



Clearance of Property Under DOE Order 458.1, *Radiation Protection of the Public and the Environment* & Change Being Considered

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Objectives



- Summarize DOE O 458.1 property release & clearance requirements
- Discuss change in clearance criteria being considered
- Answer questions





- General requirements
- Dose constraints
- Residual radioactive material
- Safeguarding institutional controls
- Process and historical knowledge



Release & Clearance of Property Elements of DOE O 458.1

- Authorized Limits-requirements, application, approvals, pre-approved, revision
- Clearance of environmental restoration, deactivation, and decommissioning and other cleanup materials
- Radiological monitoring or surveys
- Documentation and verification
- Public notification of clearance of property



Dose Constraints



- Apply to property being cleared for any actual or likely future use:
 - 25 mrem (0.25 mSv) /yr above background for real property;
 - 1 mrem (0.01 mSv) /yr above background for personal property





- For release or clearance of property:
 - It must be demonstrated not to contain residual radioactive material, or
 - It must be evaluated and appropriately monitored or surveyed & meet authorized limits.





May be used if:

- Sites have a documented evaluation process, using a graded approach to determine if property potentially contains residual radioactive material.
- Release process includes written procedures
- Radiological monitoring or surveys supplement process knowledge and address gaps





- Must be established and approved for the clearance of any property containing or potentially containing residual radioactive material
- May be applied to property for which neither process knowledge nor measurement can establish the absence of residual radioactive material

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- Be developed in accordance with ALARA requirements;
- Be based on the applicable dose constraint, supported by a complete exposure pathway analysis using appropriate methodologies, techniques, parameters and models that meet DOE quality assurance requirements under DOE O 414.1D, Quality Assurance;
- Be expressed in terms of concentration of radioactivity per unit surface area (e.g., dpm per 100 cm²), radioactivity per unit mass (e.g., pCi per gram) or volume (e.g., pCi per ml), total radioactivity, or DOE controls and restrictions, if applicable;



Authorized Limits Must:



- Include written notification of applicable
 Federal, state, or local regulatory agencies, or tribal governments;
- Be approved in accordance with DOE O 458.1.

Authorized Limits Approvals

- Must be in writing
- Field Element Manager (FEM) approves:
 - Use of pre-approved Authorized Limits
 - Real property Authorized Limits
 - Personal property-up to 1 mrem dose plus other conditions
- Cognizant Secretarial Officer approves in consultation with EHSS:
 - Authorized Limits for property to be excluded from 10 CFR 835 provisions



- Use instead of developing specific authorized limits Order also provides for the development of new preapproved limits
- Pre-approved limits included are:

 -radium-226 (or thorium 230) soil concentrations
 -radium 228 (or thorium-232) soil concentrations
 -surface guidelines in DOE G 441.1-xx (until replaced*)



Radiological Monitoring or Surveys



- Surveys must:
 - Use methodologies such as MARSSIM or MARSAME or other DOE-approved methodologies,
 - Meet measurement or data quality objectives (i.e., MQOs or DQOs)
 - Use DOE-approved sampling and analysis techniques, and
 - Include an evaluation of non-uniformly distributed residual radioactive material, if applicable.
- Instrumentation must be capable of detecting and quantifying residual radioactive material, consistent with the applicable Authorized Limits.





Documentation and Verification

- Documentation of property clearance & Authorized Limits must be made available to the public
- FEM is responsible for oversight of clearance and Independent Verification (IV)
- IV must use a graded approach commensurate with the scope of the clearance action as determined by the FEM who is accountable for ensuring adequacy of clearance process and procedures
- Minimum IV activities are specified in Order for personal and real property



Final Clearance Documentation



- Clearance of property must be documented
- Documentation content or mechanism may be tailored to the need, situation, and type of property being cleared
- Documentation must show that property being sold or otherwise cleared from DOE radiological control:
 - Meets all DOE radiological protection requirements,
 - Is not required to be controlled for national security reasons, and
 - Meets DOE property control requirements.



Change Being Considered by DOE



- Pre-approved dose-based authorized limits for Personal Property – including equipment, items and materials (ANSI N13.12-2013)
- Clearance Criteria for Real Property-for buildings and structures, could be newly derived, dose-based, surface criteria



Background



- Several consecutive DOE Work Groups 2008-2013 recommended updating the surface guidelines
- Early WG initial baseline was ANSI N13.12 1999 (later ANSI-2013/IAEA RS-G-1.7) surface clearance criteria for personal and, if justified, real property
- WG conducted dosimetric modeling to check on criteria of 18 radionuclides in particular
- WG recommended hybrid approach for clearance criteria-time consuming and expensive
- May 2014 AU-20/HS solicited input on ANSI N13.12-2013 -comments and suggestions received



Factors Work Groups Considered



- Scope
- Dosimetry basis
- Consistency with national & international radiation protection recommendations
- DOE dose constraints
- Contamination control
- Detectability



Criteria Characteristics



Criteria	Regulatory Guide 1.86	ANSI N13.12-2013
Scope	Personal & real property	Personal property only
	Surface contamination	Volumetric and surface contamination
Dose constraint (annual)	1 mrem personal and 25 mrem real	1 mrem
Dosimetry	Evaluated under ICRP 26/30	ICRP 60/72
Removable contamination	Yes	No





adopt ANSI N13.12-2013 for personal property ?

Responses to whether to

- 28 respondents
- 70% "yes"; 30% "no" or "other"
- Some major issues identified:
 - -regulatory consistency
 - -removable criteria and contamination control
 - -detectability of radionuclides



Clearance Criteria for Buildings & Structures



- in interim use Reg Guide 1.86
- dosimetric modeling likely required for new
- Primary exposure scenario: non-DOE worker in cleared building
- Some likely radionuclides: Am-241, Cs-137, Pu-238, Co-60, Pu-239/240, Sr-90, U-234, U-235, U-238, H-3, Th-228, Th-230, Th-232





THANK YOU!

QUESTIONS ?



Release & Clearance of Property **EHSS** Under DOE Order 458.1

 Must meet the dose limits under any plausible use of the property and ALARA process requirements before the property is cleared

Safeguarding Institutional Controls EHSS

- DOE must consider the need for the property (e.g., as a buffer zone) as part of the site's long-term institutional controls to ensure the safety of other DOE operations.
- Clearance of a property could increase the radiological risk from adjacent DOE properties maintained under long-term stewardship
- Need to demonstrate that the property clearance action would not compromise the controls, increase the risk, or result in a potential noncompliance for the property under DOE O 458.1, DOE O 435.1, or other applicable statutes, regulations or orders.



Authorized Limits for Personal Property Must:



- Consider internal recycle or reuse of metal material or equipment
- Be based on expected annual quantity of property to be cleared or
- Be based on expected total amount of property cleared over the life of the project for specific remedial action or decontamination and decommissioning projects



Applications for Approval of Authorized Limits



- Applications must contain:
 - Description of the property.
 - Specific limits proposed for each radionuclide or group of radionuclides.
 - Potential collective dose to the exposed population and the potential dose to a member of the public most likely to receive the highest dose for both: actual or likely future use, and plausible future use of the property.
 - ALARA cost-benefit assessments conducted under paragraph 4.d. of O 458.1.

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Applications for Approval of Authorized Limits (cont'd)



- Description of the procedures and radiological monitoring or surveys to be used to demonstrate compliance with proposed limits.
- Identification of any restrictions or conditions on the future use of the property upon which the proposed limits are based
- Evidence of notification of applicable Federal, State or local regulatory agencies or Tribal governments.
- An estimated date for when the property will be cleared and an estimate of when the property will leave DOE control.





- Process for a necessary increase or decrease in authorized limits for all or part of the property
- Documentation, application & approvals generally the same, plus must meet certain additional criteria:
 - -clear and present risk
 - -environmental harm
 - -unreasonable cost
 - -overly conservative assumptions
 - -new information indicates insufficient protectiveness



Clearance of Materials from Environmental Restoration, Deactivation & Decommissioning, CERCLA and Other Cleanup

- Can demonstrate compliance with O 458.1 using documentation from the CERCLA process
- Approved CERCLA remediation criteria may be considered equivalent to Authorized Limit if
 - -FEM makes that determination and,

-documentation and approval is as would be an authorized limit

- If Field Element is using CERCLA analysis and documentation in lieu of DOE O 458.1-specific analysis and documentation for clearance of property with residual radioactivity Field Element needs:
 - -FEM certification to CSO
 - -Relevant CERCLA documentation & any additional information to CSO, cc: AU-1



Public Notification of Clearance of Property



- FEM is responsible for effective site public notification & communications program
- Site property clearance information must be summarized in the Annual Site Environmental Report (ASER)
- FEM must make clearance documentation available to the public & to the property recipient, as appropriate



