

USE OF RISK ASSESSMENT/MANAGEMENT METHODOLOGIES IN NATURAL RESOURCE TRUSTEESHIP

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ABSTRACT

The Department of Energy (DOE) is undertaking the responsibilities of Natural Resources Trusteeship at its sites throughout the United States under CERCLA 107 (f)(2) and Executive Order 12580. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP, Subpart G) authorizes the designated trustees to assess damages for injury to, destruction of, or loss of natural resources on lands managed or protected by them. The DOE has a dual role, therefore, to act as "Primary Natural Resource Trustee" for its lands and facilities and to act as "CERCLA lead Response Agency" for cleanups on its lands. Damages assessed by other Trustees, such as the Department of Interior, U.S. Fish and Wildlife Services (USFWS) for damage to threatened and endangered species, are enforceable against the DOE.

Since the issuance of Environmental Protection Agency (EPA) guidance in March 1989 for the preparation of ecological risk assessments at CERCLA sites, several regulatory developments have occurred which indicate that ecological risks may increasingly drive environmental protection and remediation decisions, including: (1) revision of the NCP explicitly requiring ecological evaluations, (2) the July 1989 court order requiring that the scope of damages which can be recovered under a Natural Resources Damage Assessment (NRDA) to be expanded, (3) the Resource Conservation and Recovery Act (RCRA) Corrective Action proposed requirement for ecological risk considerations, and (4) EPA publication of the "Framework for Ecological Risk Assessment" in February 1992.

The DOE must conduct risk assessments in a cost effective manner and must be proactive in meeting its Trustee responsibilities. In addition, monies budgeted for remedial and corrective actions must be at least partially based on risk management principles. In response to these challenges, the DOE's Rocky Flats Office (RFO) has developed a concept for a comprehensive site wide risk assessment (CSWRA) that should be a primary tool in meeting these needs. The purpose of the CSWRA is to provide RFO with a fundamental management tool supporting its continuing efforts at the Rocky Flats Plant (RFP). The CSWRA will be a "living" document, updated from its initial descriptive analysis to be increasingly quantitative as monitoring data, Interagency Agreement (IAG) data, and data from other projects becomes available.

INTRODUCTION

The discussion below focuses on the development of one tool, a CSWRA, to assist DOE in meeting its objectives as a Trustee as well as CERCLA Response Agency at the various DOE facilities. The discussion is divided into four topics with increasing levels of detail. These are: Natural Resources Trusteeship; DOE CERCLA/NRDA Responsibilities and Requirements; Approach to Trusteeship: The Use of Risk Management Methods as DOE Management Tools; and, finally, Development of a Comprehensive Site Wide Risk Assessment.

NATURAL RESOURCES TRUSTEESHIP

The authority and responsibility for Natural Resource Trusteeship is founded in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Specifically, CERCLA 107(f) states that "The President ... shall act on behalf of the public as trustee of ... natural resources." CERCLA 107 (f)(2) and Executive Order 12580 delegate this authority and responsibility to specific Federal officers, one of whom is the Secretary of Energy. CERCLA

120 states that "Federal facilities ARE subject to CERCLA Section 107 liabilities (Emphasis added)"; specifically those resulting from releases of hazardous substances or of oil.

Natural Resources are defined by CERCLA 101 (16) as:

Land	Water
Wildlife	Groundwater
Biota	Drinking water
Air	

as well "as other such resources." Resources must be public property. The damages assessed are evaluated based on the reduction of "services." Services are functions performed by one resource for another resource or for people. Examples of resource services include: habitat, food, recreational utility or use, drinking water quality.

The CERCLA and the National Contingency Plan 40 CFR 300 (Subpart G) authorize the designated Trustees to assess damages for injury to, destruction of, or loss of natural resources on lands under their management or protection (Emphasis added). The process is called a Natural Resources Damage Assessment (NRDA). CERCLA 107 (a)(4)(c)

imposes principal party (PRP) liability for damages of hazardous substance or oil releases on natural resources.

The liability of the PRP is to: (1) the United States; (2) states; and (3) Indian Tribes (CERCLA 107 (f)). Trustees (the Department of Interior for NRDA, 43 CFR 11, the DOE for the Rocky Flats Plant (RFP) and other DOE managed facilities, and state Agencies [e.g. Colorado Department of Natural Resources]) may recover damages from a PRP for "residual" injuries (i.e., injuries not completely remediated by CERCLA response actions undertaken). The Trustees can direct compensation for:

- cost of restoring natural resource "services";
- diminution in value of resource services prior to restoration; or
- damage assessment costs.

Finally, there is a provision that these Trustee responsibilities are enforceable by citizen suit.

Therefore, the DOE, in managing the RFP, has a dual responsibility under CERCLA to:

- Act as primary natural resource trustee for the plant site including the buffer zone; and
- Act as CERCLA lead response agency for response actions on site.

Damages assessed by other Trustees, e.g. Colorado Department of Natural Resources or US Fish and Wildlife Service (for threatened and endangered species), may be enforceable against DOE. To date, no assessed claim has been directed against DOE.

DOE CERCLA/NRDA RESPONSIBILITIES AND REQUIREMENTS

The RCRA/CERCLA Division (EH-231) of the DOE has prepared (June 1991) the "Natural Resource Trusteeship and Ecological Evaluation (EE) for Environmental Restoration at Department of Energy Facilities" (DOE/EH-0192; TI91 015060) as guidance to the facilities in dealing with Trustee responsibilities and integrating the NRDA process into the preparation of EEs for CERCLA sites on DOE facilities. In the "Workshop on Natural Resource Trusteeship and Ecological Evaluation Requirements," EH-231 presented a diagram of DOE's Dual role as Trustee and as CERCLA Lead Agency. This diagram, Fig. 1, clearly defines DOE responsibilities. It will be used as a basis for presenting an approach for Risk Management/Assessment methods for specific DOE facilities to meet DOE responsibilities.

APPROACH TO TRUSTEESHIP: THE USE OF RISK MANAGEMENT METHODS AS DOE MANAGEMENT TOOLS

One approach used to meet DOE dual responsibilities for natural resource management and protection is the implementation of a Risk Management and Prevention Program (RMPP) for each DOE facility. Under the Site Development Planning Order (DOE 4320.1B), DOE facility managers at each site (field offices) must oversee "the development, implementation, maintenance and documentation of a planning process ... including formal coordination ... [with] .. environmental/safety/health/security performance."

A Risk Management Program is comprised of at least seven components:

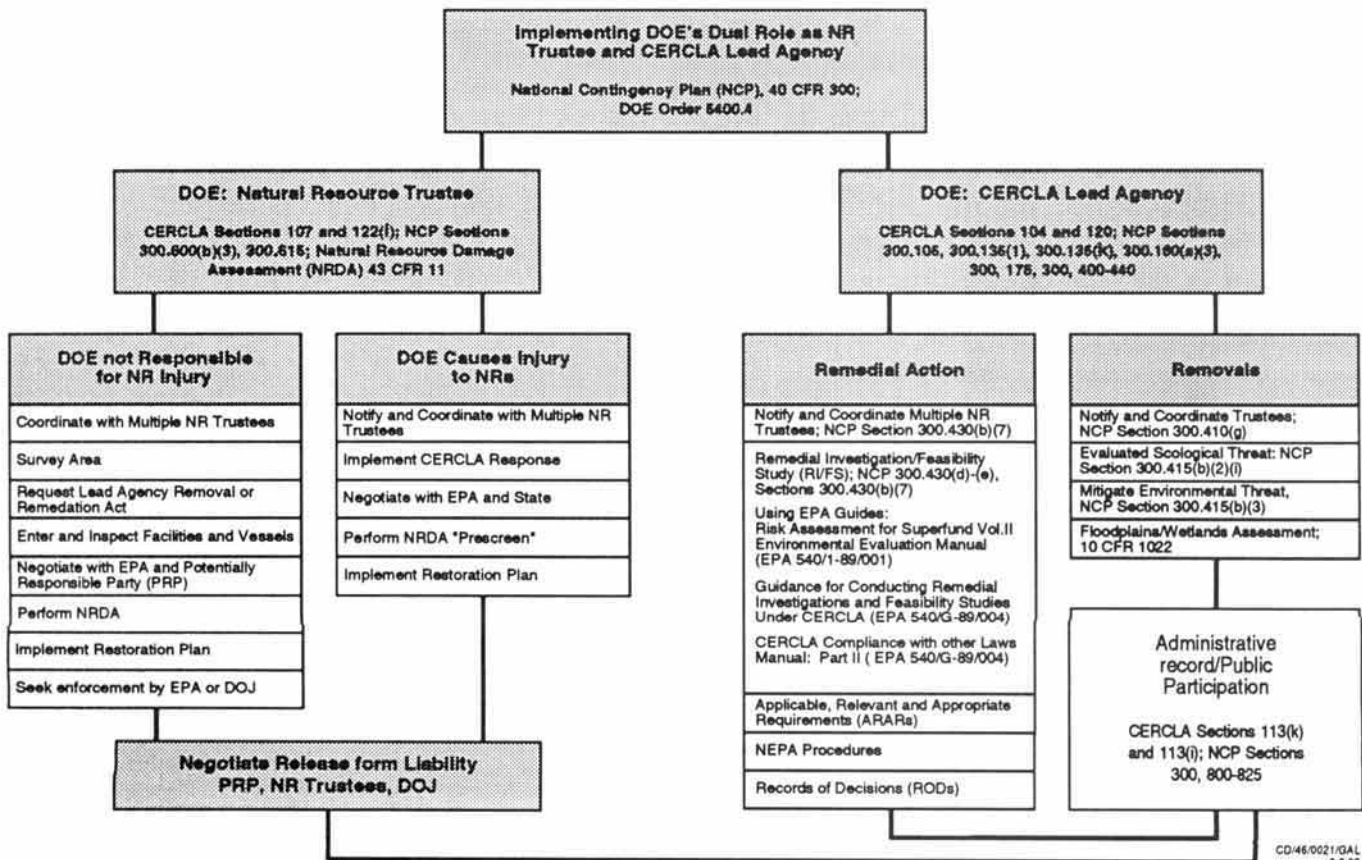


Fig. 1. Implementing DOE's dual role as Natural Resource Trustee and CERCLA lead agency.

- Development of a Risk Management and Prevention Plan (RMPP);
- Establishment and update of a Comprehensive Site Wide Risk Assessment (CSWRA);
- Establishment and updates of a baseline ecological monitoring program;
- Establishment of watershed specific and operable unit (OU) specific risk assessments;
- Use of the RMPP, CSWRA, monitoring data, and watershed and OU specific risk assessments in site development planning and budget/schedule preparation -- including prioritization of projects and inputs to the Five Year Plans (Environmental Restoration & Waste Management (EM) and Defense Programs (DP) in the case of RFP);
- Establishment and continuing a formal dialogue with other Natural Resources Trustees and with EPA documenting risks at the site, restoration results, and plans for assessment, restoration and prevention activities -- minimizing the risk of damage claims and compliance deficiency fines; and
- Implementation of a comprehensive Quality Assurance Program which provides oversight and audit of the risk management process.

Within the planning process, the implementation of a risk management program would give the facility or site manager a series of tools for: (1) defining objectives for Trustee responsibility compliance activities; (2) prioritizing CERCLA response and NRDA activities; (3) identifying opportunities for waste minimization and risk reduction; and (4) identifying interfaces and integration points among NEPA, CERCLA, RCRA, and NRDA activities underway at the site.

Use of a risk management program allows the comprehensive evaluation of risks in a facility and throughout a site. The most significant results can be realized by using the risk management program, in combination with planning and budgeting, to ensure the allocation of resources will result in the greatest risk reduction. In a period of extreme fiscal constraints, the use of a risk prioritization system to 1) negotiate compliance schedule agreements with regulatory agencies and 2) assign funding priorities and supporting spending plans is critical.

The remainder of this paper concentrates on the second component of the Risk Management Program, the development of the Comprehensive Site Wide Risk Assessment (CSWRA).

DEVELOPMENT OF A COMPREHENSIVE SITE WIDE RISK ASSESSMENT

The RFO has found it necessary and timely to initiate the development of a Comprehensive Site Wide Risk Assessment (CSWRA). The purpose of the CSWRA is to provide the RFO with a fundamental management tool supporting its continuing efforts at the RFP. The CSWRA will be a "living" document, updated from its initial descriptive analysis to be increasingly quantitative as monitoring data, Interagency Agreement (IAG) data, and data from other projects become available.

The CSWRA has three initial objectives:

- Provide a risk management tool for the RFO which can be used to assist planning and budgeting processes;
- Provide baseline evaluations of current RFP risks to human health, to ecological receptors, and to human welfare (e.g., economics) which can be used as the site-wide basis for preparation of CERCLA/RCRA required Human Health Risk Assessments (HHRAs) and EEs as well as to provide input to the Site-wide Environmental Impact Statement (EIS); and
- Provide initial information regarding natural resource services and potential injuries from RFP operations.

The summary work breakdown structure (WBS) for a CSWRA is shown in Fig. 2. It consists of four major elements: human health risks, ecological risks; human welfare risks; and management support to the CSWRA. For the RFP, the management support effort consists of:

- Planning: initial, quarterly for the first year, then annual;
- Data systems, consisting of databases and models of: human health, ecological systems, human welfare parameters, and overall support services;
- Coordination with DOE elements, and M&O and technical support contractors, etc;
- Reporting: monthly, quarterly, topical and annual CSWRA reports;
- Special assignments as identified by DOE; and
- Quality assurance including QA Project Plan, Data Quality Objectives and evaluation, monitoring and surveillance including audits, etc.

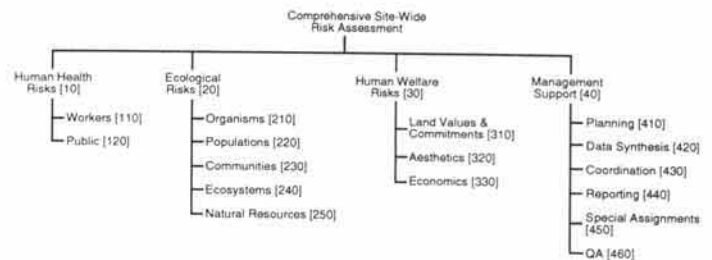


Fig. 2. Summary work breakdown structure for comprehensive site-wide risk assessment.

The only purpose of these elements is to provide the management support systems needed to accomplish the effort and to integrate the CSWRA into DOE DP and EM program requirements.

The human health WBS element addresses risks to workers and to the public. The worker health module is available (relatively) quantitative from current DOE records. It consists of records of operational or accidental exposures of radiological, chemical materials or safety risks by area (or building) within the RFP. The DOE has excellent dosimetry records. Within the last decade, the DOE has also established OSHA and chemical exposure databases for its workers.

The public health risk has been approached in terms of distance from the source term (plan or plant building, for

example) based on the gradient (wind, water) established for the maximum exposure from operational or accidental exposures. Annual exposure risks are summarized for normal operational releases of chemicals and radionuclides. Accidental exposure risks are estimated from past records and hazardous operational analysis of risk. Transportation risks are also considered public risk. Methodologies used are largely those which were developed under Nuclear Regulatory Commission Auspices (NUREG/CR-4829).

Ecological risks are based on the four primary levels of ecological organization: organismal, population, community, and ecosystem. Finally, as shown in Fig. 3, natural resource services are included in this WBS element. The measurements needed to develop this element are now incorporated into the RFP's Ecological Monitoring Plan as well as several OU Phase II or III workplans and other RFP activities which yield data which are quantified using compliance measurements (NESHAPS, for example) or NEPA (Cultural Resources, for example) assessments.

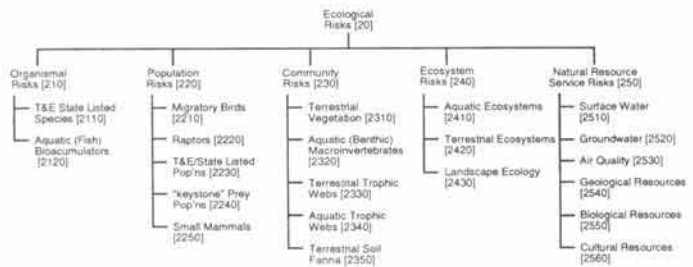


Fig. 3. Detailed work breakdown structure for the ecological risk module of the comprehensive site-wide risk assessment.

The initial subelement within each resource is the definition of the services as defined under 43 CFR 11 (fifth level WBS element). Other subelements are the measurements as defined under the criteria established to detect "damages." (See Fig. 4 subelement of surface water including floodplains and wetlands (Executive Order 11990), groundwater, air quality, geological, and biological resources).

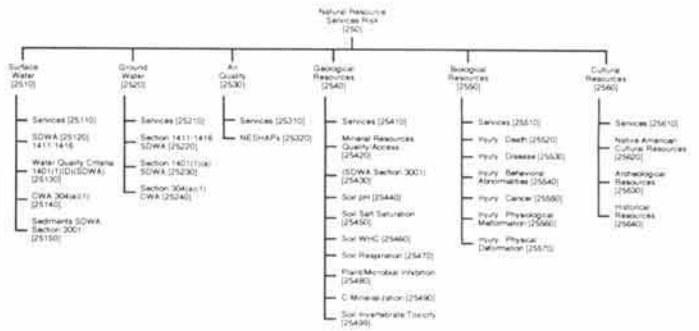


Fig. 4. Fourth level work breakdown structure for natural resource services within the ecological risk module of the comprehensive site-wide risk assessment.

Finally, cultural resources are included even though these are largely regulated under other statutes (16 USC 461-469C and, 16 USC A-470W-6, for example, and several Executive Orders).

CONCLUSIONS

DOE has responsibilities as both a Natural Resources Trustee and as a CERCLA Response Agency. Since EPA has issued guidance for the development of EEs and since 43 CFR 11 defines measurements which can be used to assess ecological services "status" it behooves DOE field offices to develop management tools which can minimize risks and maximize the cost effective use of scarce resources.

The use of risk management techniques can furnish DOE excellent management tools for its use as Trustee and CERCLA Response Agency. One of the earliest needed tools is the development of CSWRA for DOE sites. One developed for RFP focuses on assessing current risks to workers, to the public and to ecological receptors. IT is anticipated that the CSWRA will initially be largely qualitative but will over 3-5 years provide a quantitative baseline against which CERCLA response actions and other site activities can be assessed. The next step is to select which subelements can be quantitatively and qualitatively estimated and prepare an initial versions of the CSWRA.