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Albuquerque Operations Office

Memorandum

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REPLY TO ESHD:RJB

SUBJECT PROCEDURE FOR THE RELEASE OF RESIDUAL RADIOACTIVE MATERIAL FROM REAL PROPERTY

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DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, contains requirements and guidelines for clean up of residual radioactive material contained in real property (land and structures) and its subsequent release following such clean up. Prior to the release, it must be demonstrated that basic and supplemental dose limits will be met and sufficient documentation is in place to justify such release.

To ensure that these requirements are consistently met at DOE/AL sites, a procedure was developed defining the documentation required and the process to be followed when considering requests for release of real property. This procedure is attached for your use.

Should you have any questions regarding this procedure, please contact Rex Borders at (505) 845-5076.

Constance L. Soden
Director,
Environment, Safety and
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Attachment

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DOE ALBUQUERQUE OPERATIONS OFFICE

PROCEDURE FOR THE RELEASE OF REAL PROPERTY CONTAINING RESIDUAL RADIOACTIVE MATERIAL

Approved:

Director,
Environment, Safety and Health Division

Director,
Environmental Restoration Division

DOE ALBUQUERQUE OPERATIONS OFFICE

PROCEDURE FOR THE RELEASE OF REAL PROPERTY CONTAINING RESIDUAL RADIOACTIVE MATERIAL

Purpose and Background

Real property (land and structures) formerly contaminated with residual radioactive material may be proposed to be unconditionally released from radiological controls provided the property has been adequately remediated and/or it can be shown that the property meets the DOE release criteria. The requirements for the radiological release of real property are contained in DOE Order 5400.5, *Radiation Protection of the Public and the Environment*. A background information document summarizing these requirements is contained in Appendix 1.

This procedure describes the process to be followed by DOE/AL Field Elements for the preparation and submittal of a documentation package needed for the evaluation of a request to release real property that is, or has been, contaminated with residual radioactive material. This procedure also outlines the internal review and approval processes to be followed in evaluating such a request for release.

Examples of where this procedure is applicable are:

- Land being remediated under the DOE's Environmental Restoration Program where it is desirable to document the release of the site from radiological controls[1].
- A building structure previously controlled for radiological content which is being proposed for transfer to a Non-DOE owner.

Real property released under this procedure may continue to be owned by DOE or transferred to non-DOE ownership by title transfer or sale without regard to its radioactive material content. This procedure does not address the control of radioactive material for the purposes of occupational radiation protection, defining occupational control requirements or radiological posting. This procedure does not address the release of real property which has been contaminated with hazardous material.

Documentation package preparation and required contents

A documentation package must be prepared for each site or building proposed for release. The contractor proposing the release must prepare the required documentation and forward copies to the appropriate DOE Field/Project Office. Following review, the Field/Project Office shall forward three (3) copies of the documentation package to DOE/AL Environmental Safety and

[1] A similar procedure is being developed to approve "No Further Action" for remediation of a site which has been contaminated with radioactive material, but where the site cannot or will not be released from radiological control.

Health Division (ESHD). Further distribution and review of this documentation is discussed below.

The documentation must include the following major sections containing the indicated information:

Introduction – The introduction must describe the proposed action at the specified site or building and clarify why the site is being proposed for radiological release.

Description of the site or building – A description of the site or building must be provided, including, location of the site or building and the area of the site or building proposed for release.

History of the site or building – The history of the site or building must be summarized, including years of operation, types of operations occurring, and current status of the site or building.

Remedial action history at the site or building – If remediation at the site or building has occurred, the remediation activity shall be summarized.

Final radiological condition – A summary of the final radiological conditions at the site or building shall be presented. The summary must include the radionuclides remaining at the site, their concentration (in appropriate units, e.g., pCi/g for soil contamination), and the depth of contamination, if applicable. Any "hot spot" areas as defined in DOE Order 5400.5 shall be identified. The radiological data used in documenting the final condition of a site must be collected and analyzed in a technically and legally defensible manner using an approved sampling and analysis plan. Examples of appropriate sampling and analysis plans may be found in the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) or in DOE/EH 0173-T, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*. The sampling and analysis plan must be referenced and available on request.

Dose assessment for the site or building using the DOE-required RESRAD model – DOE requires the use of the RESRAD computer models (RESRAD or RESRAD-BUILD) for evaluating potential doses resulting from the presence of residual contamination. The latest versions of this program should be used. The actual version used must be specified. The RESRAD model should be used with site-specific modeling parameters, when known. The RESRAD Summary Report must be attached to the request clearly indicating the pathways considered in the analysis, the radionuclides and concentrations modeled, the area and depth of contamination, and the resulting modeled doses. Separate reports for each possible future use of the property should be included. For example, it may be appropriate to model Industrial or Recreational Land Use (whichever is most likely) as well as Residential Land Use (unlikely, but possible, if there is loss of institutional control) of the property.

ALARA analysis demonstrating the further cleanup is unwarranted – DOE Order 5400.5 specifically mandates that the ALARA process be applied to the intended release of any real property. The documentation package should summarize the ALARA process applied to the

evaluation and the conclusions of the ALARA analysis. The level of detail provided in this analysis should be subject to professional judgement of the facility manager, with a graded approach commensurate with the residual radioactivity present and the projected future dose.

Conclusions and Recommendation – The conclusions of the modeling efforts and the recommendation for release of the property should be clearly specified in the documentation package.

References – Any references used for preparation of the documentation package should be listed.

Attachments – Relevant attachments should be provided. The RESRAD Summary Report is always required. Other attachments may include site maps, the final site survey data, evaluation of the intended use of the property, remediation activity reports, etc.

Review Process

DOE Field/Project Offices shall forward three copies of the documentation package to the DOE/AL Director, Environment, Safety and Health Division. The Director will assign an individual to coordinate distribution and review of the documentation. The documentation will be distributed to the applicable DOE/AL program office (typically the Environmental Restoration Division) and the DOE Headquarter Office of Environmental Policy and Assistance (EH-41).

DOE/HQ will be allowed a minimum of 15 working days for review. Questions or problems with the evaluation will be resolved prior to approval. DOE/AL staff will approve proposed releases of real property where the modeled dose is up to and including 15 mrem/year. Proposed releases resulting in doses greater than 15 mrem/year require concurrence with DOE/HQ.

Following favorable review of the release request, a memorandum will be prepared documenting approval. This memorandum will be co-signed by the Director of the appropriate programmatic office and the Director, Environment, Safety and Health Division in support of the programmatic office as delegated by the Manager, DOE/AL.[2]

Retention of release paperwork

The contractor proposing the radiological release of a site shall maintain all paperwork associated with the release indefinitely. This paper work includes but is not limited to the sampling and analysis plan, survey data, laboratory QA documentation, soil sample results, and computer modeling analyses.

DOE shall maintain the documentation packages submitted for review and any associated correspondence.

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[2] DOE/AL Safety Management Functions, Responsibilities and Authorities (ALFRA) document.

10CFR834

DOE is preparing a Federal Regulation to replace sections of DOE Order 5400.5 and to supplement other sections. This rule is to be issued as 10CFR834, *Radiation Protection of the Public and the Environment*. The latest version of this draft rule is dated August 1999. The rule is accompanied by an Implementation Guide G-10 CFR-834, also dated August 1999.

Although final language is not available, the draft rule states:

> "A 25 mrem in a year dose constraint (capping ALARA process determinations) must be applied for selecting authorized limits for release of property."

The Implementation Guide clarifies that the public dose limit of 100 mrem EDE is intended to include the sum of internal and external doses resulting from all modes of exposure from all radiation sources[7]. To ensure that the primary limit of 100 mrem to ALL facility sources is maintained, a cap of 25 mrem is established to control the release of DOE real property.

NRC Criteria

The Nuclear Regulatory Commission published a Final Rule in the Federal Register (62FR39058, 7/21/97) entitled *Radiological Criteria for License Termination*. This rule provided specific radiological criteria for decommissioning of lands and structures subject to NRC licensing requirements. The rule resulted in modifications to several Code of Federal Regulations[8]. 10CFR20, Standards for Protection Against Radiation specifies the new criteria in Subpart E – Radiological Criteria for License Termination. The basic criteria is contained in a statement which reads as follows:

> "A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to levels that are otherwise also as low as reasonably achievable (ALARA)."

In the publication of the Final Rule, NRC reviews the comments they received from earlier publication of the proposed rule and explains their reasons for selecting 25 mrem as the decommissioning limit.

The NRC has developed another computer code, "DandD 1.0", which may be used for dose assessment by their licensees.

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[7] Excluding doses received from background radiation and doses received as a patient from medical sources.
[8] 10CFR Parts 20, 30, 40, 50, 51, 70 and 72.

EPA OSWER Directive 9200.4-18

The EPA's Office of Solid Waste and Emergency Response (OSWER) issued a memorandum, dated 8/22/97, known as Directive 9200.4-18, providing guidance for the establishment of cleanup levels for radioactive contamination at CERCLA[9] sites. Remediation at a CERCLA site requires the development of cleanup criteria know as Applicable or Relevant and Appropriate Requirements (ARARs). This directive provides guidance to EPA staff on what levels of radiation dose meet the stated CERCLA clean up risk levels in the 10^{-4} to 10^{-6} range. This directive states:

> "If a dose assessment is conducted at the site then 15 millirem per year (mrem/yr) effective dose equivalent (EDE) should generally be the maximum dose limit for humans."

The document states that this level of dose corresponds to 3×10^{-4} increased lifetime risk and is consistent with levels considered protective.

RESRAD

DOE Order 5400.5 endorses the use of a computer program called RESRAD to calculate potential doses from residual radioactive material in soil. This program was developed at Argonne National Laboratory specifically to support the issuance of DOE Order 5400.5 and has been upgraded several times[10]. The program allows designating site-specific exposure pathways as well as site-specific model parameters (such as the area of the site, depth of contamination, and others). This model is used convert radioactive material concentrations into potential radiation doses based on defined model parameters. The conversion of concentration values to dose values allows direct comparison with the 100 mrem/year Basic Dose Limit of 5400.5.

Conclusions

There are several documents addressing the release of property containing residual radioactive materials. Different documents specify different release criteria. The mandatory compliance document for DOE facilities is DOE Order 5400.5.[11] This document requires setting an Authorized Release Limit to be used in establishing the unrestricted release of real property. All documents require that releases comply with the ALARA process.

DOE/Albuquerque has typically endorsed an upper value of 15 mrem/year as an Authorized Release Limit. DOE does have procedures allowing the selection of alternative values, provided the Basic Dose Limit of 100 mrem per year (500 mrem/year in unusual circumstances) is not exceeded.

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[9] Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

[10] The latest version of RESRAD is Version 5.91 for Windows. An accompanying code, RESRAD-Build, Version 2.37, supports the evaluation of residual radioactive materials in buildings.

[11] Unless the remediation is part of a CERCLA cleanup action.