through these site evaluations, NA-50 will develop uniform program performance standards that embody the Secretarial mandates. Once developed, these standards will be offered to the Administrator as objective indicators of improvement in site radiological clearance and management programs that may be used to request relief from the suspension from the Secretary of Energy.

This review of [insert site] radiological clearance and occupational radiation safety programs is not the result of any incident of non-compliance or non-conformance to DOE/NNSA regulation, order, or policy. Rather it is proactively directed at identifying opportunities for program improvements specifically related to the aforementioned Secretarial mandates. As well, any best practices identified at [SITE NAME] may be used to support creation of complex wide performance standards.

Any observations and recommendations associated with this review will be documented and presented to [insert site] Site Office management for follow-up as appropriate.

SCOPE OF REVIEW

This review will focus on four areas of interest:

1. [site name] processes for control and clearance of materials and equipment from radiological areas;
2. The status of evaluation and enhancements to management of property control systems, processes and record keeping mandated by the Secretary of Energy's Memoranda of July 13, 2000 and January 19, 2001 suspending the release of metals from recycle from radiological areas;
3. Implementation of the Secretarial suspension on the release of metals for recycle from radiological areas;
4. Procedures and practices associated with managing compliance with the requirements of 10 CFR 835, Occupational Radiation Protection.[6]

TEAM MEMBERSHIP

The review team will include experts on the techniques and technology associated with radiation surveys, independent verification of survey results, establishment and operation of radiation restricted areas as defined by 10 CFR 835 Occupational Radiation Protection, and the current Secretarial policies associated with disposition of materials and equipment from DOE facilities.

---

[6] Note: The suspension specifically restricts the release of scrap metal for recycling from radiological areas as defined by 10 CFR 835. Processes and procedures associated with delineation and management of areas subject to 10 CFR 835 regulation are therefore part of this review.

The list team members are as follows:

Mr. Richard W. Meehan	Office of Nuclear Materials Integration Operations, NA-58 (Team Lead)
Ms. Amanda Anderson	Office of Environmental Policy and Assistance, HS-22 (Deputy Team Lead)
Mr. Peter O'Connell	Office of Worker Safety and Health Policy, HS-11
Maj. David Pugh, USAF	Office of Defense Programs, Safety Management Systems Division, NA-171.2

The Review Team Lead has full authority and responsibility for all aspects of the review, including, but not limited to, team composition, purpose, roles and responsibilities, expected outcomes, and issue resolution. The Deputy Team Lead will coordinate the completeness of technical and background information for review by team members, as well as the appropriateness, adequacy and timeliness of information requests. Team leadership will share the responsibility for timely report completion.

Site Liaison: [site office representative]

Expectations of the Review Team Lead include effective control of the team, process, schedule, and content. Expectations for [insert site] Site Office support include coordinating presentation of technical and background documentation, briefings to the review team Members, and logistical support (e.g., site access) of the Review Team site visit.

PERIOD of PERFORMANCE

The Review will be conducted at an accelerated pace to support delivery of a draft report by November 6, 2009.

LINE of INQUIRY

Lines of inquiry are intended to focus effort and achieve the scope of the review.

Radiological Areas

How are/were radiological areas established?

How are areas designated for posting?

How are areas downposted?

How are materials managed in areas that are candidate for downposting?

What process related and empirically derived information was used to support establishment of the areas?

What radiation survey information is available supporting operation and maintenance of these areas?

What procedures are available that specify how work is to be conducted in these areas?

How is radioactive contamination controlled and monitored within these areas before and after downgrading?

Material Control and Clearance

Does [site name] have separate processes for clearing material having no potential for residual radioactivity versus property that contains or potentially contains residual radioactive material?

Describe how process knowledge is used to control or clear property for reuse or recycle.

Are process knowledge determinations verified by survey? If so, what is the frequency is applied to the initial survey (e.g. percent surveyed)? What is the MDA (minimal detectable activity) of the instruments used? What processes are employed to verify process knowledge?

How is the clearance process documented and approved? What criteria are used for the material clearance? Are there different processes and criteria for designated use (e.g., restricted clearance)?

What procedures are used to guide the conduct of surveys for radioactive contamination on items that are candidate for unrestricted clearance?

How are survey instruments selected? Are calibration records for survey instruments available?

How are surveys documented? Is documentation for surveys archived and available for subsequent review if the need arises?

How are areas that are inaccessible to radiation survey instrumentation handled? Is statistical sampling used to guide surveys of materials and equipment? If so, is the approach proceduralized and reproducible? What confidence level is required? How was it derived?

Is independent verification practiced? How is it defined? Is there a real or perceived conflict of interest between the independent verifier and the line organization with an interest in disposition of the material in question?

Implementation of the terms of the Suspension on the Release of Metals from Radiological Areas

How has [site name] assured that scrap metal generated and managed in radiological areas is not released into general commerce?

What site directives were issued to the contractor?

How does and what oversight does the Site Office provide to ensure good faith implementation of the suspension by the operating contractor?

Since the issuance of the July 13, 2000 and the January 19, 2001 Secretarial memoranda, how has [site name] evaluated and/or improved:

processes for defining areas and activities that can contaminate property;

procedures for defining clearance criteria and measurement and survey protocols;

procedures for ensuring DOE requirements including approved criteria and procedures are met, implemented and independently verified;

procedures to inform and involve the public and make information on releases and associated protocols available?

Radiological clearance criteria monitoring practices at the site?

Management of survey records and other information associated with the clearance of material from radiological areas on the site?

Public involvement in the material clearance efforts?

- Was public input sought and considered? How?
- Was the recipient of the material provided relevant documentation regarding the origin and character of the material cleared?
- Was documentation made available to the public regarding the clearance of the material?

Appendix III

NNSA-HSS

Property Clearance Assistance Team Roster

Property Clearance Team
Member Roster

Name	Office Affiliation
Mr. Richard W. Meehan	Office of Nuclear Materials Integration Operations, NA-58 (Team Lead)
Ms. Amanda Anderson	Office of Environmental Policy and Assistance, HS-22 (Deputy Team Lead)
Mr. Peter O'Connell	Office of Worker Safety and Health Policy, HS-11
Maj. David Pugh, USAF	Office of Defense Programs, Safety Management Systems Division, NA-171.2

Appendix IV

NNSA-HSS Property Clearance Assistance Team

Inter-Site Workshop

Workgroup Consensus Documents

RADIOLOGICAL CLEARANCE OF PROPERTY WORKSHOP

Workgroup I: Management and Minimization of Radiological Areas

Purpose: The charge given to Workgroup I was to:

> *Describe a consistent management strategy to encourage minimization and reduction of radiological areas to the maximum extent practical.*

Background

The Secretarial memorandum issued on January 19, 2001 entitled, "Managing the Release of Surplus and Scrap Materials," issued the following challenge for management of radiological operations at DOE sites:

> "Clearly define areas and activities that can potentially contaminate property."

This challenge has been interpreted broadly to include the best management practice of limiting the number and extent of such areas to lower the potential for uncontaminated property to become contaminated with radiological materials. Further, restricting these areas to those that are identified through empirical methods to be subject to 10 CFR 835 (Occupational Radiation Protection) controls enhances worker safety by minimizing the potential for exposure to potentially harmful levels of radioactive materials.

Discussion

The Working Group deliberated on the radiological posting practices used at various sites, including those used at accelerator facilities where exposure to "prompt" radiation and radiologically activated metals are the primary concerns. The goal of these discussions was to settle on a common set of principles to guide posting practices of radiological areas at all sites as well as encourage de-posting of spaces that to not meet the requirements of 10 CFR 835.

Deliverable

The Working Group defined a consistent set of principles to guide the 10 CFR 835 posting practices associated with management and control of radiological operations:

1. Sites should have an active and continuous program of validating radiological postings. Establishment and posting of such areas to meet 10 CFR 835 requirements should be consistent with actual conditions and radiological hazards and not simply for convenience. It was recognized that DOE/NNSA have many aging facilities where process knowledge regarding past

operations may be insufficient for informed decision making regarding 10 CFR 835 status. The lack of this information and may require precautionary posting while radiological surveys and other necessary characterization data is obtained and assessed.

2. The posting/downposting processes employed by sites to comply with 10 CFR 835 requirements is subject to DOE oversight. The site independent verification program (Workgroup III) may be an appropriate form of oversight for down posting of areas intended for clearance for DOE radiological control.
3. For accelerator facilities where there is a potential for activation (e.g., induced radioactivity), a zoning concept should be employed to segregate equipment areas. Areas with a significant potential for activation (e.g., targets, beam dumps, beam loss areas, etc.) would be identified for further characterization prior to release from radiological control. Effective methods of characterization (per Workgroup V) should be used to employ the zoning concept.
4. Care should be taken to apply proper order to operations where non contaminated scrap may be generated as a function of facility maintenance and/or decontamination and decommissioning (D&D). To the extent possible the operational area(s) should be surveyed to ensure the physical conditions of the area are consistent with the posting requirements for radiological areas as defined by 10 CFR 835. If not, the area should be de-posted prior to initiation of any maintenance or demolition project. Materials removed from these areas that comply with authorized limits as defined by DOE Order 5400.5 may be cleared from radiological control and recycled.

RADIOLOGICAL CLEARANCE OF PROPERTY WORKSHOP

Workgroup II: Documentation, Management and Tracking of Process Knowledge

Purpose: The charge given to Workgroup II was to:

> *Define a system of data acquisition and management that supports after the fact validation, tracking, and accountability for radiological clearance decisions. Specify what constitutes a reasonable time to retrieve all relevant information to support a clearance decision. (Note: "system" is not intended to imply "automated")*

Background

Knowledge of the use history of an item(s) is an important factor in determining the potential of an item to have been contaminated with radioactive materials. Further, this information is particularly useful in selecting the appropriate radiation survey instrumentation and characterization protocols (e.g., lab analyses) to support a decision on clearance of the item(s) from radiological control. As such, a complete record of process knowledge collected to support clearance should be memorialized to account for the integrity of the site clearance process and to provide an audit trail for release of materials and equipment should the need arise.

Discussion

The January 19, 2001 Secretarial Memorandum entitled, "Managing the Release of Surplus and Scrap Materials," challenged DOE/NNSA sites to enhance the acquisition, content, and management of process knowledge to support radiological clearance processes:

> "It is necessary that we establish and document clear process knowledge based procedures for those releases that have no potential to violate our radiological protection requirements."

During its deliberations, the workgroup determined that the following criteria should be defined and applied to all DOE/NNSA operations to ensure adequate and consistent process knowledge is collected and managed to support clearance decisions, as well as management and public inquiries regarding the integrity of site clearance programs:

A consistent definition of process knowledge accepted across the department is needed;

1. Expectations regarding the retrievability of process knowledge records must be articulated and quantified;
2. A retention schedule for process knowledge must be specified that is consistent with DOE directives and federal records retention requirements.

The workgroup recommended that decisions regarding automation of process knowledge be left to the field elements to determine as long as the records management system employed supports the performance objectives established.

Deliverable

The workgroup concluded the following definition of Criteria 1 represents a competent response to the challenge offered by the former Secretary of Energy in the January 19, 2001 memorandum:

> *Process knowledge is the documented collection of anecdotal, historical, and/or analytical information that supports an informed decision regarding the clearance of an item(s) from radiological control. Process knowledge documentation shall satisfy all relevant and appropriate regulatory and/or departmental policy requirements such that an independent verifier could reach the same clearance determination regarding the disposition of the item(s).*

The workgroup determined that a process knowledge package fully responsive to the Secretarial mandate must minimally include:

1. Radiological survey and chemical analysis data.
2. Type of instrumentation used to perform required surveys.
3. Calibration and source check references to verify the validity of instrument derived data.
4. Identity of radiation control technician responsible for the surveys as well as his/her team lead or supervisor.
5. Description of the use and/or storage history of the item(s) offered for radiological clearance as well as the organizational position and identity of the individual offering this information.

Concerns were registered regarding the comprehensiveness of process knowledge documentation referenced in items 1-5 above. It should be understood that these are operating principles rather prescriptive direction. However, during the work group deliberations, it was determined that the site radiation control organization may not be the most appropriate repository for process knowledge information used to support clearance of an item(s) from the site. In several cases, the working group found that the property management or waste management organization kept comprehensive process knowledge records that referenced evaluations of all potential hazards – including radiological contamination. Efforts to institutionalize this process knowledge definition should determine if organizations other than radiation control are better situated to manage information used to support clearance decisions. A robust and complete data package is vital to support the integrity of site radiological clearance processes.

While key to the radiological clearance decision making, process knowledge information is vitally important in the event of management or public inquiries regarding the suitability of an item(s) for release from DOE/NNSA sites. Such information is particularly important to account for past decisions to clear items from radiological control. As such, the workgroup recommended the following minimum performance standards be applied to address the issue of retrievability established in Criteria 2:

- *< one week for clearance events less than one year old;*
- *~ one week for clearance events more than one year old but less than three years old.*
- *< 30 days for clearance events more than three years old.*

While it was acknowledged that most sites can retrieve process knowledge records within one day of a request, the workgroup believes that these time frames are achievable across all DOE/NNSA sites using records management practices and technologies currently in place (e.g., automated or manual). In general, the workgroup felt that records for events up to three years old should be universally available at site locations. The longer time frame for events more than three years old accounts for the time necessary for retrieval of records from off-site Federal Records Centers established by the National Archives.

With regard retention schedules, the workgroup determined that the criteria contained in DOE G 1324.5B "Implementation Guide for use with 36 CFR Chapter XII -Subchapter B Records Management," should be considered as the minimum standard with respect to retention of process knowledge records. DOE G 1324.5B is already incorporated into DOE/NNSA management and operation contracts as a standard of contract performance therefore compliance with the requirements set forth in this guide should not impart any additional requirements beyond those already established at DOE/NNSA sites.

RADIOLOGICAL CLEARANCE OF PROPERTY WORKSHOP

Workgroup III: Independent Verification, Training, and Instrument Control

Purpose: The charge given to Workgroup III was to:

> *Define the specific performance objectives of an Independent Verification system considering the Secretarial mandate that it be separate from site operating contractor performance management systems and accountable to the federal site manager.*

Background

The workgroup carefully considered DOE directive requirements, the direction from the January 19, 2001, Secretarial memorandum regarding the need for DOE independent verification that contractors are implementing effective clearance programs and the practical implementation of the DOE oversight process. The Secretarial memorandum explained the expectation:

> "...DOE has both the authority and responsibility for regulating the radiological release of property under our radiological control. Line management, in particular the Field Offices, has the responsibility to ensure that contractors and DOE personnel comply with DOE requirements. ...DOE contractors or DOE elements [directly implementing property control and clearance programs] are responsible for conducting final surveys and the preparation of documentation to demonstrate that property releases meet DOE requirements. In addition, DOE field offices, working with their lead program office should establish independent verification programs to further confirm that survey and evaluation processes are in place, being appropriately implemented and that property released from DOE radiological control meets authorized limits. The level and scope of the verification effort should be commensurate with the potential for contamination, as well as the complexity and hazard, and it should appropriately address real and personal property releases. If DOE personnel responsible for independent verification use contractors, the contractors must be independent of the operating contractor managing the property or responsible for the release survey or decontamination of the property."

Based on the Secretarial direction and requirements in DOE directives (e.g., DOE 5400.5 and DOE O 226.1A), the workgroup observed that the independent verification process for clearance is an element of the overall DOE oversight program that fulfills DOE's regulatory responsibilities under the Atomic Energy Act. It is to be tailored to the needs based on the complexity and hazards of the releases being overseen and that DOE site personnel have primary responsibility but their expertise may be supplemented by DOE or contractor staff from other organizations as necessary. The consensus of the workgroup is that independent verification is:

A system of federal oversight to monitor and *ensure the integrity and effectiveness* of the site radiological clearance program. "The independent verification function is *organizationally and contractually separated from the contractor organization directly responsible for implementing the property control/clearance."*

Discussion

To develop a consistent, implementable set of performance objectives and expectations for independent verification of property control and clearance provided in the Deliverables section, the workgroup had several discussions on various issues and elements associated with the independent verification requirement. These discussions assisted the group to settle on a common understanding of the intent of the Secretarial memorandum that supported consensus on the requirements of a responsive and effective independent verification process.

It was agreed that the independent verification process was the responsibility of the DOE site office. In employing a graded approach the DOE site office must define the scope and rigor of the process (noting that there may be differences for certain streams of materials or specific property) which would be dependent on:

- Complexity/hazard of the activity
- Confidence/reliability of Contractor Assurance Program (CAS)
- End use of property/final disposition of the property.

The graded approach will drive the depth and breadth of the independent verification assessment of the site property control/clearance process. Examples of acceptable assessment techniques discussed, generally ranked from the lowest to highest scope and rigor, include:

- Paper/document review with general operational awareness
- Shadow Assessment of Contractor Assessment
- Periodic independent field observation and review
- Full Assessment/audit process
- Independent sampling/monitor/split samples (it was noted that except for highlycomplex, or controversial personal property, this level of rigor would only be necessary for clearance of real property.)

Where deemed appropriate by DOE site independent verification staff, it is acceptable to supplement the site independent verification system with "third party" support noting that the third party's role is to advise the DOE site verification staff who are ultimately responsible for verification determinations (i.e., the authority cannot be delegated). Third party support may be used for any independent verification activities but is probably most useful for the more detailed processes) although work group

members did note use of other site or program staff in some document reviews). Acceptable examples of third party support:

- Peer reviews such as those employed by Science facilities which use staff from other laboratories or sites and external experts (e.g., from universities) to support independent reviews of programs
- DOELAP (DOE Laboratory Accreditation Program) - type approaches
- Independent Verification Contractor (contractor must be independent of the contractor responsible for managing and implementing specific property control and clearance).
- Support from other DOE sites or program offices. Examples included use of DOE staff from headquarters program offices or program support offices, support from the Office of Health, Safety and Security or their contractors.

The workgroup discussed what was intended by a Documented DOE Independent Verification Process. It was recognized that this could be achieved by a number of mechanisms and the consensus was that it should be left to the DOE site management to determine the best means for their application. The key factor is that the process be institutionalized and not depend solely on the existing staff. Examples of acceptable means by which to document and institutionalize and independent verification process was to address it in:

- The Site FRAM (Functions, Responsibilities and Authorities Manual)
- Site Oversight program documentation
- The site ISMS/EMS (integrated safety management system/environmental management system) documentation, and/or
- DOE staff Position Descriptions and performance standards.

The key point is that the process should not depend on specific personnel but rather site office functions and documented general staff responsibilities.

The workgroup also discussed instrument selection, calibration, control and use. The general consensus was that these are the responsibility of the contractor implementing the clearance program. The independent verification process need only review the contractor program to ensure adequate procedures are in place and implemented. Although presentations during the workshop identified several automated practices and systems that are desirable and should be employed as funds and time permit to improve performance, these type of systems are not necessary to ensure effective and adequate clearance programs. As a result, the workgroup makes no recommendation regarding standardizing the use of such systems, although it is recognized that the use of such systems can improve process knowledge documentation (Workgroup II) and may influence the site offices determinations regarding the rigor, scope and frequency of independent verification activities.

Deliverable

Based on the considerations and understanding discussed in the Background section as well as during work group deliberations, the workgroup developed and agreed to the following deliverable which describes the expectations and objectives for a process to provide independent verification of clearance programs:

The DOE Site Manager is responsible and accountable for establishing and maintaining a process to independently verify that contractors develop and implement Radiological Clearance Programs that comply with DOE requirements and meet DOE expectations. DOE independent verification activities should be integrated within the DOE Site Office oversight program.

The DOE Independent Verification process must review and assess the adequacy and effectiveness of the Contractor's radiological clearance program to ensure it appropriately addresses at a minimum:

1. *Collection, use and management of process knowledge*
2. *Release criteria/authorized limits*
3. *Approval authority for clearance of property from radiological control*
4. *Survey and monitoring effectiveness*
5. *Training and qualifications*
6. *Instrumentation selection, calibration, use and control*
7. *Record-keeping/retrievability/reporting*
8. *Quality assurance*

The documented DOE Independent Verification process must:

- *Clearly define DOE staff responsibilities and authorities of Independent Verification activities*
- *Define scope, rigor and mechanism to be employed based on risk and complexities.*
- *Define periodicity of Independent Verification review based on risk.*
- *Ensure DOE oversight staff maintain operational awareness of site property control/clearance activities*
- *Provide for appropriately qualified staff to implement independent verification and necessary training to maintain Radiation Protection expertise. DOE site independent verification staff expertise may be supplemented by DOE staff from other programs or sites or independent contractors as deemed necessary.*

RADIOLOGICAL CLEARANCE OF PROPERTY WORKSHOP

Working Group – IV: Public Reporting and Outreach

Purpose: The Charge given to Workgroup IV was:

> *Define what constitutes an adequate and responsive public involvement and outreach program related to site radiological clearance programs in consideration of the Secretarial mandate of January 19, 2001.*

Background

The challenge contained in the Secretarial memorandum was to, "... incorporate information on property control and release programs including information on authorized limits, certification and verification survey programs and process knowledge decisions into site public involvement and communications programs."

Deliberations of Workgroup IV revealed that all sites represented at the workshop already had institutionalized public information and outreach programs in place. However, the comprehensiveness of these programs varied from site to site. Workgroup IV determined that consistency of program content across sites as well as improvements to headquarters information systems focused on environmental reporting would be responsive to the challenges articulated in the aforementioned Secretarial mandate to improve public outreach and interaction with regard to radiological clearance programs.

Deliverable

The Working Group determined that the most effective means of ensuring adequate and responsive public outreach and communication would be to apply the following general set of principles to site public participation programs:

1. Annual reporting on site radiological clearance processes and property releases will be through the Annual Site Environmental Reports (ASERs).

    a. ASER information will be publicly available through a site specific website or page with the latest information that describes the materials and equipment clearance program.

    b. The section of the ASER used to report on property releases should be standardized to support consistency of site data reporting. The Workgroup recommends all sites report scrap metal release for recycling in the pollution prevention (P2) recycling section, referencing compliance with Executive Order (E.O.) 13514. A section of the report will describe material release programs, including information on authorized limits , certification and independent verification survey programs, and process knowledge decisions, per the Secretarial mandate.

c. The ASER will have a specific section that documents the processes and procedures used at the site to control and release radiological property and release scrap metals into the recycle/re-use program.

d. The annual ASER workshop will be used as a mechanism to introduce this standardization as part of continual improvement.

2. To accomplish the goal of Department wide transparency of radiological clearance and property release programs, the Workgroup recommends that the HSS P2 reporting website be updated to collect scrap metal recycle/reuse metrics. The information on this website is available to the public. This rollup will also comply with the annual reporting requirements associated with DOE Order 450.1A, Environmental Protection Program and Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance.

3. Sites will maintain detailed additional data on scrap metal release quantities to include scrap metal from radiological areas to support public outreach purposes.

4. Sites will refer to Public Affairs Offices are the primary point of contact for public questions related to property release.

5. Sites will conduct a public information forum at a minimum of once a year. This requirement can be satisfied through the conduct of any site specific forum for any site program(s), however the forum must be open to questions regarding site radiological clearance programs/actions. The schedule for these forums should be advertised via local media.

Other proactive and interactive approaches are encouraged, to include use of individual site web pages to solicit real time feedback.

Workgroup V: Management of Accelerator Materials

Purpose

The charge given to Workgroup was to:

- *Develop... "Technical Position that will support the release of equipment and material from accelerator facilities and operations where there is potential for induced radioactivity or activated material."*
- *"This effort shall include all available facility, equipment, material, survey and detection information needed to derive criteria that can be used to determine the areas of and extent of activation."*
- *"Criteria being developed should be reasonable and detection activities should be based on current techniques used within the Department and private industry."*

Background

This workgroup was established in November 2009 as a joint effort between SC and NNSA to pull together a group of accelerator experts that could identify and work issues related to accelerator operations and the potential for induced activity in various materials. The workgroup conducted several conference calls that allowed collaboration of the group while working through technical issues dealing with volumetric activation of materials or induced radioactivity caused by accelerator operations. The working group membership included groups from accelerator laboratories who have field experience in measurements, simulations, accelerator and environmental radiation protection. The scoping document for the working group required careful consideration of technical data, DOE directive requirements and Secretarial mandates.

Discussion

The workgroup reviewed various release protocols and developed the following deliverable which describes expectations and objectives for a process to provide release criteria and a technical basis for clearance of materials from accelerators. These criteria are needed to provide DOE sites with a defined regulatory framework that supports ongoing operations and allows resumption of clearance operations for recycling and reuse of materials from accelerators.

The Management of Accelerator Materials workgroup was asked to address the following questions.

A. At what energies/particle species is activation to occur?

Generation of induced radioactivity in accelerators depends on the particle species being accelerated and the material being irradiated.

1) Electron accelerators and Radiation Generating Devices (including klystrons and radio-frequency (RF) devices) operating at less than 2 MeV do not have activation potential on any type of material/s.
2) Synchrotron radiation beam lines and Free Electron Laser (FEL) photon beam lines (operated at less than 2 MeV) do not have activation potential on any type of material/s.
3) Induced activity of metals and most other elements in electron accelerators starts at 10 MeV.
4) In hadron (proton/heavy ion) accelerators activation is possible even at low kinetic energy of accelerated particles, no lower threshold is defined.

B. Can accelerators incapable of producing these energies/particles identified above be eliminated from consideration for clearance issues associated with activation? If yes, how can/should it be monitored?

The energies of accelerated particle beams are established during the design of accelerators and can be measured with diagnostic devices. Site offices can ask contractors to declare the energy and the type of the particle being accelerated in their Technical Basis Documents (TBDs). Monitoring should be performed through defined measurement and evaluation process and verified using the independent verification process (Work group III).

C. What is the "zone of influence" inside of which activation is likely to occur? Can this zone be reliably identified?

Accelerator beam losses, and consequent material activation, take place only in or around limited portions of the accelerator facility. The majority of the beam loss occurs on a limited number of components designed to intercept the whole beam (targets, beam dumps) or a fraction of the beam (collimators, septa). Locations and areas of beam loss points are well known through process knowledge including but not limited to; machine studies, surveys, analytical and Monte Carlo simulations etc... Other losses may occur accidentally at a few locations, due to mis-steering events or other analyzed events. Most of the accelerator magnets, support structures and sections of vacuum chambers do not become radioactive, especially at electron accelerators. For example in the dismantling of the Large Electron Positron (LEP) collider at CERN less than 3% of materials in the tunnel was found to be radioactive or have induced activity (defined as measured above background). Accelerator facilities can reliably identify the areas where beam losses can occur and the Workgroup has defined this as the *Area of Interest (AOI)*. All materials that can be considered for release from an AOI, should be

considered as radioactive unless proven to be non-radioactive through a combination of Process Knowledge and measurement.

The facility TBD should classify accelerator zones as: those that might contain induced activity and /or radioactive materials and those where activation cannot occur based on Process Knowledge (including machine operation, beam intensity, accelerated particle energy, intensity and type) and previous survey or measurements. This distinction is made based on the knowledge of installation operation and on calculations or simulations and is validated by detailed measurements. These zones could be integrated into a MARSAME classification system as described by Workgroup VI.

Materials outside the AOIs are not suspected to be radioactive or have induced activity; however, representative measurements (inside and outside an AOI) should be performed to confirm predictions. This would allow for a graded approach in performing surveys of potentially induced or activated materials.

Deliverables

The workgroup concluded the following process and clearance criteria represent a prudent approach to identify materials that have the potential to be radioactive or contain induced activity. In addition, the clearance criteria proposed is consistent with other consensus standards and is protective of public health and the environment. Both process and criteria is responsive to the Secretarial Mandates and addresses the scope and challenge given to the workgroup.

> *Define a process whereby accelerator materials may be segregated into items reasonably expected to be activated by facility operation AND be subject to DOE Order 5400.5 authorized limit process for unrestricted clearance. Items not captured by this segregation would be eligible for clearance from radiological control.*

The process to segregate suspect accelerator materials is based on:

1) Clearance criteria listed below where the materials can have unrestricted or restricted clearance.
2) Evaluation of the potential radioactivity of components is based on process knowledge. The evaluation may include identifying areas and/or activities that can potentially activate or contaminate materials. The evaluation can be used to set the needs, requirements and graded approach for the measurement protocols.
3) Measurement protocols.
4) TBDs supporting the clearance protocols and measurement protocols.
5) Administrative controls for clearance of materials with activity above background – these can include; a) recipient notification concepts, b) quality

control and verification processes, and 3) documentation on clearance processes.

Clearance Protocol

The clearance protocol for materials from areas with potential induced or volumetric radioactivity is based on a 3-tiered clearance criteria regulatory framework that allows for clearance of materials that are not impacted by accelerator operations as well as restricted clearance of radioactive materials with different levels of induced radioactivity. Consistent with recent International Atomic Energy Agency (IAEA), European Union (EU), National Council on Radiation Protection (NCRP) and American National Standards Institute (ANSI) standards, a Clearance Level based on an annual dose criterion of 1 mrem/yr is recommended for the unrestricted clearance. Furthermore, the Clearance Levels (in units of specific radioactivity) for radioisotopes in solid materials given in ANSI N13.12-1999 are recommended to be used as one of the clearance criteria.

The working group recommends the following **Clearance Criteria**:

1) **Indistinguishable from Background (IFB):** Measurements that are IFB are at the level below which materials are categorized as non-radioactive for the purposes of clearance from radiological controls using standard techniques and instruments, therefore, are not subject to regulatory control and can have unrestricted clearance.
2) **Greater that IFB but less that ANSI N13.12:** Measurements that are above background but not more than the ANSI N13.12 Clearance Level should be considered as DOE pre-approved Authorized Limits for materials that may be volumetrically activated in accelerators. This allows for a consistent technical basis to document compliance with the consensus standard and allows more effective control of clearance protocols.
3) **Greater than ANSI N13.12:** Measurements that are above the ANSI N13.12 Clearance Level are materials that may be cleared through the current DOE Order 5400.5 Derived Authorized Limit process. This is consistent with requirements in the DOE Order 5400.5 and DOE Order 458.1 draft for volumetric and/ or induced radioactivity.

For potential volumetric or induced radioactivity in materials from accelerators, process knowledge, current measurement techniques show that: 1) the maximum radioactivity occurs at one of the surfaces, and 2) there are proxy radioisotopes (which emit high-energy and high-intensity gamma rays) which can be measured in place of the hard-to-measure radioisotopes. The measurement protocols, surface and proxy isotopes will allow the DOE to utilize commercially available field instruments to detect proxy isotopes with sufficient sensitivities (operated in an ambient environment with acceptable background) to adequate identify induced activity. A TBD that includes

detection limits and measurement protocols will be developed based on the consensus reached by the joint workgroup, site specific process knowledge and operating parameters for each accelerator facility. The measurement protocols must satisfy the following requirements.

The measurement sensitivity requirements for the measurement protocols are:

1) The measurement sensitivity for the volumetric/induced radioactivity measurement protocol should be no more than the ANSI N13.12 Screening Levels and

2) The measurement sensitivity of the surface radioactivity measurement protocol should meet the DOE 5400.5 authorized limits for surface contamination.

Workgroup VI: Multi Agency Radiological Survey and Assessment of Materials and Equipment (MARSAME)

Purpose: The charge given to Workgroup VI was to:

> *Develop a draft policy that supports the use of the MARSAME interagency framework for radiological characterization as the foundation of radiological clearance practices.*

Background

The MARSAME manual describes a multi-agency consensus approach to the radiological clearance of materials and equipment. It should be used as a tool to provide consistency amongst DOE/NNSA property clearance programs.

The protocol described in the MARSAME manual was reviewed by the EPA Science Advisory Board (SAB) and made available for an extensive public comment period through the Federal Register process before final publication in January 2009. As such, it provides a technically defensible approach subjected to public participation in the development of clearance of property programs. Use of the MARSAME protocol complies with the requirement for public participation in the Department's radiological clearance program as stated in the January 19, 2001 Secretarial Memorandum entitled, "Managing the Release of Surplus and Scrap Materials:"

> "...Site release policies and protocols shall be coordinated with the public, and public input considered in DOE's development and approval of site release programs."

The use of the MARSAME protocol throughout DOE/NNSA sites would demonstrate significant progress in improving radiological monitoring and clearance practices. Use of the MARSAME protocol provides a means for inter-agency (e.g., DoD, NRC, EPA and DOE) consistency of approach to radiological clearance of non-real property. This consistency fosters public and institutional confidence in the technical competence of DOE/NNSA sites to assess personal property prior to unrestricted release.

Discussion

The MARSAME protocol recommends a statistical approach for the monitoring of materials and equipment. Sampling (e.g., radiological survey frequency) rates vary based on the operational history (e.g., process knowledge) of the equipment or material that is candidate for clearance from radiological control. Characterization of items and

survey plans are developed based on a number of factors including assessment of process knowledge and potential for the presence of contamination.
While some sites currently default to "100% survey" of materials and equipment to support clearance from radiological control, the Workgroup noted that DOE Occurrence Reports associated with loss of control of radioactive materials appear to have been entered primarily by sites that default to the 100% survey protocol. The Workgroup concluded that this approach is counterproductive to effective control of radioactive materials because it obviates the need for sufficient radiological survey planning. This can result in radiation control technicians apportioning greater effort on low risk areas and a lesser effort on high risk areas due to human factors associated with exhaustive survey plans.

Deliverable

The Workgroup determined that the MARSAME protocol can be integrated into site radiological clearance programs through revision of existing Technical Basis Documents (TBDs) with a graded approach to implementation. Minimum Factors that should be included in a MARSAME consistent approach are the following:

- Framework (major steps as outlined in Roadmap Figure 1 of the MARSAME manual)

Process Steps	Task Accomplished
• Categorization	Determine if impacted or non-impacted
• Initial assessment	Collect/evaluate process knowledge
• Preliminary surveys	Validate initial assessment
• Decision rule	Identify action levels and disposition alternatives
• Design disposition survey	Select survey type/instrumentation
• Disposition survey	Conduct survey
• Verification & validation	Quality Assurance
• Evaluate results	Assess collected data
• Decision	Determine disposition pathway

Classification (types of surveys)

• Impacted	
○ Class 1	Highest potential for contamination or insufficient evidence to support other classifications
○ Class 2	Low potential for contamination

- Class 3 — Little potential for contamination or insufficient evidence to support non-impacted classification
- Non-impacted

- Terminology (terminology used throughout the manual: framework terminology, classification types, measurement quality objectives (MQOs), data quality objectives (DQOs), etc.)

It is recognized that most sites use a process with a similar framework and classification system as noted above to plan and execute competent radiological surveys that yield appropriate dispositioning decisions. The MARSAME framework should be used to define a consistent approach across DOE/NNSA sites which is also recognized throughout the regulatory community.

Lastly the Workgroup recommended that the Office of Health, Safety, and Security should issue a technical position paper describing the value of using the MARSAME approach and how it can be integrated into existing radiological clearance programs.