



Radiological Control & Clearance of Property and DOE 5400.5 – Part 835 interface

Andrew Wallo

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**U.S. Department of Energy
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Outline



- DOE Objectives and Requirements for Clearing Property
 - Guidance and Supporting Tools
 - Good Practices and Opportunities for Improvement
- Status of Volumetric Moratorium and Metals Recycle Suspension
- Authorized Limits Review and Approval Process
 - Additions due to Part 835 Revision
- Revision of DOE Order 5400.5 and Associated Guidance: Opportunities for Clarification of Property Release Requirements



Control of Property Under DOE 5400.5: Authorized Limits



- ***Authorized Limits*** govern the control and clearance of personal and real property. They are **radionuclide concentrations or activity levels approved by DOE** to permit the clearance of property under DOE radiological control for either restricted or unrestricted use, consistent with DOE's radiation protection framework and standards for workers, the general public, and the environment.



DOE's Radiation Protection Framework



Policy:

DOE P 441.1, Department of Energy Radiological Health & Safety Policy

Directive:

DOE Order 5400.5, Radiation Protection of the Public and the Environment

Related:

- ❑ DOE O 450.1, Environmental Protection Program
- ❑ DOE P 454.1, Institutional Controls Policy
- ❑ 10 CFR Part 835 Occupational Radiation Protection
- ❑ DOE O&P 226.1 Oversight Policy and Order
- ❑ DOE O 231.1 – ES&H Reporting
- ❑ DOE P 1210.1 – Public Participation
- ❑ DOE O 435.1 – Radioactive Waste Management



Clearance of Property: Principal Requirements



- Authorized limits must meet DOE dose limit & constraint
- Derived through ALARA options analysis
- Property must be radiologically characterized or surveyed
- Public involvement and notification
- Comply with applicable federal and state requirements
- Independent verification prior to property release
- Final documentation approved by DOE to demonstrate all requirements have been met; specifying any restrictions
- Records maintenance and reporting



DOE Dose Limit and Constraint



Primary Dose Limit

- 100 mrem/yr all sources and pathways

Dose Constraint

Real Property:

- 25 mrem/yr, with a goal of a few mrem/yr or less
- Contingency analysis for worst plausible use

Personal Property:

- Goal of <1mrem/yr and <10 person-rem
- Clearance at higher doses possible up to few mrem/yr should be for a restricted or specified use



Surface Activity on Property



- Use of Surface Activity Guidelines (SAGs) permitted for real (structures) and personal property
- Used in lieu of dose constraint and dose assessment
- Application of ALARA process still required
 - May be qualitative
 - More detailed for certain radionuclides (e.g., Pu-239 and Th)
- Concentration limits provided for Ra-226 in soil and Rn-222 in structures



Surface Activity Guidelines



Allowable Total Residual Surface Activity (dpm/100 cm²)

Radionuclides	Average	Maximum	Removable
Group 1 - Transuranics, I-125, I-129, Ac-227, Ra -226, Ra-228, Th-228, Th-230, Pa-231	100	300	20
Group 2 - Th-natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232	1000	3000	200
Group 3 - U-natural, U-235, U-238, and associated decay products, alpha emitters	5000	15000	1000
Group 4 - Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5000	15000	1000
Tritium (applicable to surface and subsurface)	N/A	N/A	10000



Key Guidance and Tools

www.hss.energy.gov/nuclearsafety/nsea/oepa

Search "Rad Protection (AEA)"



- Guide for "Control and Release of Property with Residual Radioactive Material" (2002)
- EH Guidance Memorandum (1995)
- ALARA Guide, Volumes 1 and 2 (1997)
- Modeling Tools:
 - RESRAD and RESRAD-OFFSITE
 - RESRAD-BUILD
 - RESRAD-RECYCLE
 - TSD DOSE



Guide for Control and Release of Property with Residual Radioactive Material (DOE G 441.xx)



- Provides detailed guidance on derivation of authorized limits for real property (lands and structures) and personal property
- Integrates policy memoranda with DOE Order 5400.5 requirements
- As allowed by DOE Order 5400.5, contains guidance on flexibility to permit use of DOE approved dose-based authorized limits



DOE Property Release Limitation on Scrap Metal



Secretarial Moratorium

- Release of volumetrically contaminated metal (January 2000)
 - Metal with potential for volumetric residual activity
 - Then, may not disposition into commerce for unrestricted use

Secretarial Suspension

- Recycle of scrap metal (July 2000, modified January 2001)
 - Scrap metal in radiological area (per 10 CFR 835)
 - Then, may not disposition for unrestricted recycle into commerce

Both are Still in Place

EM Mixed Waste Moratorium and No Rad Added P.O.s



Opportunities for Improving DOE Release Practices



- “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.”
- “These steps are consistent with existing provisions of DOE Order 5400.5 and should be incorporated into your existing release programs.”

Secretary of Energy
January 19, 2001



Additional Areas for Improvement



- Greater awareness of process knowledge
- Well-defined, documented, and approved authorized limits
- Line management, in particular Field Offices, has the responsibility to ensure that contractors and DOE personnel comply with release requirements
 - Internally review control and release of property systems and programs
 - Appropriate independent verification



A Guide to Good Practices for the Control and Release of Property



Environment, Safety and Health Bulletin

DOE/EH-0697

2006-05

July 2006

Control and Release of Property

A Guide to Good Practices for the Control and Release of Property

Critical Operational Events are used to initiate management actions in response to events whose subject matter represents significant Departmental safety concerns.

Environment, Safety and Health Alerts are issued to initiate immediate action on potentially significant safety issues.

Assessment Safety Interim Reports are issued to share information and recommend actions on potential safety issues.

Safety Advisories are issued to provide information to the DOE complex on potentially significant safety or health issues.

Accountability Office and Inspector General reports, and several Freedom of Information Act requests regarding DOE control and release of property actions and programs. This Bulletin highlights important elements of Departmental requirements and guidance relevant to the control and release of property concerning these lessons learned.

BACKGROUND

DOE operates a variety of nuclear and radiological facilities (e.g., reactors, accelerators, weapons test facilities, and medical and research facilities). Some of these facilities are just being built or planned, and the requirements for radiological control should be integrated into that planning. Many others are aging and undergoing remediation and decommissioning. Decisions are made on the appropriate disposition of materials generated or remaining from these restoration and cleanup projects. These decisions involve the evaluation of candidate disposition options (e.g., disposal of material compared to its release for reuse), and the determination

PURPOSE

This Environment, Safety and Health Bulletin discusses good practices for the control and release of property that may contain residual radioactive material. It is based on lessons learned from recent decisions on the disposition of materials associated with restoration and cleanup projects at Department of Energy (DOE) sites, Government

Key Points: Authorized limits for radiological control and release of property should not be an afterthought but should be integrated into life-cycle project planning such that radiation protection of the public and the environment, pollution prevention, and project management are addressed effectively. DOE programs and projects that use or manage radioactive material should address the management, control, and release of property early on in the planning phase of site operations, remediation, and restoration as part of Environmental Management Systems (EMSs) and Integrated Safety Management Systems (ISMSs).

Key elements of effective control and release of property programs include:

- Identifying early the need for authorized limits for controlling and releasing property;
- Applying DOE pollution prevention policies and guidance such that property is controlled and released in a manner that reduces or prevents the generation of new waste and pollutants, reduces the further release or spread of contamination, and reduces life-cycle costs;
- Keeping stakeholders appropriately informed of authorized limits and release processes;
- Developing, coordinating, and obtaining appropriate DOE approval for and documentation of authorized limits as soon as practical in the contractor's work planning and execution process through the DOE/ISMSs and
- Conducting self-assessments within the program, and implementing independent verification as part of DOE oversight activities, to ensure that control and release of property actions and programs are consistent with DOE requirements, approved authorized limits, and procedures.

Helping the field succeed with safe and reliable operations.



Authorized limits should not be an afterthought but should be integrated into life-cycle project planning.

Key elements include:

- Identifying needed authorized limits early;
- Applying DOE pollution prevention policies and guidance such that property is controlled and released in a manner that reduces or prevents the generation of new waste and pollutants, reduces the further contamination, and reduces life-cycle costs;
- Keeping stakeholders appropriately informed of authorized limits and release processes;
- Developing, coordinating, and obtaining appropriate DOE approval for and documentation as soon as practical in the contractor's work planning and execution process; and
- Conducting self-assessments within the program, and implementing independent verification as part of DOE oversight activities.



Plans for Clarifying Process



- DOE 5400.5 in Revision Process
 - Guide 441.xx part of process
 - Moratorium and Suspension?
- In interim HSS will issue Bulletin to address process given HSS creation and Part 835 recent revision



DOE Real Property Release Review & Approvals



Real Property	Approval	Time Required	Comments or Other Conditions
Lands (soil criteria)	Field Manager and PSO	Depends on Program circumstances	Depends on approval being delegated
Structures (Using SAGs)	Field Manager and PSO	Depends on Program circumstances	Depends on approval being delegated
Dose-based or with alternative surface limits	Field Manager and PSO	Depends on Program circumstances	Depends on approval being delegated: HS-20 for review



DOE Personal Property Release Review & Approvals



Personal Property	Approval	Time Required	Comments or Other Conditions
Using Surface Activity Guidelines	Field Manager and PSO	Depends on Program circumstances	Inform HS-20(document in ASER)
Using dose-based; volume or in mass limits or alternative surface limits	HS-1 And For NNSA in coordination with NA-1	Depends on complexity: desired 30 < x < 45 working days for final package	Informal coordination with HS-20 recommended prior to submittal
Expedited Process if conditions met	HS-1 pre-approved, Field Manager with PSO submit to HS-20	30 working days (for HS-20 review and verification)	If Field to confirm pre-approval conditions are met; HS review
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Part 835 Exclusion



- (b) Exclusion. Except as provided in paragraph (c) of this section, the requirements in this part do not apply to:
- (6) Radioactive material on or within material, equipment, and real property which is approved for release when the radiological conditions of the material, equipment, and real property have been documented to comply with the criteria for release set forth in a DOE authorized limit which has been *approved by a Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.*



Effects on Process

If Exclusion is Applicable



For the exclusion to apply,

- **new authorized limits must be approved by a secretarial officer in consultation with HSS.**
 - *Submit authorized limits to HS-20 and they will be coordinated in HSS (estimated response times will be longer)*
 - *Program Office approval procedures are to be defined by each office (cannot be delegated to field or site office)*
- **Previously approved authorized limits for personal property:**
 - *need not be resubmitted to HSS*
 - *If they were not specifically approved by the HQ Program Office they need to be*
- **Although HSS has assisted in numerous real property authorized limits, there are few that were coordinated and officially approved.**
 - *Need to be submitted to HS-20 for HSS coordination*
 - *Program Office needs to define process for approval.*



Review of Authorize Limits: Frequent HS-20 Comments



- Include actual waste stream characterization data
- Include discussion of site procedures:
 - Survey & release of the property
 - Documentation, tracking, and reporting
 - Independent verification
- Environmental background of radionuclides not included
- Estimated total volume and activity to be released



Review of Property Releases: Frequent HS-20 Comments (continued)



- ALARA assessment:
 - Considered various (higher/lower) concentrations?
 - Provided collective dose estimate
- Various property disposition alternatives considered?
- Rely on average/expected concentrations; not on maximum concentrations
- Rely on reasonable & likely scenario; not on a bounding worst case, one
- Inform or coordinate with State or NRC



DOE Order 5400.5 Radiation Protection of the Public and the Environment



- DOE Order 5400.5 is the primary radiation protection standard used to protect the public and the environment from undue risk of radiation associated with DOE operations
- Establishes requirements and framework for the release of property (real and personal) with residual radioactivity from DOE control
- Last revised in 1993, DOE Order 5400.5 remains effective and continues to provide protection



Why is HSS Revising DOE Order 5400.5?



- To meet a requirement established by the Office of Management (MA-1) in November 2006 to revise Orders and Manuals with a 4-digit numbering system
- To comply with format and content standards in DOE M 251.1-1B, *Departmental Directives Program Manual*
- To highlight current organizational structure, and to include roles and responsibilities for the National Nuclear Security Administration (NNSA) and the Office of Health, Safety and Security (HSS)
- To reflect today's radiation protection concepts, technical standards and practices
- For consistency with June 2007 amendments to DOE's Occupational Radiation Protection Rule (10 CFR 835)



DOE Order 5400.5 Work Group



- **Purpose:**
 - To encourage early interaction between HSS and other DOE elements, HS-1 requested participation by DOE Program Offices, including sites under their purview, on a Work Group to revise DOE Order 5400.5
- **Goals:**
 - Active and full participation by DOE radiation protection experts from across the DOE complex to assist HSS develop the revised Order
 - Exchange of viewpoints on technical and policy issues related to proposed revisions and accommodation of different views by Work Group members in revising the Order to the extent possible
 - A framework to foster consistency and flexibility in implementation of the revised Order
 - Recommendations to HSS in identifying and prioritizing the development of final implementation guides for the revised Order



Contacts for Additional Information and Assistance



Gustavo Vazquez, 202-586-7629

gustavo.vazquez@hq.doe.gov

– Colleen Ostrowski, 202-586-4997

colleen.ostrowski@hq.doe.gov

- Edward Regnier, 202-586-5027

edward.regnier@hq.doe.gov